



MICROFINE® CONVEYOR PARTS AND SERVICE MANUAL



TURBO SYSTEMS INCORPORATED

Thank you for choosing a TURBO Systems' Chip Conveyor. We are proud to have you among our Turbo Systems' family of users.

TURBO Systems' Chip Conveyors simply and reliably remove waste from machining operations. Machine efficiency is increased and operator safety is improved since chip conveyors work with little operator attention and without interrupting production time. TURBO Systems' conveyors are available for many types of machine tools or other applications. They can be arranged to deliver wet or dry waste to containers or to conveyor or chute-type disposal systems. For further information, contact:

Sales Department
TURBO Systems Inc.
203 Turbo Drive
Kings Mountains, NC 28086

This Service Manual is intended to assist with the normal maintenance that will assure long service life of your TURBO Systems' Chip Conveyor. It is in two parts – a Service Instruction Section, followed by a Parts Section, which includes drawings and parts lists for the basic elements of the conveyors.

NOTICE

ALL INFORMATION CONTAINED IN THIS MANUAL IS INTENDED TO BE CORRECT; HOWEVER INFORMATION AND DATA IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. TURBO SYSTEMS INC. MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS INFORMATION OR DATA. FURTHER, TURBO CONVEYOR IS NOT RESPONSIBLE FOR ANY OMISSIONS OR ERRORS OR CONSEQUENTIAL DAMAGE CAUSED BY THE USER OF THE PRODUCT. TURBO CONVEYOR RESERVES THE RIGHT TO MAKE MANUFACTURING CHANGES WHICH MAY NOT BE INCLUDED IN THIS MANUAL.

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INSTRUCTIONS FOR ORDERING PARTS

FURNISH THE FOLLOWING INFORMATION ON YOUR ORDER:

- MODEL AND SERIAL NO. OF MACHINE
- CATALOG NUMBER AND NAME OF PART
- QUANTITY REQUIRED
- PURCHASE ORDER NUMBER
- BILL TO ADDRESS

FURNISH EXACT SHIPPING INSTRUCTIONS:

- COMPLETE SHIPPING ADDRESS
- MODE OF DELIVERY
PARCEL POST, TRUCK LINE, ETC

HOW TO FIND THE MODEL AND SERIAL NUMBER OF YOUR MACHINE:

The machine model number and serial number is stamped on the machine nameplate located on the motor cover.

The image shows a rectangular nameplate for Turbo Systems Incorporated. On the left is the company logo, which consists of the word "TURBO" above "SYSTEMS" above "INCORPORATED", with stylized horizontal lines to the left of the text. Below the logo, the address "203 TURBO DRIVE, KINGS MOUNTAIN NC 28086" is printed, followed by phone and fax numbers "PH#: 704-739-7111" and "FX#: 704-739-6039", and the website "www.turbosystemsinc.com". On the right side of the nameplate, there are two input fields: "MODEL #:" followed by a rectangular box, and "SERIAL #:" followed by another rectangular box. At the bottom right, it says "An ISO 9001 Certified Company".

DIRECT YOUR ORDER TO:

TURBO SYSTEMS INC.
203 Turbo Drive
Kings Mountains, NC 28086 U.S.A.
Telephone: (704) 739-7111 Fax: (704) 739-6039

WARRANTY

Turbo Systems' conveyors carry a warranty against defective material or workmanship during manufacture of the conveyor for one year in service or eighteen months from shipment, whichever occurs first. Turbo will repair or replace, at its option, free of charge except freight, FOB shipping point, any parts it finds nonconforming on these conditions:

- a. on request, user promptly allows Turbo to inspect, and user returns all requested parts to Turbo's plant, and
- b. user has operated and maintained products in accordance with Turbo's maintenance and operational literature and good business practice has been used; and
- c. products have not been misused, abused, damaged by accident or altered without Turbo's written consent; and
- d. user employs trained maintenance and operating personnel; and
- e. buyer meets all payment obligations;

Parts, which have expected life shorter than one year under normal usage, are excluded.

USED PRODUCTS ARE SOLD AS IS UNLESS OTHERWISE AGREED UPON AT THE TIME OF PURCHASE. SELLER MAKES NO WARRANTY FOR USED PRODUCTS EXCEPT AS TO TITLE. BUYER MAY INSPECT AND TEST BEFORE SHIPMENT AND ACCEPTS USED PRODUCTS ON THESE TERMS.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, OR IMPLIED, (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.)

MICROFINE® START-UP & SERVICE INSTRUCTIONS

PRIOR TO INITIAL START-UP

GENERAL

In addition to the following, please read the separate Conveyor Installation and Start-up Instructions furnished with your MICROFINE® conveyor.

Prior to installation of the MICROFINE®, the coolant tank should be cleaned of any chip residue from prior machining operations or debris from shipment packaging. This will ensure a clean and trouble free start-up.

DANGER!

DO NOT TURN ON ELECTRICAL SUPPLY PRIOR TO COMPLETING THE PRE-START CHECK LIST THAT FOLLOWS.

PRE-START CHECK LIST

The MICROFINE® conveyor is equipped with several components and features not found on conventional chip conveyors. Each of these components is described below. Connection or pre-start inspection instructions follow the description of each component.

1. An air header assembly is located at the conveyor discharge end and under the hinge belt return face.

Plant air must be connected to the air regulator provided with the assembly - adjust air pressure reading at the regulator within the range of 6 to 10 PSI.

Higher or lower pressure may be used later depending on actual operating requirements.

Excessively high pressure will cause coolant loss and mist generation.

2. A back-wash pump is generally supplied with your MICROFINE® conveyor and is pre-connected. If your MICROFINE® conveyor was ordered without a back wash-pump that supplies continuous coolant flow through the nozzles to clean the filter drum, insure that a pump source is used that supplies consistent, continuous coolant flow. Spindle pumps are not recommended for this application because they are used intermittently and will result in inconsistent pressure and flow depending on when the spindle coolant is being used. Failure to supply continuous back-wash flow to clean the filter drum can result in coolant overflows from the conveyor into the clean side of the coolant tank..

The back-wash pump assembly is to be vertically mounted on your coolant tank so that the liquid level mark is at least 25/32" (20 mm.) below the pump flange when the system is turned off and all the coolant has returned to the reservoir. The discharge line should have the same diameter as the discharge flange thread to minimize pressure losses. The immersion depth can be changed by adding an extension pipe at the base of the pump. At start-up the liquid level must be above the pump chamber; afterwards it is sufficient if the coolant level

is above the suction port or the extension pipe. Note that the pump is provided with a short length electrical cable; this is to ensure that the pump is located as near as practical to the filter. The cable is supplied with a 4 pin connector that is to be attached to a mating outlet on the control enclosure (located on the enclosure bottom face). Also, connect the back-wash fluid supply hose (clear vinyl) to both the pump and back-wash piping at the filter housing side. Barbed hose fittings and screw adjustable hose clamps are provided for ease of assembly.

3. The filter drum drive gear-motor is located on top of the filter housing - just to the rear of the conveyor incline. This drive operates on 220 volt, three-phase power supply unless specified otherwise on the purchase order.

The drum drive has been pre-wired to the control enclosure and does not need pre-start connection.

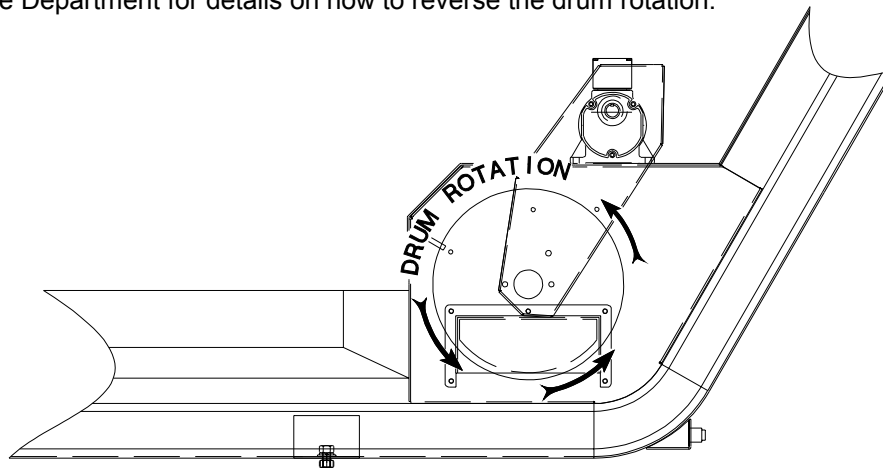
4. The drum filter assembly - contained within the metal housing to the rear of the conveyor incline.

No special pre-start preparations are required. However, it is advisable to inspect the inlet area to the rear of the housing and the conveyor load section belt. Remove any foreign objects or material that may remain from shipment packaging. The hinged top cover located immediately behind the drum drive provides inspection access to the filter area. A visual check of the filter area is recommended to ensure absence of foreign material within the filter housing; open the hinged cover for this inspection.

CONVEYOR ELECTRICAL SERVICE CONNECTION

Upon completion of the above pre-start activities, check to be sure both the conveyor and filter control switches are in the "OFF" position; the filter power control switch is a "mushroom" type, PULL ON, PUSH OFF. Depending on the type of conveyor drive, the conveyor start/stop switch may be located in a separate enclosure near the filter control. After verification that both control switches are in the "OFF" position, connect the conveyor to your power supply. Once power supply connections are completed, verify correct drum filter rotation and conveyor belt travel direction.

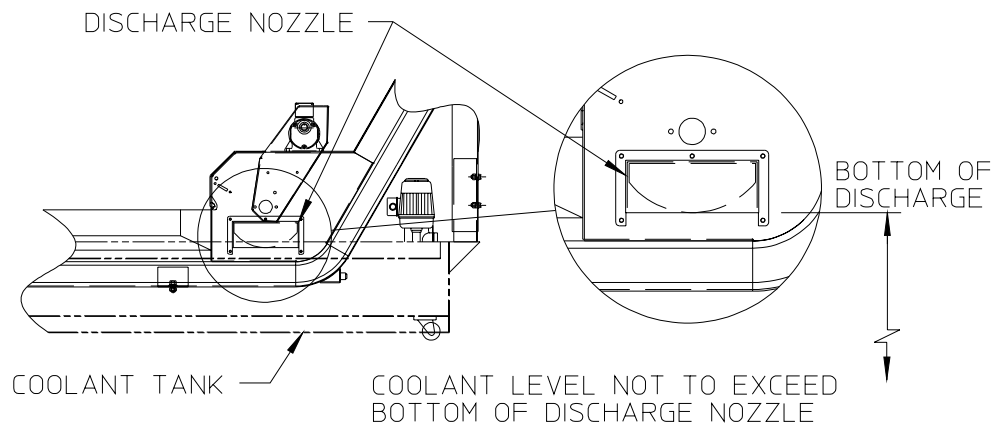
Note: The normal direction of the drum filter rotation should be as shown below. If not, please call the Turbo Systems' Service Department for details on how to reverse the drum rotation.



