

Cable Granulator and Separator

Operator's &
Maintenance
Manual



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Introduction

This manual provides information and suggestions regarding the safe operation of the Strip Technology, Incorporated (Strip-Tec) Cable Granulator and Separator system.

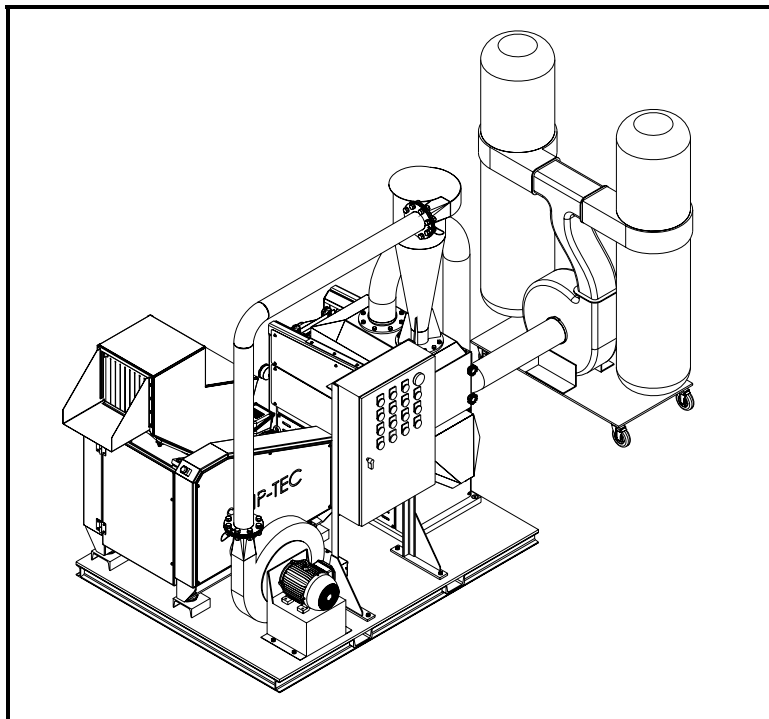
The information contained in this manual is known to be correct and accurate to the best knowledge of Strip-Tec at the time of publication. This manual is not intended to take precedence over existing plant safety rules and regulations, OSHA rules and regulations, and/or individual component manufacturer's operating procedures and safety procedures.

Strip-Tec and any and all associated companies cannot be held liable for lack of or unintended errors and/or omissions in this publication, improper safety precautions taken by the operator, and/or improper training regarding proper operating and maintenance procedures and safety guidelines.

This manual is subject to change without notice. Questions regarding the information contained within this manual should be directed to:

Strip Technologies, Inc.

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Fort Worth, TX 76106
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Operator Qualifications

Safe and efficient operation of the Strip-Tec Cable Granulator and Separator system requires the exercise of extreme care and good judgment, alertness and concentration, and a rigid adherence to proven safety rules and practices as outlined in applicable and current ANSI and OSHA safety standards.

No person should be permitted to operate the Cable Granulator and Separator system:

1. Who cannot read and understand printed instructions;
2. who is not of legal age to operate this type of equipment;
3. Whose hearing or eyesight is impaired (unless suitably corrected – with good depth perception);
4. Who may be suffering from a heart condition or other ailments which could interfere with the operator's safe performance;
5. Unless the operator has carefully read and studied this Operator's and Maintenance Manual;
6. Unless the operator has been properly instructed;
7. Unless the operator has demonstrated his instructions through practical operation.

Safety

The information contained in this manual has been compiled to help an operator safely and effectively operate the Cable Granulator and Separator system. All safety rules and practices outlined by ANSI or OSHA must be observed at all times. Always stay alert to possible safety risks and if in doubt, stop and consult a supervisor.

WARNING

Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to performing any inspection or maintenance.

System Specifications

The following table details the specifications of the Cable Granulator and Separator system. Review the specifications carefully prior to placing the system in service to insure the application does not exceed the system's specifications.

Dimensional Information	
Overall Length of System (inches) – Not including dust collector	8' – 3"
Overall Width of System (inches) – Not including dust collector	5' – 6"
Overall Height of System (inches)	8' – 1.5"
Overall Weight of System (pounds)	5,500
Operational Information	
System Capacity (pounds/hour)	500
Maximum Wire Size	6.5 AWG
Maximum Copper Core Diameter (inches)	0.157
Maximum Wire Length (inches)	18
Standard Granulator Power (hp)	20
Optional Granulator Power (hp)	30
Pneumatic Conveyor Blower Power (hp)	3
Shaker Table Drive Motor Power (hp)	½
Shaker Table Blower Motor Power (hp)	1
Dust Collector Motor Power (hp)	3
Electrical Information	
Input Voltage (volts)	230
Required Service Capacity (amps)	100
Number of Emergency Stops	3
Number of Limit Switches	2

Table 1 – Cable Granulator and Separator Specifications

Intended Use

The Strip-Tec Cable Granulator and Separator system was designed specifically to granulate and sort copper core cable and wire no larger than 6.5 AWG. The system is capable of granulating and sorting aluminum wire but aluminum processing greatly increases the wear on the cutting blades. If processing aluminum, maintain at least one spare set of cutting blades and change the knives as soon as quality of the material from the granulator decreases. This system is not recommended to granulate and sort:

- Mixed cable types with both large and small wire.
- Mixed cable types with both Cu I and Cu II.
- Non-ferrous metal cables containing lead.
- Flexible wire products.

Major Sub-Systems General Overview

The Strip-Tec Cable Granulator and Separator system can be divided into six (6) major sub-systems, as illustrated in Figure 1.

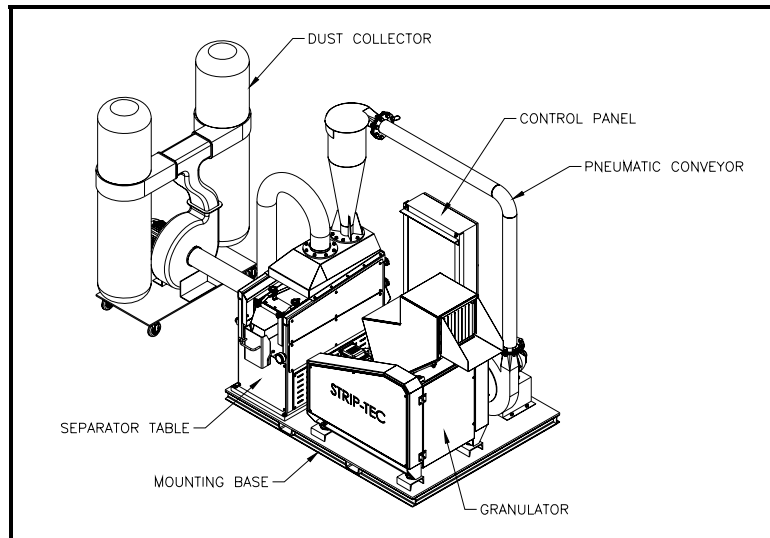


Figure 1 – Cable Granulator and Separator Major Sub-Systems

These six major sub-systems can be broken down further by functional components:

- Mounting Base
- Granulator
 - Main Granulator Structure
 - Granulator Infeed
 - Grinding Mill Housing and Components
 - Catch Tray
 - Drive Components
 - Limit Switches and Emergency Stop
- Pneumatic Conveyor
 - Blower Assembly
 - Piping
 - Cyclone
- Separator Table
 - Main Separator Structure
 - Separator Table
 - Separator Table Drive System
 - Blower and Damper Mechanism
 - Product Discharge and Waste Chutes
 - Emergency Stop
- Dust Collector
- Control Panel
 - Control Panel Support Structure
 - Control Panel Lights and Buttons

- Emergency Stop
- Power Cable and Grounding

Each of the major sub-systems and functional components are described below.

Mounting Base

The mounting base provides a solid foundation for mounting all the sub-systems except for the dust collector. It is fabricated from steel beams and plate and has two channels designed to accept the forks from a forklift for convenient transportation. The top of the base plate has a raised lug pattern to help prevent slippage.

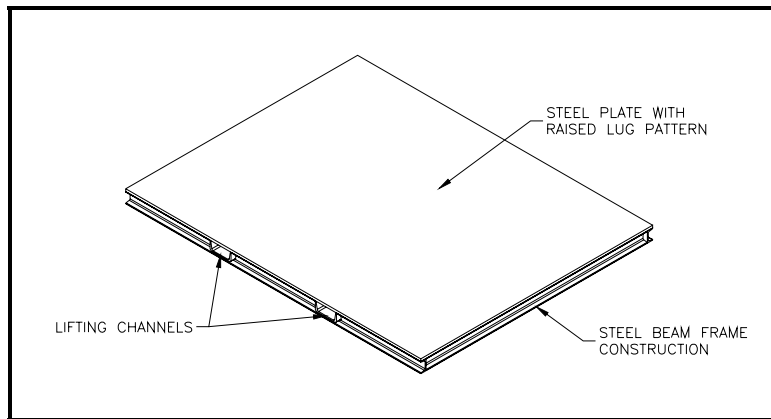


Figure 2 - Mounting Base

Granulator

The granulator's main functions are to provide an input location for wire and cable, and a means to granulate the wire and cable for separation. Each component of the granulator sub-system is designed to perform a given function.

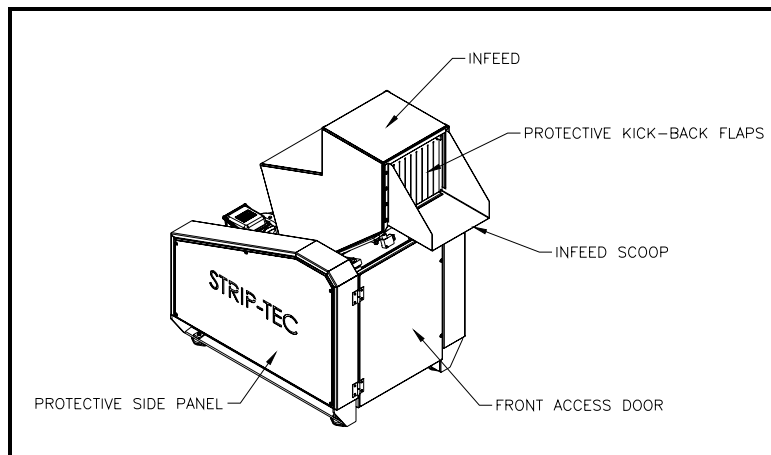


Figure 3 - Granulator

Main Granulator Structure

The main granulator structure is responsible for transferring the loads created during the granulation of product to the mounting base. The fabricated steel structure is designed to insure long life with minimal deflection. Access doors and protective panels are provided to protect the operator from moving components while still allowing access for maintenance.

Granulator Infeed

The granulator infeed is the point where product is fed into the granulator for processing. The infeed is configured to keep the operators hands and arms out of the cutting area. Rubber kick-back flaps have been installed on the input of the infeed to keep product from flying out of the granulator.

Grinding Mill Housing and Components

The grinding mill housing is a large steel structure that encases both the fixed and rotating blades that chop the wire and cable fed into the infeed. The blades, made from high strength tool steel, have been designed to withstand the high impact loads created during granulation. A flywheel mounted to the granulator rotor shaft helps reduce the loads experienced by the motor. A filter screen is located in the bottom of the grinding mill housing that retains product in the chopping area until it is small enough to be separated.

Catch Tray

A catch tray, located below the grinding mill housing, is used to catch product that passes through the filter screen and provide a staging area for transfer to the separator table.

Drive Components

The grinding mill rotor is powered by a squirrel cage, AC electric motor connected through a set of v-belts and sheaves. The components were selected to provide reliable power to the grinding mill rotor while helping to reduce the impact loading experienced at the motor.

Limit Switches and Emergency Stop

Limit switches have been installed on the front access door and on the infeed structure to help prevent operation of the unit with a non-secure grinding mill housing. The system will not operate without the limit switches being properly engaged. An emergency stop button has been located on the granulator, near the infeed, in case an immediate shutdown of the system is required.

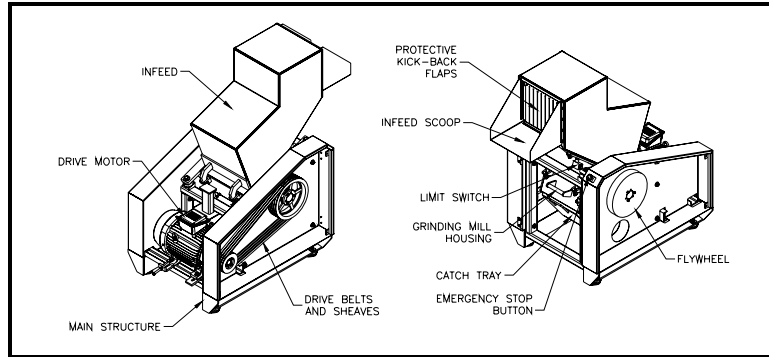


Figure 4 - Granulator without Covers

Pneumatic Conveyor

The pneumatic conveyor system transports the granulated product from the granulator and onto the separator table. The cyclone located at the end of the pneumatic conveyor also aids in the separation of the product.

Blower Assembly

The blower produces air pressure throughout the conveyor piping that is used to move the product from the granulator to the separator. The blower is driven by a powerful industrial AC motor.

Piping

The piping provides a path for the product to be transported, from the granulator and into the separator.

Cyclone

The cyclone reduces air pressure at the outlet of the conveyor system while providing an obstacle to flow, helping to further separate the product from the waste.

Separator Table

The separator table is responsible for separating the copper core from the remainder of the cable and wire. The copper is transported to one side of the separator table, where it is collected. The remaining, unwanted parts of the wire and cable are transported to the opposite end of the separator table where they are collected.

Main Separator Structure

The main separator structure is responsible for transferring the loads created during separation of the product to the mounting base. The fabricated steel structure is designed to insure long life with minimal deflection. Access doors and protective panels are provided to protect the operator from moving components while still allowing access for maintenance.

Separator Table

The separator table is designed and configured to provide agitation and air flow to create an environment to separate the product from the waste. The table is manufactured from steel plates, providing a durable surface for long life.

Separator Table Drive System

The drive system for the separator table generates the oscillatory motion of the shaker table. A drive motor powers a sheave and belt system that drives an eccentric bearing system connected to the shaker table.

Blower and Damper Mechanism

The blower and damper mechanism provide an updraft into the shaker table to help separate the product from the waste. An adjustable damper system allows the operator to adjust the flow and cleanliness of the product as desired.

Product Discharge and Waste Chutes

Product discharge and waste chutes are located at opposite ends of the shaker table assembly to provide convenient means of collecting the product and waste. A hanging product bin provides a convenient location for the product to collect during separation while the waste chute conveniently discharges waste into a standard five gallon bucket.

Emergency Stop

An emergency stop button has been located on the side of the separator table in case an immediate shut-down of the system is required.

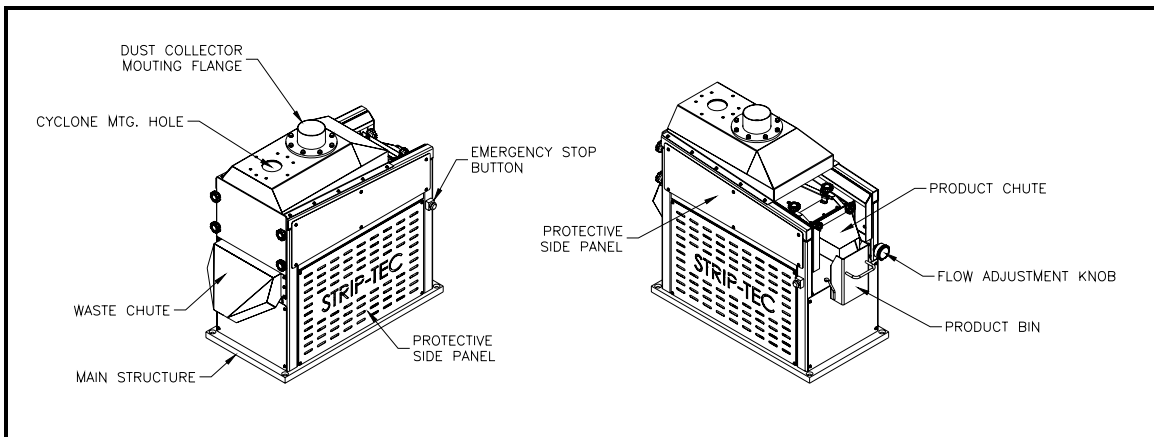


Figure 5 - Separator Table

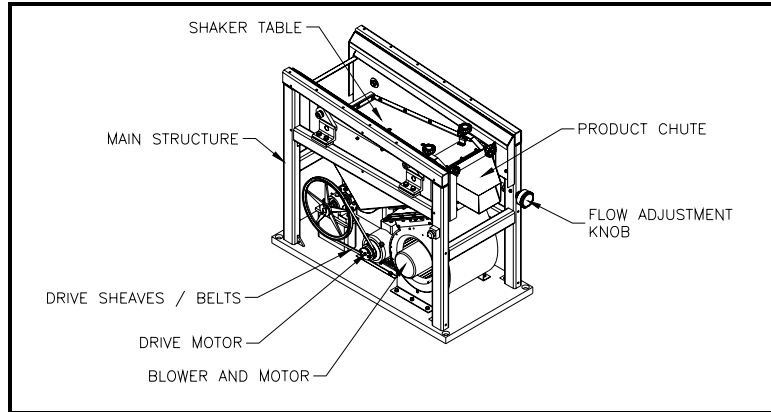


Figure 6 - Separator Table without Covers

Dust Collector

The dust collector system draws off dust particles generated during the process of granulating, conveying, and separating the product. The dust collector system captures the dust in bags for convenient disposal.

Control Panel

The control panel provides a centralized control center for the operator. Almost all of the electronic control devices are housed inside the control panel for convenient access.

Emergency Stop

An emergency stop button has been located on the front face of the control panel in case an immediate shut-down of the system is required.

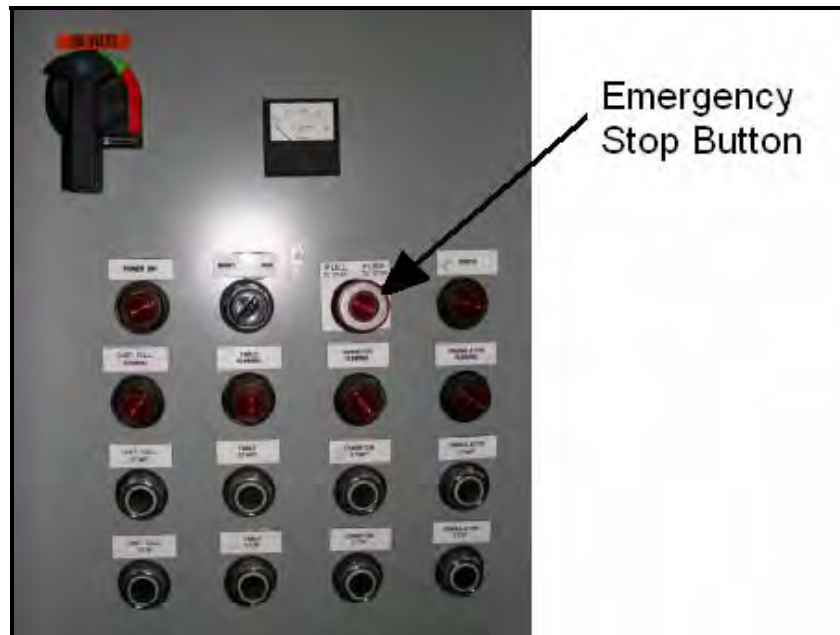


Figure 7 - Control Panel Emergency Stop Button

Power Cable and Grounding

Power cables are run from the control panel to the various motors, limits, and emergency stop buttons through a series of cable trays. These trays help protect the cables and wires from accidental damage.

All equipment is grounded to the base to help prevent the build-up of static charge and reduce the likelihood of electric shock.

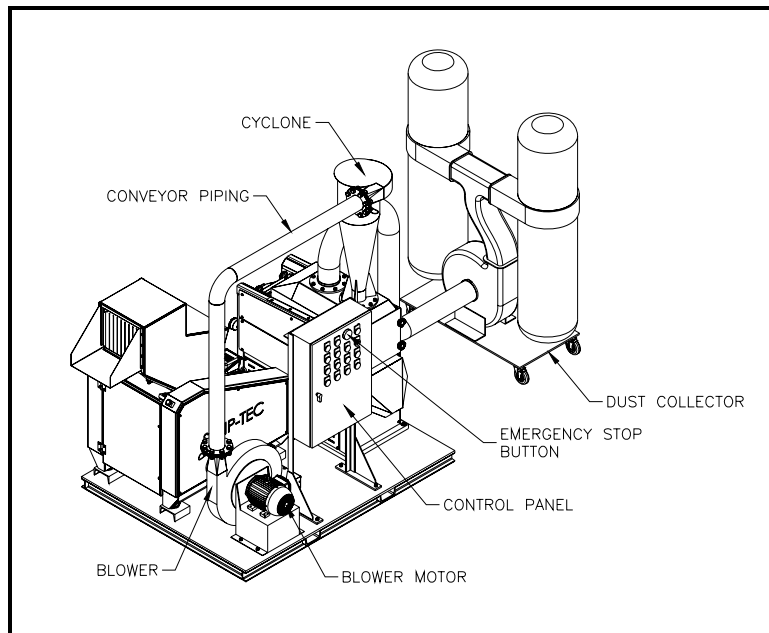


Figure 8 - Pneumatic Conveyor Components, Control Panel, and Dust Collector

Initial Installation and Periodic Maintenance

To keep the Strip-Tec Cable Granulator and Separator system safe and efficient, it is important to follow the correct installation and periodic maintenance found in this section. Failure to follow these recommendations can cause serious injury and/or machine failure.

Initial Installation

The Strip-Tec Cable Granulator and Separator system requires minimal installation prior to operation of the unit, but it is very important that all installation procedures be completed prior to operation of the unit. Failure to do so can cause serious injury and/or machine failure.

⚠ WARNING

Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to performing any installation or maintenance.

CAUTION

Always wear appropriate hearing protection and eye protection when installing or maintaining the Cable Granulator and Separator system.

The Strip-Tec Cable Granulator and Separator system is shipped partially disassembled in order to protect the equipment from damage during shipping. Install the equipment in a well-lit location, free from excessive noise, distraction, or pedestrian and/or vehicle traffic.

The initial installation of the Strip-Tec Cable Granulator and Separator system will follow these steps:

- Gather all required tools and equipment
- Unpack and inspect the Strip-Tec Cable Granulator and Separator system
- Install the Cyclone
- Install the Pneumatic Conveyor Pipe
- Install and Check all Ground Cables
- Install the Dust Collector System
- Install the Infeed Scoop
- Inspect the Granulator Blade Gap, Bolts, and Drive System
- Inspect the Granulator Flexible Hose
- Inspect the Separator Table Drive System
- Set the Separator Table Damper Mechanism
- Connect Main Power
- Perform Emergency Stop Tests
- Check for Correct Motor Rotational Direction

Required Tools and Equipment

Some tools and equipment will be needed during the initial installation of the Strip-Tec Cable Granulator and Separator system:

- Safety Glasses
- Hearing Protection
- Steel Toed Boots
- Protective Gloves
- Inch Series Allen Wrench Set
- Adjustable Wrench
- Set of Inch Series Wrenches
- 370 ft-lb Torque Wrench
- Wire Crimps and Cutters
- Phillips Head and Flat Head Screw Drivers
- Set of Feeler Gages

Unpack and Inspect

Carefully unpack all items and inspect for damage that may have occurred during shipping. If damage has occurred during shipping, then document the damage with photos and call the factory.

Move all loose pieces of equipment away from the main assembly so they will not create a tripping hazard.

Insure the base is sitting on a level, solid foundation. For the Strip-Tec Cable Granulator and Separator system to function properly, it is important that the base be fully supported.

WARNING

Be extremely cautious during transport of the granulator system. The equipment is unbalanced and may cause tipping. Lift the system with the granulator located nearest to the forklift.

CAUTION

Some of the Strip-Tec Granulator and Separator components are heavy and should be lifted by two persons. Do not attempt to lift any of the components by yourself. Injury could result from lifting the components alone.

Cyclone Installation

The cyclone must be installed on top of the separator table with the inlet facing towards the pneumatic conveyor blower. There is a guide chute assembly located inside the separator table that uses the same bolts to connect the cyclone. Remove the guide chute assembly and bolts, place the cyclone in place on top of the separator table, replace the guide chute assembly, and install all bolts. The bolts should be tightened to 900 in-lbs (75 ft-lbs).

CAUTION

The cyclone is heavy and should be lifted by two persons. Do not attempt to lift the cyclone by yourself. Injury could result from lifting the cyclone alone.

Pneumatic Conveyor Pipe Installation

The pneumatic conveyor pipe must be connected between the outlet of the pneumatic conveyor blower and the inlet of the cyclone. Install a flange gasket on both ends of the pneumatic conveyor pipe, on the outlet fo the pneumatic

conveyor blower, and the inlet of the cyclone. Lift the conveyor pipe into the position shown in the figure and install a Hex Head, $\frac{3}{4}$ -10 UNC x 2 $\frac{1}{4}$ LG, Grade 5 bolt through the flanges with two $\frac{3}{4}$ lockwashers and a $\frac{3}{4}$ -10 UNC, Grade 5, Hex Head Nut through all flange holes. Tighten the bolt assembly to 3,000 in-lbs (250 ft-lbs).

⚠ CAUTION
The pneumatic conveyor pipe is heavy and should be lifted by two persons. Do not attempt to lift the pneumatic conveyor pipe by yourself. Injury could result from lifting the pneumatic conveyor pipe alone.

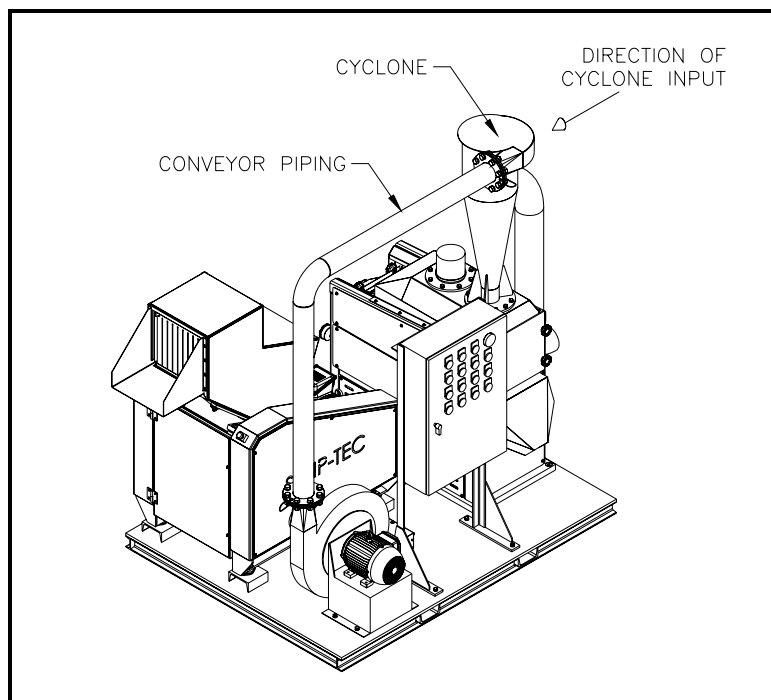


Figure 9 - Cyclone and Pneumatic Conveyor Pipe Assembly

Install and Check All Ground Cables

Install a ground cable from the output flange of the pneumatic conveyor blower to the corresponding flange on the pneumatic conveyor pipe and from the input flange of the cyclone to the corresponding flange on the pneumatic conveyor pipe. Use a Hex Head, $\frac{1}{4}$ -10 UNC x $\frac{1}{2}$ " LG, Grade 5, Bolt to connect the ground wire to the flange.