MICROFINE® START-UP

COOLANT FILLING

Fill the coolant tank with water soluble coolant solution of your choice. After initial start-up, you may find it necessary to add coolant to restore the desired fluid level. This is because the conveyor load section acts as an additional reservoir and complete drain down of the conveyor does not occur even during system idle periods. Note: Do not fill the coolant tank level with coolant above the discharge nozzle of the filter drum. (The discharge nozzles are located on each side of the drum housing and are the outlets for filtered coolant from the conveyor).



COOLANT FOAMING

If coolant foaming occurs, a de-foaming agent should be added to the coolant solution. The MICROFINE® filter will not remove floating chips and chip fines that form on a layer of foam. Layers of fine foam that develop on the coolant will restrict flow and the flow of solids pass through the filter and if allowed to continue, the foam layer will cause an overflow condition. If this occurs the clean side of the tank may be contaminated.

WHEN TO OPERATE THE MICROFINE® FILTER

Although the MICROFINE® is supplied with separate "on/off" controls for the conveyor and filter, the filter should always be running when the conveyor is in operation. If the filter is not on during periods of normal conveyor operation, the filter eventually will become blinded by chip fines which may cause a coolant over-flow condition. A blinded filter will clear itself within a short time after the filter drum is turned on. However, the coolant system should be turned off, with the exception of the backwash pump, until normal filter operation is assured. This will prevent any further overflows while the filter is being cleaned.

PERIODIC INSPECTION

GENERAL

Again, refer to the separate conveyor manual for additional periodic inspection and service requirements.

The MICROFINE® has been designed to be maintenance free; however, the following periodic checks should be completed at the recommended service intervals to ensure continued and trouble-free operation.

AFTER FIRST 100 HOURS

After the first 100 hours of operation and the regular intervals indicated in the separate conveyor manual, complete the following:

1. Remove the hinged inspection cover located at the front of the filter housing just forward of the filter gear-drive.

WARNING!

DO NOT REACH INTO THE DRUM HOUSING WHEN THE SYSTEM IS RUNNING. SERIOUS PERSONAL INJURY COULD RESULT.

With the hinged inspection cover open and the backwash system "on", check for backwash system function. A strong, uniform fluid flow should be properly cleaning the filter drum across the full width of the drum. If there is an absence of spray or the spray pressure is weak, there are several possible causes. See the trouble shooting section of this manual for further information.

After verification of back-wash function, close the hinged inspection cover and tighten the two wing nuts securing the cover.

2. Open the hinged top cover to check the condition of the filter screens and viton v-ring seals attached to the filter drum.

WARNING!

DO NOT REACH INTO THE DRUM HOUSING WHEN THE SYSTEM IS RUNNING. SERIOUS PERSONAL INJURY COULD RESULT.

The screens should be free of tears and firmly positioned by the filter clamp. The bolts that secure the three metal wipers plates that attach the screen to the drum must be tight. Inspect the v-ring seals for damage (tears or punctures). In the event that the filter screen or v-ring seals are damaged, they must be replaced immediately. Failure to do so will result in contamination of the clean side of the tank.

BE SURE TO SWITCH THE FILTER "OFF" prior to checking tightness of the filter and wiper blade mount screws. All screws should be firmly seated, but not tighten enough to cause compression of any metal parts. To check all screens and mounting screws, the drum drive can be "jogged" to rotate to each exposed section of the filter screen around the circumference of the drum. **DO NOT LEAVE THE DRUM DRIVE RUNNING** while performing this inspection process.

Prior to closing the inspection cover, be sure to remove any tools, shop rags or towels you may have used while completing inspection and maintenance. Any foreign article(s) left on the filter drum can cause an immediate lock-up at re-start; this may lead to failure of drum components and/or gear-drive.

3. Remove the filter drum chain drive guard and check the chain for tension - a small amount of chain deflection is acceptable, but no more than 1/4". To tension the chain, loosen both of the 1/4" bolts holding the eccentric tensioner; an adjustable wrench may be used to rotate the eccentric tensioner until the chain slack is removed. While holding the eccentric tensioner in the proper position, tighten the outer 1/4" bolt to lock the eccentric; then tighten the center bolt. Apply grease to the chain and the eccentric tensioner face on the side that the chain passes by. Re-install the chain guard.

4. Back-flush in-line strainer filter inspection: The back-wash in-line strainer is clogged if a 5 PSI differential between the two gauges on each side of the in-line strainer exist. In this case, the strainer filter is to be removed and cleaned. To clean the strainer, turn the conveyor off (back-wash coolant pressure and flow must be shut off) and remove the strainer filter housing by unscrewing the filter bowl (right-hand threads), remove the screen filter inside, clean the screen filter, and reinstall by screwing the filter bowl onto the housing (right-hand threads).

TROUBLE SHOOTING

The following chart will show some problems, their probable causes and possible solutions.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
(1) Fines build-up on drum filter screens:	(a) Drum filter/back-wash pump not running:	Check switch position at control - pull to "On" position.
	(b) Drum filter/back-wash pump running backward:	Correct supply electrical connection for lead reversal.
	(c) Drum filter/back-wash pump failure:	See #4 and #5.
	(d) Back-wash spray nozzles are clogged.	Remove backwash spray nozzles and clean or replace.
	(e) The spray pattern of the backwash nozzles are not cleaning the entire width of the drum filter.	The spray nozzle(s) are not oriented properly on the spray manifold. The slit in the nozzle must be parallel with the centerline of the filter drum.
	(f) The back-wash in-line filter is clogged.	Remove in-line backwash filter and clean.
(2) Low coolant flow or over-flow of load section baffles:	(a) Plugged drum filter screens.	See the section titled "Repair and Replacement".
	(b) Coolant foam build-up.	See start-up recommendations.
(3) Deteriorating fines removal efficiency:	(a) Damaged or worn drum seals, torn or loosened screens	Remove and replace worn or damaged parts. See the section titled "Repair & Replacement".
	(b) Leakage past drum "V" lip seals	Seal scrapers worn; remove and replace.
(4) Drum rotation failure:	(a) Overload relay in motor control circuit has tripped out.	Reset overload relay.
	(b) Failed capacitor on drive motor	Replace capacitor
	(c) Excessive motor wear or burn-out	Replace motor.
	(d) Sheared shaft key at drive motor sprocket or drum drive sprocket	Replace failed parts AFTER determining cause of failure; maybe caused by filter drum lock-up.
	(e) Worn-out drive sprockets, excessively loose or broken drive chain	Replace worn or broken parts.
	(f) Failed drum drive hub	See the section titled "Repair & Replacement".
(5) Back-wash system failure:	(a) Blown fuse in control circuit	Replace fuse.
	(b) Clogged back-wash in-line strainer	Clean the back-wash in-line strainer (see the section titled "Repair & Replacement").
	(c) Plugged spray nozzles	Remove back-wash spray nozzles and clean or replace (see the section titled "Repair & Replacement").
	(d) Failed pump motor or impeller	Replace pump or damaged pump part(s).

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
(6) Noisy drum rotation (squeak or metallic grating sound):	(a) Excessively worn spray tube/drum shaft bushings	
	(b) Failed drum drive shaft bearing	Remove and replace. See the section titled "Repair & Replacement"

MICROFINE® FILTER REPAIR & PART REPLACEMENT

REPAIRS

MALFUNCTIONING BACK-WASH SYSTEM

1. Stop the conveyor and drum filter if running.
2. Remove the back-wash in-line strainer filter screen – clean if plugged.
3. While the strainer screen is removed, “jog” the back-wash pump to check for back-wash coolant discharge from the strainer body.

Note: The back-wash spray pump and filter drum “jog” features can be used only when the system “Start-Stop” switch is in the “Stop” position; pushed in. The “jog” switches are momentary contact and must be held in to maintain motor operation.
4. If there is low or no flow, the back-wash pump discharge line may be plugged, the pump may have failed, the pump inlet may be blocked.
5. Clear the discharge line, pump inlet, blockage, or replace a failed pump.
6. If there is strong flow, re-install the strainer screen and tighten.
7. Next, remove the inspection cover which is just forward of the drum gear-drive.
8. Turn on the drum filter and check for back-wash spray. There should be a strong, uniform spray pattern.
9. If there is weak or no back-wash spray, stop the drum filter. The back-wash spray nozzles may be plugged.
10. See the following section for spray nozzles access and removal.

WARNING!

DO NOT REACH INTO THE DRUM HOUSING WHEN THE SYSTEM IS RUNNING. SERIOUS PERSONAL INJURY COULD RESULT.

SPRAY NOZZLE ACCESS

The following procedure describes the back-wash spray nozzle access, removal, and replacement:
In some cases, the conveyor may need to be lifted at the discharge end high enough so the drum housing is above the tank. If this is required, insure that all hardware (if any) that attaches the conveyor to the tank is removed prior to lifting the discharge end of the conveyor.

1. Remove the coolant hose that runs from the back-wash pump to the in-line strainer filter.
2. Remove the u-bolt that supports the back-wash plumbing. Loosen the ½" pipe union which is located to the right of the u-bolt. After the plumbing is separated, slide the in-line strainer filter and attached plumbing to the left and sit aside.
3. Remove the ½" tee fitting from the spray tube manifold. Then remove the coolant discharge cover plate which is attached with six ¼-20 nuts.
4. Access to the spray nozzles can be achieved now through the half circle opening in the drum housing. Remove the brass spray nozzles and clean the nozzles by removing any foreign material blocking or restricting the orifice in each nozzle. The nozzles can be cleaned using air pressures. If necessary, use a stiff piece of small diameter wire to loosen packed material.
5. The spray tube manifold must be inspected for any foreign material. Air pressure may be used to remove any material from the spray tube manifold.