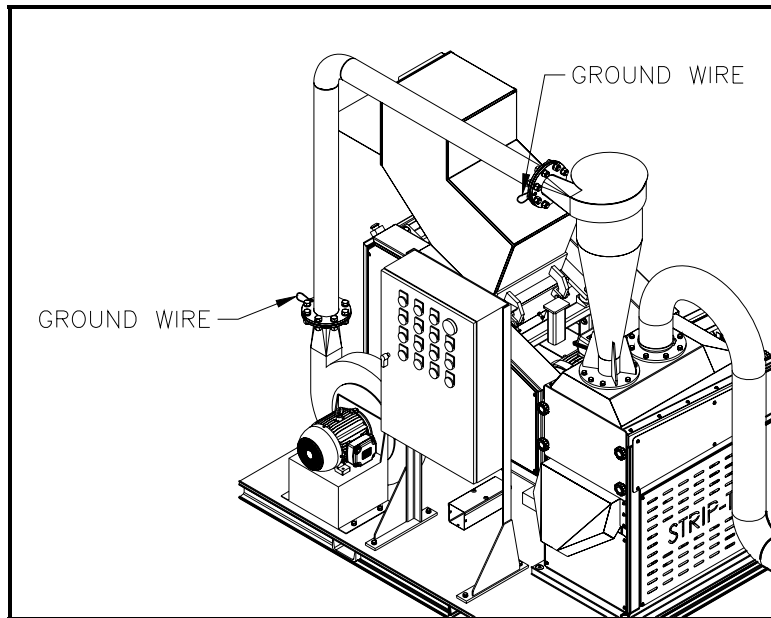


Figure 10 - Ground Wire Installation - Pneumatic Conveyor Pipe

Inspect the granulator and insure a ground wire is connecting the main structure of the granulator to the mounting base.

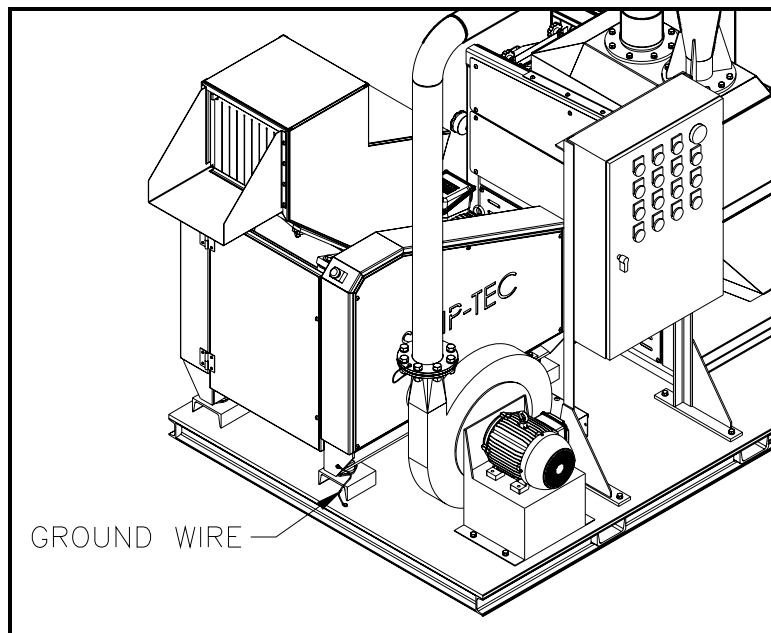


Figure 11 – Granulator Ground Wire Inspection

Install the Dust Collector System

Assembly instructions for the dust collector system are located with the dust collector components. Follow all instructions for assembling the dust collector. Connect the dust collector inlet on the dust collector blower to the dust collector outlet on the separator table with the provided 6 inch flexible hose and hose clamps.

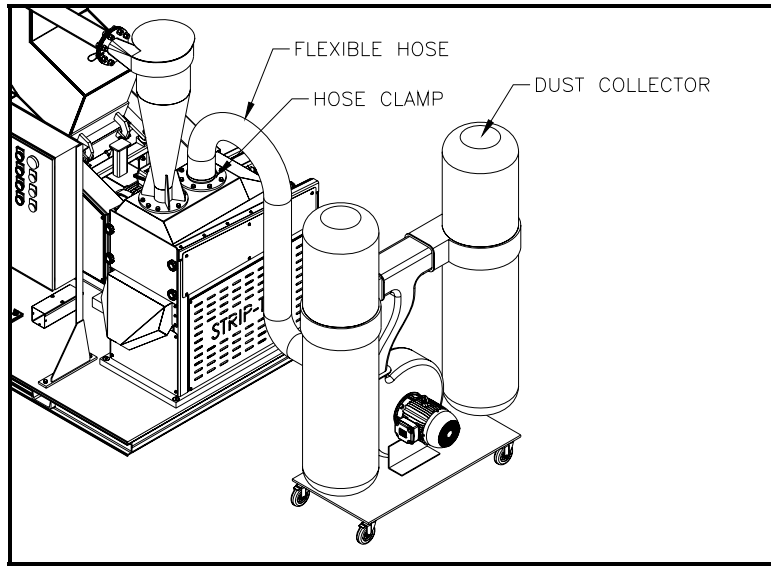


Figure 12 - Dust Collector Installation

Install the Infeed Scoop

Install the infeed scoop on the front of the infeed using 3/8-16 X 3/4 Long, button head cap screws.

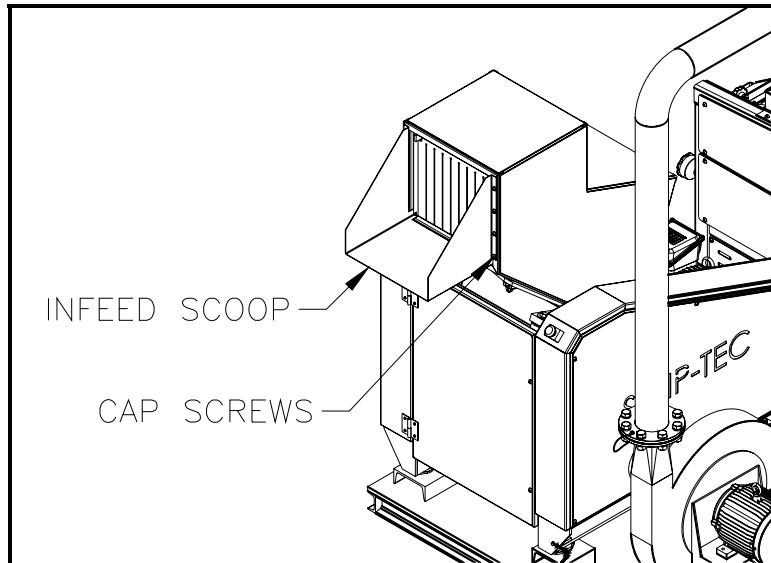


Figure 13 - Infeed Scoop Installation

Inspect the Granulator

Prior to operation of the granulator, it is very important that the blades be checked for correct gap settings and bolt tightness. In addition, the drive system should be checked for proper tightness and operation.

⚠ WARNING

Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to performing any inspection or maintenance.

To access the granulator blades:

- Open the front access door to the granulator by removing two button head cap screws as shown.
- Remove the retaining nut and washer to the infeed structure and tilt the infeed structure back until it rests on the support bracket
- Remove the side panel covering the sheaves and belts of the drive system by removing five button head cap screws.

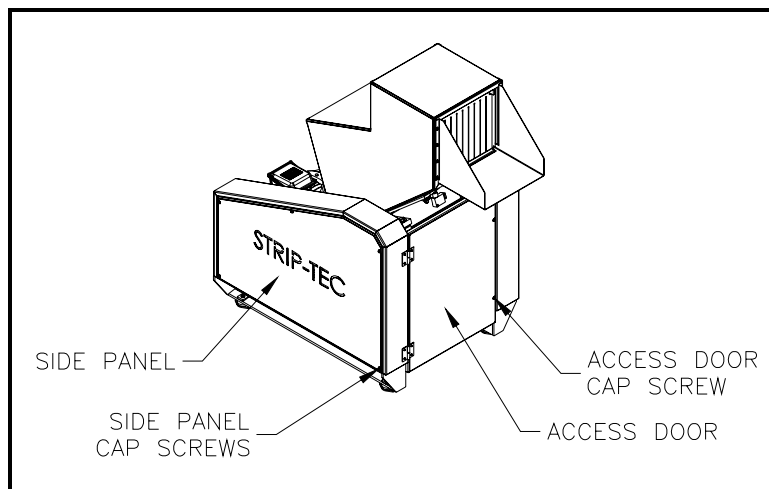


Figure 14 - Granulator Access Door and Side Panel - Closed

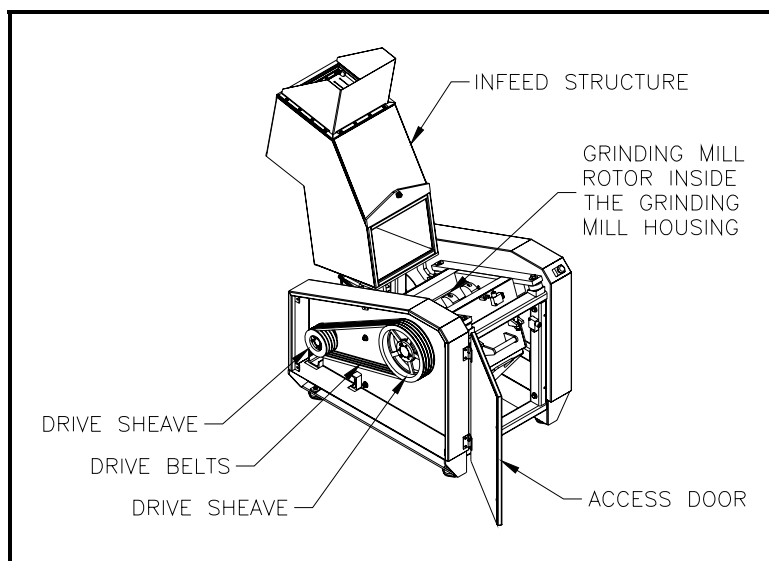


Figure 15 - Granulator Opened for Inspection

Inspect the following items on the granulator:

1. Carefully rotate the grinding mill rotor assembly at least one complete revolution, by hand, to insure the drive system and grinding mill rotates freely.
2. With feeler gages, check the gap between all three rotating blades and the two fixed blades (six sets of measurements). The gap between the rotating and fixed blades should be 0.010 inches.
3. With a torque wrench, turn all the bolts on the rotating and fixed blades as if tightening. Turn the bolts until the torque wrench reads 4,200 in-lbs (350 ft-lbs). The bolts should not move.
4. Inspect the tightness of the drive system belts by pulling up on the belts in the middle, between the two sheaves. The deflection of each belt in the center should be approximately 7/16 of an inch.

Note: refer to the appendix for complete instructions on how to inspect the drive system belts.

Inspect the Granulator Flexible Hose

A flexible hose connects the catch tray of the granulator to the blower of the pneumatic conveyor system. Inspect the hose and insure the hose clamps are securely fastened at both ends.

Re-install the side panels using the button head cap screws, lower the infeed structure into place and secure with the nut and washer, and close the front access door and secure with the button head cap screws.

Inspect the Separator Table Drive System

Remove the side panel by removing the button head cap screws as shown.

 WARNING
Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to performing any inspection or maintenance.

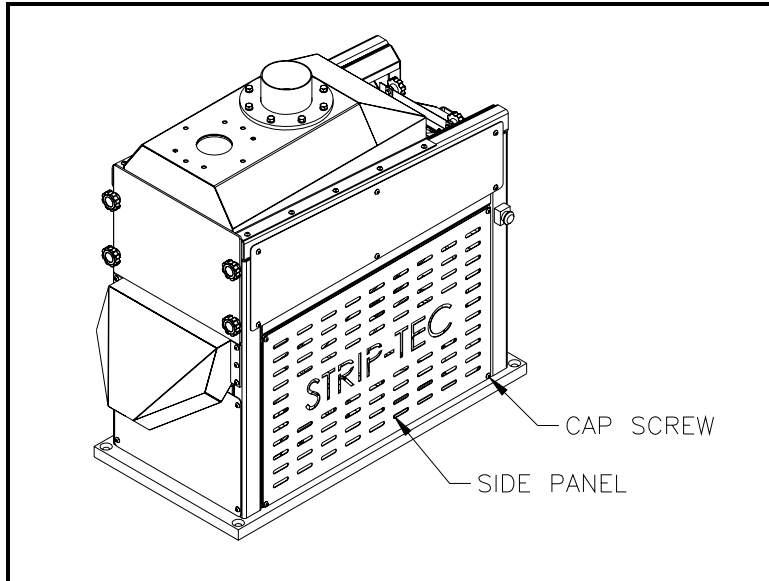


Figure 16 - Separator Table Side Panel - Closed

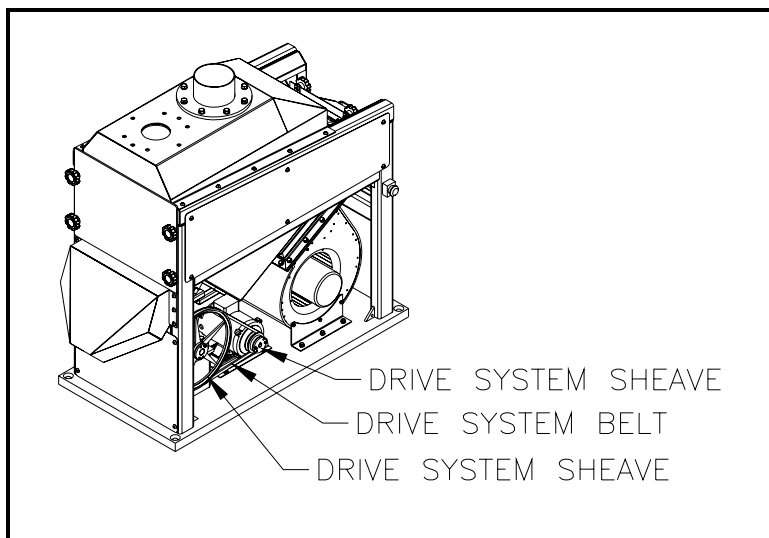


Figure 17 - Separator Table Opened for Inspection

Inspect the following items on the separator table drive system:

1. Carefully rotate the drive system at least one complete revolution, by hand, to insure the drive system and separator table move freely.
2. Inspect the tightness of the drive system belt by pulling up on the belt in the middle, between the two sheaves. The deflection of the belt in the center should be approximately 3/16 of an inch.

Note: refer to the appendix for complete instructions on how to inspect the drive system belts.

Re-install the side panel using the button head cap screws.

Set the Separator Table Damper Mechanism

Preset the damper mechanism for the slowest separation speed by turning the flow adjustment knob clockwise until the dampers are fully closed. Adjustments to the separating speed can be made after the unit is operational.

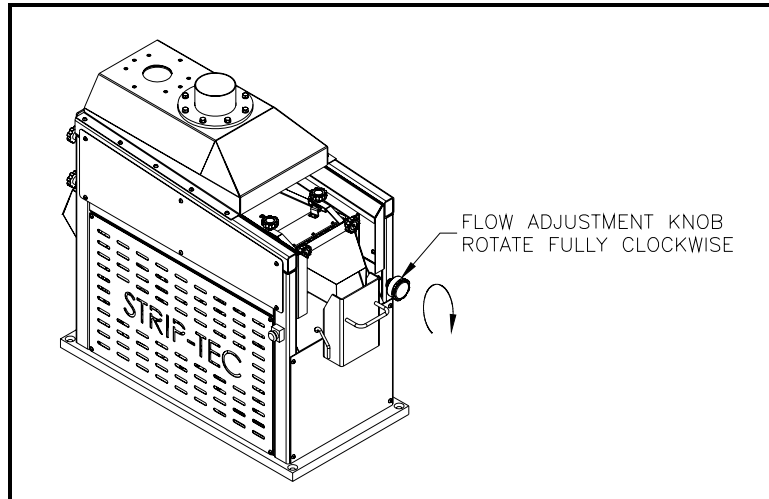


Figure 18 - Setting the Damper Mechanism

Connect Main Power

Using a certified electrician, connect the main supply power to the control panel of the Strip-Tec Cable Granulator and Separator system. Insure the supply service is 230 volt, 100 amp rated.

Perform Emergency Stop Test

Using a certified electrician, perform a functional check on all emergency stop buttons to insure they are functioning correctly.

Check for Correct Motor Rotational Direction

For the Strip-Tec Cable Granulator and Separator system to function correctly, both the granulator and separator table drive systems must be rotating in the correct direction. To see the rotation of the granulator drive belts, the protective side panel will have to be removed. The rotation of the shaker table drive belts can be viewed through the slots in the protective side panel.

⚠ WARNING

Do not touch the drive belts of the granulator or separator system while power is supplied to the control panel. Touching the belts while operating can result in serious injury.

Turn power on to each system, independently, and verify the units are operating in the correct direction of rotation according to the figure below. If they are

rotating in the opposite direction, then have a certified electrician change two of the legs from the main power line.

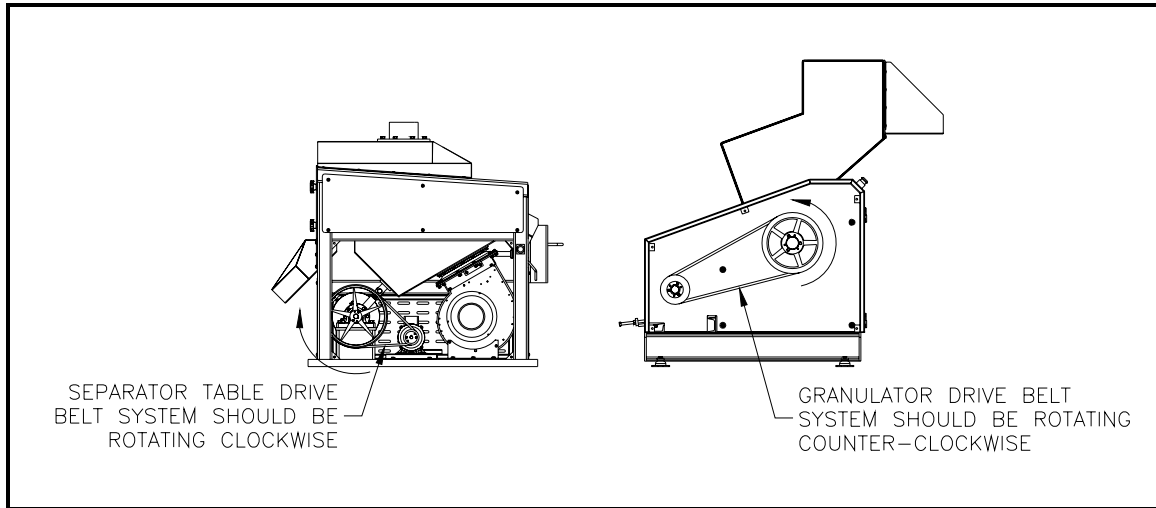


Figure 19 - Correct Motor Rotational Directions

Periodic Maintenance

To keep the Strip-Tec Cable Granulator and Separator system functioning safely and correctly, it is important to provide proper maintenance to all components of the machine. This section will detail the required maintenance of the Strip-Tec Cable Granulator and Separator system and instructions on how to perform the maintenance. The maintenance section is broken down into:

- Schedule
- Lubrication Points
- Drive System
- Granulator Blades
- Pneumatic Conveyor
- Dust Collector

⚠ WARNING
Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to performing any inspection or maintenance.

Schedule

The following schedule details the minimum maintenance required to keep the Strip-Tec Granulator and Separator system operating reliably and efficiently.

Frequency	Task
Every Shift	<ul style="list-style-type: none"> • Empty the dust collector and clean the filter bags (simply shake or strike the filter bags while attached to the machine to clean). • Empty the product collection bin and waste bin.
Every Other Shift	<ul style="list-style-type: none"> • Clean the inner surfaces of the separating table (where product is sorted). • Check the fixed and rotating blades.
Weekly	<ul style="list-style-type: none"> • Inspect the control panel switches, buttons, and lights. • Make sure all protective covers are securely attached and that all safety equipment is correctly functioning. • Clean the inside of the granulator grinding mill housing. • Check the granulator blades for wear or damage. • Check for unusual sounds during operation of the system.
Monthly	<ul style="list-style-type: none"> • Check the granulator flywheel to make sure it is securely attached to the grinding mill rotor shaft. • Inspect the granulator and separator table drive systems. • Check for loose bolts on the machinery and tighten as needed.
Bi-Annually	<ul style="list-style-type: none"> • Lubricate all lubrication points with SKF LGWA 2 Extreme Pressure Lithium Complex grease or equivalent.

Table 2 - Maintenance Schedule

Lubrication Points

Six bearing lubrication points are located on the Strip-Tec Cable Granulator and Separator system, two inside the granulator and four inside the separator table.

To access the bearing lubrication points on the granulator, open the front access door of the granulator. On both sides of the grinding mill are grease fittings that provide a means to re-grease to the grinding mill rotor bearings. Apply the appropriate bearing grease as specified in the Schedule section.

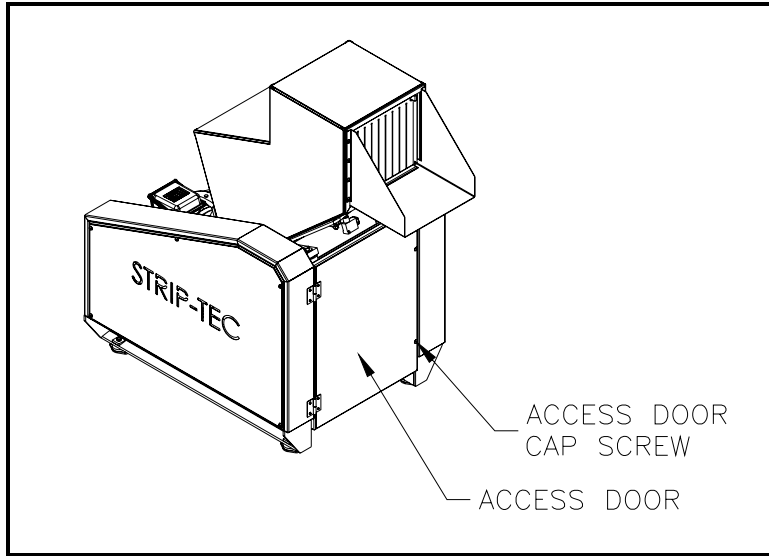


Figure 20 - Granulator Access Door – Closed

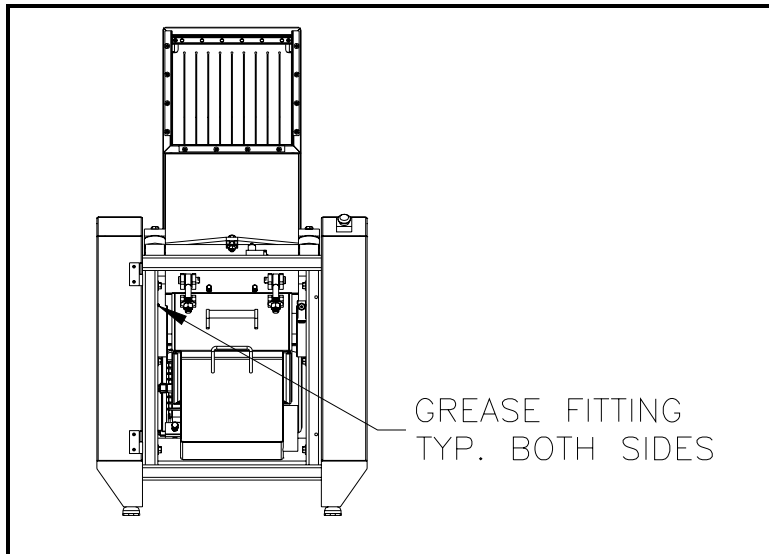


Figure 21 - Granulator Lubrication Points

To access the bearing lubrication points for the separator table, remove the end panel as shown. Grease fittings are located on each of the pillow block bearings and on the eccentric bearing housing. Apply the appropriate bearing grease as specified in the Schedule section.

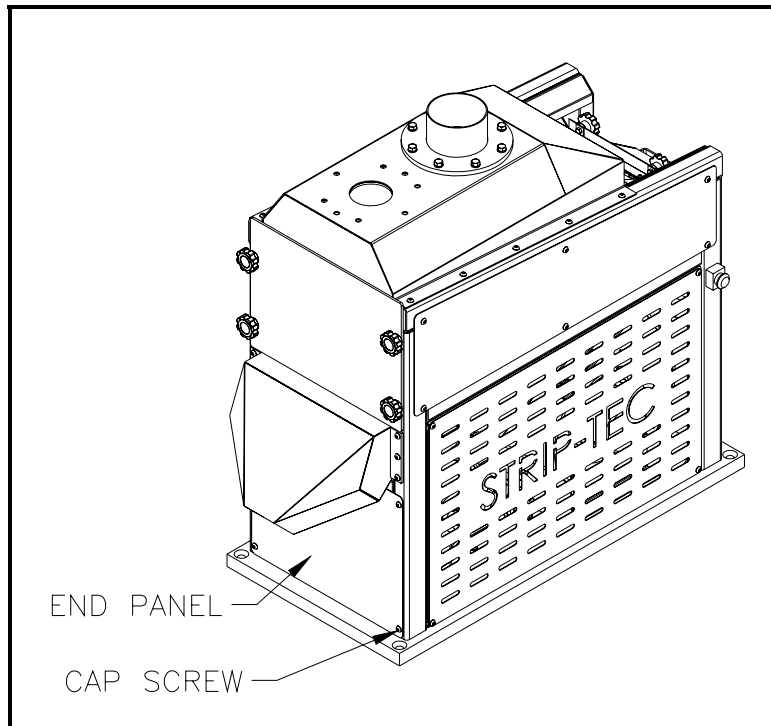


Figure 22 - Separator Table End Panel – Closed

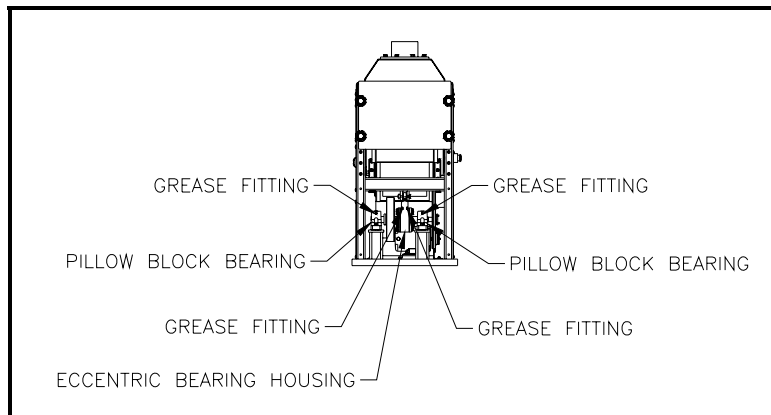


Figure 23 - Separator Table Lubrication Points

Drive System

Two drive systems can be found on the Strip-Tec Cable Granulator and Separator system, one driving the grinding mill rotor of the granulator and the other driving the eccentric of the separator table. Remove the side panels located on the granulator and separator table to gain access to the drive systems by removing all necessary cap screws. Refer to the Dodge installation instructions in the Appendix for detailed information on adjusting the drive systems.

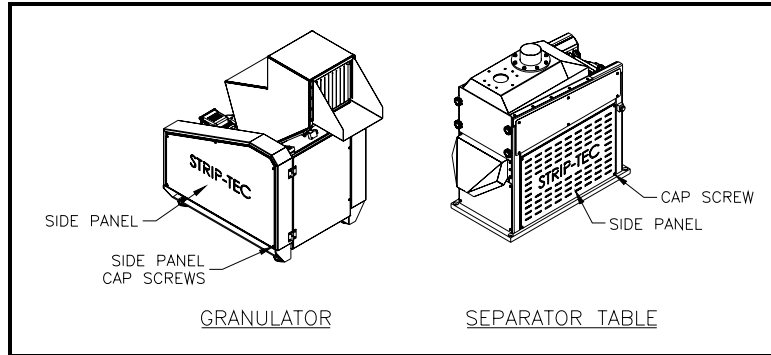


Figure 24 - Granulator and Separator Table Side Panels - Closed

Inspect the following on both drive systems:

Inspection	Corrective Action
Inspect the sheaves for foreign matter, such as dirt or rust.	Remove any foreign matter from the sheaves.
Inspect the sheave grooves for signs of wear or slippage. A worn sheave can result in a significant amount of power loss.	Replace any worn or damaged sheaves.
Inspect the belts for signs of wear or cracking.	Replace any belts showing signs of wear and/or cracking. Note: on the granulator, all belts must be replaced at the same time to insure proper operation.
Inspect the belts for the proper tightness. An over-tightened belt will produce excessive loads on the motor and grinding mill rotor. An under-tightened belt will slip and cause sheave and belt wear.	Set the belt tightness to the correct value. <ul style="list-style-type: none"> - For the 20 hp granulator belts, the installation deflection = 0.41" and the installation force = 5.7 to 6.6 lbs. - For the 30 hp granulator belts, the installation deflection = 0.41" and the installation force = 7.2 to 8.4 lbs. - For the separator table belts, the installation deflection = 0.18" and the installation force = 1.7 to 1.9 lbs.
Inspect the QD bushing bolts to insure they are tight.	Tighten any loose bolts.

Table 3 - Drive System Inspections and Corrective Actions

Granulator Blades

The granulator blades must be kept sharp and correctly adjusted for the granulator to function correctly. Dull or poorly adjusted blades will be unable to separate the copper from the plastic. To gain access to the granulator blades, you must:

- Open the front access door to the granulator by removing two button head cap screws.
- Remove the retaining nut and washer to the infeed structure and tilt the infeed structure back until it rests on the support bracket.
- Remove the flexible hose from the catch tray.
- Remove the catch tray.
- Loosen the nuts on the rod ends that hold the bottom half of the grinding mill housing in place. Lower the bottom half of the grinding mill housing to gain access to the fixed blade bolts.

Inspect the following on both the rotating and fixed blades:

Inspection	Corrective Action
Inspect the blades for signs of damage such as a crack or missing material on the blade edge.	Any blade with a crack longer than 1/8" or missing edge material larger than 1/8" should be sharpened. Refer to the maximum sharpening limits below.
Measure the gap between both fixed blades and all rotating blades. The gap should be 0.010".	Set all gaps between the rotating and fixed blades to 0.010". Set all rotating blades to one fixed blade and then set the gap on the second fixed blade. Refer to the directions on setting the blade gaps below.
Check all rotating and fixed blade bolts to insure they are tight.	Tighten any loose blade bolts using a torque wrench set to 4,400 in-lb (365 ft-lb).

Table 4 - Granulator Blade Inspections and Corrective Actions

Blade Sharpening Limits

The granulator blades must not be sharpened beyond the limits specified below.

 WARNING
<p>Do not sharpen the granulator blades beyond the specified limits. Sharpening beyond the specified limits could result in serious injury or damage to the granulator.</p>

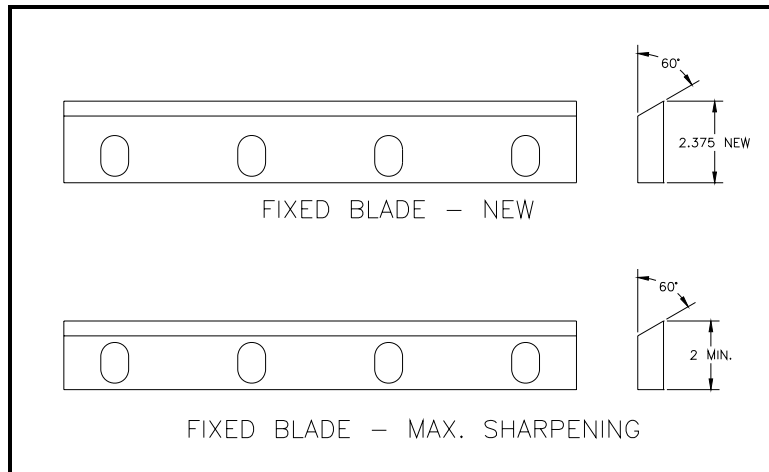


Figure 25 - Fixed Blade Sharpening Limits

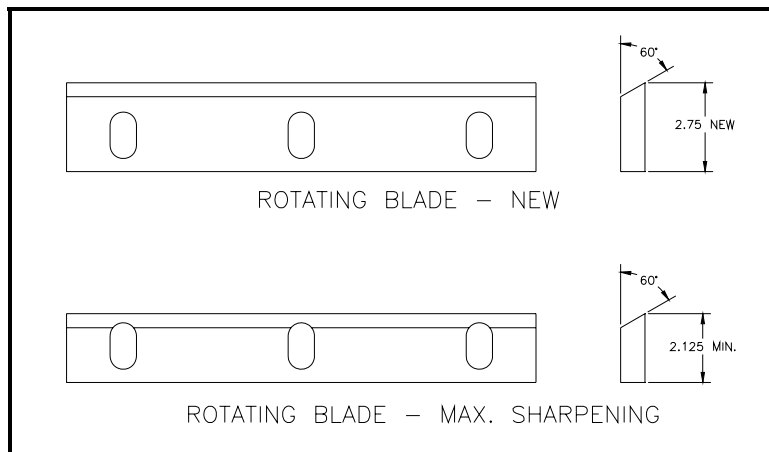


Figure 26 - Rotating Blade Sharpening Limits

Setting Blade Locations

Setting the proper blade gaps between the rotating and fixed blades is very important for proper functioning of the granulator. Follow this procedure to set the blade gaps:

- Set the rear fixed blade 0.25" from the inside edge of the grinding mill housing. Insure the blade distance is the same across the entire length of the blade. Use the adjusting screws located at the rear of the grinding mill housing to assist in setting the blade distance.
- Using a torque wrench, tighten the rear fixed blade bolts to 4,400 in-lb (365 ft-lb).
- Set the gap between each of the rotating blades to 0.010" from the edge of the rear fixed blade using a feeler gage. Insure the gap is the same across the entire length of the rotating blades.
- Using a torque wrench, tighten all the rotating blade bolts to 4,400 in-lb (365 ft-lb).
- Re-check the gap between all rotating blades and the rear fixed blade and make any necessary adjustments.

- Locate the front fixed blade by referencing one of the rotating blades. Set the gap between the front fixed blade and rotating blade to 0.010" using a feeler gage. Insure the gap is the same across the entire length of the blades. Use the adjusting screws located at the front of the grinding mill housing to assist in setting the blade gap.
- Using a torque wrench, tighten all the rotating blade bolts to 4,400 in-lb (365 ft-lb).
- Re-check the gap between all rotating blades and the both fixed blades and make any necessary adjustments.
- Slowly rotate the grinding mill rotor through at least one revolution to check for blade interference prior to operation of the unit. Readjust the blades as needed.

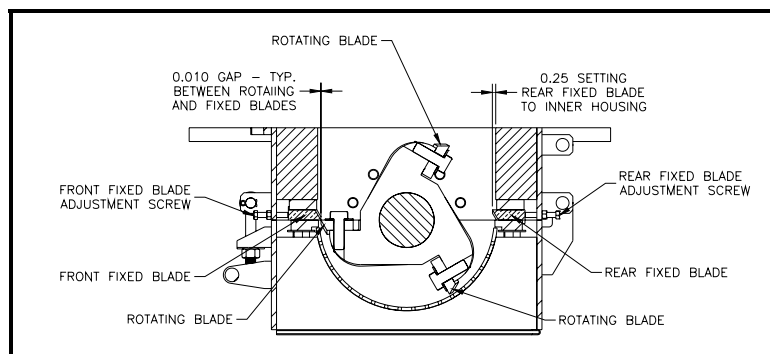


Figure 27 - Setting Blade Locations

Pneumatic Conveyor

Refer to the pneumatic conveyor blower maintenance manual located in the Appendix for inspection and maintenance requirements for the pneumatic conveyor blower.

Dust Collector

Refer to the dust collector maintenance manual located in the Appendix for inspection and maintenance requirements for the dust collector system.

Operation

This section details the proper operation of the Strip-Tec Cable Granulator and Separator system. It is very important that the operator fully understand and comply with all safety recommendations within this manual. Failure to do so could result in serious injury.

No person should be permitted to operate the Strip-Tec Cable Granulator and Separator system:

1. Who cannot read and understand printed instructions;
2. who is not of legal age to operate this type of equipment;
3. Whose hearing or eyesight is impaired (unless suitably corrected – with good depth perception);

4. Who may be suffering from a heart condition or other ailments which could interfere with the operator's safe performance;
5. Unless the operator has carefully read and studied this Operator's and Maintenance Manual;
6. Unless the operator has been properly instructed;
7. Unless the operator has demonstrated his instructions through practical operation.

Safety Precautions

At all times during operation of the Strip-Tec Cable Granulator and Separator system, safety rules and practices outlined by ANSI, OSHA, and this manual must be observed. Always stay alert to possible safety risks and if in doubt, stop and consult a supervisor.

Safety Equipment

It is important to wear the appropriate hearing and eye protection during operation of the Strip-Tec Cable Granulator and Separator system.

⚠ CAUTION
Always wear appropriate hearing protection and eye protection when operating the granulator and separator system.

Feeding In Product

All product fed into the granulator must be untangled and cut to an overall length of 18 inches or less. Cables and wires longer than 18 inches can be drawn rapidly into the granulator and "whip" the operator or pull the operator's hands and arms into the granulator.

⚠ WARNING
Wires and cables fed into the granulator must be shorter than 18 inches. Product that is longer than 18 inches can pull hands and arms into the granulator.

All product fed into the granulator must be of appropriate size and type. The Strip-Tec Cable Granulator and Separator system was designed specifically to granulate and sort copper core cable and wire no larger than 6.5 AWG. The system is capable of granulating and sorting aluminum wire but aluminum processing greatly increases the wear on the cutting blades. If processing aluminum, maintain at least one spare set of cutting blades and change the knives as soon as quality of the material from the granulator decreases. This system is not recommended to granulate and sort:

- Mixed cable types with both large and small wire.
- Mixed cable types with both Cu I and Cu II.
- Non-ferrous metal cables containing lead.
- Flexible wire products.

The cut-down wire can be combined into bundles that are shorter than 18 inches and no larger in diameter than 1 ½ inches.

Do not feed dirty or oily product into the Strip-Tec Granulator and Separator system. Dirty and oily wire cannot be separated and will contaminate the system, requiring an extensive cleaning effort to prepare the system for operation.

Do not put your hands, arms, or any other foreign object into the infeed of the granulator while the unit is in operation. A foreign object placed into the infeed can catch on the rotating blades and cause serious personal injury or damage to the granulator.

⚠ WARNING
Never put your hand, arm, or any foreign object into the infeed of the granulator while the unit is in operation. Any object placed into the infeed can get pulled into the rotating blades, causing serious injury or damage to the granulator.

If you need to clear the infeed of an obstruction, then:

- Disconnect and lock-out / tag-out all power to the system.
- Open the front access door to the granulator by removing two button head cap screws.
- Remove the retaining nut and washer to the infeed structure and tilt the infeed structure back until it rests on the support bracket.
- Clear the infeed structure as needed.

⚠ WARNING
Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to clearing any obstructions.

Never remove or open the rubber kick-back flaps located at the input of the infeed. These rubber kick-back flaps have been installed on the input of the infeed to keep product from flying out of the granulator.

Protective Panels

Never operate the Strip-Tec Cable Granulator and Separator system with any of the protective panels removed. These panels prevent the operator and other personnel from accidental contact with rotating equipment and charged electrical components.

⚠ WARNING
Never operate the Strip-Tec Cable Granulator and Separator system with any protective panels removed. Serious injury could occur due to contact with rotating equipment and/or charged electrical components.

Pinch Points

There are a number of pinch points located inside the separator table of the Strip-Tec Cable Granulator and Separator system. Do not place your fingers or hands inside the separator table during operation. If you must reach inside the separator table, then turn off all power to the system and wait for all movement to stop before reaching into the separator table.

Electrical Shock

Do not open the control panel or terminal box on any motors while power is supplied to the Strip-Tec Cable Granulator and Separator system. Serious injury due to electrical shock can occur. If you need to open the control panel, then shut-down the system and lock-out / tag-out all power to the system. Only a certified electrician should perform any type of work on the electrical components of the Strip-Tec Cable Granulator and Separator system.

⚠ WARNING
Disconnect and lock-out / tag-out all power to the Cable Granulator and Separator system prior to opening the control panel or any motor terminal boxes. Serious personal injury can occur caused by electrical shock.

Emergency Stop Buttons

There are three emergency stop buttons located on the Strip-Tec Cable Granulator and Separator system. One emergency stop is located on the control panel, one is located on the granulator, and one is located on the separator table. It is important to know where these are and to insure they are functioning correctly.

Granulating and Separating

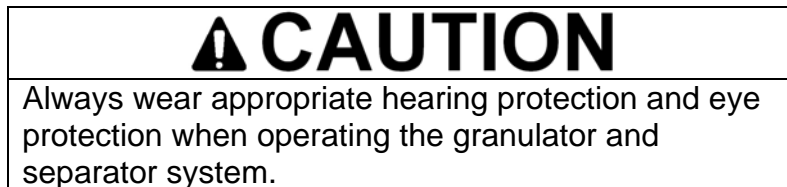
The Strip-Tec Cable Granulator and Separator system is a self-contained system that requires very little input from the operator.

Pre-Check

Before starting the Strip-Tec Cable Granulator and Separator system, walk around and visually inspect the equipment. Check to make sure:

- All protective panels are in place and securely fastened;
- The product bin has been emptied and is in the correct position;
- A bucket or box has been placed under the waste chute to catch waste from the granulating and separating process;
- The dust collector bags have been emptied;
- All flexible tubing is firmly attached to the equipment;
- There are no visible material jams;
- There are no apparent safety issues with the equipment.

Be sure to wear appropriate hearing and eye protection while operating the Strip-Tec Cable Granulator and Separator system.



Startup

It is important to start the Strip-Tec Cable Granulator and Separator system components in a particular order to reduce the possibility of a material jamb. Turn on the equipment in the following order:

1. Main Power
2. Dust Collector
3. Separator Table
4. Pneumatic Conveyor
5. Granulator

Shutdown

Shutdown of the Strip-Tec Cable Granulator and Separator system is opposite of the startup. Following the proper shutdown sequence will greatly reduce the chance of material jams. Turn off the equipment in the following order:

1. Granulator
2. Dust Collector
3. Separator Table
4. Pneumatic Conveyor
5. Granulator

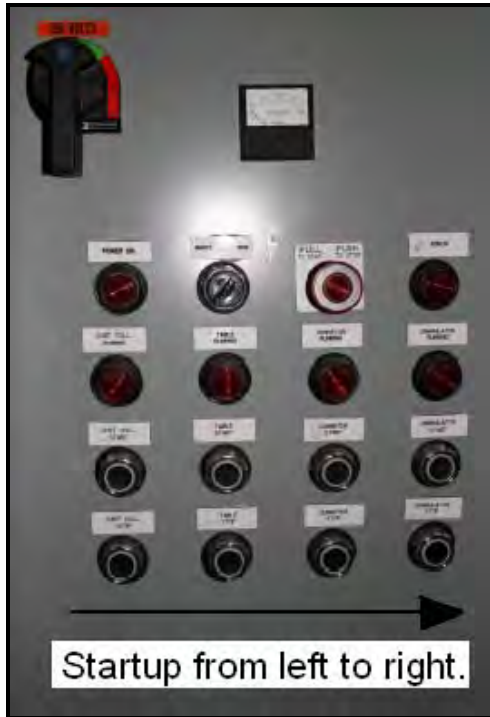


Figure 28 - Startup Sequence

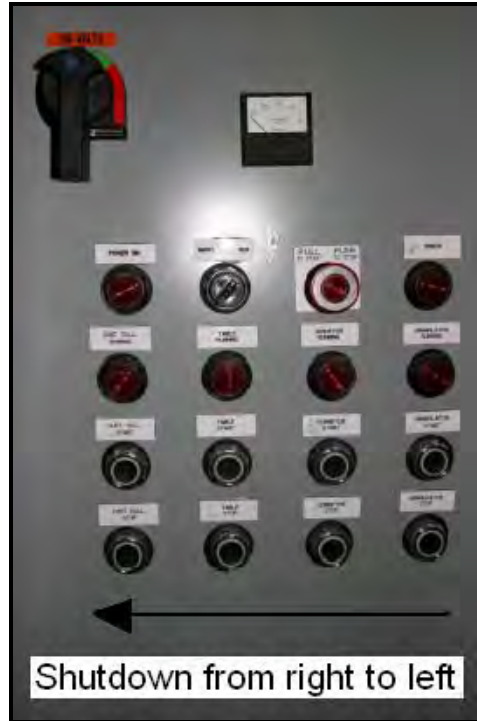


Figure 29 - Shutdown Sequence

Feeding In Material

It is important to follow all safety precautions listed previously while feeding material into the granulator. All product fed into the granulator must be untangled and cut to an overall length of 18 inches or less. Cables and wires longer than 18 inches can be drawn rapidly into the granulator and “whip” the operator or pull the operator’s hands and arms into the granulator.

<p>⚠ WARNING</p>
<p>Wires and cables fed into the granulator must be shorter than 18 inches. Product that is longer than 18 inches can pull hands and arms into the granulator.</p>

Feed product directly into the infeed structure. Make sure the rubber kick-back flaps are in place and completely covering the infeed opening.

Do not feed dirty or oily product into the Strip-Tec Granulator and Separator system. Dirty and oily wire cannot be separated and will contaminate the system, requiring an extensive cleaning effort to prepare the system for operation.

Collecting Material

Material is collected in the catch bin hanging from the separator table. Monitor the catch bin throughout the process and empty into a separate container as required.

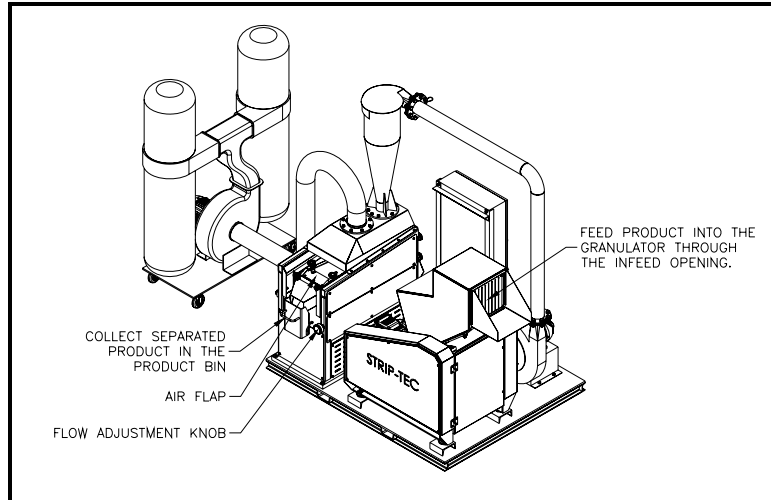


Figure 30 - Feeding and Collecting Product

Adjusting Production Rate and Quality

The rate and quality of production are adjusted using the adjustment knob located on the separator table, which increases or decreases airflow to the separator table. A high air flow will result in a high production rate but low quality level. A large amount of waste product will be mixed in with the copper that collects in the product bin. A low air flow will result in a low production rate but high quality level. Very little waste product will be mixed in with the copper that collects in the product bin.

To increase the airflow, the adjustment knob is turned counter-clockwise. To decrease the airflow, the adjustment knob is turned clockwise. The air flap located just before the product bin can also be used to fine-tune the flow of product into the product bin. Be careful not to lower the air flap so low that it creates a blockage to product flow.

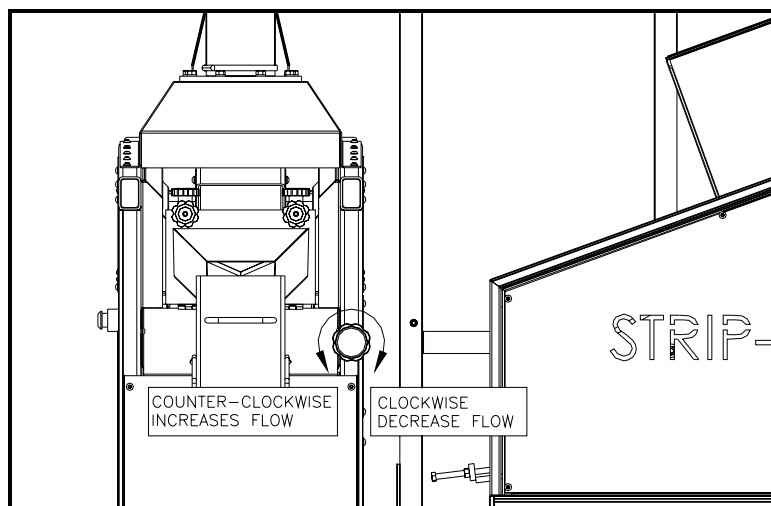


Figure 31 - Adjusting Production Rate and Quality

Troubleshooting

If you experience problems during the operation of the Strip-Tec Granulator and Separator system, refer to the following tables for tips on how to correct some operational and equipment problems.