Note: The spray nozzles have a "v" grooved face. The groove axis must be parallel with the centerline of the spray tube manifold axis.

6. After all fittings, nozzles and the manifold are cleaned between the in-line strainer and the spray nozzles the nozzles can be assembled to the spray manifold. Do not over tighten the brass nozzles.
7. Install the coolant discharge cover plate that is attached with six ¼-20 nuts.
8. Install the ½" tee fitting to the spray tube manifold.
9. Install the plumbing and in-line strainer filter.
10. Install the ½" pipe union, which is located to the right of the u-bolt.
11. Install the u-bolt that supports the back-wash plumbing.
12. Install the coolant hose that runs from the back-wash pump to the in-line strainer filter.
13. Once the back-wash system is reassembled and the system is fully functional, turn on the back-wash pump and inspect the plumbing to insure it is not leaking and insure proper back-wash spray pattern and pressure.

FILTER SCREEN REPLACEMENT INSTRUCTIONS

The following procedure describes the sequence for replacement of the drum filter screen:

1. Remove the drum drive cover and drive chain so the drum can be rotated by hand.
2. Remove the drum housing hinged top cover, which can be identified by the attached warning tag.
3. Remove three metal wiper plates that are attached to the filter drum housing. The drum must be rotated by hand to access all three of these wiper plates.

4. Remove the adjustable filter screen hose clamps.
5. Remove the two screws that attach the screen brace and the filter mesh support screen to the spreader bar on the drum. Then remove the filter screen and filter screen brace. Reinstall the screws to attach the wire mesh support screen in place.
6. While slowly rotating the drum housing, position the metal drum spacer rings and v-ring seals against the sides of the drum housing side plates. This will allow space to attach the new filter mesh screen.
7. Remove the two screws that attach the support screen in place then position the filter screen brace between the two vertically formed end of the support screen and reinstall the screws and properly torque the screws.
8. When installing the filter mesh screen, insure that the screen is pulled tight across the spreader bar where the screen brace is attached. Punch holes in the filter mesh screen only in the proper position for attaching the wiper plate to the filter drum housing. Before installing the first metal wiper plate, insure that all rubber seals are in position on the drum housing and underneath the cross clamping strip with the filter mesh screen positioned properly. Install the first cross clamping strip but do not tighten the screws until both of the filter mesh hose clamps are underneath the metal cross strips on both sides of the drum. Make sure that the filter mesh screen is firmly under the hose clamps, then tighten the screws.
9. Rotate the drum by pushing it from the top back towards the conveyor incline. Be careful not to position the hose clamp so it is over the open area of the drum housing. Punch holes through the filter mesh screen only in the position that the bolts attach the metal wipers secure the filter mesh screen to the drum housing. Again, do not completely tighten the mounting screws. This step will be repeated to install the 3rd metal wiper to secure the filter mesh screen to the drum housing.
10. After all three metal wiper plates are positioned into place, remove the 1st metal wiper plate installed and overlap the filter mesh screen. Punch mounting holes in the overlapped filter mesh screen. Reconnect the hose clamps but do not tighten the clamping screw. Reinstall the metal wiper plate. Tighten both hose clamps. Rotate the drum and tighten all screws and bolts. Excess screen can be trimmed on the end. Be careful not to cut the filter area of the screen.
11. Inspect the filter mesh screen and drum to insure that the filter mesh screen is properly sealed against the filter drum and there are no areas that will allow chips to pass through.

REPLACEMENT OF “V” RING AND FILTER SCREEN SEALS:

REPLACEMENT OF “V” RING SEALS

When it is necessary to replace the “V” ring seals, follow these assembly procedures:

1. To remove the drum housing assembly, follow the procedures spelled out under the “Drum Replacement and Removal/Assembly” section of this manual.
2. Slide the “V” ring seals off of the filter drum housing.
3. Prepare the new “V” ring seals for installation by coating the interior face with soapy water. Also coat the wheel rim with soapy water.
4. Install the new “V” ring seals on the filter drum housing. The seal inside diameter is smaller than the drum housing outside diameter requiring the seal to be stretched – it may be necessary to soak the seal in hot tap water for 15 to 20 minutes to permit adequate stretch. **DO NOT USE BOILING WATER!**

Note: The “V” ring seal must slide over the outside diameter of the drum housing and seat against the drum spacer ring. Make sure that the drum spacer rings are firmly seated against the three drum cleats. If not carefully review the filter screen assembly to make sure that the two filter screen clamps were not positioned too far toward the outside of the drum creating an interference between the adjustment clamping screw assembly on the clamp and the drum spacer ring. If so, reposition the clamp to the inside of the drum housing farther until the interference is eliminated.

5. To install the drum housing assembly, follow the procedures spelled out under the “Drum Replacement and Removal/Assembly” section of this manual.

REPLACEMENT OF FILTER SCREEN SEALS

When it is necessary to replace seals underneath the filter screen, follow these assembly procedures:

1. Remove the filter screen. See the “Filter Screen Replacement” section in this manual for instructions on removing the filter screen.
2. Remove the screen seals from the drum housing.
3. Clean the drum housing seal surfaces using a wire brush or knife to remove all traces of residue from the old seals and rust, if present. Wipe all surfaces using (denatured) alcohol solvent.
4. Clean the drum hub bushing using alcohol and apply a light coating of lubricant to the contact surfaces.
5. Check drum housing seal surfaces and remove any burrs or sharp irregularities using a file or small, fine grit grinding wheel/burr. Wipe down seal surfaces again with alcohol solvent and allow to dry.
6. Trial fit the screen seals first and mark for proper cutting length. The seal length should be such that there is no more than 0.015” (approximately 1/64”) end gap when the seal strip is firmly seated around the wheel rim.
7. Cut the seal strip ends diagonally, approximately 45 degrees, from edge to edge.
8. Peel away the seal backing paper, on the adhesive face, and carefully press the seal in place making certain the seal edge is even with the rim edge.
9. Measure and cut the cross-bar seal strips; the ends should butt firmly against the rim seal inside edges.
10. Peel away the backing and press the cross-bar seals in place.
11. Locate the punch holes through the seal strips at the tapped hole locations for the filter screen fasteners.
12. Install the filter screen. See the “Filter Screen Replacement” section in this manual for instructions on installing the filter screen.

DRUM REPLACEMENT AND REMOVAL/ASSEMBLY

1. Remove the union on the back wash plumbing and loosen the u-bolt that supports the plumbing to the conveyor and push to the side. Remove the tee. Remove the hinged drum inspection top cover.
2. Remove the drum drive cover, drum drive chain, drive sprocket. It is not necessary to remove the motor sprocket. Remove the drive cover mounting plate by removing the two mounting bolts. Loosen the two set-screws in the bearing on the stub shaft. It is not necessary to remove the bearing.
3. Remove both discharge nozzles from the drum housing side plates.
4. Reach through the right-hand discharge opening (the smaller opening) and loosen the two setscrews in the drum hub that secure the stub driveshaft to the stub shaft. (It may be easier to cut an opening in the filter screen and reach through from the outside of the drum to access the set screws if the filter mesh screen is damaged and is being replaced).
5. Remove the 3 button head screws attaching the bearing to the drum housing. These screws are located on the left side (the same side as the back wash plumbing). Remove the manifold tube weldment and bearing mount assembly in one piece.
6. Remove the stub drive shaft. Remove the drum assembly from the drum housing. (Note: In some models the drum drive motor mounting plate must be removed to provide clearance to remove this assembly.)
7. To reassemble, install the drum assembly in the drum housing. Insure that the seals do not roll under as the drum assembly as it is pushed over the side frame discharge openings on either side.
8. Install the stub drive shaft through the drum hub and bearing on the right side of the drum housing. The stub shaft is to be flush with the hub. Install the manifold tube weldment assembly into the drum hub and brass bushing in the stub drive shaft. Install the 3 bearing mounting screws.
9. Fasten the discharge nozzle plate to the left side discharge opening.
10. Insure that the drum assembly is centered between the drum side frames. Check for uniform v-ring seal compression on both sides of the drum.
11. Replace the right side discharge nozzle and install the mounting nuts on top of the discharge nozzle plate.
12. Replace the drum housing top cover, drive cover mounting plate, drum drive sprocket and drive chain. Reinstall the backwash plumbing after inspecting the drum assembly and drum drive installation. Replace the drum drive cover.
13. With the drum inspection cover opened, manually rotate the drum to insure that screen is in good condition, seals are properly installed, and all hardware is reinstalled and properly tightened.
14. Power up the conveyor and drum drive. Inspect the rotation of the drum; inspect width of coolant spray nozzle pattern on the drum to make sure the full width of the drum is being cleaned by the back wash system. If the nozzle is not properly installed with the spray pattern being parallel with the centerline axis of the drum drive, the spray pattern will be too narrow and the drum filter mesh screen will not be fully cleaned along the full width. This will reduce the coolant flow capability of the filter drum and may cause the coolant to overflow and wash chips into the clean side of the tank.
15. If all inspected items are acceptable, the drum installation is completed.