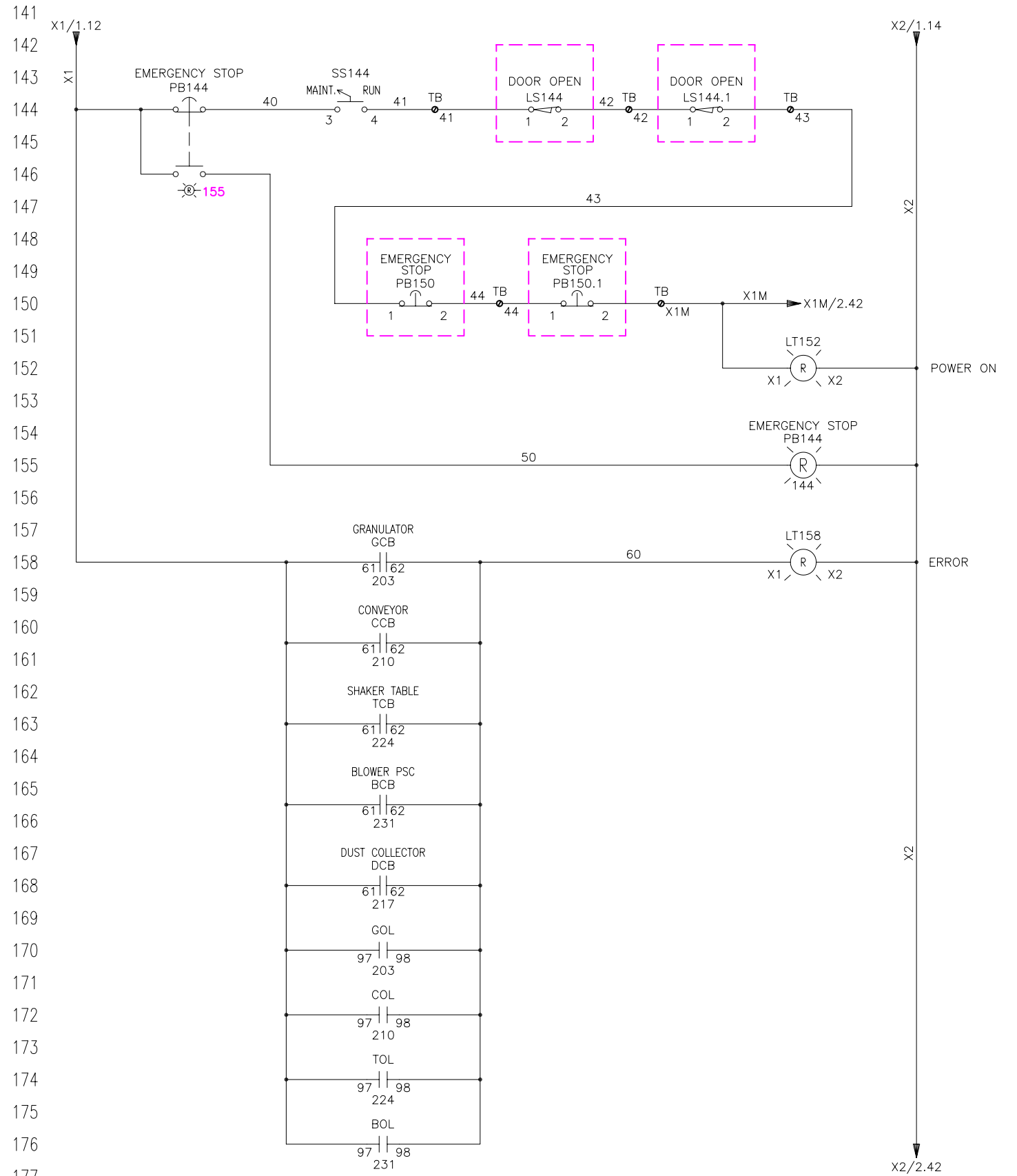
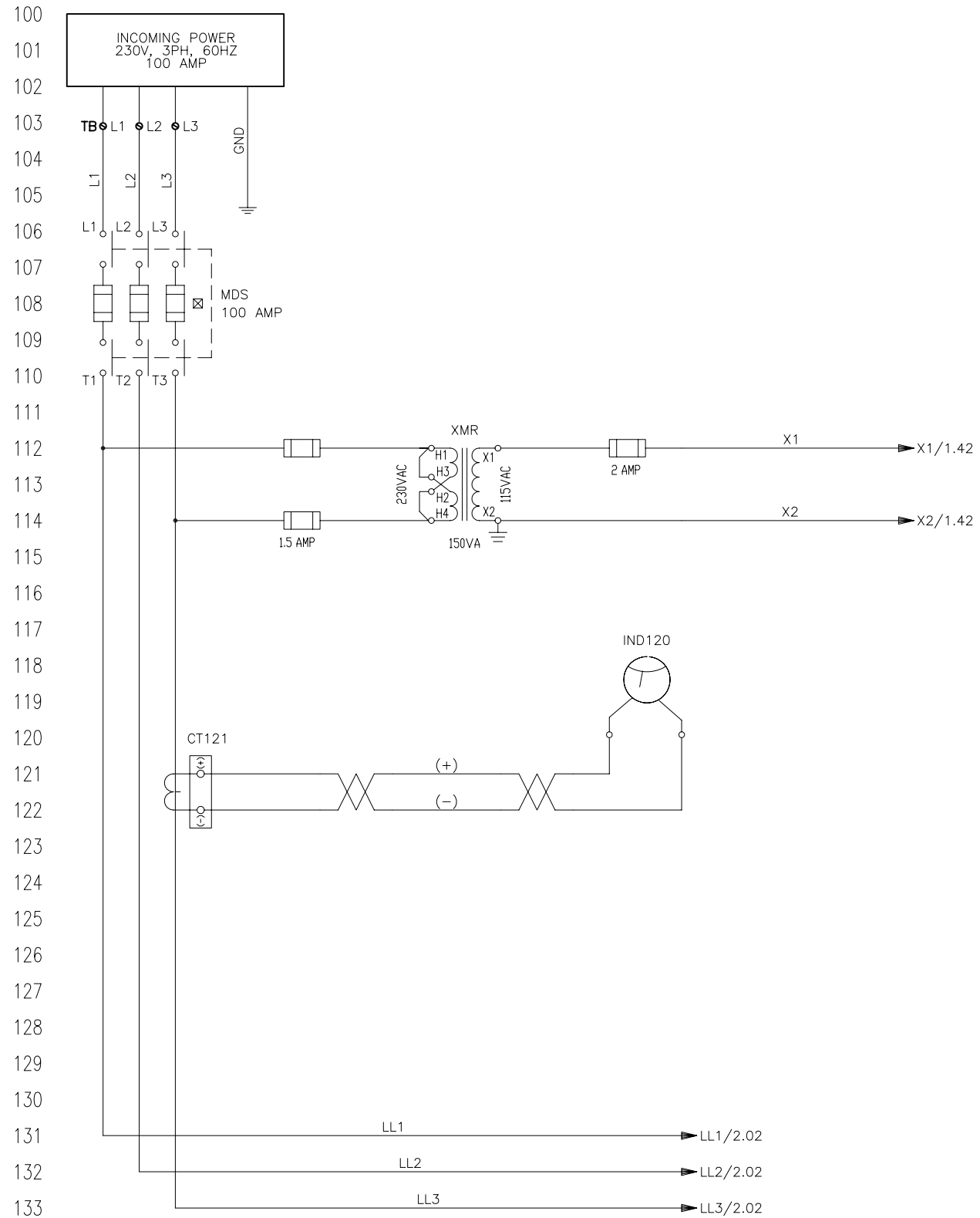
Symptom	Possible Causes	Corrective Actions
Granulator does not operate or stops operating.	Motor overload protection has been tripped.	<ul style="list-style-type: none"> Contact an electrician.
	The cutting blades are stuck.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Open the granulator grinding mill housing and clear any obstructions.
	The drive belts are broken or slipping.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Inspect the drive belts and sheaves for signs of wear. Replace or adjust the drive system components as needed.
	The granulator drive motor does not work.	<ul style="list-style-type: none"> Contact an electrician to replace the motor.
The system will not start.	Main power switch is in the "off" position.	<ul style="list-style-type: none"> Turn the main power switch to the "on" position.
	An emergency stop button has been pressed.	<ul style="list-style-type: none"> Determine why an emergency stop button has been pushed and correct any safety issues. Reset the emergency stop button.
	A limit switch has been activated.	<ul style="list-style-type: none"> Insure that all protective covers and the front access door to the granulator are securely closed. Insure the infeed structure is securely closed. Check the limits and call an electrician if needed.
	A fuse has blown.	<ul style="list-style-type: none"> Have an electrician change the fuse and thoroughly evaluate the electrical components of the system.
Pneumatic conveyor does not operate	The exit of the cyclone is jammed with material.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Clear the jam.
	The flexible hose between the granulator and pneumatic conveyor blower is loose.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Re-install the flexible hose.
	The blower blade is blocked.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Clear the blockage from the blower.
	The blower is damaged.	<ul style="list-style-type: none"> Order necessary repair parts.
Separator table does not move up and down.	The separator table drive motor does not work.	<ul style="list-style-type: none"> Contact an electrician to replace the motor.
	The drive belt is broken or slipping.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Inspect the drive belt and sheaves for signs of wear. Replace or adjust the drive system components as needed.
Strong vibration at the separating table.	Counterbalance weight is not in the proper position or has come loose.	<ul style="list-style-type: none"> Lockout / tagout power to the system. Adjust and retighten the counterbalance as needed to eliminate vibration.

Table 5 - Operational Troubleshooting Guide

Symptom	Possible Causes	Corrective Actions
Product exits the cyclone with poor quality (flattened pieces or no separation)	Rotating or fixed blades are worn or damaged	<ul style="list-style-type: none"> • Lockout / tagout power to the system • Inspect the blades and replace if needed
	Improper gap between the blades.	<ul style="list-style-type: none"> • Lockout / tagout power to the system • Inspect and adjust the blade gap.
	Wrong type of material being processed.	<ul style="list-style-type: none"> • Recheck the acceptable material types listed in this manual.
Product is concentrated at one side of the separator table.	The system is not sitting on a level foundation.	<ul style="list-style-type: none"> • Move the system to a level foundation • Shim under the base as needed to level the system.
Metal product is moving quickly and the waste product does not move.	The airflow is too strong.	<ul style="list-style-type: none"> • Lower the airflow with the adjusting knob.
Excessive waste in the product bin.	The airflow is too strong.	<ul style="list-style-type: none"> • Lower the airflow with the adjusting knob.
Excessive metal in the waste bin.	The airflow is too weak.	<ul style="list-style-type: none"> • Increase the airflow with the adjusting knob.
Metal and waste cannot be separated.	Cable being fed into the granulator is oily or dirty.	<ul style="list-style-type: none"> • Lockout / tagout power to the system. • Disassemble and clean the entire system from the granulator infeed into the separator table, removing all dirt and oil.
	Simultaneous feeding of both Cu I and Cu II cable into the system.	<ul style="list-style-type: none"> • Stop feeding product into the granulator. • Run the system for two to five minutes to allow the product to clear the granulator and pneumatic conveyor. • Shutdown and lockout / tagout the system. • Remove all material from the machine. • Do not feed both Cu I and Cu II cables through the system simultaneously.
	Granulated pieces are too large.	<ul style="list-style-type: none"> • Lockout / tagout power to the system. • Replace the filter tray at the granulator with a finer mesh tray.
	Specific weight of the metal and plastic are too close to the same.	<ul style="list-style-type: none"> • This product cannot be sorted by this system. • Lockout / tagout the system. • Remove all material from the machine.

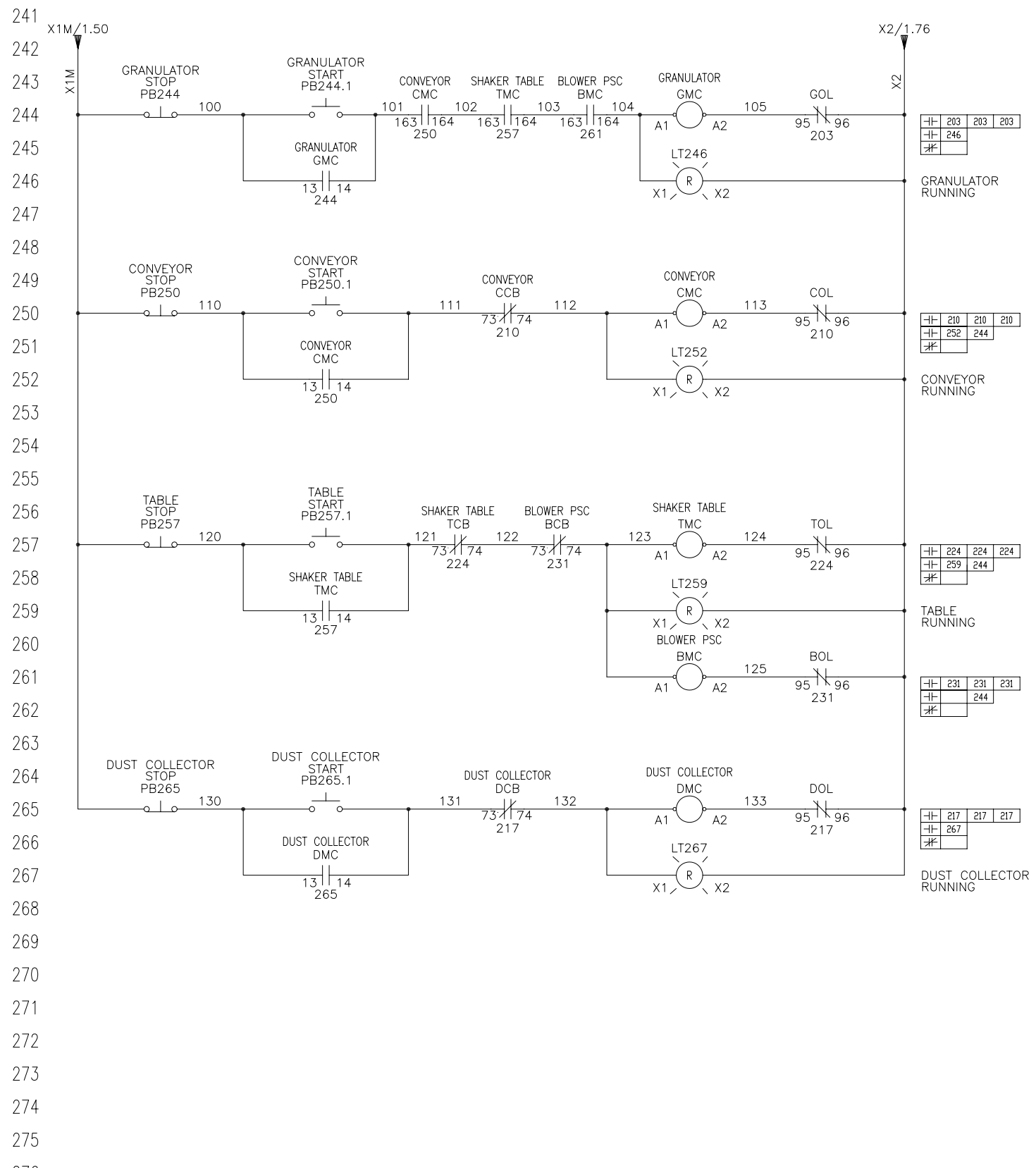
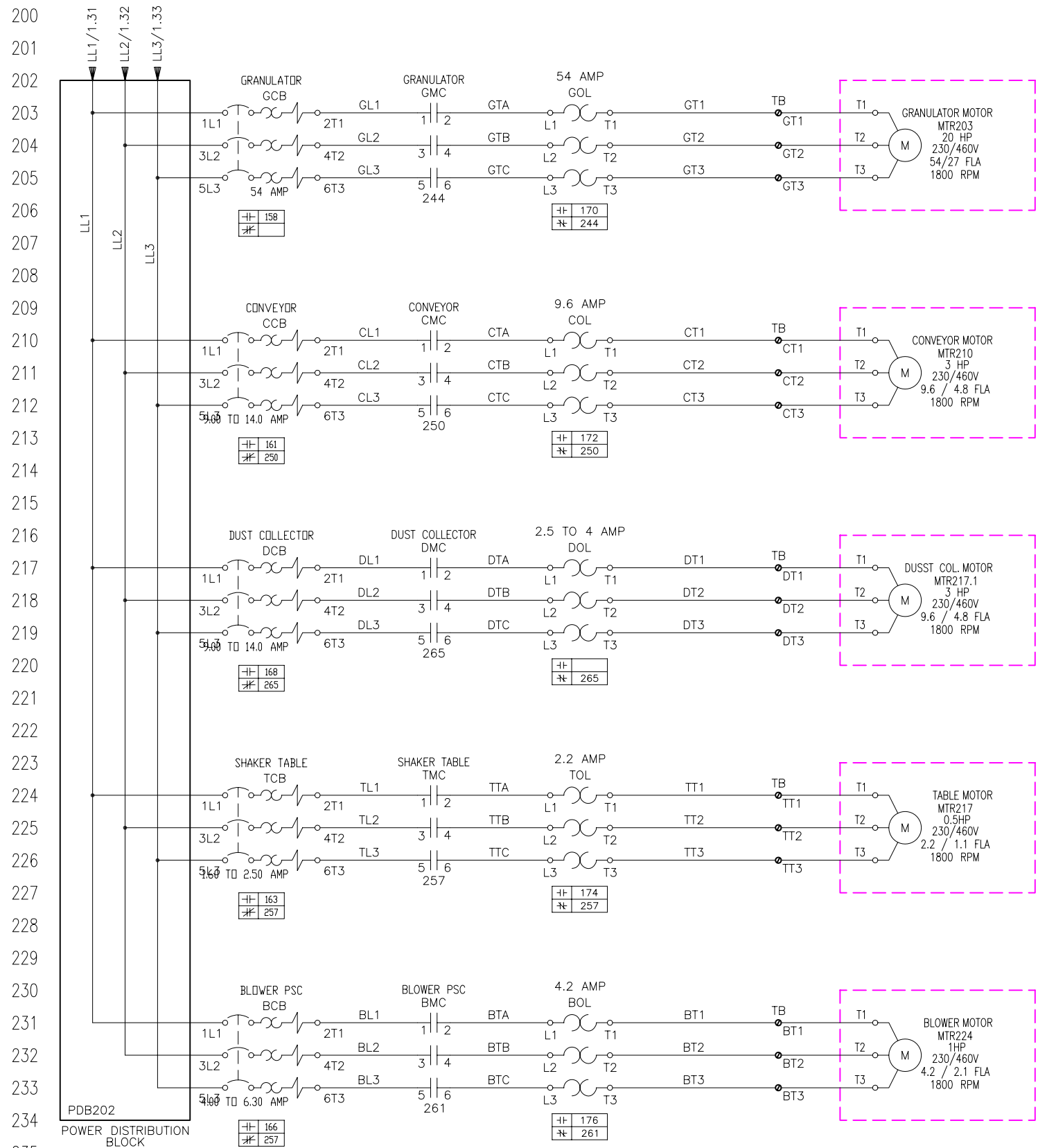
Table 6 - Process Troubleshooting Guide

Appendix A – Electrical Schematics – 20HP Granulator



					10200 JACKSBORO HIGHWAY FORT WORTH, TX 76135		ACE-TRONICS™	
					PH: 817-237-7700 FAX: 817-237-2777			
REV	DESCRIPTION	DATE	REV BY	APPROVED	DRAWN BY Mike P	JOB # 16336	CUSTOMER	ALEXANDER MACHINE
					CHECKED	DATE 01/14/07	DESCRIPTION	20 HP CABLE GRANULATOR
					APPROVED	P/N	DRAWING #	16336 - CP PAGE 1 OF 4

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REV	DESCRIPTION	DATE	REV BY	APPROVED

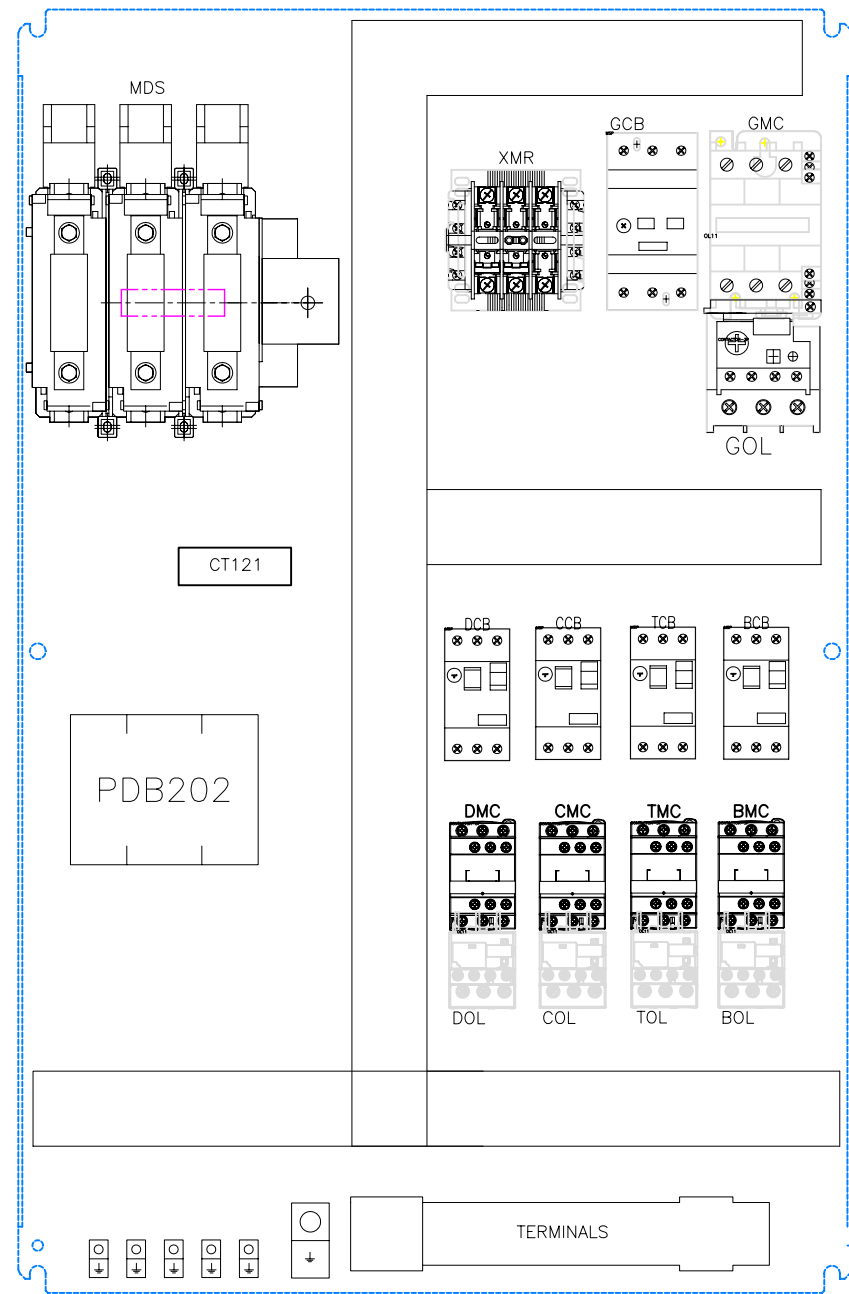
10200 JACKSBORO HIGHWAY
FORT WORTH, TX 76135
PH: 817-237-7700
FAX: 817-237-2777

ACE-TRONICS™

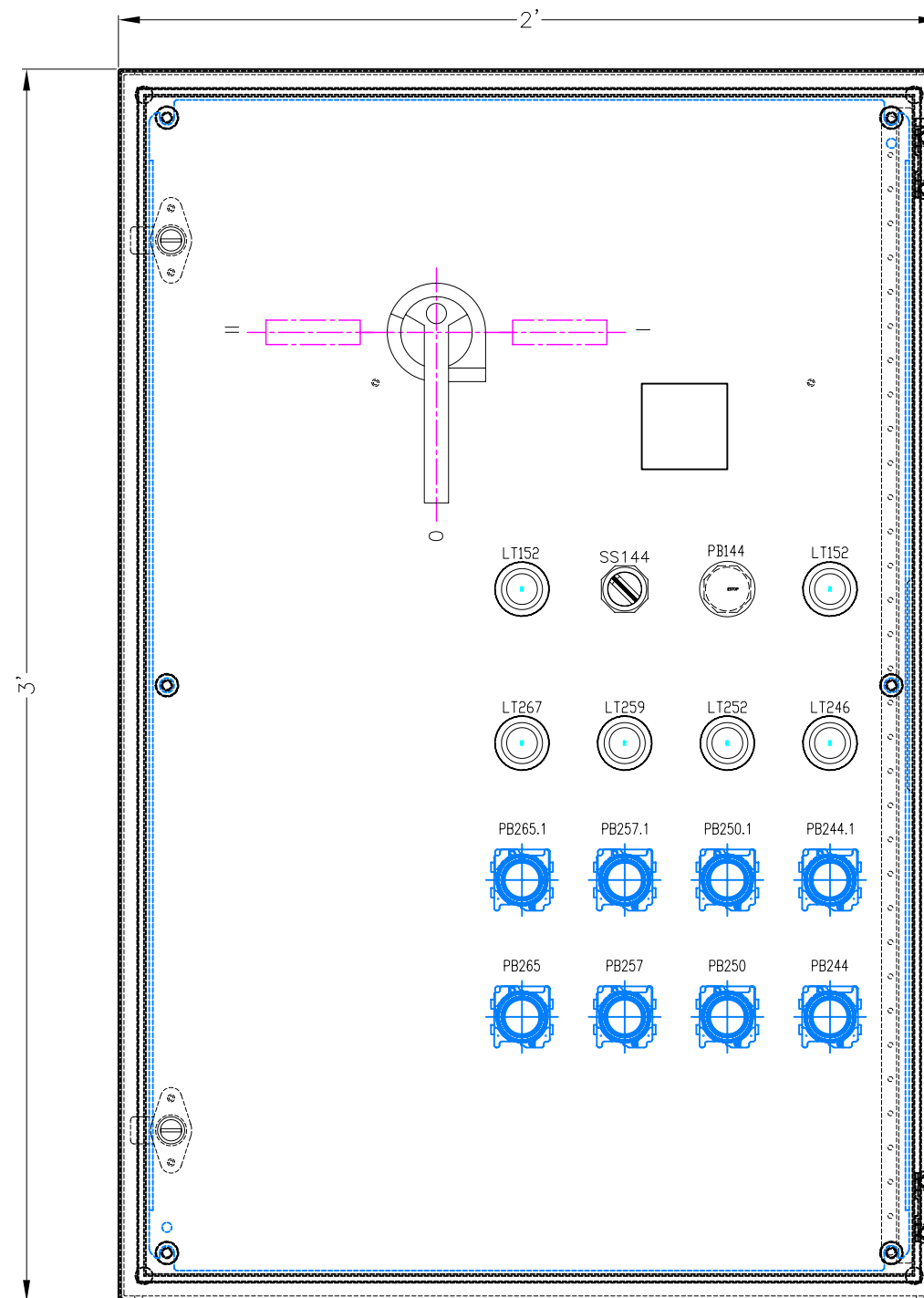
DRAWN BY	Mike P	JOB #	16336	CUSTOMER	ALEXANDER MACHINE
CHECKED		DATE	01/14/07	DESCRIPTION	20 HP CABLE GRANULATOR
APPROVED		P/N		DRAWING #	16336 - CP

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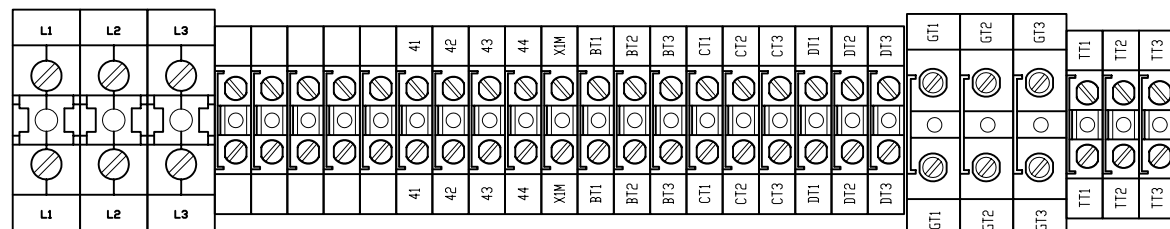
PAGE 2 OF 4



DEVICE	DESCRIPTION
LT152	POWER ON
LT158	ERROR DETECTED
LT246	GRANULATOR RUNNING
LT252	PNEUMATIC CONVEYOR RUNNING
LT259	TABLE RUNNING
LT267	DUST COLLECTOR RUNNING
PB144	EMERGENCY STOP
PB244	GRANULATOR STOP
PB244.1	GRANULATOR START
PB250	PNEUMATIC CONVEYOR STOP
PB250.1	PNEUMATIC CONVEYOR START
PB257	TABLE STOP
PB257.1	TABLE START
PB265	DUST COLLECTOR STOP
PB265.1	DUST COLLECTOR START
SS144	MAINTENANCE / RUN SELECTION



TERMINALS

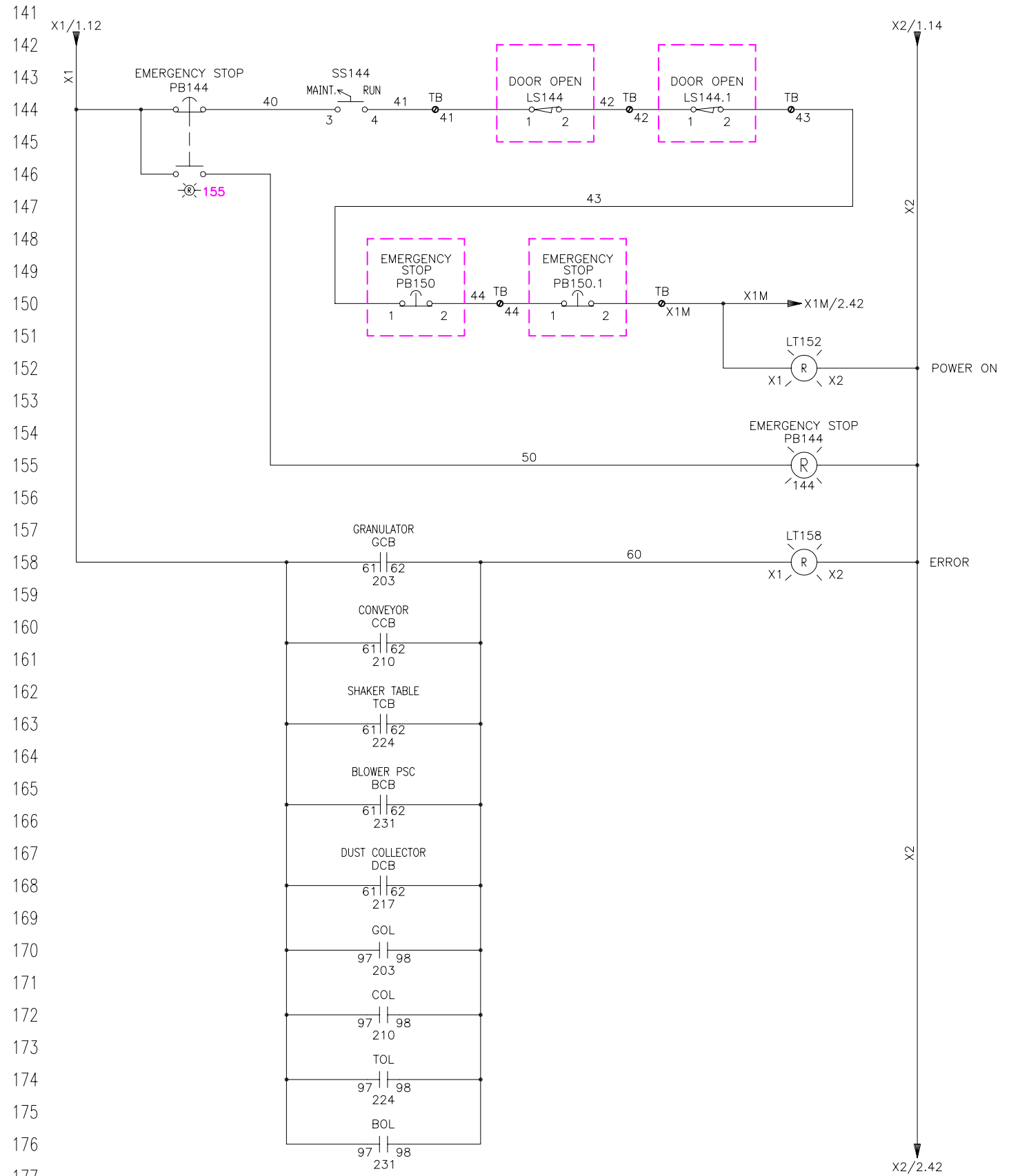
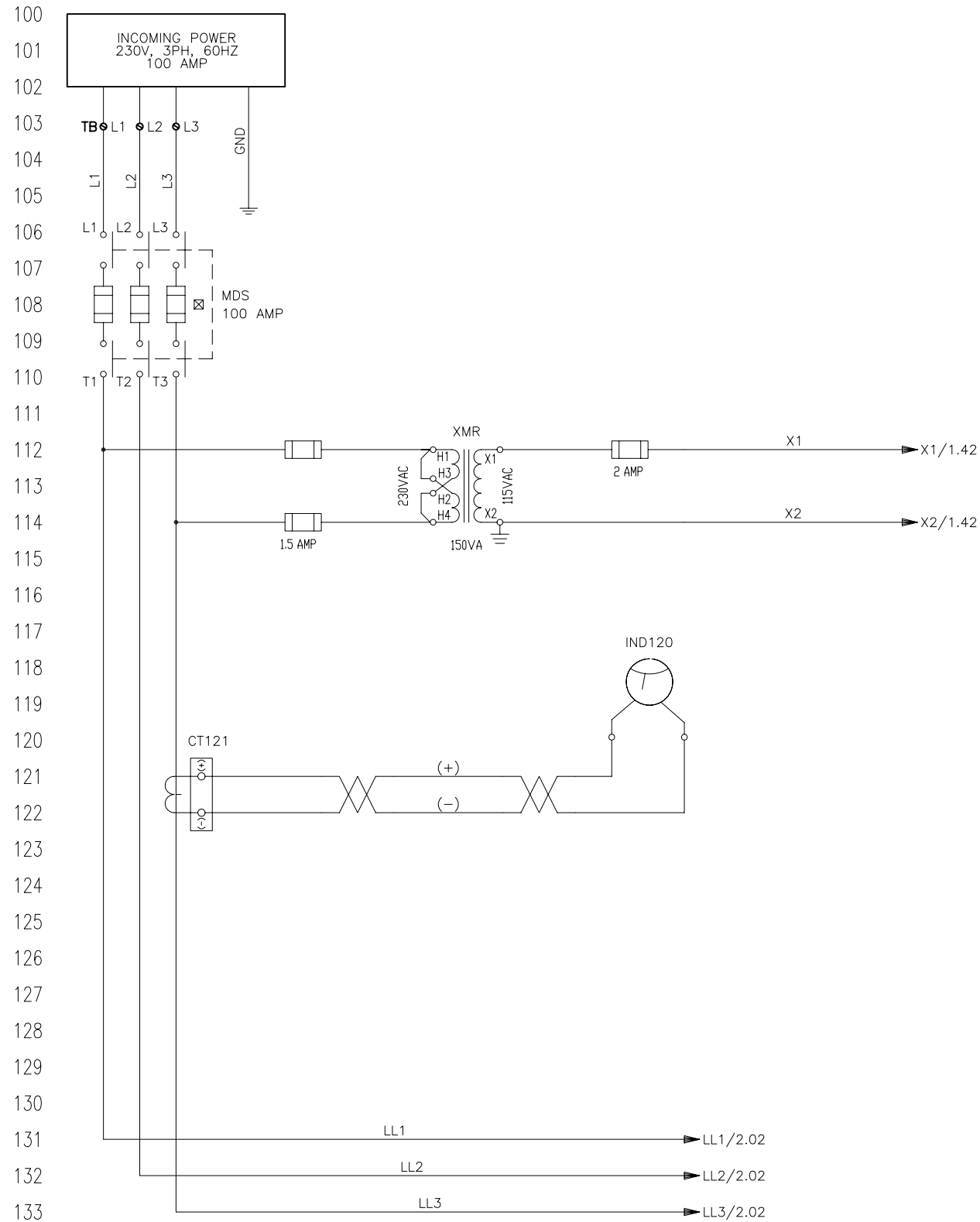


				10200 JACKSBORO HIGHWAY FORT WORTH, TX 76135 PH: 817-237-7700 FAX: 817-237-2777		ACE-TRONICS™			
REV	DESCRIPTION	DATE	REV BY	APPROVED	DRAWN BY Mike P			JOB # 16336	CUSTOMER ALEXANDER MACHINE
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						APPROVED	P/N	DRAWING # 16336 - CP	PAGE 3 OF 4

DEVICE	QTY	PART NO.	DESCRIPTION	REF.
XMR	1	E10701	2 AMP 600 V TIME DELAY UL CLASS CC REJECTION	1.12
XMR	2	E10709	1 1/2 AMP 600 V TIME DELAY UL CLASS CC REJECTION	1.12
MDS	3	E10918	FUSE TIME DELAY, 100 AMP, 600V	1.06
SS144	1	E12719	SELECTOR SWITCH, 1-NO 1-NC, 2POS,MAINTAINED	1.44
BMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.65
CMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.50
TMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.57
DMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	
BMC	1	E12756	CONTACTOR, 9AMP, 3POLE, 1NO/1NC AUX.	2.65
TMC	1	E12756	CONTACTOR, 9AMP, 3POLE, 1NO/1NC AUX.	2.57
MDS	1	E12933	100AMP DISCONNECT SWITCH	1.06
MDS	1	E12934	DISCONNECT SWITCH SHAFT	1.06
MDS	1	E12935	DISCONNECT SWITCH HANDLE	1.06
GMC	1	E12951	CONTACTOR, 65 AMP MAIN CONTACTS, 120VAC COIL	2.44
GMC	1	E12952	SURGE SUPPRESSOR, SQD#LA4DE2U	2.44
PB244	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.44
PB244.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.44
PB250	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.50
PB250.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.50
PB257	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.57
PB257.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.57
PB265	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.65
PB265.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.65
GCB	1	E13136	MANUAL STARTER AND PROTECTOR, 40 TO 63 AMP	2.03
XMR	1	E13145	CONTROL TRANSFORMER, 150VA W/ FUSE BLOCK	1.12
LT152	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.52
LT152	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.52
LT158	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.58
LT246	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.46
LT252	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.52
LT259	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.59
LT267	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.67
TCB	1	E13184	MANUAL STARTER AND PROTECTOR, 1.60 TO 2.50AMP	2.17
BCB	1	E13186	MANUAL STARTER AND PROTECTOR, 4.00 TO 6.30AMP	2.24
CCB	1	E13188	MANUAL STARTER AND PROTECTOR, 9.00 TO 14.0AMP	
DCB	1	E13188	MANUAL STARTER AND PROTECTOR, 9.00 TO 14.0AMP	
BCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.24
CCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.10
GCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.03
TCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.17
DCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	
TOL	1	E13296	2.5 TO 4 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.17
BOL	1	E13297	4 TO 6 AMP OVERLOAD RELAY, 3POLE, CLASS 10, PHASE SENSE	2.24
CMC	1	E13358	CONTACTOR, 18AMP, 3POLE, 1NO/1NC AUX.	2.50
DMC	1	E13358	CONTACTOR, 18AMP, 3POLE, 1NO/1NC AUX.	
PDB202	1	E13923	POWER DISTRIBUTION BLOCK, 3POLE, (1)2/0-(6)#4	2.02
PDB202	3	E13924	COVERS FOR POWER DISTRIBUTION BLOCK BDB-16-2/0-3	2.02
COL	1	E15035	9 TO 13 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.10
DOL	1	E15035	9 TO 13 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	
GOL	1	E15205	48 TO 65 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.03
ENC	1	E15246	BACK PANEL	
ENC	1	E15349	ENCLOSURE, 36"x24"x8", NEMA 4/12	
CT121	1	E15350	CURRENT TRANSFORMER, 100:5	1.21
IND120	1	E15350	CURRENT METER, 0..100AMP	1.21
BMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
CMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
TMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
PB150	1	E15357	E-STOP PUSH BUTTON AND ENCLOSURE	
PB150.1	1	E15357	E-STOP PUSH BUTTON AND ENCLOSURE	
LS144	1	E15358	LIMIT SWITCH	
LS144.1	1	E15358	LIMIT SWITCH	
PB144	1	E49950	PUSH BUTTON, MUSHROOM, ILLUM, 1-NO 1-NC RED,PUSH-PULL	1.44

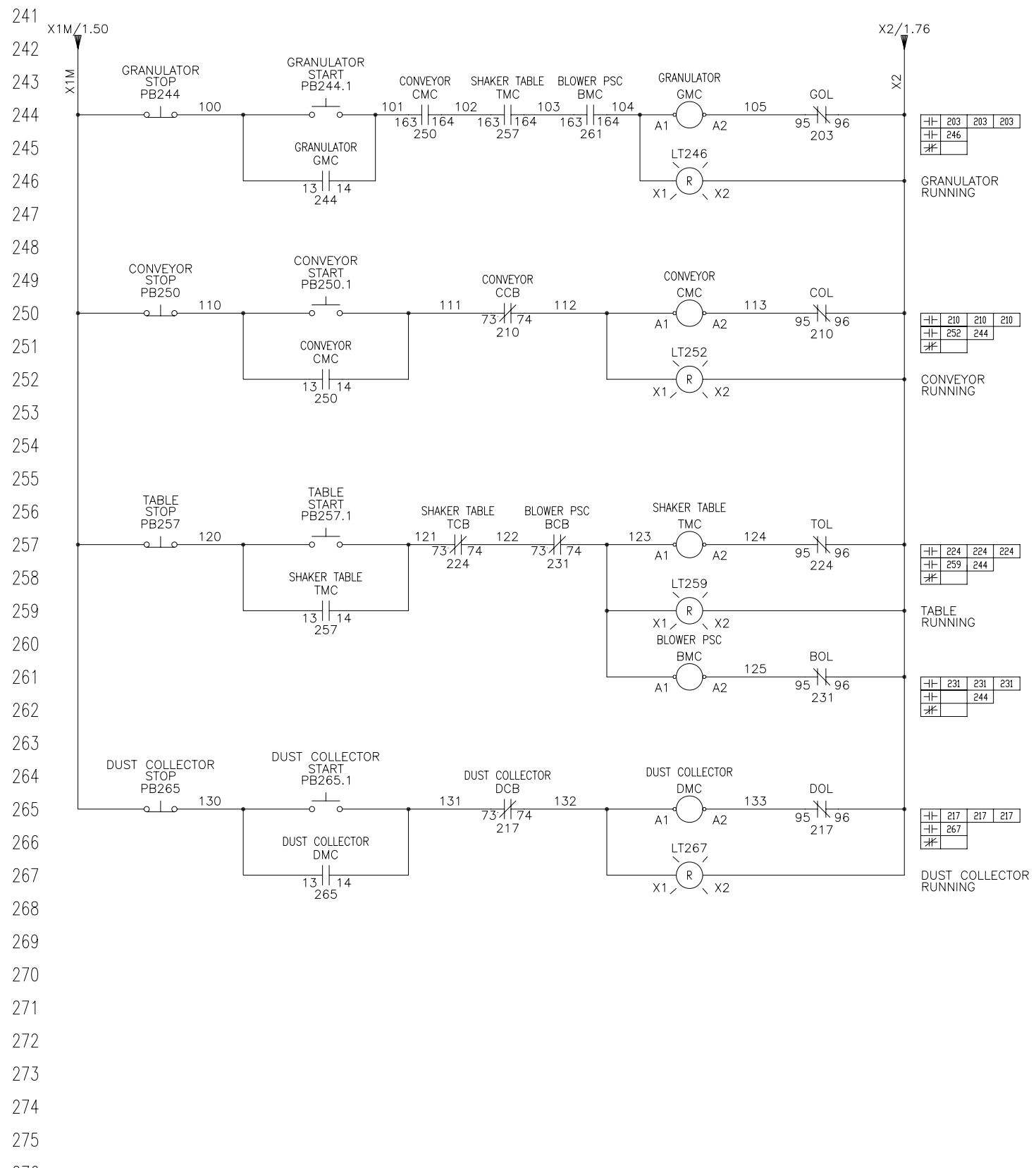
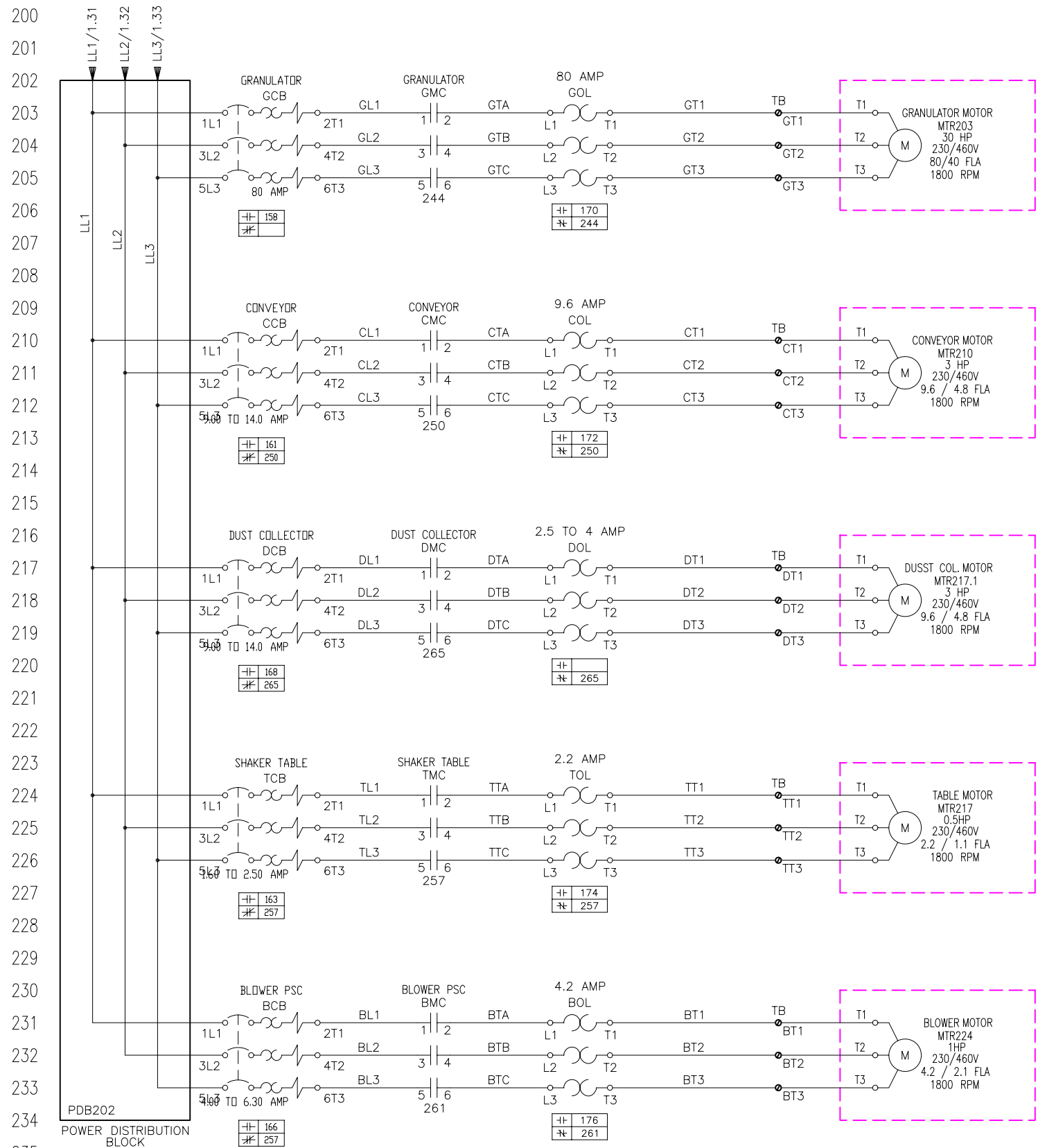
					10200 JACKSBORO HIGHWAY FORT WORTH, TX 76135		ACE-TRONICS™	
					PH: 817-237-7700 FAX: 817-237-2777			
REV	DESCRIPTION	DATE	REV BY	APPROVED	DRAWN BY Mike P	JOB # 16336	CUSTOMER	ALEXANDER MACHINE
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Appendix B – Electrical Schematics – 30HP Granulator



					10200 JACKSBORO HIGHWAY FORT WORTH, TX 76135		ACE-TRONICS™	
					PH: 817-237-7700 FAX: 817-237-2777			
REV	DESCRIPTION	DATE	REV BY	APPROVED	DRAWN BY Mike P	JOB # 16336	CUSTOMER	ALEXANDER MACHINE
					CHECKED	DATE 01/14/07	DESCRIPTION	30 HP CABLE GRANULATOR
					APPROVED	P/N	DRAWING #	16336 - CP
								PAGE 1 OF 4

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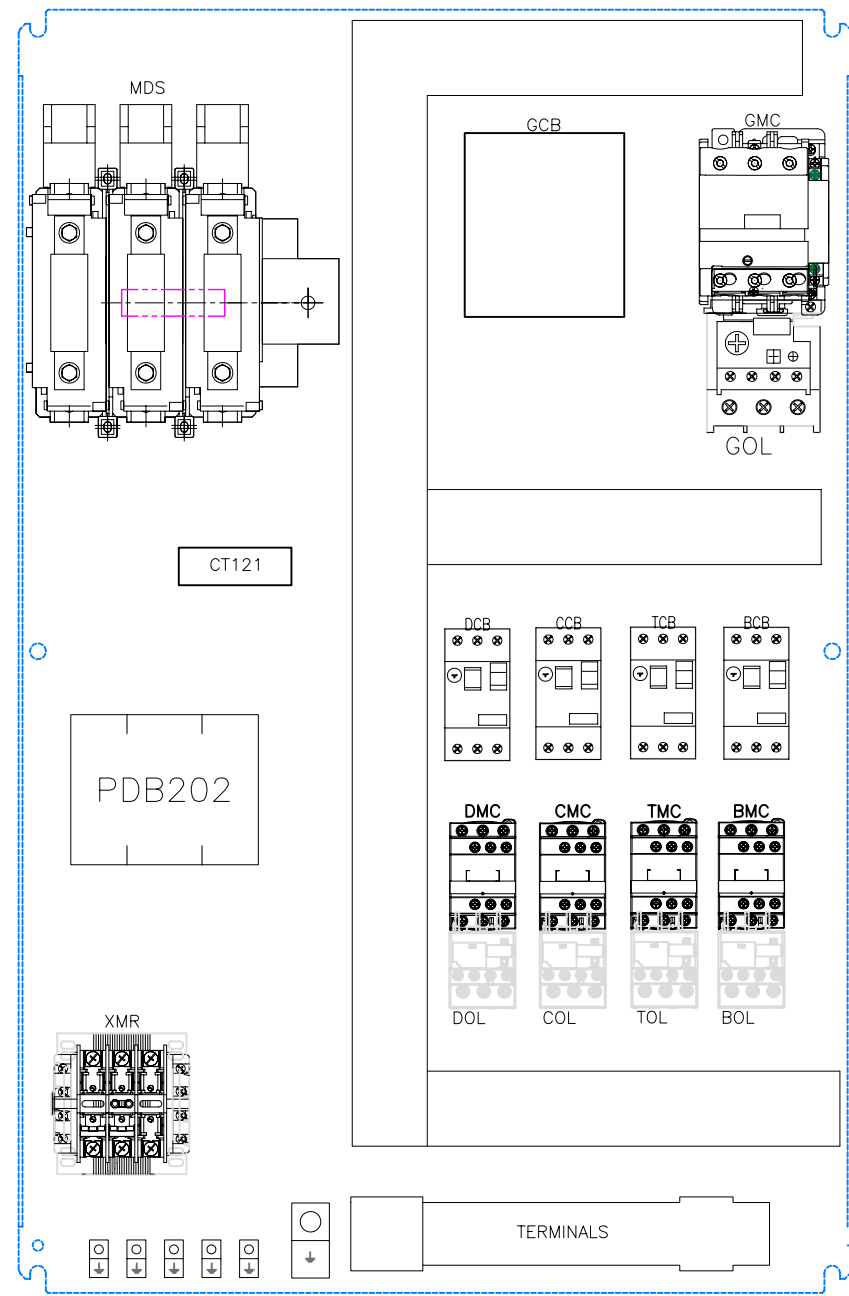
10200 JACKSBORO HIGHWAY
 FORT WORTH, TX 76135
 PH: 817-237-7700
 FAX: 817-237-2777

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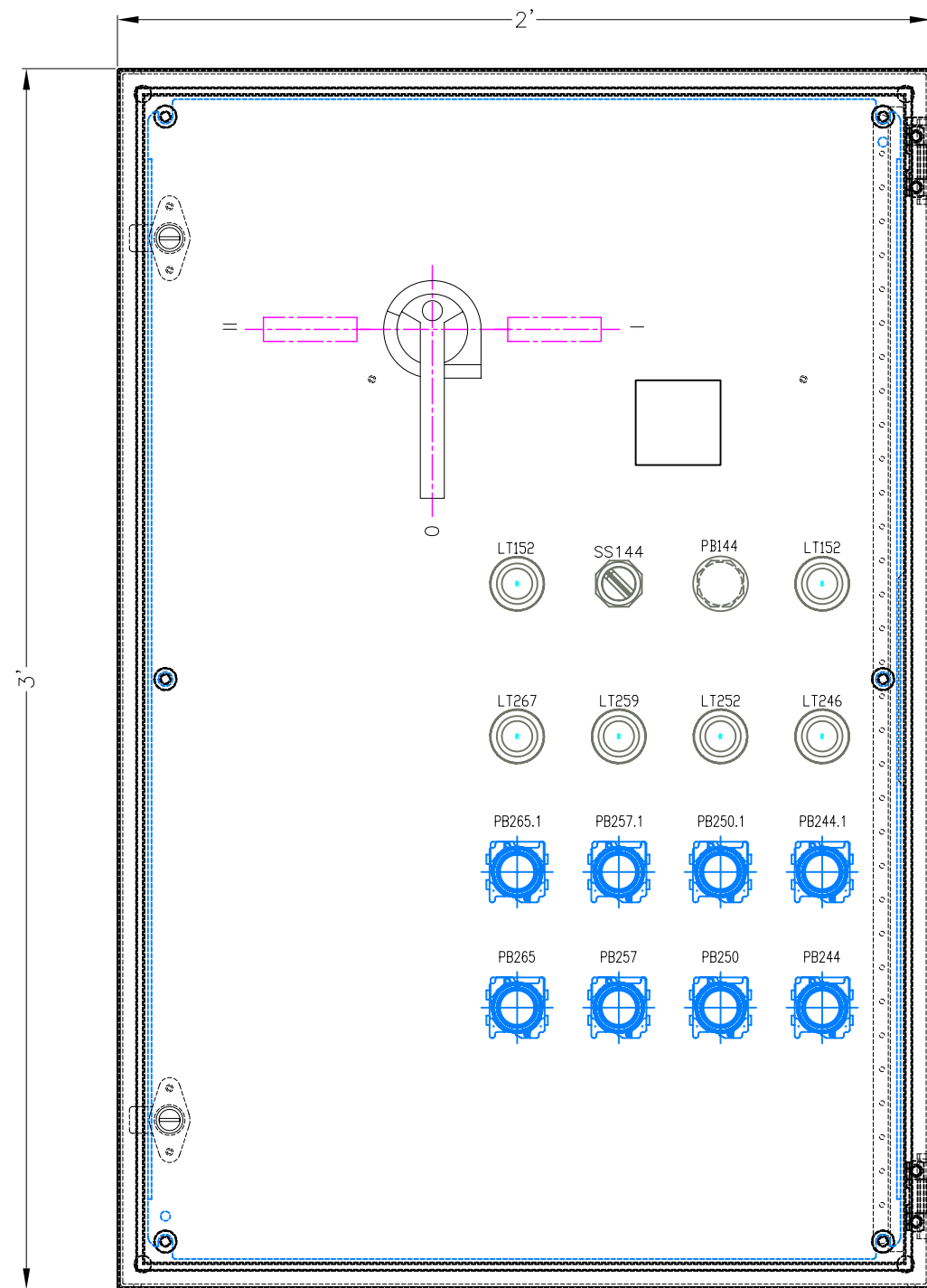
DRAWN BY	Mike P	JOB #	16336	CUSTOMER	ALEXANDER MACHINE
CHECKED		DATE	01/14/07	DESCRIPTION	30 HP CABLE GRANULATOR
APPROVED		P/N		DRAWING #	16336 - CP

PAGE 2 OF 4

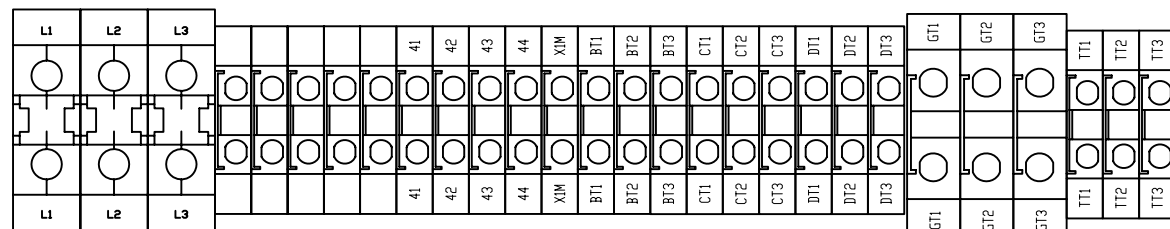
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DEVICE	DESCRIPTION
LT152	POWER ON
LT158	ERROR DETECTED
LT246	GRANULATOR RUNNING
LT252	PNEUMATIC CONVEYOR RUNNING
LT259	TABLE RUNNING
LT267	DUST COLLECTOR RUNNING
PB144	EMERGENCY STOP
PB244	GRANULATOR STOP
PB244.1	GRANULATOR START
PB250	PNEUMATIC CONVEYOR STOP
PB250.1	PNEUMATIC CONVEYOR START
PB257	TABLE STOP
PB257.1	TABLE START
PB265	DUST COLLECTOR STOP
PB265.1	DUST COLLECTOR START
SS144	MAINTENANCE / RUN SELECTION



TERMINALS

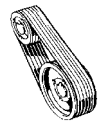


				10200 JACKSBORO HIGHWAY FORT WORTH, TX 76135		ACE-TRONICS™	
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					APPROVED	P/N	DRAWING # 16336 - CP