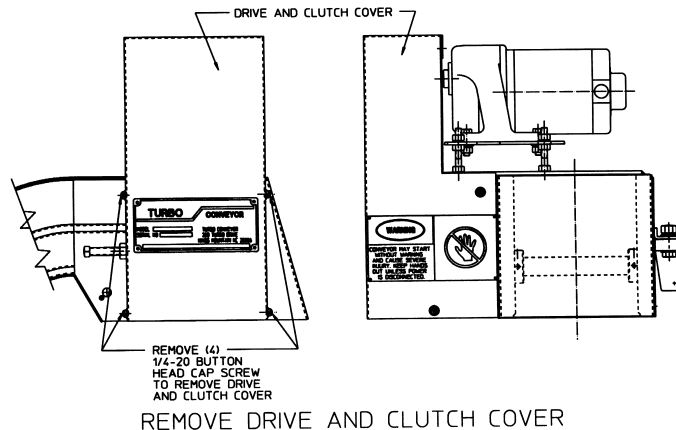
BACK-WASH PUMP

If your MICROFINE® was ordered without the backwash pump option, please review the following recommendations:

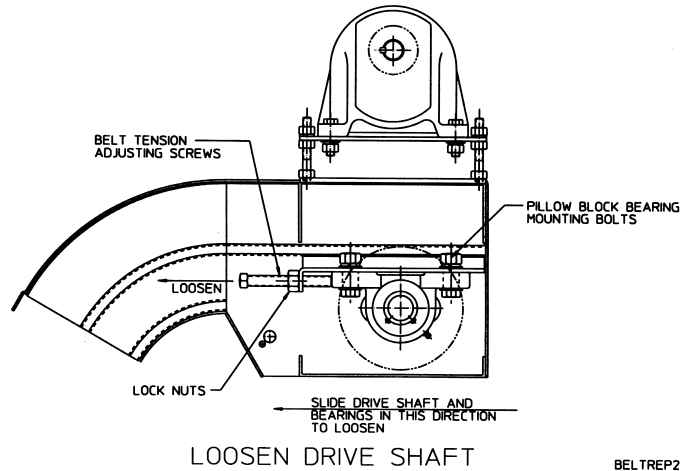
1. Backwash supply pressure must not be less than 10 p.s.i. (23 ft. head), nor exceed 20 p.s.i. (46 ft. head). Delivery pressure in excess of this recommended value will rapidly decrease efficiency of the conveyor belt in chip removal.
2. Backwash supply flow must be constant while conveyor and filter are in use; do not use supply from an intermittently operated pump such as used to flush chips from the machine tool.

HINGE BELT REMOVAL AND INSTALLATION INSTRUCTIONS

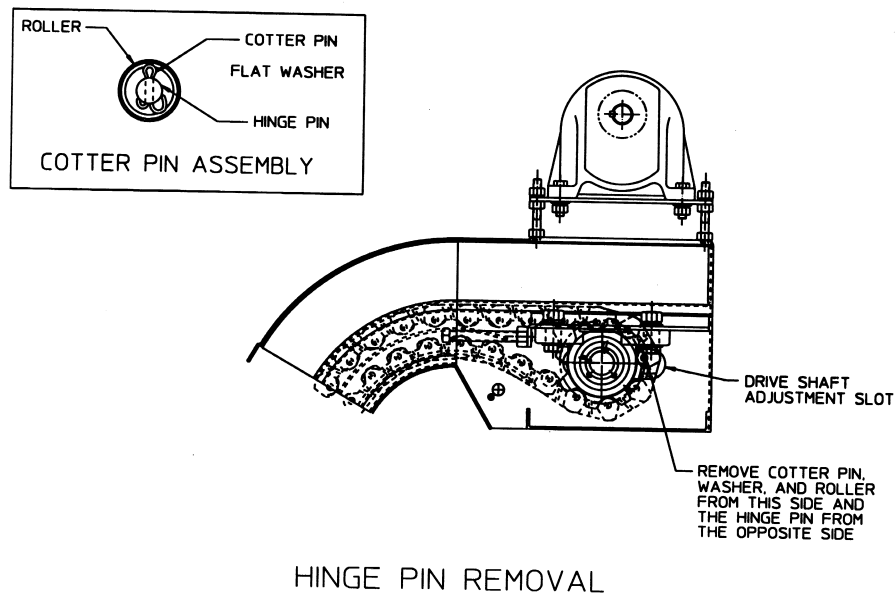
1. Disconnect power to the conveyor before performing any work on the belt.
2. Remove the cover over the clutch and drive chain.



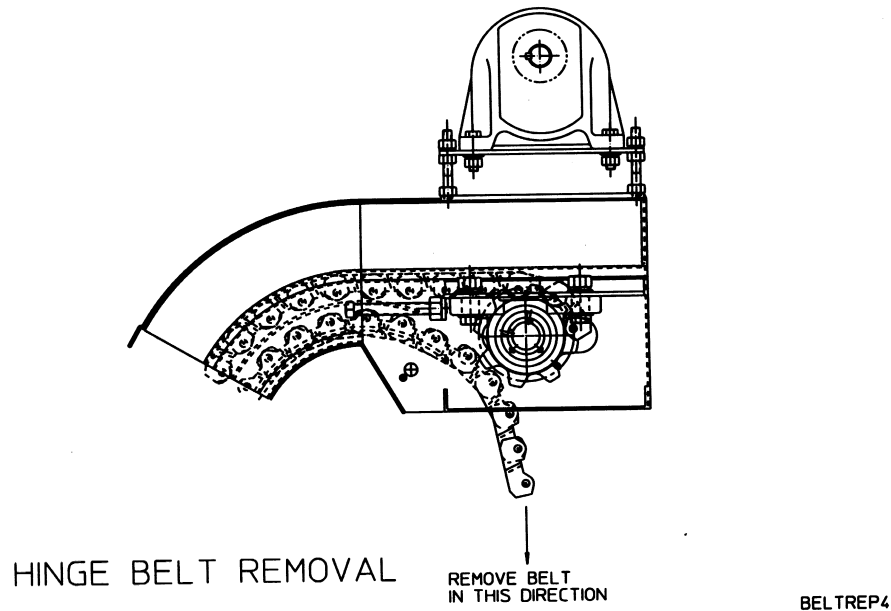
3. Take the master link out of the roller drive chain between the clutch and motor and remove the chain.
4. Loosen the lock nuts on the belt tension adjusting screws (located just behind each of the pillow block bearings on the drive shaft) and back off the adjusting screws until they are flush with the face of the adjusting bracket.
5. Loosen the two bolts holding each pillow block bearing.
6. Slide the drive shaft toward the tail of the conveyor as far as the adjusting slots for the pillow block bearings will allow. This will provide maximum slack in the belt.



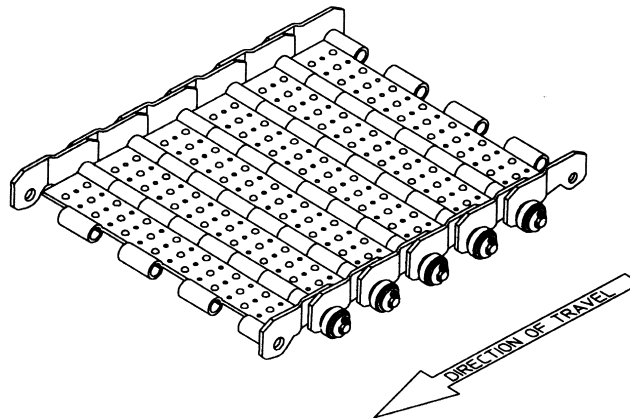
7. Working through the drive shaft adjustment slot, remove the cotter pin from one of the belt hinge pins on the end of the pin nearest the clutch.
8. Being careful to catch the flat washer and roller, pull the hinge pin out through the adjustment slot on the side opposite the clutch. The hinge pin cannot be removed from the clutch side because it won't clear the clutch's sprocket.



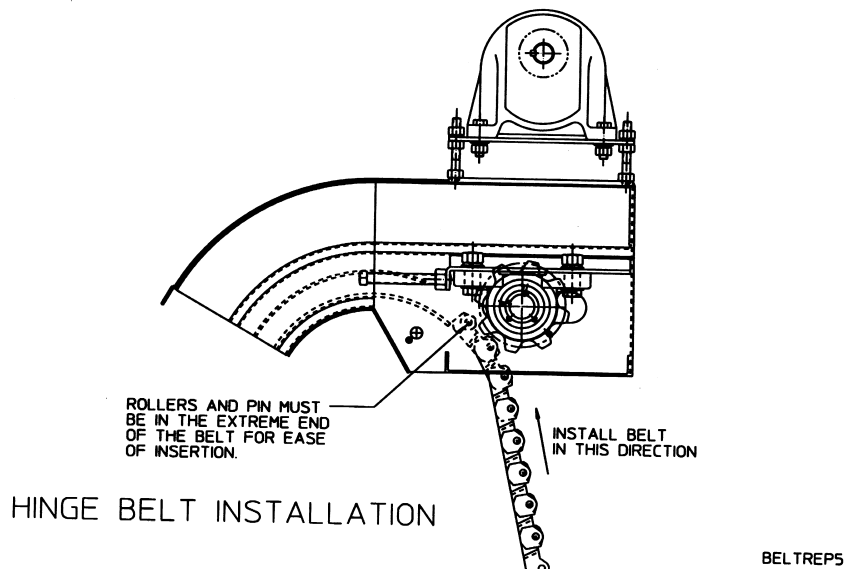
9. Grasp the end of belt below the drive shaft and pull the belt out of the conveyor. Be sure to wear gloves to avoid being cut by sharp edges on the belt. When only a few feet of belt remain in the conveyor, the belt on the floor will have enough weight to begin pulling the remainder out on its own. As the last of the belt begins to run out faster, don't attempt to stop it; just stand clear and let it run out onto the floor. Note that the belt was moved in the direction opposite normal belt travel.



10. Before moving the old belt out of the way, pay particular attention to the way the side wings overlap. When the belt is running in the normal direction of travel, the leading ends of the side wings are outboard, and the trailing ends are inboard.



11. Place the new belt on the floor beneath the conveyor discharge, being careful to orient it in the same direction as the old one that was removed.
12. If there is not already a hinge pin in the end of the belt, use the pin and rollers that were removed to separate the old belt. There must be a pin and rollers in the extreme end of the belt for ease of insertion.
13. With a person standing on either side of the belt, lift up the lead end and start it in the lower track, from which the old belt was pulled out. Be sure and wear gloves to prevent injury, and be sure to maintain a secure hold on the belt until at least five feet have been fed into the conveyor frame. At this point, the weight of the belt inside the frame should be enough to prevent it running back out on it's own.