DEVICE	QTY	PART NO.	DESCRIPTION	REF.
BCB	1	E13186	MANUAL STARTER AND PROTECTOR, 4.00 TO 6.30AMP	2.24
BCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.24
BMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.65
BMC	1	E12756	CONTACTOR, 9AMP, 3POLE, 1NO/1NC AUX.	2.65
BMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
BOL	1	E13297	4 TO 6 AMP OVERLOAD RELAY, 3POLE, CLASS 10, PHASE SENSE	2.24
CCB	1	E13188	MANUAL STARTER AND PROTECTOR, 9.00 TO 14.0AMP	2.10
CCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.10
CMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.50
CMC	1	E13358	CONTACTOR, 18AMP, 3POLE, 1NO/1NC AUX.	2.50
CMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
COL	1	E15035	9 TO 13 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.10
CT121	1	E15350	CURRENT TRANSFORMER, 100:5	1.21
DCB	1	E13188	MANUAL STARTER AND PROTECTOR, 9.00 TO 14.0AMP	
DCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	
DMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	
DMC	1	E13358	CONTACTOR, 18AMP, 3POLE, 1NO/1NC AUX.	
DOL	1	E15035	9 TO 13 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	
ENC	1	E15246	BACK PANEL	
ENC	1	E15349	ENCLOSURE, 36"x24"x8", NEMA 4/12	
GCB	1	E15366	MANUAL STARTER AND PROTECTOR, 60 TO 100 AMP	2.03
GCB	1	E15368	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.03
GMC	1	E15365	CONTACTOR, 80 AMP MAIN CONTACTS, 120VAC COIL	2.44
GMC	1	E12952	SURGE SUPPRESSOR, SQD#LA4DE2U	2.44
GOL	1	E15802	63 TO 80 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.03
IND120	1	E15350	CURRENT METER, 0..100AMP	1.21
LS144	1	E15358	LIMIT SWITCH	
LS144.1	1	E15358	LIMIT SWITCH	
LT152	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.52
LT152	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.52
LT158	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	1.58
LT246	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.46
LT252	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.52
LT259	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.59
LT267	1	E15783	PILOT LIGHT, RED LENS, RESISTOR, FV RED 120V AC/DC	2.67
MDS	3	E10918	FUSE TIME DELAY, 100 AMP, 600V	1.06
MDS	1	E12933	100AMP DISCONNECT SWITCH	1.06
MDS	1	E12934	DISCONNECT SWITCH SHAFT	1.06
MDS	1	E12935	DISCONNECT SWITCH HANDLE	1.06
PB144	1	E49950	PUSH BUTTON, MUSHROOM, ILLUM, 1-NO 1-NC RED,PUSH-PULL	1.44
PB150	1	E15357	E-STOP PUSH BUTTON AND ENCLOSURE	
PB150.1	1	E15357	E-STOP PUSH BUTTON AND ENCLOSURE	
PB244	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.44
PB244.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.44
PB250	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.50
PB250.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.50
PB257	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.57
PB257.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.57
PB265	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.65
PB265.1	1	E12982	PUSH BUTTON, 1-NO 1-NC, BLACK FLUSH HEAD	2.65
PDB202	1	E13923	POWER DISTRIBUTION BLOCK, 3POLE, (1)2/0-(6)#4	2.02
PDB202	3	E13924	COVERS FOR POWER DISTRIBUTION BLOCK BDB-16-2/0-3	2.02
SS144	1	E12719	SELECTOR SWITCH, 1-NO 1-NC, 2POS,MAINTAINED	1.44
TCB	1	E13184	MANUAL STARTER AND PROTECTOR, 1.60 TO 2.50AMP	2.17
TCB	1	E13204	AUX. CONTACT FOR MANUAL STARTER PROTECTOR	2.17
TMC	1	E12753	120VAC SURGE SUPPRESSOR -VARISTOR	2.57
TMC	1	E12756	CONTACTOR, 9AMP, 3POLE, 1NO/1NC AUX.	2.57
TMC	1	E15356	AUX. CONTACT, SIDE MOUNT, 2 x N.O.	
TOL	1	E13296	2.5 TO 4 AMP O/L RELAY, 3POLE, CLASS 10, PHASE SENSE	2.17
XMR	1	E10701	2 AMP 600 V TIME DELAY UL CLASS CC REJECTION	1.12
XMR	2	E10709	1 1/2 AMP 600 V TIME DELAY UL CLASS CC REJECTION	1.12
XMR	1	E13145	CONTROL TRANSFORMER, 150VA W/ FUSE BLOCK	1.12

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					APPROVED	P/N	DRAWING #	16336 - CP

Appendix C – V-Belt Technical Manual



INSTALLING/TENSIONING V-DRIVES

INSTALLING A DRIVE

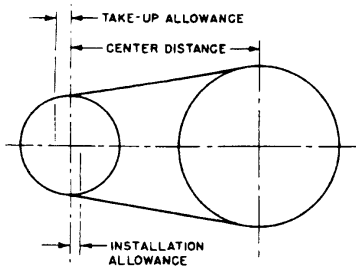
Check Condition of Sheaves—Before a new set of V-belts are installed, check the condition of the sheaves. Dirty or rusty sheaves impair the drive's efficiency and abrade the belts, which result in premature failure.

Worn sheaves shorten belt life as much as 50%. If the grooves are worn to where the belt bottoms, slippage may result and burn the belts. If the sidewalls are "dished out," the bottom shoulder ruins the belts prematurely by wearing off the bottom corners.

Check Sheave Alignment—Sheave adjustment should be checked by placing a straight edge or tight cord across the sheave faces so that it touches all four points of contact. Ordinarily, a misalignment of more than one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causes the belt to roll over in the sheaves or throws all the load on one side of the belt, stretching or breaking the cords on that side.

INSTALLATION AND TAKE-UP ALLOWANCES

After calculating a center distance from a standard pitch length, make provision for adjusting the center distance as in sketch below, to allow for installation of the belts without injury, for tensioning, and for maintenance of proper tension throughout the life of the belt. (Refer to Tables 11 or 12 for values).



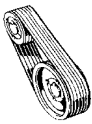
Placing Belts on Sheaves—Shorten the center distance of the drive until the belts can be put on the sheaves without forcing. Forcing the belts can cause internal injury to the belts.

Belt Selection—For maximum service, replace V-belt drives with a complete new matched set of belts or use the new Matchmaker belts.

Never employ a used belt as a replacement for a unit of a set. Used belts, normally, are worn in cross-section and stretched. A new belt so applied will ride higher in the sheave, travel faster and operate at a much higher tension than the used belts. The cord center may be ruptured, allowing the new belt to elongate. Shortly after this occurs it will cease to accept its full share of the load, leaving the drive under-belted. Thus, the new belt is wasted. Belts of different manufacturers should not be mixed for the same reasons.

Table 11—Center Distance Allowance for Narrow Belt Installation and Take-Up

Nom. Belt Lgth. in Inches	Min. Installation Allowance (in inches) (Below Center)						Min. Take-up Allowance (Above Center)
	3V Dyna-V	3V Poly-band	5V Dyna-V	5V Poly-band	8V Dyna-V	8V Poly-band	
Up to & incl. 47.5	.05	1.2	...	...	...	...	1.0"
50-71	0.8	1.4	1.0	2.1	...	...	1.2
75-106	0.8	1.4	1.0	2.1	1.5	3.4	1.5
112-125	0.8	1.4	1.0	2.1	1.5	3.4	1.8
132-170	0.8	1.4	1.0	2.1	1.5	3.4	2.2
180-200	...	...	1.0	2.1	1.8	3.6	2.5
212-236	...	...	1.2	2.4	1.8	3.6	3.0
250 & 265	...	...	1.2	2.4	1.8	3.6	3.2
280 & 300	...	...	1.2	2.4	1.8	3.6	3.5
315-355	...	...	1.2	2.4	2.0	4.0	4.0
375	...	...	...	...	2.0	4.0	4.5
400-560	...	...	...	...	2.0	4.0	5.5



INSTALLING/TENSIONING V-DRIVES

Table 12 - Center Distance Allowance for Classical Belt Installation and Take-up

Nom. Belt Lgth. in Inches	Min. Installation Allowance (in inches) (Below Center)							Min. Take-up Allowance (Above Center)
	A	B	B Poly-band	C	C Poly-band	D	D Poly-band	
26-37	0.75	1.00	1.50	1.50	...	...	...	1.00"
38-59	0.75	1.00	1.50	1.50	2.00	...	...	1.50
60-89	0.75	1.25	1.61	1.50	2.00	...	...	2.00
90-119	1.00	1.25	1.61	1.50	2.00	...	...	2.50
120-157	1.00	1.25	1.81	1.50	2.11	2.0	2.00	3.00
158-194	...	1.25	1.81	2.00	2.20	2.00	3.00	3.50
195-239	...	1.50	1.81	2.00	2.31	2.00	3.20	4.00
240-269	...	1.50	2.00	2.00	2.50	2.50	3.20	4.50
270-329	...	1.50	2.20	2.00	2.50	2.50	3.50	5.00
330-419	...	...	...	2.00	2.70	2.50	3.60	6.00
420 & Over	...	...	...	2.50	2.90	3.00	4.10	1-1/2% of belt lgth.

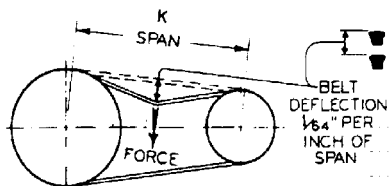
TENSIONING A DRIVE

General Rules of Tensioning—

1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24-48 hours of run-in operation.
3. Over tensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slip.
5. Make V-Drive inspection on a periodic basis. Tension when slipping. Never apply belt dressing as this will damage the belt and cause early failure.

SIMPLE TENSIONING PROCEDURE

1. Measure the span length, K.
2. At the center of the span (K) apply a force (perpendicular to the span) large enough to deflect the 1/64, for every inch of span length. For example, one deflection of a 100 inch span would be 100/64 or 1-9/16 inches.

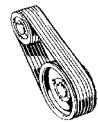


3. Compare the force you have applied with the values given in Tables 13 or 14. If the force is between the values for normal tension, and 1-1/2 times normal tension, the drive tension should be satisfactory. A force below the value for normal tension indicates an under-tensioned drive. If the force exceeds the value for 1-1/2 times normal tension, the drive is tighter than it needs to be.

For V-Belt Tension Testers, See Page PT7-123.

After the proper operating tension has been applied to the belts, a double-check should be made of the following:

- a. Parallel position of the sheave shafts.
- b. Correct alignment of sheave grooves.



Installing/Tensioning V-Drives

Table 13-Belt Deflection Force (Check factory for conditions not covered in this table)

V-Belt Section	Small Sheave		Deflection Force In Lbs. For Drive Speed Ratio of:			
	Speed Range	Diameter	1.0	1.5	2.0	4.0 +
A (AP)	1800-3600	3.0	2.0	2.3	2.4	2.6
	1800-3600	4.0	2.6	2.8	3.0	3.3
	1800-3600	5.0	3.0	3.3	3.4	3.7
	1800-3600	7.0	3.5	3.7	3.8	4.3
B (BP)	1200-1800	4.6	3.7	4.3	4.5	5.0
	1200-1800	5.0	4.1	4.6	4.8	5.6
	1200-1800	6.0	4.8	5.3	5.5	6.3
C (CP)	1200-1800	8.0	5.7	6.2	6.4	7.2
	900-1800	7.0	6.5	7.0	8.0	9.0
	900-1800	9.0	8.0	9.0	10.0	11.0
	900-1800	12.0	10.0	11.0	12.0	13.0
D (DP)	700-1500	16.0	12.0	13.0	13.0	14.0
	900-1500	12.0	13.0	15.0	16.0	17.0
	900-1500	15.0	16.0	18.0	19.0	21.0
	700-1200	18.0	19.0	21.0	22.0	24.0
AX	700-1200	22.0	22.0	23.0	24.0	26.0
	1800-3600	3.0	2.5	2.8	3.0	3.3
	1800-3600	4.0	3.3	3.6	3.8	4.2
	1800-3600	5.0	3.7	4.1	4.3	4.6
BX	1800-3600	7.0	4.3	4.6	4.8	5.3
	1200-1800	4.6	5.2	5.8	6.0	6.9
	1200-1800	5.0	5.4	6.0	6.3	7.1
	1200-1800	6.0	6.0	6.4	6.7	7.7
CX	1200-1800	8.0	6.6	7.1	7.5	8.2
	900-1800	7.0	10.0	11.0	12.0	13.0
	900-1800	9.0	11.0	12.0	13.0	14.0
	900-1800	12.0	12.0	13.0	13.0	14.0
DX	700-1500	16.0	13.0	14.0	14.0	15.0
	900-1500	12.0	16.0	18.0	19.0	20.0
	900-1500	15.0	19.0	21.0	22.0	24.0
	700-1200	18.0	22.0	24.0	25.0	27.0
700-1200	22.0	25.0	27.0	28.0	30.0	

Table 14-POLYBAND Plus Belt Deflection Force (lbs.) (Force is pounds for one belt only)

Cross Section	Small Sheave Diameter Range	RPM Range	Belt Deflection Force*	
			Normal	New Belt
5VF	7.1-10.9	200-700	21.1	30.9
		701-1250	18.0	26.3
		1251-1900	16.7	23.4
		1901-3000	15.8	23.0
5VF	11.8-16.0	200-700	26.8	39.5
		701-1250	23.5	34.7
		1251-2100	22.7	33.3
8VF	12.5-20.0	200-500	44.7	65.8
		501-850	38.5	56.6
		851-1150	35.2	51.6
		1151-1650	33.5	49.0
8VF	21.2-25.0	200-500	65.9	97.6
		501-850	61.2	90.6
		851-1200	57.0	84.3

* Multiply the force required for one belt by the number of belts in the Polyband Plus unit to get total force to apply.

Example: New 8VF drive with a small sheave dia. equal to 20".

The rpm of the sheave is 1000.

The belt to be installed is 8/8VF4000.

Total deflection force = table value x 8 = 51.6 x 8 = 413 lbs.

Belt Pull and Bearing Loads

Belt Pull Calculations—The following method of calculating belt pull is found to be the most convenient and accurate for drives operating at design loads and tensions:

$$T_1 + T_2 = 33,000 (2.5-G) \left(\frac{HP}{GV} \right)$$

WHERE:

T₁ = Tight side tension, pounds

T₂ = Slack side tension, pounds

HP = Design horsepower

V = Belt speed, feet per minute = (PD) (RPM) (.262)

G = Arc of contact correction factor

Arc of Contact Factors

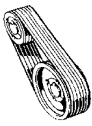
D-d C	Arc of Contact	Factor G	D-d C	Arc of Contact	Factor G
.00	180°	1.00	.80	133°	.87
.10	174°	.99	.90	127°	.85
.20	169°	.97	1.00	120°	.82
.30	163°	.96	1.10	113°	.80
.40	157°	.94	1.20	106°	.77
.50	151°	.93	1.30	99°	.73
.60	145°	.91	1.40	91°	.70
.70	139°	.89	1.50	83°	.65

Arc of contact is on small sheave

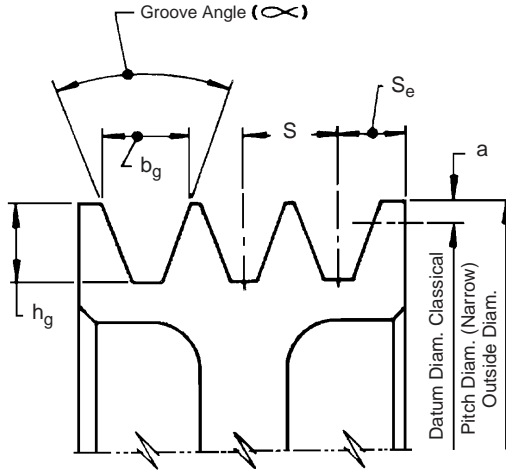
d=Diam. of small sheave.

D=Diam. of large sheave.

C=Center distance.



V-Belt Sheave Groove Dimensions



Narrow

Belt Section	Outside Diameter Range	∞ $\pm .025$	b_g $\pm .005$	h_g Min.	a	S $\pm .015$	S_e	
3VX, 3V	LESS THAN 3.50	36°	.350	0.340	0.025	0.406	0.344	+.094 -.000
	3.50 TO 6.00	38°						
	6.01 to 12.00	40°						
	Over 12.00	42°						
5VX, 5V	Less than 10.00	38°	.600	0.590	.050	0.688	0.500	+.125 -.000
	10.00 to 16.00	40°						
	Over 16.00	42°						
8VX, 8V	Less than 16.00	38°	1.000	0.990	.100	1.125	0.750	+.250 -.000
	16.00 to 22.40	40°						
	Over 22.40	42°						

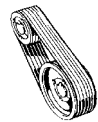
Classical

Belt Section	Pitch Diameter		m $+ 0.33$	b_g	h_g Min.	$2a$ ref *	S $\pm .025$	S_e		
	Min. Recom.	Range								
AX, A	3.0	2.6 to 5.4	34°	.494	±.005	.460	.125	.625	.375	+.090 -.062
		Over 5.4	38°	.504						
BX, B	5.4	4.6 to 7.0	34°	.637	±.006	.550	.175	.750	.500	+.120 -.065
		Over 7.0	38°	.650						
A, B AX, BX	-	To 7.0	34°	.612	±.006	.612	A (.634/.602) B (.333/.334)	.750	.500	+.120 -.065
		Over 7.0	38°	.625						
CX, C	9.0	7.0 to 7.99	34°	.879	±.007	.750	.200	1.000	.688	+.160 -.070
		8.0 to 12.0	36°	.887						
		Over 12.0	38°	.895						
DX, D	13.0	12.0 to 12.9	34°	1.259	±.008	1.020	.300	1.438	.875	+.220 -.080
		13.0 to 17.0	36°	1.271						
		Over 17.0	38°	1.283						
E	21.0	18.0 to 24.0	36°	1.527	±.010	1.300	.400	1.750	1.125	+.250 -.000
		Over 24.0	38°	1.542						

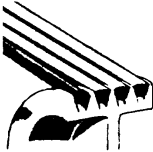
Note—For complete manufacturing tolerances – see RMA, MPTA, Narrow/Classical V-belt Standards.

* Datum diameter, not pitch diameter.

BELTS PAGES PT7-28	SELECTION: WEDGE PAGES PT7-42	SELECTION: CLASSICAL PAGES PT7-84	ENGINEERING/TECHNICAL PAGES PT7-124
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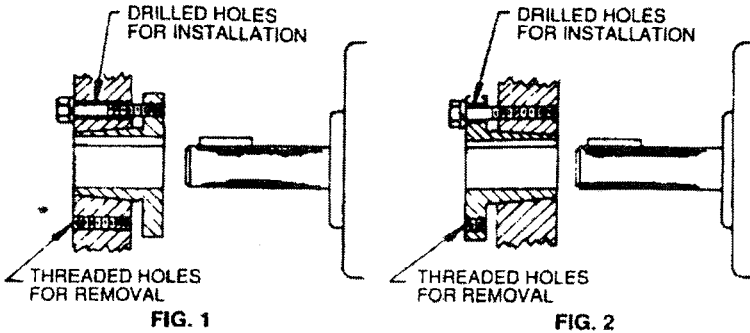


More Power and Life From V-Drives

TROUBLE AREA AND OBSERVATION	CAUSE	REMEDY
<p>BELT STRETCH BEYOND TAKE-UP</p> <p>Belt stretch unequally.</p> <p>All belts stretch about equally.</p>	<p>Mis-aligned drive, unequal work done by belts.</p> <p>Belt tensile member broken from improper installation.</p> <p>Insufficient take-up allowance.</p> <p>Greatly overloaded or underdesigned drive.</p>	<p>Realign and re-tension drive.</p> <p>Replace all belts with new matched set properly installed.</p> <p>Check take-up and follow allowance on page .</p> <p>Redesign.</p>
<p>SHORT BELT LIFE</p> <p>Relatively rapid failure; no visible reason.</p> <p>Sidewalls soft and sticky. Low adhesion between cover plies. Cross-section swollen.</p> <p>Sidewalls dry and hard. Low adhesion between cover plies. Bottom belt cracked.</p>	<p>Tensile members damaged through improper installation.</p> <p>Worn sheave grooves (check with groove gauge)</p> <p>Under-designed drive.</p> <p>Oil or grease on belts or sheaves.</p> <p>High temperatures.</p>	<p>Replace with all new matched set, properly installed.</p> <p>Replace sheaves.</p> <p>Redesign.</p> <p>Remove source of oil or grease. Clean belts and grooves with cloth moistened with alcohol.</p> <p>Remove source of heat. Ventilate drive better.</p>
<p>BELT TURN OVER</p> 	<p>Excess lateral belt whip.</p> <p>Foreign material in grooves.</p> <p>Mis-aligned sheaves.</p> <p>Worn sheave grooves (check with groove gauge).</p> <p>Tensile member broken through improper installation.</p> <p>Incorrectly placed flat idler pulley.</p>	<p>Use Banded belt.</p> <p>Remove material—shield drive.</p> <p>Realign the drive.</p> <p>Replace sheave.</p> <p>Replace with new matched set properly installed.</p> <p>Carefully align flat idler on slack side of drive as close as possible to driver sheave.</p>
<p>DETERIORATION OF RUBBER COMPOUNDS USED IN BELT</p> <p>Extreme cover wear.</p> <p>Spin burns on belt.</p> <p>Bottom of belt cracked.</p> <p>Broken belts.</p>	<p>Belt dressing.</p> <p>Belts rub against belt guard or other obstruction.</p> <p>Belts slip under starting or stalling load.</p> <p>Too small sheaves.</p> <p>Object falling into or hitting drive.</p>	<p>Never use dressing on V-belts. Clean with cloth moistened with alcohol.</p> <p>Tension drive properly to prevent slip.</p> <p>Remove obstruction or align drive to give needed clearance.</p> <p>Tighten drive until slipping stops.</p> <p>Redesign for larger sheaves.</p> <p>Replace with new matched set of belts.</p> <p>Provide shield for drive.</p>
<p>IMPROPER DRIVEN SPEED</p> <p>Incorrect driveR-driveN ratio.</p> <p>Spin burns on belt.</p>	<p>Design error.</p> <p>Belt slip.</p>	<p>Use correct sheave sizes.</p> <p>Re-tension drive until belt stops slipping.</p>
<p>BELT NOISE</p> <p>HOT BEARINGS</p> <p>Drive over-tensioned.</p> <p>Sheaves too small.</p> <p>Poor bearing condition.</p> <p>Sheaves out too far on shaft.</p> <p>Drive under-tensioned.</p>	<p>Belt slip.</p> <p>Worn grooves-belts bottoming and will not transmit power until over-tensioned.</p> <p>Improper tensioning.</p> <p>Motor manufacturers sheave diameters not followed.</p> <p>Underdesigned bearing or poor bearing maintenance.</p> <p>Error or obstruction problem.</p> <p>Belts slipping and causing heat build-up.</p>	<p>Re-tension drive until it stops slipping.</p> <p>Replace sheaves. Tension drive properly.</p> <p>Re-tension drive.</p> <p>Redesign drive.</p> <p>Observe recommended bearing design and maintenance.</p> <p>Place sheaves as close as possible to bearings. Remove any obstruction preventing this.</p> <p>Re-tension drive.</p>

Appendix D – QD Bushing Installation Instructions

QD* Bushings



WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

INSTALLATION:

1. Clean shaft, product bore, bushing, tapered surface and bushing bore of oil, paint dirt, etc.

CAUTION: DO NOT USE LUBRICANTS. The use of lubricants can cause product breakage during installation.

2. QD bushing sizes JA thru W (see table on page 2) may be assembled in either conventional or reverse mounting. Size H must be assembled in conventional mounting position only.

CAUTION: When mounting a product on size M thru S bushings, the hub jack holes should be positioned away from the bushing saw slot to reduce the possibility of bushing breakage and insert cap screws thru drilled holes in hub.

Conventional Mounting (Fig. 1): Place bushing in hub. Tighten cap screws finger tight into threaded holes in bushing flange.

Reverse Mounting (Fig. 2): Place bushing in hub and insert cap screws thru drilled holes in bushing flange. Tighten cap screws finger tight into threaded holes in hub.

3. With key on shaft, slide loosely assembled unit onto shaft so that cap screw heads are on the outside. Locate unit in desired position on shaft. When installing large or heavy parts in conventional position, it may be easier to mount the key and bushing on the shaft first, then place the product on the bushing aligning the holes and installing the cap screws.

Warning: Because of the possible danger to person(s) or property from accidents, which may result from the improper use of products. It is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manual must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guard and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided and are neither provided by Rockwell Automation nor are the responsibility of Rockwell Automation or the manufacturer of this component. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

WARNING: When mounting on a vertical shaft, insure that the products and/or bushing do not drop during installation.

4. Tighten cap screws alternately and evenly to the wrench torque specified in table below. Note: When tightened there will be a 1/8" to 1/4" gap between bushing flange and the hub. Should this gap close, then either undersize shafting or wrong bushing shaft size is indicated.

CAUTION: Excessive screw torque may cause damage to either bushing and/or product.

5. Tighten setscrew over key to torque value listed below.

REMOVAL

1. Remove all cap screws.
2. Install cap screws into threaded jack holes.
3. Tighten all jackscrews alternately and evenly, beginning with screw farthest from bushing saw slot, until bushing grip is released. Slide unit off shaft.

CAUTION: Excessive screw torque may cause damage to either bushing and/or product. Uneven pressure on jackscrews may also damage the bushing flange making removal difficult without damage to the product.

Bushings	Recommended Torque - English				Bushings	Recommended Torque - Metric			
	Cap Screws		Key Seat Set Screws			Cap Screws		Key Seat Set Screws	
	Size	lb-in	Size	lb-in		Size	N-m	Size	N-m
H	1/4-20 x 7/8	90	-	-	H	M6 x 1 x 25	5.6	-	-
JA	#10-24 x 1	60	-	-	JA	M5 x 0.8 x 22	9.6	-	-
SH	1/4-20 x 1-3/8	108	1/4-20	87	SH	M6 x 1 x 35	11.5	M6 x 1	7.7
SDS	1/4-20 x 1-3/8	108	1/4-20	87	SDS	M6 x 1 x 35	11.5	M6 x 1	7.7
SD	1/4-20 x 1-7/8	108	1/4-20	87	SD	M6 x 1 x 50	11.5	M6 x 1	7.7
SK	5/16-18 x 2	180	1/4-20	87	SK	M8 x 1.25 x 50	20.5	M6 x 1	7.7
SF	3/8-16 x 2	360	3/8-16	290	SF	M10 x 1.5 x 50	34	M10 x 1.5	35
E	1/2-13 x 2-3/4	720	3/8-16	290	E	M12 x 1.75 x 70	77	M10 x 1.5	35
F	9/16-12 x 3-5/8	900	3/8-16	290	F	M14 x 2 x 100	100	M10 x 1.5	35
J	5/8-11 x 4-1/2	1620	1/2-13	620	J	M16 x 2 x 120	194.5	M12 x 1.75	55
M	3/4-10 x 6-3/4	2700	1/2-13	620	M	M20 x 2.5 x 180	256	M12 x 1.75	55
N	7/8-9 x 8	3600	5/8-11	1325	N	-	-	-	-
P	1-8 x 9-1/2	5400	5/8-11	1325	P	-	-	-	-
W	1 1/8-7 x 11	7200	3/4-10	2400	W	-	-	-	-
S	1 1/4-7 x 15	9000	1-8	7200	S	-	-	-	-

BAG OF HARDWARE [^]			
Bushings	Part Numbers - English	Bushings	Part Numbers - Metric
H	411682	H	411801
JA	411683	JA	411802
SH	411684	SH	411803
SDS	411684	SDS	411803
SD	411685	SD	411805
SK	411686	SK	411806
SF	411687	SF	411807
E	411688	E	411808
F	411689	F	411809
J	411690	J	411810
M	411691	M	411811
N	411692	N	411812
P	411693	P	411813

[^]Includes 3 cap screws and 3 washers.