14. Continue feeding the belt into the conveyor frame. One person may have to use a length of 2 x 4 or a pry bar to "help" it along from time to time. Force should not be required. Many times the belt can be pushed in all the way around from the discharge end. If the belt hangs up, look for some obstruction; don't force it.
15. When the lead end of the belt reaches the drive shaft, carefully feed it up over the drive sprockets.
16. Remove the hinge pin and rollers that were used to help guide the belt through the track.
17. With the ends of the belt engaged in the teeth around the top and bottom of the drive sprockets, the two ends should join. At this point, it may be necessary to remove one or more hinge plates from the new belt. Most new belts are supplied longer than necessary.
18. Reverse steps 1 through 7.
19. When adjusting belt tension, clamp a pair of vise grip pliers on one of the formed cleats on the belt. Use the vise grips to "rock" the belt back and forth to feel the slack and drag on the belt. There should not be more than enough slack to allow rocking the drive shaft through 15 degrees of rotation without moving the belt. On a new belt, zero slack is O.K., but if the belt is difficult to move with the vise grips, it's too tight. Correctly adjusted, it should be possible, if difficult, to move the belt with one's gloved hands by turning the clutch sprocket.
20. Visually confirm the belt is located in the center of the frame. Adjust if necessary by loosening the set screws in the pillow block bearings and shifting the drive shaft; clutch and all; to the left or right as appropriate.
21. Re-connect power and test run the conveyor. The belt should run freely and the only sound should be a subdued clicking as each hinge plate passes over the drive sprocket.

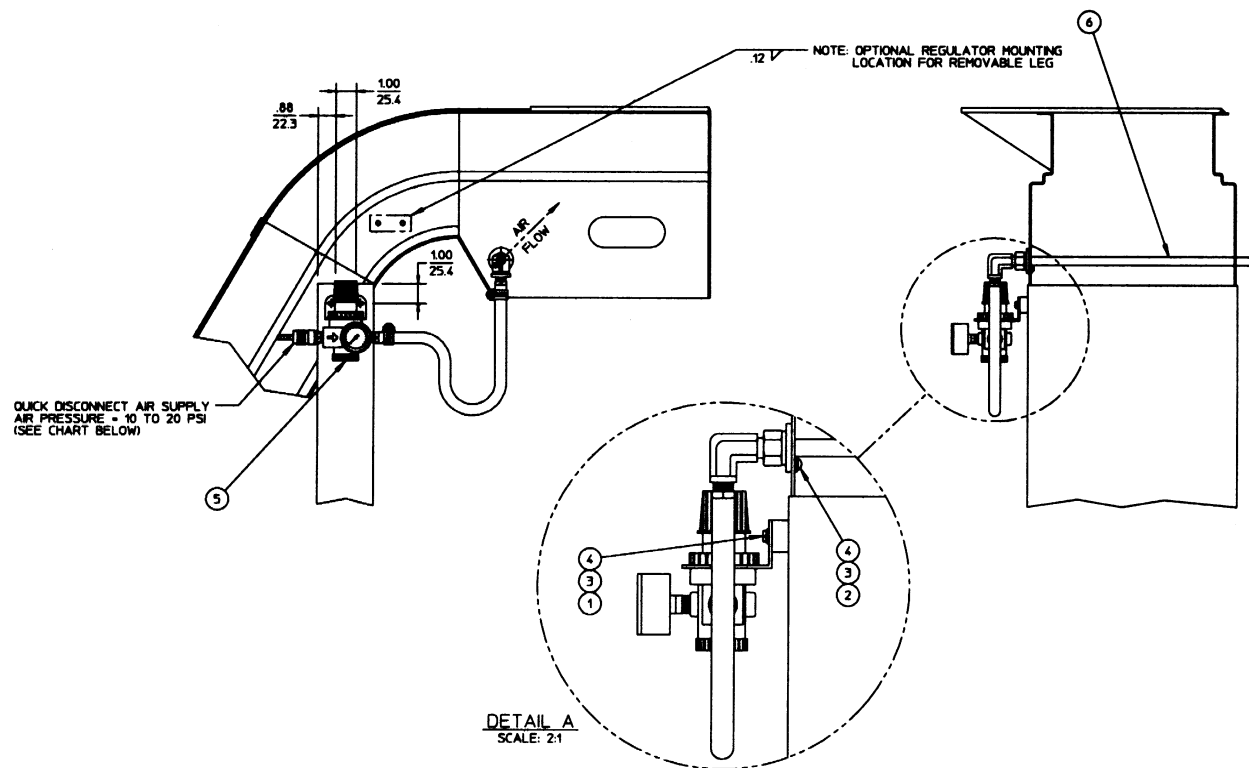
AIR HEADER INSTALLATION AND OPERATION

All Microfine® conveyors with hinge belts are equipped with an air header assembly. This equipment is mounted under the belt, near the discharge end and directs multiple streams of compressed air onto the belt to dislodge small chips that might otherwise be carried back down into the conveyor frame.

This assembly ships loose with the conveyor. To assemble this unit, follow the following procedure:

1. Mount the regulator bracket to the conveyor side frame using the two hex head cap screws, lock washers and flat washer provided. There will be a block welded to the side frame of the conveyor for mounting this bracket.
2. Insert the air header manifold tube through mounting holes in the conveyor discharge and secure it with the button head screw, flat washer and lock washer provided. (Note: insert the screw from the inside of the conveyor discharge as shown below).
3. Connect the air hose provided to the air header input. The fitting on the end of the hose slides over the end of the air header manifold tube.
4. Connect customer supplied shop air to the regulator input (quick connect male fitting supplied). The normal air pressure required is 10 to 20 p.s.i. depending upon the conveyor belt width (see the air requirement chart below). However, use the lowest pressure required that effectively removes the chips from the belt. If the pressure is too high, coolant misting may occur.

		AIR REQUIREMENT CHART (CFM)							
		BELT WIDTH (INCHES)							
		4	8	12	16	20	24	30	36
AIR PRESSURE (PSI)	10	1.5	2.9	4.2	5.6	6.4	8.7	11.6	13.8
	12	1.7	3.1	4.6	6.1	7.1	9.5	12.7	15.2
	14	1.8	3.4	5.0	6.6	7.6	10.3	13.7	16.4
	16	1.9	3.6	5.3	7.1	8.2	11.0	14.7	17.6
	18	2.1	3.9	5.7	7.5	8.7	11.7	15.6	18.6
	20	2.2	4.1	6.0	7.9	9.1	12.3	16.4	19.6