*QD is a registered trademark of EMERSON

www.rockwellautomation.com www.ptplace.com www.dodge-pt.com www.reliance.com www.ptplace.ca

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Appendix E – Cincinnati Fan Maintenance Manual

OPERATING & MAINTENANCE INSTRUCTIONS AND PARTS LIST

for
HDBI - Backward Inclined Blowers
HDAF - Airfoil Wheel Blowers
RBE - Radial Blade Exhausters
HP - High Pressure Blowers

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V. Operation.....	Page 3
VI. General Maintenance	Page 3
VII. V-belt Drives.....	Pages 3, 4 & 5
VIII. Bearing Maintenance.....	Pages 4 & 5
IX. Warranty.....	Page 5
X. Ordering Replacement Parts	Page 5
XI. Trouble Shooting	Page 6
XII. Assembly Drawings	Pages 7-12

NOTICE

If fan will not be put into operation within 30 days, obtain long-term storage instructions from our website (www.cincinnati-fan.com) or your local Cincinnati Fan Sales Office.

▲ DANGER

ALL FANS AND BLOWERS SHOWN HAVE ROTATING PARTS AND PINCH POINTS. SEVERE PERSONAL INJURY CAN RESULT IF OPERATED WITHOUT GUARDS. STAY AWAY FROM ROTATING EQUIPMENT UNLESS IT IS DISCONNECTED FROM ITS POWER SOURCE AND ALL ROTATING PARTS HAVE STOPPED MOVING.

READ ALL OPERATING INSTRUCTIONS CONTAINED HEREIN
BEFORE INSTALLING EQUIPMENT.

▲ DANGER

NO GUARANTEE OF ANY LEVEL OF SPARK RESISTANCE IS IMPLIED BY SPARK RESISTANT CONSTRUCTION. IT HAS BEEN DEMONSTRATED THAT ALUMINUM IMPELLERS RUBBING ON RUSTY STEEL MAY CAUSE HIGH INTENSITY SPARKS. AIR STREAM MATERIAL AND DEBRIS OR OTHER SYSTEM FACTORS MAY ALSO CAUSE SPARKS.



PART # 01001
CATALOG #PMK-1001
SUPERSEDES: PMK-1293

7697 Snider Road, Mason, Ohio 45040-9135 (513) 573-0600

I. GENERAL SAFETY NOTES

1. Rotating parts including shaft and V-belt drives must be properly guarded to prevent personal injury.
2. Electrical wiring must be accomplished by a qualified electrician in accordance with all applicable codes.
3. Care should be taken:
 - Not to run fan above its safe speed
(See Performance Tables in Sales Catalog or call **CF** sales office).
 - Not to operate in excessive temperatures
(See limitations in Sales Catalog or call **CF** sales office).
 - Not to operate in dangerous environments.
 - Read all instructions carefully.

II. RECEIVING

Receiving Inspection

When unit is received, inspect immediately for damaged or missing parts. Even though all units are carefully inspected and prepared for shipment at the factory, rough handling en route may cause concealed damage or cause nuts, set screws, bolts or locking collars to work loose. Be certain all fasteners are tightened securely. Rotate wheel by hand to verify that it rotates freely and that there are no obstructions.

Table #1

TORQUE VALUES FOR SPLIT TAPER BUSHINGS	
Bushing Size	MINIMUM RECOMMENDED TORQUE (INCH-LBS)
H	95
B & P	192
Q & R	350

Table #2

SET SCREW TORQUE VALUES		
SET SCREW SIZE		MINIMUM REQUIRED TORQUE (INCH-LBS)
Diameter & No. of Threads/Inch	Hex Size Across Flats (Allen Wrench)	
1/4-20	1/8"	65
5/16-18	5/32"	165
3/8-16	3/16"	228
7/16-14	7/32"	348
1/2-13	1/4"	504
5/8-11	5/16"	1104

NOTE: If wheel set screws are loosened and/or wheel is removed from shaft, set screws *must* be replaced. Set screws cannot be used more than once. Use knurled, cup point set screws with a locking patch.

Inspect all shipments carefully for damage. THE RECEIVER MUST NOTE ANY DAMAGE ON THE CARRIER'S BILL OF LADING AND FILE A CLAIM IMMEDIATELY WITH THE FREIGHT COMPANY IN THE CASE OF ANY DAMAGE. Keep a record of all equipment received, including inspection details and date of receipt because of the possibility of partial shipments.

III. HANDLING

Handle your equipment with care. Some fans are provided with lifting lugs or holes for easy handling. Others must be handled using nylon straps or well-padded chains and cables which protect the fan's coating and housing. Spreader bars should be used when lifting large parts.

Centrifugal fans are best lifted using one strap under the fan's scroll and another strap around the bearing base. DO NOT LIFT CENTRIFUGAL FANS BY THE FAN SHAFT, WHEEL, FLANGES OR INLET SUPPORT OR MOTOR EYE BOLT.

NOTICE

If fan will not be put into operation within 30 days, obtain long-term storage instructions from our website (www.cincinnati-fan.com) or your local Cincinnati Fan Sales Office.

IV. GENERAL INSTALLATION INSTRUCTIONS

Foundations

Fan foundation must be flat, level and rigid. Where foundation is not completely flat, shims must be placed under fan support at each anchor bolt as required. Bolting fan to an uneven foundation distorts alignment and causes vibration.

Structural steel foundations should be heavily cross-braced for load support.

V. OPERATION

Before Connecting Power

1. Inspect all fasteners and retighten if necessary:
 - a. Foundation bolts.
 - b. Set screws in fan and wheel and V-belt drive (See Tables #1 & #2 on preceding page).
 - c. Housing, bearing and motor mounting.
2. Inspection doors should be tight and sealed.
3. Bearings should be checked for alignment and lubrication (See Bearing Maintenance, pages 4 & 5).
4. Turn rotating assembly by hand to insure that it does not strike housing. If the wheel strikes the housing, the wheel may have moved on the shaft or the bearings may have shifted in transit. Correction *must* be made prior to start up.
5. Check motor to insure proper speed and electrical characteristics.
6. Check V-belt drive for alignment and correct belt tension.
7. After wiring, energize motor for one second to check for proper rotation.

VI. GENERAL MAINTENANCE

CAUTION

Before any maintenance or service is performed, assure that unit is disconnected or locked out from power source to prevent accidental starting.

The key to good fan maintenance is a regular and systematic inspection of all fan parts. Severity of the application should determine frequency of inspection. The components requiring service are generally the moving parts which include bearings, fan wheel, belts, sheaves and motor.

Cast Aluminum & Metal Parts

Cast aluminum and steel parts usually do not require maintenance during the life of the unit except painted metal surfaces that may require periodic repainting. In a severe, dirty operation, the wheel should be cleaned with a wire brush to prevent an accumulation of foreign matter that could result in fan unbalance. After cleaning wheel, inspect for possible cracks or excessive wear, which can cause unbalance. **DO NOT** operate a wheel that is cracked, chipped, has broken blades or excessive wear. NOTE: If wheel set screws are loosened and/or wheel is removed from shaft, set screws *must* be replaced. Set screws cannot be used more than once. Belts on V-belt drive units require periodic inspection and replacement when worn. For multiple belt drives, belts should be replaced with matched sets.

Motor Maintenance

1. Disconnect or lock out power to motor.
2. Removing dust and dirt: Blow out open type motor windings with low pressure air to remove dust or dirt. Air pressure above 50 P.S.I. should not be used as high pressure may damage insulation and blow dirt under loosened tape. Dust accumulation can cause excessive insulation temperatures.
3. Lubrication: The motor bearings and the fan bearings on the belt drive fans should be greased at regular intervals. Motor manufacturers' greasing instructions and recommendations should be followed closely. Avoid the use of a pressure greasing system which tends to fill the bearing chamber completely. Do not overgrease. Use only 1 or 2 shots with a hand gun in most cases. Maximum hand gun rating 40 P.S.I. Rotate bearings during lubrication where good safety practice permits. NOTE: On motors with non-regreasable sealed bearings, no lubrication is required for the life of the bearings.

To prevent rusting of bearing parts, the rotor must be rotated at regular intervals (30 days) to assure these parts are well covered with oil or grease.

VII. V-BELT DRIVES

Care should be taken not to overtighten V-belt drive. Excessive belt tension overloads fan and motor bearings. It is much less expensive to replace belts worn from slippage than to replace bearings damaged from excessive loading.

Fans shipped completely assembled have had V-belt drive aligned at the factory. Alignment should be rechecked before operation as a precaution due to handling during shipment.

A WORD OF CAUTION ABOUT MOTORS

Using your hand to test the running temperature of a motor can be a very painful experience:

Normal body temperature	98.6° F
Threshold of pain caused by heat.....	120.0° F
Average temperature of hot tap water.....	140.0° F
Average temperature of hot coffee.....	180.0° F
Normal operating temperature of a fully loaded electric motor open type, 70° F ambient temperature	174.0° F

1. Be sure sheaves are locked in position.
2. Key should be seated firmly in keyway.
3. Place straight edge or taut cord across faces of driving and driven sheaves to check alignment. The motor and fan shafts must be parallel with V-belts and at right angles to the shafts.
4. Start the fan. Check for proper rotation. Run fan at full speed. A slight bow should appear on slack side of belt. Disconnect power and adjust belt tension by adjusting motor on its sliding base. All belts must have some slack on one side.

5. If belts squeal at start up, they may be too loose.
6. When belts have had time to seat in the sheave grooves, then readjust belt tension. (2-3 days)

V-belt drive assembly can be mounted as follows:

1. Clean motor and fan shafts. Be sure they are free from corrosive material. Clean bore of sheaves and coat with heavy oil for ease of shaft entry. Remove oil, grease, rust or burrs from sheave grooves.
2. Place fan sheave on fan shaft and motor sheave on its shaft. **Do not pound sheaves** on as this may damage bearings. Tighten sheaves per Table #1 or #2 on page 2.

Table #3 (See Bearing Maintenance, page 5.)

Conditions Around Bearing	Operating Temperature of Fan	**Greasing Intervals
Fairly Clean	up to 120 °F 120°-160°F 160°-200°F plus*	6-12 months 2-3 months 1-2 months
Moderate to Extremely Dirty	up to 160°F 160°-200°F plus*	1-2 months 2-4 weeks
Cold Storage Room		every defrosting period or no more than 4 months
*For fan applications over 200°F: greasing intervals should be from several days to 2 weeks, depending on the temperature.		
**For vertical installations, greasing intervals should be twice as frequent as table values.		
<hr/> <p>The following greases, or one that is equivalent to the general description, are recommended for the following temperatures or excessive moisture applications.</p>		
Operating Conditions	Use Grease Equivalent to these Grades	
Temperatures -65°F to 0°F	Esso-Beacon #325 (-65°F) Mobil Grease #28 (-65°F) Shell Oil Aeroshell No. 7 (-100°F)	
General Description: Versatile multipurpose microgel thickened synthetic hydrocarbon grease with corrosion inhibitors, anti-oxidant additives, water resistance tendencies and EP characteristics.		
Temperature 0°F to 200°F inclusive (Also use for heavy condensation or direct splash of water)	Mobil Oil - Mobilux EP #2 Shell Oil - Shell Alvania EP #2 Chevron - Chevron SRI #2	
General Description: Multipurpose NLGI#2 grease from lithium soap with EP characteristics, rust inhibitors, anti-oxidant additives and good water resistance tendencies.		
Temperatures over 200°F	Dow Corning-DC44 (400°F) (Not compatible with non-silicon based greases)	
General Description: Versatile multipurpose microgel thickened synthetic hydrocarbon grease with corrosion inhibitors, anti-oxidant additives, water resistance tendencies and EP characteristics.		

3. Move motor on slide base so belts can be placed in grooves of both sheaves without forcing. Do not roll belts or use a tool to force belts over the grooves.
4. Align fan and motor shafts so they are parallel. The belts should be at right angles to the shafts. A straight edge or taut cord placed across the face of the sheaves will aid in alignment.
5. Tighten belts by adjusting motor base. Correct tension gives the best drive efficiency. Excessive tension causes undue bearing pressure.
6. Start the fan and run it at full speed. Adjust belt tension until only a slight bow appears on the slack side of the belts. If slippage occurs, a squeal will be heard at start-up. Eliminate this squeal by **disconnecting or locking out motor from power source** and then tightening up the belts.
7. Give belts a few days running time to become seated in sheave grooves, then readjust belt tension.

If the shafts become scratched or marked, carefully remove sharp edges and high spots such as burrs with fine emery cloth or honing stone. Avoid getting emery dust in the bearings.

Do not apply any belt dressing unless it is recommended by the drive manufacturer. V-belts are designed for frictional contact between the grooves and sides of the belts. Dressing will reduce this friction.

Belt tension on an adjustable pitch drive is obtained by moving the motor, not by changing the pitch diameter of the adjustable sheave.

VIII. BEARING MAINTENANCE

Sealed Bearings

Sealed for life bearings are pre-lubricated with the correct amount of manufacturer approved ball bearing grease, and are designed for application where relubrication is not required.

Relubricatable Bearings

The motor bearings and fan bearings on belt drive fans should be greased at regular intervals. Motor manufacturers greasing instructions and recommendations should be followed closely. Avoid the use of a pressure greasing system which tends to fill the bearing chamber completely. Do not over grease.

NOTE: On motors with non-regreasable, sealed bearings, no lubrication is required for the life of the bearing.

Table #3 (page 4) lists the time intervals between fan greasing to insure proper lubrication in adverse conditions of heat and dust. Use only 1 or 2 shots with a hand gun in most cases. Maximum handgun rating 40 P.S.I.

IX. WARRANTY

Cincinnati Fan & Ventilator Company warrants products of its own manufacture against defects of material and workmanship under normal use and service for a period of eighteen (18) months from date of shipment or twelve (12) months from date of installation, whichever occurs first.

This warranty does not cover ordinary wear and tear, abuse, misuse, overloading, negligence, alteration or systems and/or materials not of Seller's manufacture. Expenses incurred by Buyer(s) in repairing or replacing any defective product will not be allowed except where authorized in writing and signed by an officer of the Seller.

The obligation of Seller under this warranty shall be limited to repairing or replacing F.O.B. Seller's plant, or allowing credit at Seller's option. This warranty is expressly in lieu of all other warranties expressed or implied including the warranties of merchantability and fitness for use and of all other obligations and liabilities of the Seller. The Buyer acknowledges that no other representations were made to him or relied upon him with respect to the quality or function of the products herein sold.

On equipment furnished by the Seller, but manufactured by others, such as motors, Seller extends the same warranty as Seller receives from the manufacturer thereof. Repairs for motors should be obtained from nearest authorized motor service station for the make of motor furnished. All motors used are products of well-known manufacturers with nationwide service facilities. Check the yellow pages of your telephone directory for the location of the nearest service shop.

Cincinnati Fan & Ventilator Company assumes no responsibility for material returned to our plant without our prior written permission.

X. ORDERING REPLACEMENT PARTS

Replacement or spare parts may be ordered through your local Cincinnati Fan representative. (Refer to drawings that begin on page 7.) The following information should accompany parts orders:

1. Motor horsepower, frame size, motor speed, voltage, phase, cycle and enclosure. Motor manufacturer's model number from motor nameplate.
2. Fan Speed (if V-belt driven).
3. Fan serial **and** model numbers from the **fan** nameplate and a complete description of the part.

An adequate stock of repair parts is maintained where possible. **If your fan is vital to production or to plant operation, it is advisable to have all spare parts on hand to minimize downtime.**

XI. TROUBLE SHOOTING

In the event that trouble is experienced in the field, the following are the most common fan difficulties. These points should be checked in order to prevent needless delay and expense.

1. CAPACITY OR PRESSURE BELOW RATING

- a. Incorrect direction of wheel rotation.
- b. Speed too slow.
- c. Dampers not properly adjusted.
- d. Poor fan inlet or outlet conditions (elbows, restrictions).
- e. Air leaks in system.
- f. Damaged wheel.
- g. Total resistance of system higher than anticipated.
- h. Wheel mounted backwards on shaft.
- i. Fan not properly selected for a high temperature and/or high altitude application.

2. VIBRATION AND NOISE

- a. Misalignment of bearings, coupling, wheel or V-belt drive.
- b. Unstable foundation or supports.
- c. Foreign material in fan causing unbalance.
- d. Worn bearings.
- e. Damaged wheel or motor.
- f. Broken or loose bolts and set screws.
- g. Bent shaft.
- h. Worn coupling.
- i. Fan wheel or drive unbalanced.

- j. 120 cycle magnetic hum due to electrical input. Check for high or unbalanced voltage.
- k. Fan delivering more than rated capacity.
 - l. Loose dampers.
- m. Speed too high or fan rotating in wrong direction.
- n. Vibration transmitted to fan from some other source.

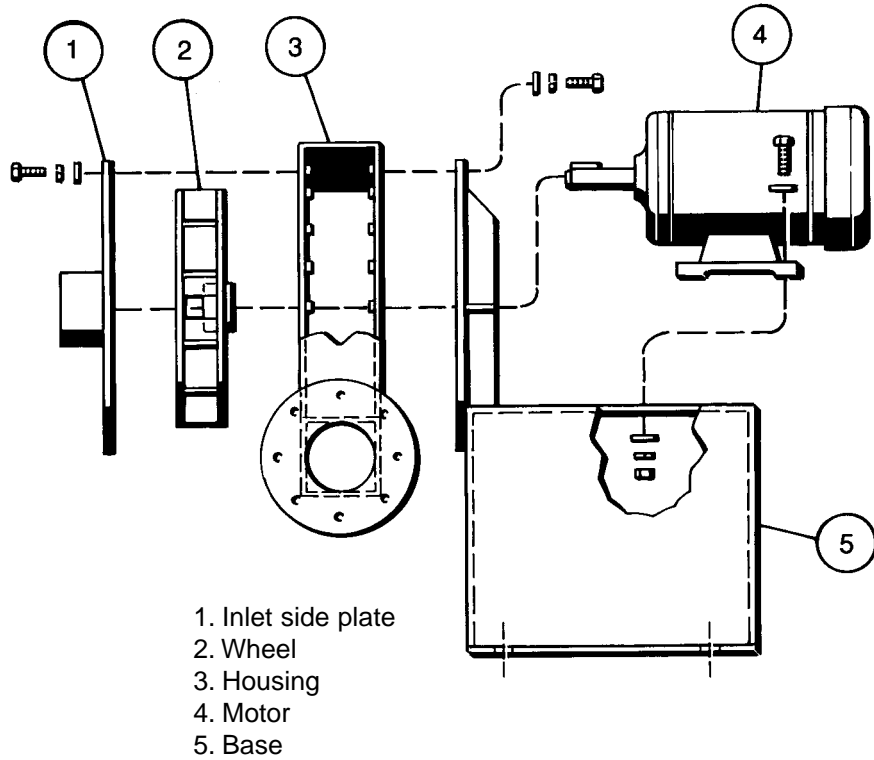
3. OVERHEATED BEARINGS

- a. Check bearing lubrication.
- b. Poor alignment.
- c. Damaged wheel or drive.
- d. Bent shaft.
- e. Abnormal end thrust.
- f. Dirt in bearings.
- g. Excessive belt tension.

4. OVERLOAD ON MOTOR

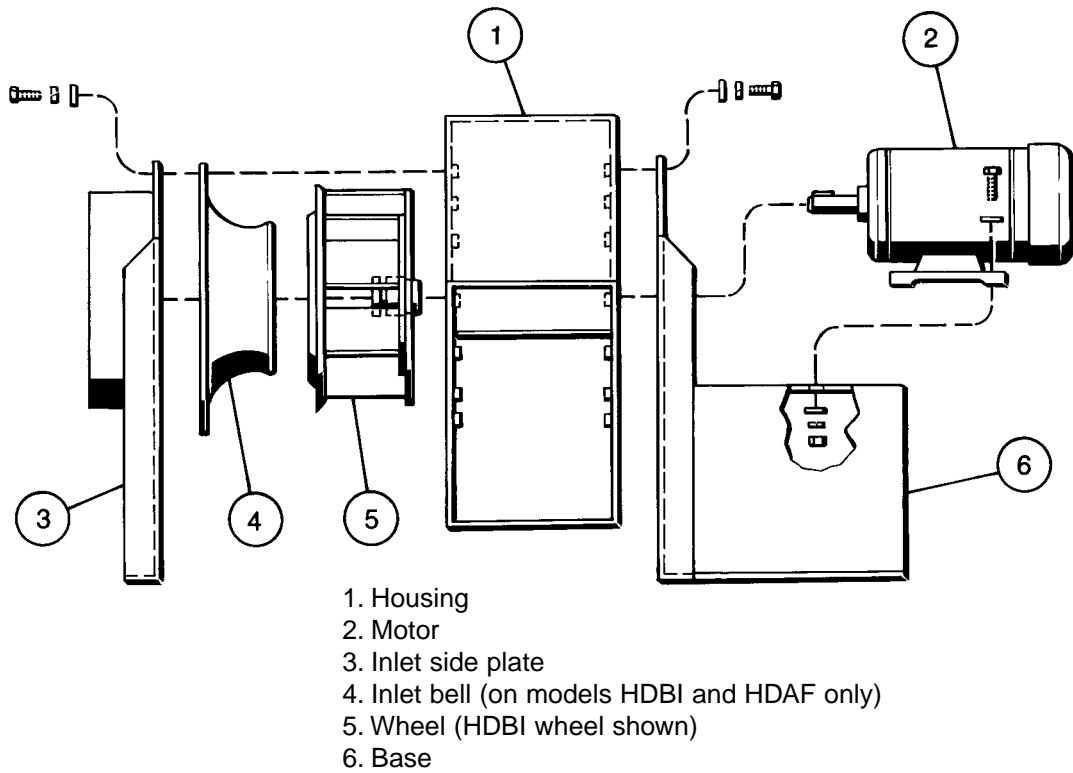
- a. Speed too high.
- b. Fan over capacity due to existing system resistance being lower than original rating.
- c. Specific gravity or density of gas above design value.
- d. Wrong direction of wheel rotation.
- e. Shaft bent.
- f. Poor belt alignment.
- g. Wheel wedging or binding on fan housing.
- h. Bearings improperly lubricated.
- i. Motor improperly wired.
- j. Defective motor. Motor must be tested by motor manufacturer's authorized repair shop.

**MODEL HP
Arrangement 4**

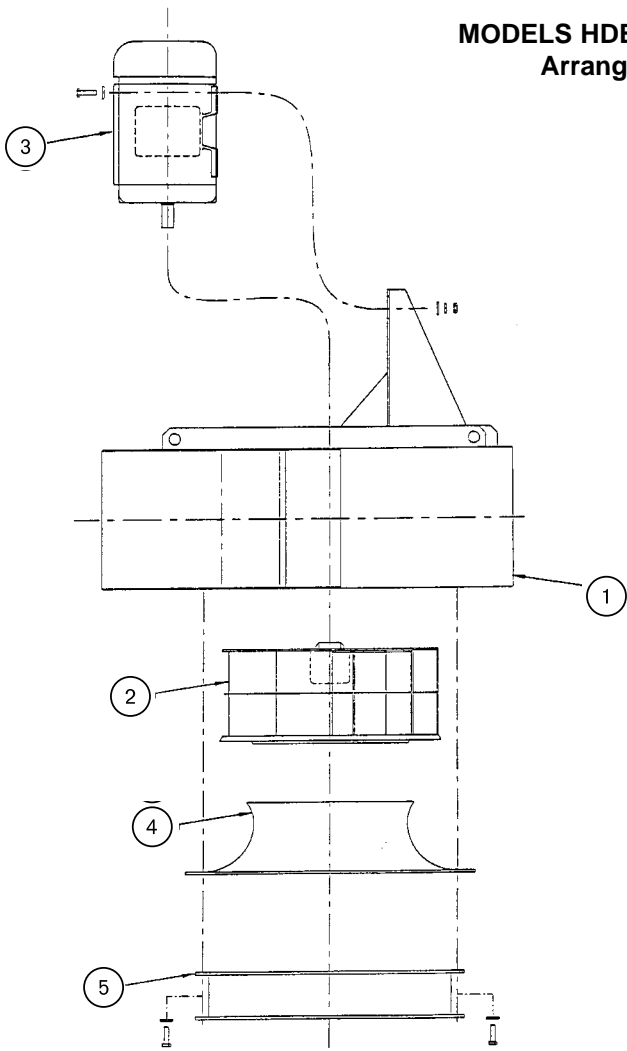


NOTE: Shaft seal is not shown

**MODELS HDBI, HDAF and RBE
Arrangement 4**

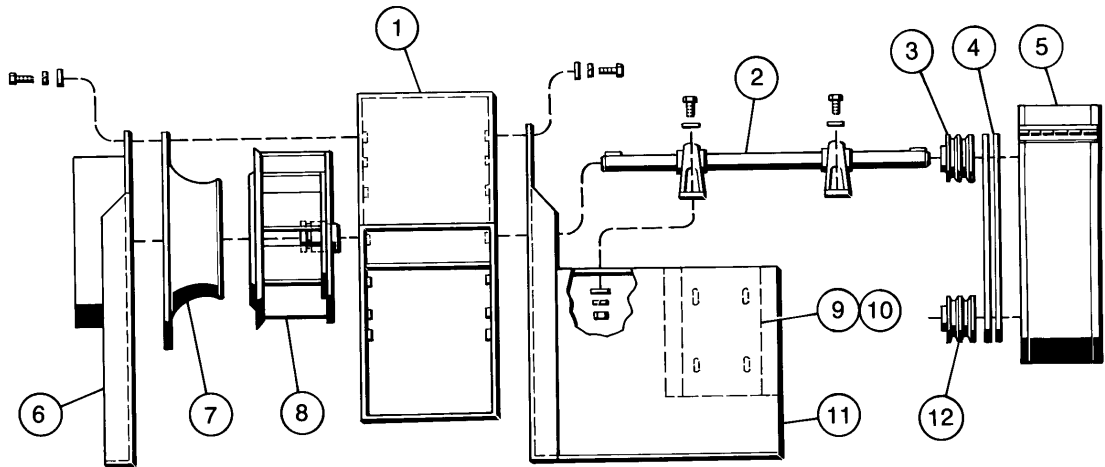


**MODELS HDBI, HDAF and RBE
Arrangement 4HM**



- 1. Housing
- 2. Wheel (HDBI shown)
- 3. Motor
- 4. Inlet bell (HDBI and HDAF only)
- 5. Inlet spool piece (Inlet side plate with optional inlet flange)