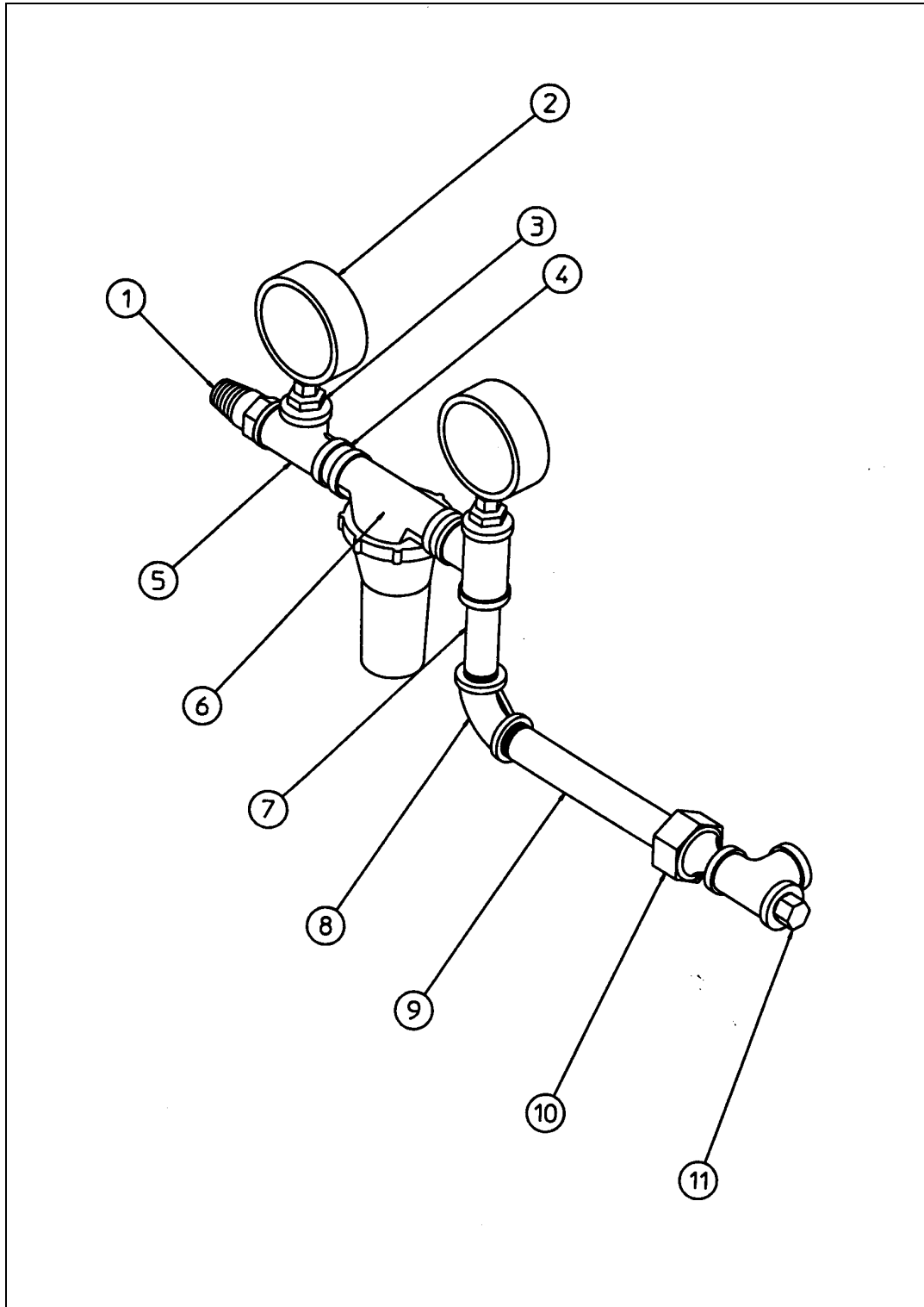


AIR HEADER ASSEMBLY

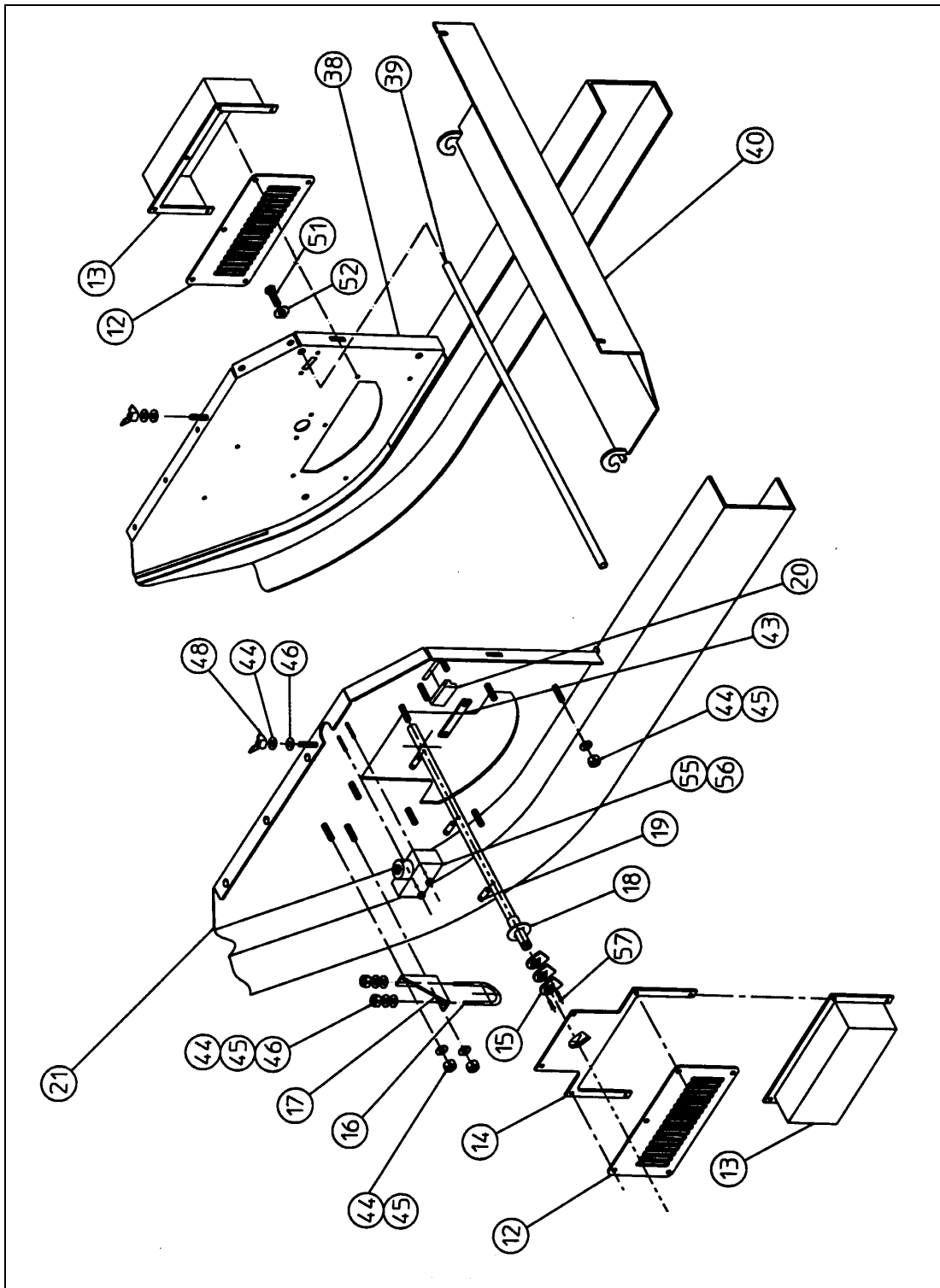
MICROFINE® SERVICE PARTS LIST

ITEM NO.	CATALOG NO.	PART NAME	ITEM NO.	CATALOG NO.	PART NAME
1	65A-1	1/2" Hose Barbed Nipple	30	65A-30	Roller Chain, ASA #40, 31.5"
2	65A-2	Pressure Gauge	31	65A-31	Chain Take-up Handle
3	65A-3	Bushing, 1/2" NPT X 1/4"	32	65A-32	Chain Take-up
4	65A-4	Close Nipple, 1/2" NPT	33	65A-33	Sprocket, 16 tooth, #40, 1/4" key
5	65A-5	Pipe Tee, 1/2" NPT	34	65A-34	Bearing, Drive Shaft
6	65A-6	In-Line Strainer	35	65A-35	Shaft, Stub Drive
7	65A-7	Pipe Nipple, 1/2" NPT X 6" Long	36	65A-36	Bronze Bushing
8	65A-8	Pipe Elbow, 1/2" NPT	37	65A-37	Stub Shaft
9	65A-9	Pipe Nipple, 1/2" NPT X 8"	38	65A-38	Right Hand Plate (Not a Serviceable Part)
10	65A-10	Pipe Union, 1/2" NPT	39	65A-39	Bolt Tube
11	65A-11	Pipe Plug, 1/2" NPT	40	65A-40	Top Cover
12	65A-12	Discharge Grate	41	65A-41	Standoff
13	65A-13	Discharge Nozzle	42	65A-42	Key, 1/4" Square X 1 1/2" Long
14	65A-14	Discharge Nozzle Plate	43	65A-43	Seal Scraper Keeper
15	65A-15	Shaft, Directional Lock	44	65A-44	Lock Washer, 1/4"
16	65A-16	"U" Clamp for 1/2" Pipe	45	65A-45	Hex Nut, 1/4"-20
17	65A-17	Bracket	46	65A-46	Flat Washer, 1/4"
18	65A-18	Manifold	47	65A-47	Button Head Screw, 1/4"-20
19	65A-19	Spray Nozzle	48	65A-48	Wing Nut, 1/4"-20
20	65A-20	Seal Scraper	49	65A-49	Hex Nut, 5/16-18
21	65A-21	Left Side Plate (Not Serviceable Part)	50	65A-50	Lock Washer, 5/16"
22	65A-22	Drum Assembly with Screen and Seals	51	65A-51	Hex-Head Screw, 3/8-24
23	65A-23	Chip Deflector	52	65A-52	Lock Washer, 3/8"
24	65A-24	Motor Mounting Plate	53	65A-53	Nylock Set-Screw, 5/16-18
25	65A-25	Drum Drive Motor	54	65A-54	Set Screw (included with #28)
26	65A-26	Key, 3/16" Square X 7/8" Long	55	65A-55	Microswitch
27	65A-27	Drum Drive Cover	56	65A-56	Hex Nut, #6-32
28	65A-28	Sprocket, 10 tooth, #40, 3/4" Bore	57	65A-57	Slotted Head Screw, #10-32
29	65A-29	Drum Drive Cover			

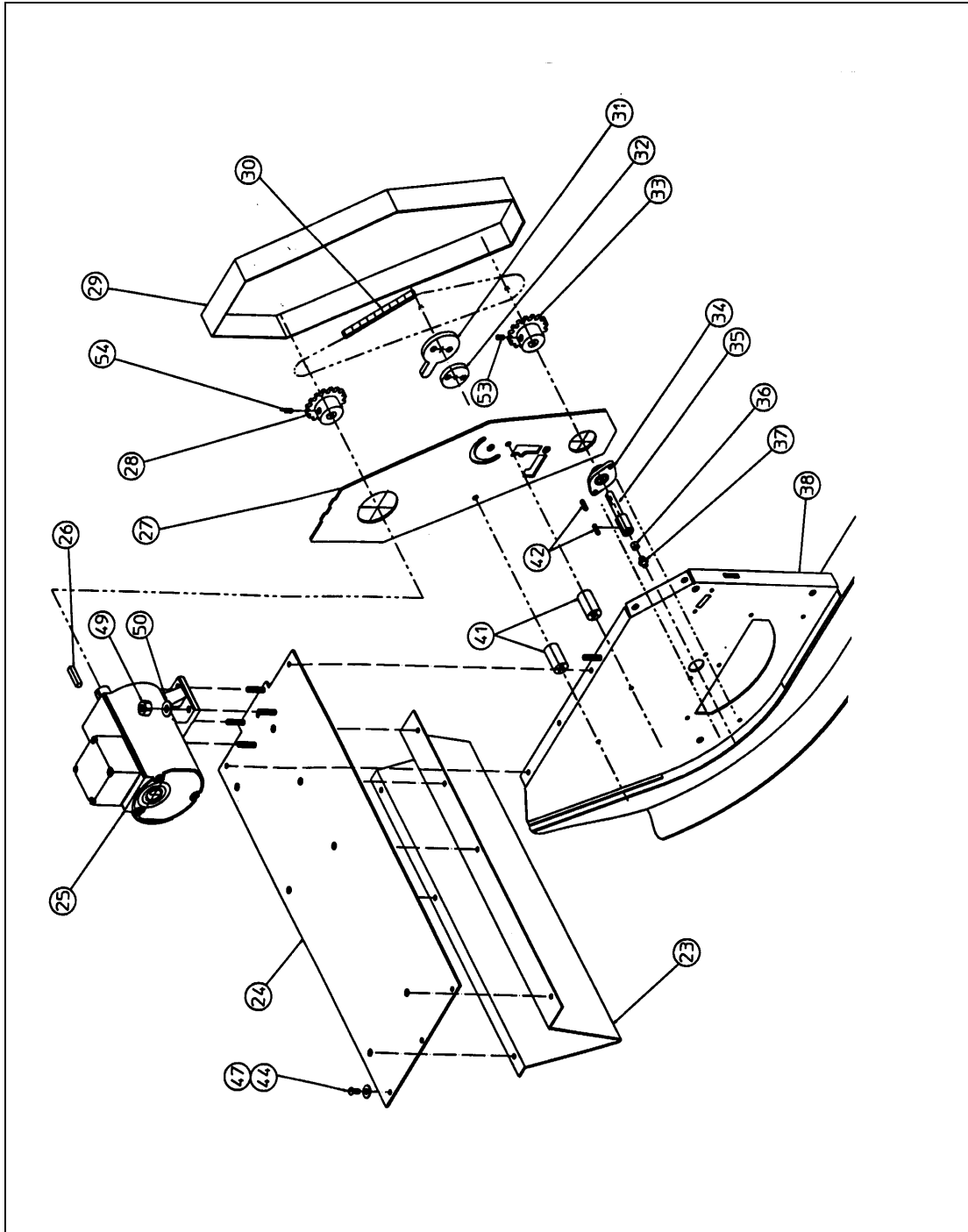
MICROFINE® IN-LINE STRAINER ASSEMBLY



MICROFINE® DRUM HOUSING ASSEMBLY



MICROFINE® DRUM DRIVE ASSEMBLY

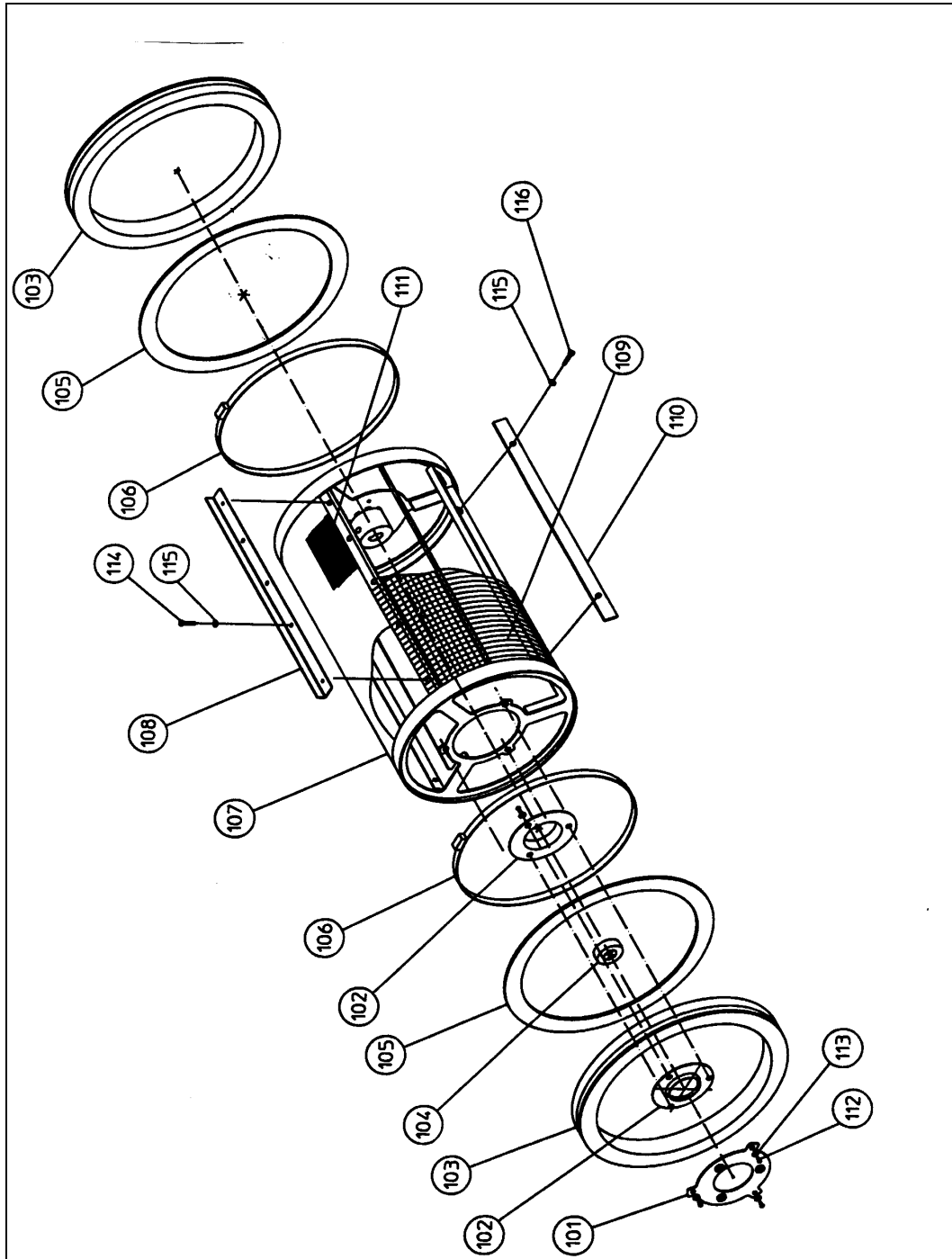


MICROFINE® FILTER DRUM PARTS LIST

ITEM NO.	CATALOG NO.	PART NAME
109	65A-109	Filter Wire Support
110	65A-110	Filter Brace
111	65A-111	Filter, Mesh Screen
112	65A-112	Button Head Screw, 1/4-20 X 5/8"
113	65A-113	Lockwasher, 1/4"
114	65A-114	Socket-Head Cap Screw, #8-32 X 1/2"
115	65A-115	Flat Washer
116	65A-116	Socket Head Cap Screw, #10-32 X 1/2"

ITEM NO.	CATALOG NO.	PART NAME
101	65A-101	Hub Bearing Mount
102	65A-102	Bearing, Flanged
103	65A-103	V-Ring Seal, Viton
104	65A-104	Bearing, Spherical
105	65A-105	Spacer, Drum
106	65A-106	Hose Clamp, 12" Diameter
107	65A-107	Drum Housing
108	65A-108	Drum Cleat

MICROFINE® FILTER DRUM ASSEMBLY

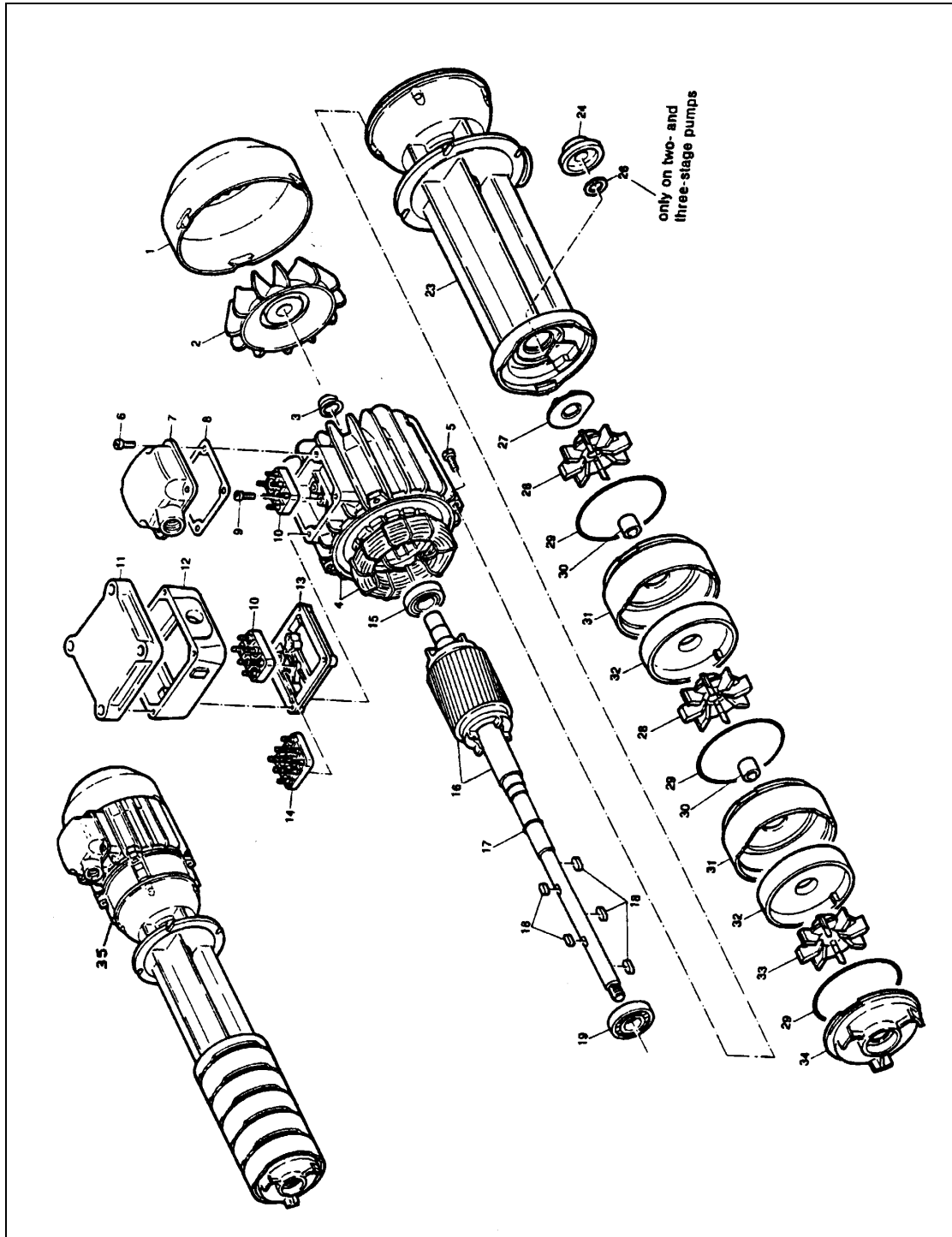


MICROFINE® BACK-WASH PUMP PARTS LIST

ELECTRIC IMMERSION BACK-WASH PUMP, THREE STAGE

ITEM NO.	CATALOG NO.	PART NAME	ITEM NO.	CATALOG NO.	PART NAME
1	65C-1	Fan Housing	18	65C-18	Key, DIN 6885-A 3 X 12
2	65C-2	Fan	19	65C-19	Ball Bearing, DIN 625
3	65C-3	U-ring (PRA only)	20	65C-20	Seal (PRA only)
4	65C-4	Stator Housing with Winding	21	65C-21	Screw
5	65C-5	Screw	22	65C-22	Bearing End Shield
6	65C-6	Phillips-Head Screw, M4 X 14	23	65C-23	Pump Support
7	65C-7	Terminal Box (Plastic)	24	65C-24	Top Splash Ring
8	65C-8	Gasket	26	65C-26	Washer
9	65C-9	Phillips-Head Screw M4 X 14	27	65C-27	Seal
10	65C-10	Terminal Board, 6-Pole	28	65C-28	Impeller
11	65C-11	Terminal Box Cover	29	65C-29	O-ring
12	65C-12	Terminal Box, Light Alloy	30	65C-30	Spacer
13	65C-13	Terminal Board Base	31	65C-31	Intermediate Chamber
14	65C-14	Terminal Board, 9-Pole	32	65C-32	Insert
15	65C-15	Ball Bearing, DIN 625	33	65C-33	Impeller, 1 st Stage
16	65C-16	Shaft with Rotor	34	65C-34	Pump Bottom
17	65C-17	O-ring	35	65C-35	Pump, Electric Immersion

MICROFINE® BACK-WASH PUMP ASSEMBLY



MICROFINE® ELECTRICAL INFORMATION

Turbo Systems' chip conveyors are supplied with a variety of drive packages and electrical controls, depending on conveyor application and customer preference. Only a qualified electrician or machine service technician should perform any maintenance, repairs or adjustments on this equipment.

WARNING!

ONLY QUALIFIED ELECTRICIAN OR SERVICEMAN SHOULD PERFORM ANY ELECTRICAL TROUBLESHOOTING OR MAINTENANCE TO THIS EQUIPMENT.

DO NOT PERFORM ANY MAINTENANCE, REPAIRS OR ADJUSTMENTS ON THIS EQUIPMENT WITHOUT FIRST LOCKING OUT ALL ELECTRICAL CONTROLS.

PERSONNEL SHOULD BE TRAINED IN OSHA COMPLIANT LOCK-OUT/TAG-OUT AND ELECTRICAL SAFETY PROCEDURES.

MAKE CERTAIN THAT THE POWER SUPPLY IS DISCONNECTED BEFORE ATTEMPTING TO SERVICE OR REMOVE ANY COMPONENTS!

AT NO TIMES SHOULD CIRCUIT CONTINUITY BE CHECKED BY SHORTING TERMINALS WITH A SCREWDRIVER OR OTHER METAL DEVICE.

NEVER SHOULD ADJUSTMENTS, MAINTENANCE OR CLEANING BE PERFORMED WITHOUT FOLLOWING PROPER SAFETY PROCEDURES IN ACCORDANCE WITH LOCAL, STATE AND NATIONAL SAFETY CODES.

Before making any electrical connections be certain the voltage for which the conveyor drive and control are wired is the same as incoming voltage being delivered by the electric power supply. Failure to do so may result in injury or damage to the equipment. It may be necessary in the case of 220/440V, 3 phase, for example, to change the motor wiring from one voltage to another. Normally a wiring diagram is located inside the motor terminal box, which indicates proper wiring for the incoming voltage supplied.

Some machines are equipped with internal electrical controls and a multi-pin type accessory plug for connecting the chip conveyor. Turbo Systems' chip conveyors can be ordered with a mating plug, so that connecting the conveyor is as simple as plugging it in.

The best and most common source of power for the chip conveyor is the machine electrical cabinet. It is the customer's responsibilities at the time of order to determine what, if any, electrical components are present and/or order the appropriate conveyor control.

Even if the machine has no plug or other provision for connecting a chip conveyor, the conveyor should be ordered from Turbo Systems Inc. with both halves of a quick-disconnect style plug. One half will come pre-wired to the conveyor control cable. The other half of the plug will be wired to the machine electrical cabinet where it will be connected to the power supply. The chip conveyor can then be quickly unplugged for cleaning or service without having to disconnect "hard wired" connections.

Before starting the chip conveyor, check to be sure no tools, packing, or other material have been left on the belt or in the discharge opening. Start the conveyor and verify proper direction of belt travel. Reverse polarity if the belt is moving in the wrong direction. Check the rotation of the filter drum and backwash coolant pump. If either of these motors is running backwards, reverse the polarity. If the conveyor belt, filter drum or backwash pump runs backwards for an extended period of time it may result in the conveyor not operating effectively and/or cause damage to the conveyor.

FILTER CONTROL CIRCUIT SAFETY SWITCH

Starting with conveyor serial number 317313, a safety interlock switch stops filter drum operation whenever the hinged cover is opened and the start/stop switch has been left in the "start" position. The drum "jog" feature can be used with the cover open but only when the start/stop switch is in this "stop" position.

The above electrical feature has been added to reduce the possibility of injury when the cover is open for inspection or service of the filter drum.

TIME DELAY DEVICES

The use of a time delay device is prohibited on a Microfine® Conveyor. If the conveyor is not running when the machine tool is cutting chips it may cause a large chip build up in the conveyor frame. When the conveyor is finally turned on it may not be able to handle the chip load. This condition may cause belt, frame and/or filter damage to the Microfine® Conveyor. It is imperative that the Microfine® Conveyor is operating continuously whenever the machine tool is cutting chips. Turbo will not be responsible for damage caused to the conveyor when a time delay device is being used.

AC SUPPLY CIRCUIT AMP LOAD FOR MICROFINE® CONVEYORS

Your Turbo Systems' chip conveyor may be equipped with an AC motor and a variable speed AC inverter control unit. The full load amp draw of the AC drive is based on the horsepower of the AC motor, as well as the input AC voltage. The Turbo Systems' MICROFINE® model, is equipped with an AC drum drive motor and may be equipped with an optional AC backwash pump. These motors will place an additional load on the AC power supply circuit.

The conveyor motor control circuit is not separately fused. The customer must provide a circuit breaker or a fused disconnect switch on the power supply to the conveyor

It may be necessary to change a circuit protection device on the incoming power supply line to accommodate the higher full load amp draw. Refer to the following tables to determine the full load amp draw on the AC supply circuit:

Table 1. The Conveyor is equipped with an AC conveyor drive motor and with an AC drum filter drive motor, and optionally with an AC pump motor.

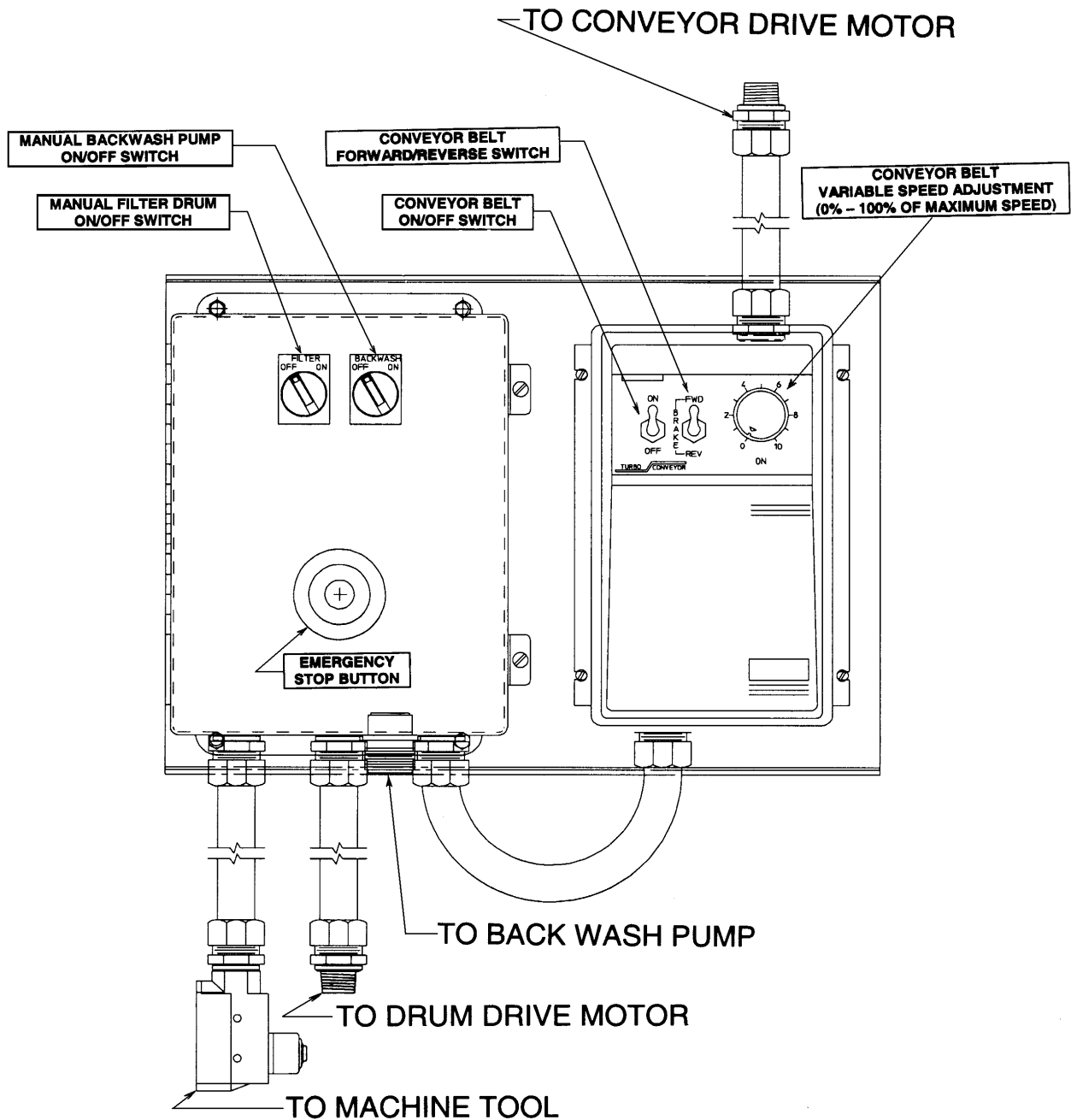
AC CURRENT REQUIREMENTS FOR MICROFINE® CONVEYORS

Voltage 3 Phase	Belt Drive Type	Belt Drive Horsepower	Backwash Pump	Current per phase at Rated Load	Recommended Overload Relay Setting 150% x Rated Current
230VAC	Fixed Speed	¼	No	1.03A	1.55A
460VAC	"	¼	No	0.61A	0.92A
230VAC	Variable Speed	¼	No	1.19A *	1.79A
460VAC	"	¼	No	0.69A *	1.04A
230VAC	"	¼	Yes	2.92A *	4.38A
460VAC	"	¼	Yes	1.69A *	2.54A

* 84% average inverter efficiency

Note: The variable speed control should not be used as an ON-OFF switch. Only the ON-OFF switch or the REV-STOP-FWD switch should be used to turn the conveyor motor on or off.

TYPICAL MICROFINE® ELECTRICAL CONTROL



TYPICAL MICROFINE® ELECTRICAL SCHEMATIC