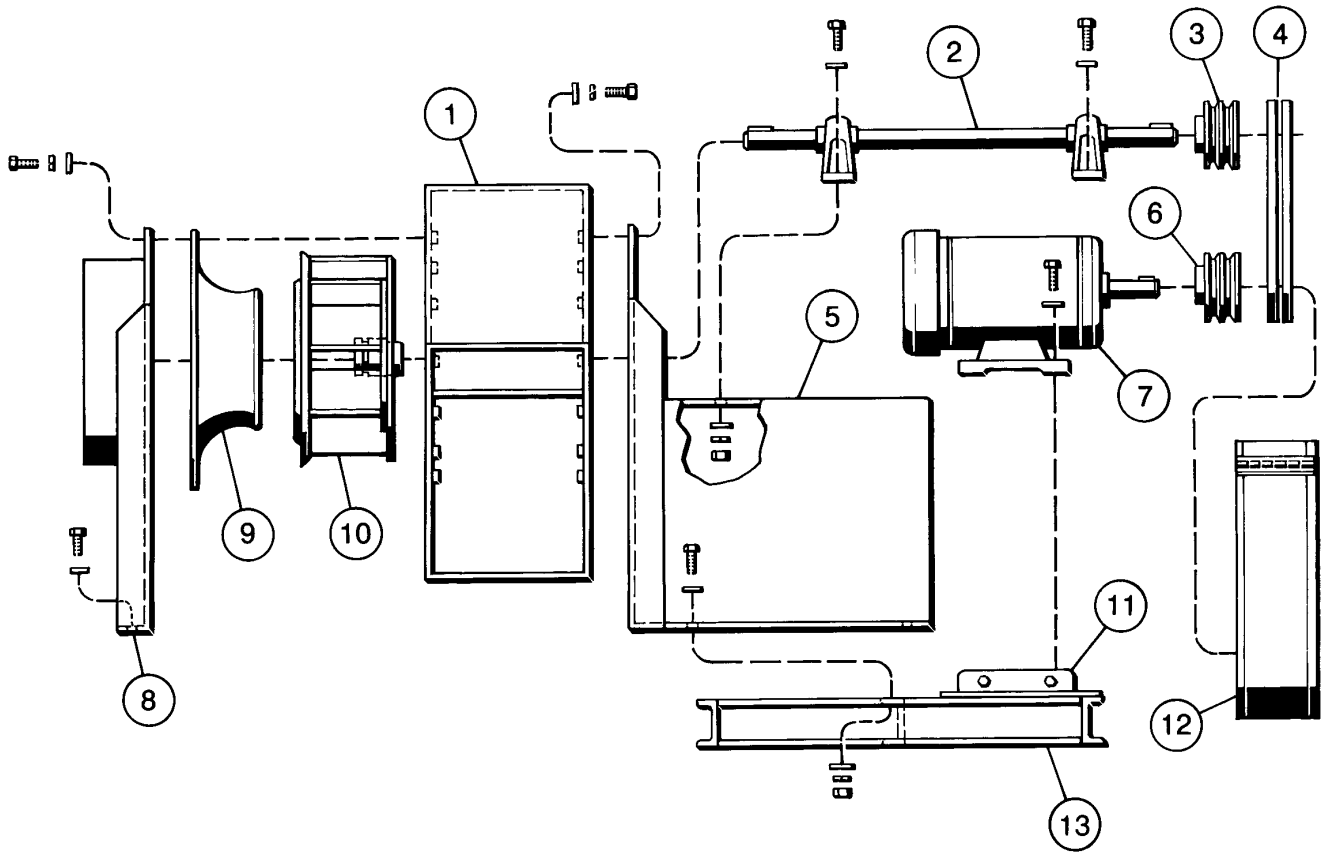
**MODELS HDBI, HDAF and RBE
Arrangements 1 and 9**



- 1. Housing
- 2. Shaft and bearing assembly
- 3. Fan shaft pulley (Arr. 9 only)
- 4. Belt(s) (Arr. 9 only)
- 5. Belt guard (Arr. 9 only)
- 6. Inlet side plate
- 7. Inlet bell (on Models HDBI and HDAF only)
- 8. Wheel (HDBI wheel shown)
- 9. Motor slide base (Arr. 9 only)
- 10. Motor (Arr. 9 only)*
- 11. Base, fan
- 12. Motor shaft pulley (Arr. 9 only)

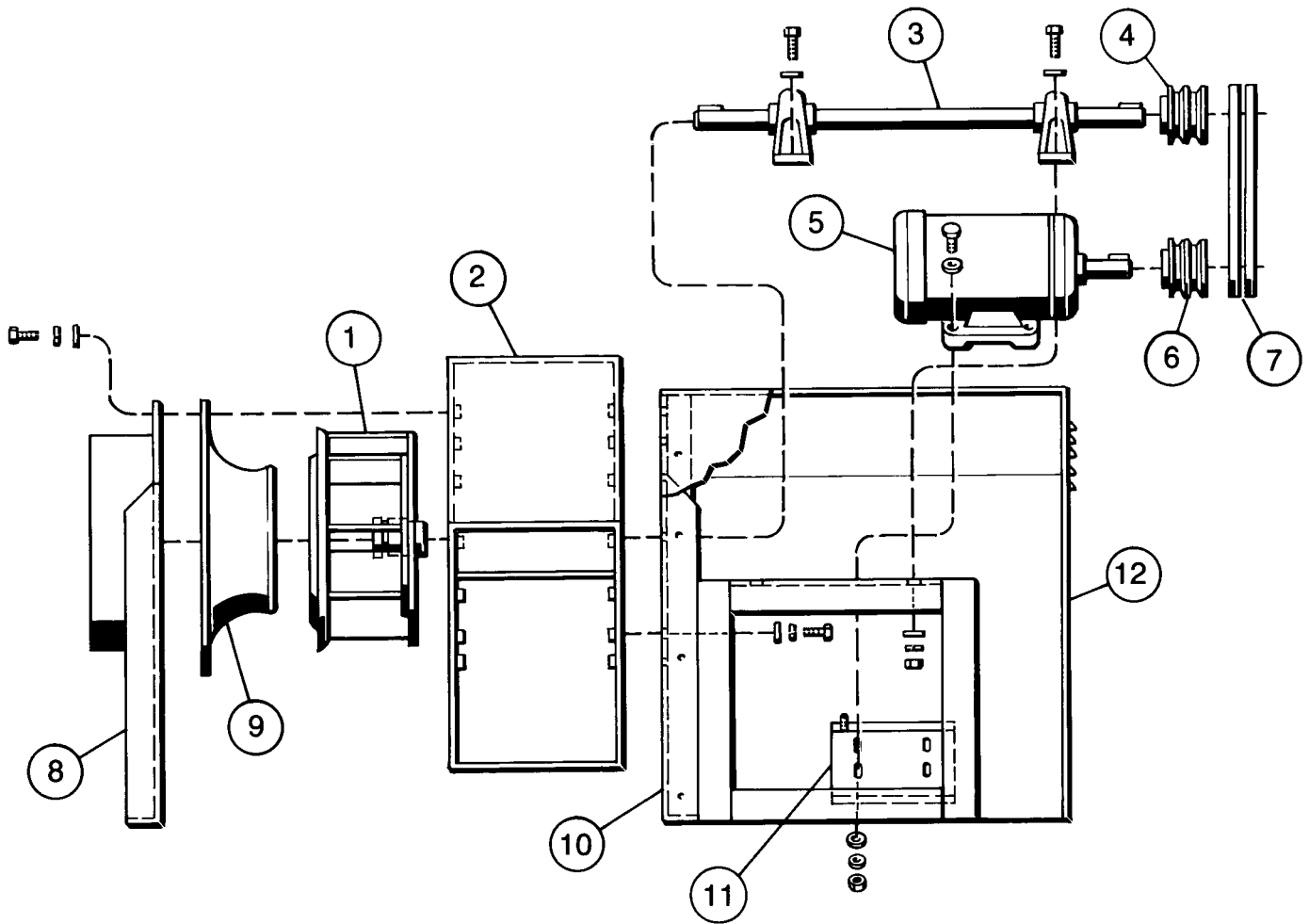
* Motor not shown in figure

**MODELS HDBI, HDAF and RBE
Arrangement 9CB Channel Base**



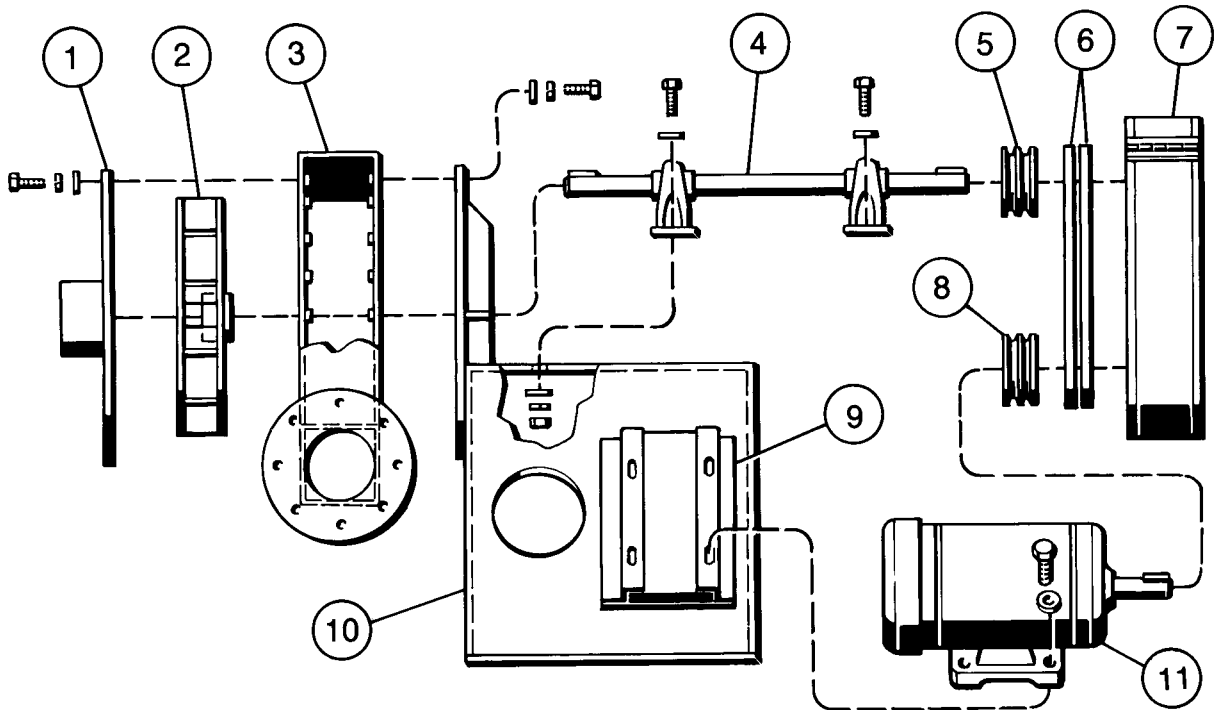
1. Housing
2. Shaft and bearing assembly
3. Fan shaft pulley
4. Belt(s)
5. Base, fan
6. Motor shaft pulley
7. Motor
8. Inlet side plate
9. Inlet bell (on Models HDBI and HDAF only)
10. Wheel (HDBI wheel shown)
11. Motor slide base
12. Belt guard
13. Base, Channel

MODELS HDBI, HDAF and RBE
Arrangement 10



1. Wheel (HDBI wheel shown)
2. Housing
3. Shaft and bearing assembly
4. Fan shaft pulley
5. Motor
6. Motor shaft pulley
7. Belt(s)
8. Inlet side plate
9. Inlet bell (on Models HDBI and HDAF only)
10. Base, fan
11. Motor base
12. Weather cover

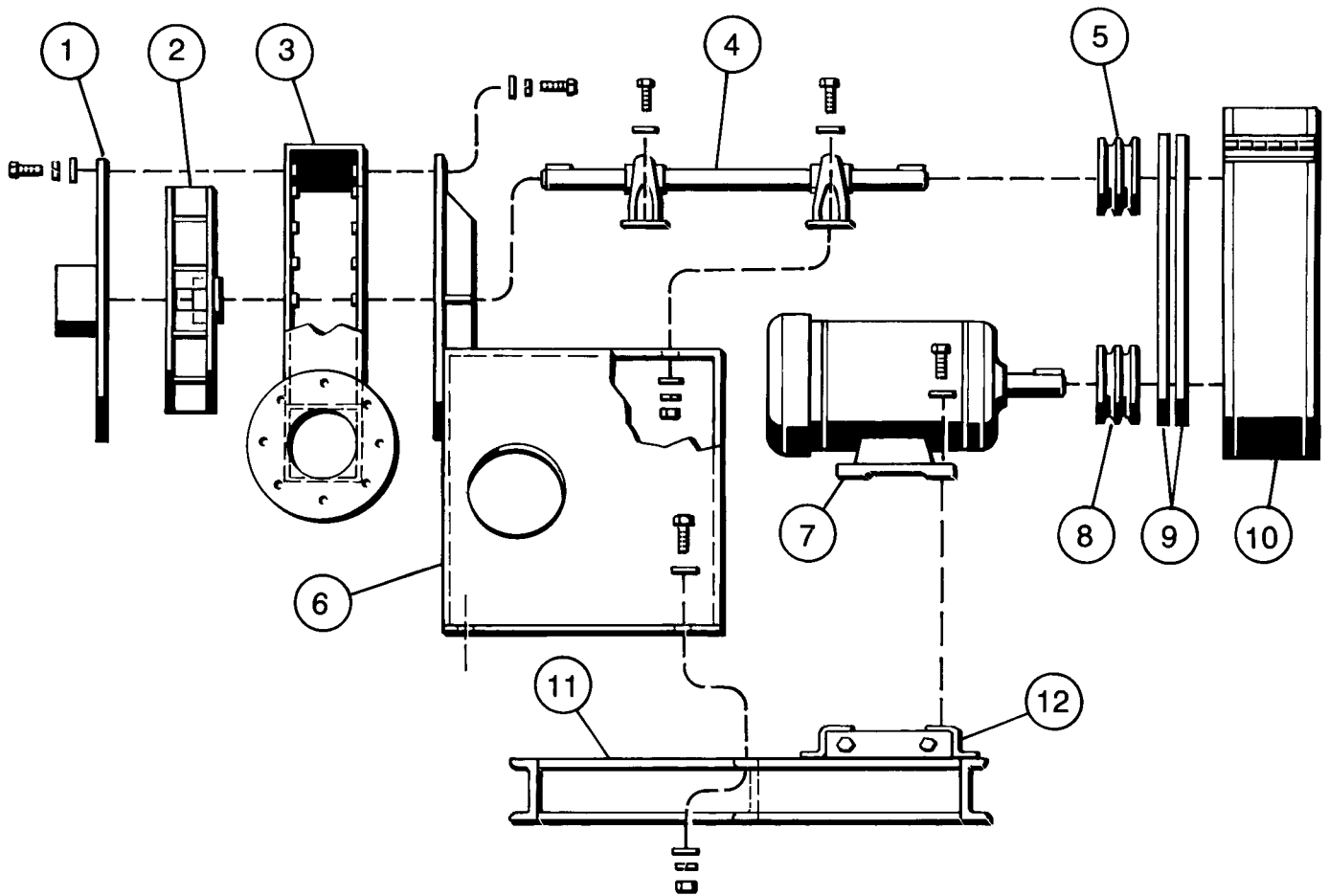
MODEL HP
Arrangement 1 and 9



- 1. Inlet side plate
- 2. Wheel
- 3. Housing
- 4. Shaft and bearing assembly
- 5. Fan shaft pulley (Arr. 9 only)
- 6. Belt(s) (Arr. 9 only)
- 7. Belt guard (Arr. 9 only)
- 8. Motor shaft pulley (Arr. 9 only)
- 9. Motor slide base (Arr. 9 only)
- 10. Base, fan
- 11. Motor (Arr. 9 only)

NOTE: Shaft seal is not shown

MODEL HP
Arrangement 9CB Channel Base



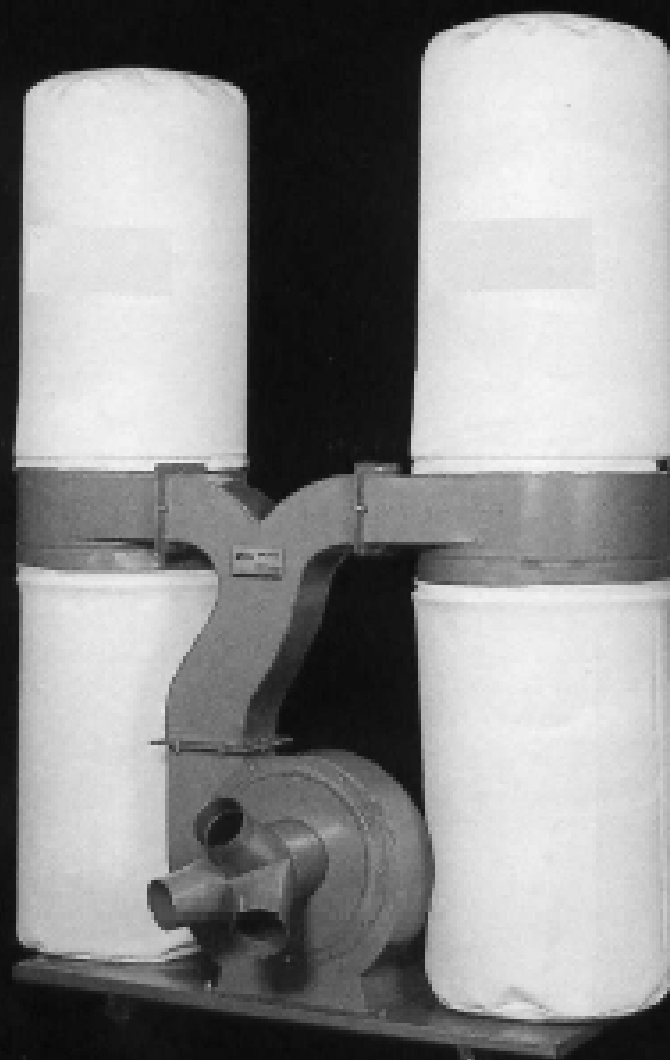
1. Inlet side plate
2. Wheel
3. Housing
4. Shaft and bearing assembly
5. Fan shaft pulley
6. Base, fan
7. Motor
8. Motor shaft pulley
9. Belt(s)
10. Belt guard
11. Base, channel
12. Motor slide base

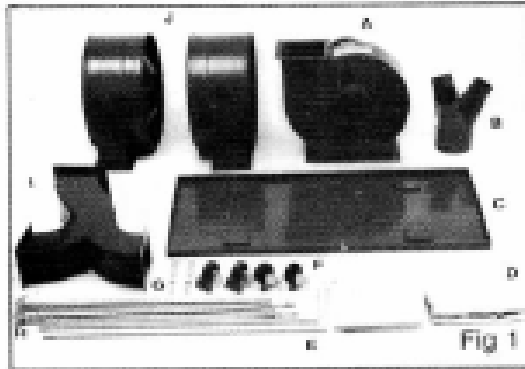
Note: Shaft seal is not shown.

Appendix F – Dust Collector Maintenance Manual

DUST COLLECTOR **UFO-102B**

OPERATOR'S MANUAL

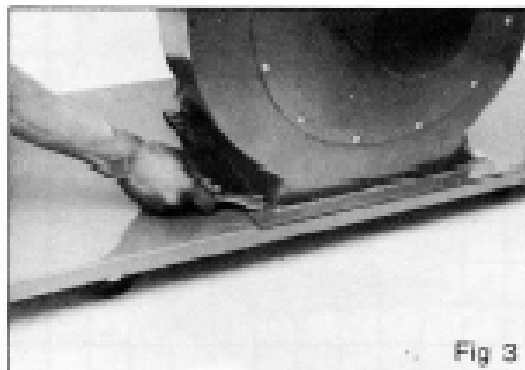




All parts needed to assemble your new Dust Collector have been included. These parts consist of the Fan/motor assy (A), Shutter (B), Base plate (C), four Bags (D), two Bag supports (E), four Casters (F), two Support inserts (G), two Supports (H), Connector (I), two Collectors (J), Nuts, Screws, Was hers, Spring washers, and Wrench. Fig 1.



To assemble, first place the base plate (C) upside down and attach the four casters (F) to the holes provided and tighten with the wrench. Fig 2.



Install the connector (I) to the fan/motor assy using six nuts, screws, and spring washers provided. Fig 4.



Next install the two collectors (J) to the connector as shown in Fig 5.

Next, return the base plate to the upright position and install the fan/motor assy (A) to the base plate. Fig 3.

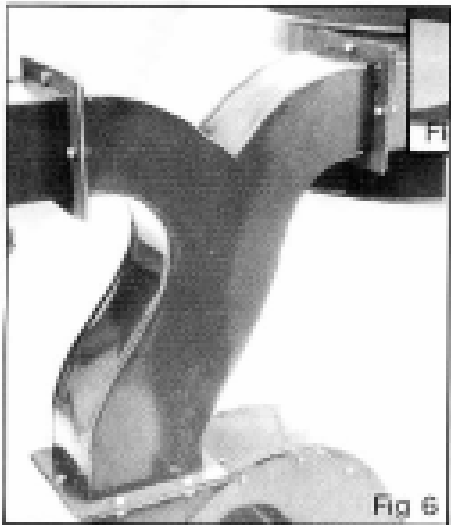


Fig 6



Fig 6 shows the two collectors attached to the connector and fan/motor assy.

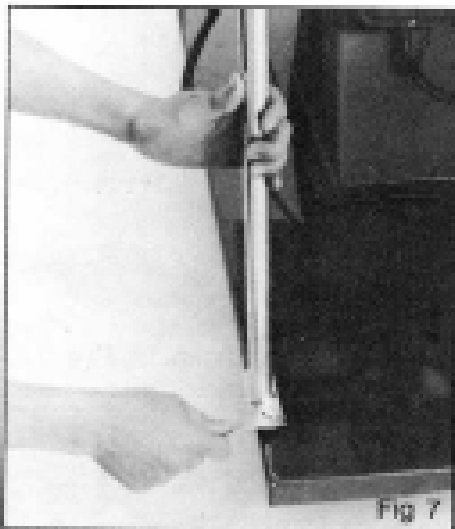


Fig 7

Now install the two collector supports(H) and the two support inserts(G) as shown in fig 7 and fig 8.



Fig 8

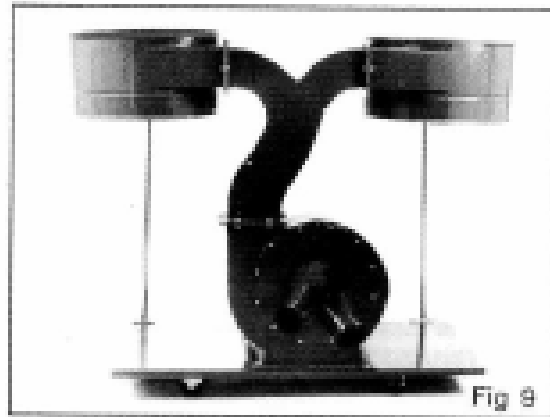


Fig 9



Fig 9 shows the Dust Collector as it should now appear.



Fig 10



At this time the two bag supports(E) should be installed onto the support inserts as shown in fig 10.

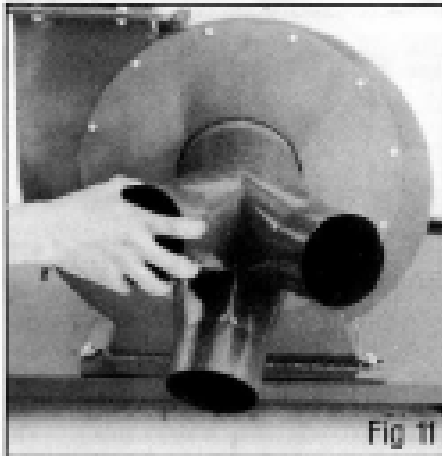


Fig 11



The shutter can now be placed on the intake hole of the fan/motor assy. Fig 11.

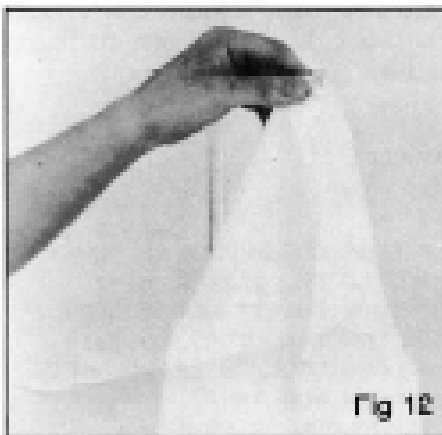


Fig 12



Next, hang the two filter bags (D) from the support rods. Fig 12.

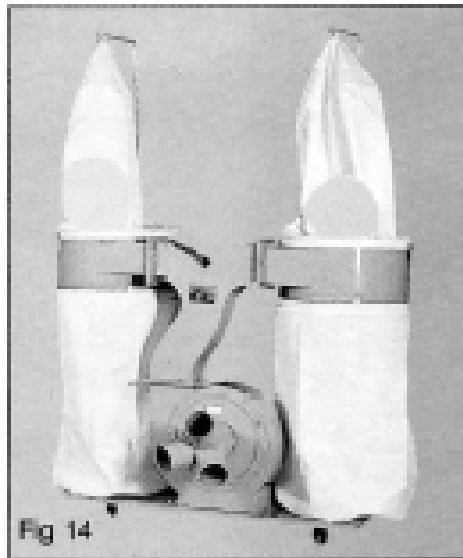


Fig 14



Your new Dust Collector should now look like the one pictured in fig 14.

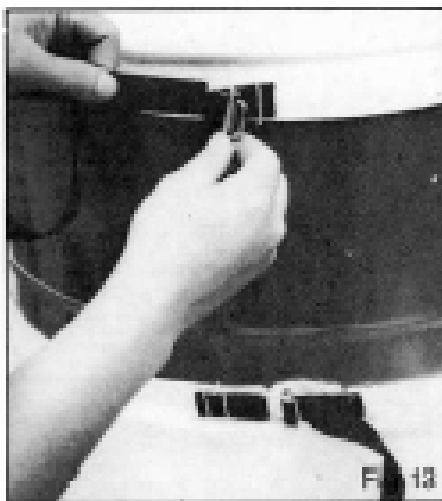


Fig 13



Now attach the two filter and two collection bags to the collectors using the hands sewn in the base of the bags as shown in fig 13.

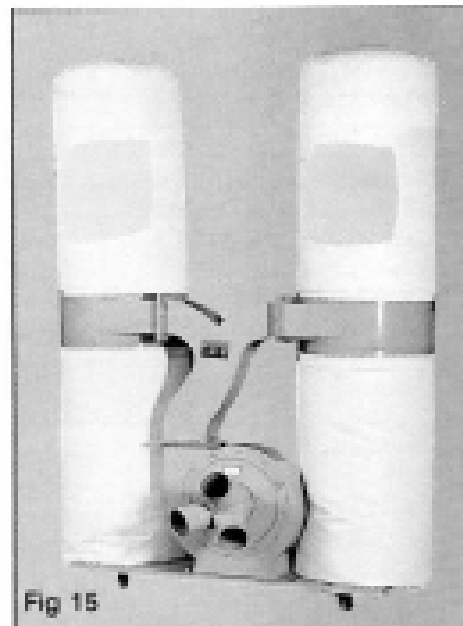
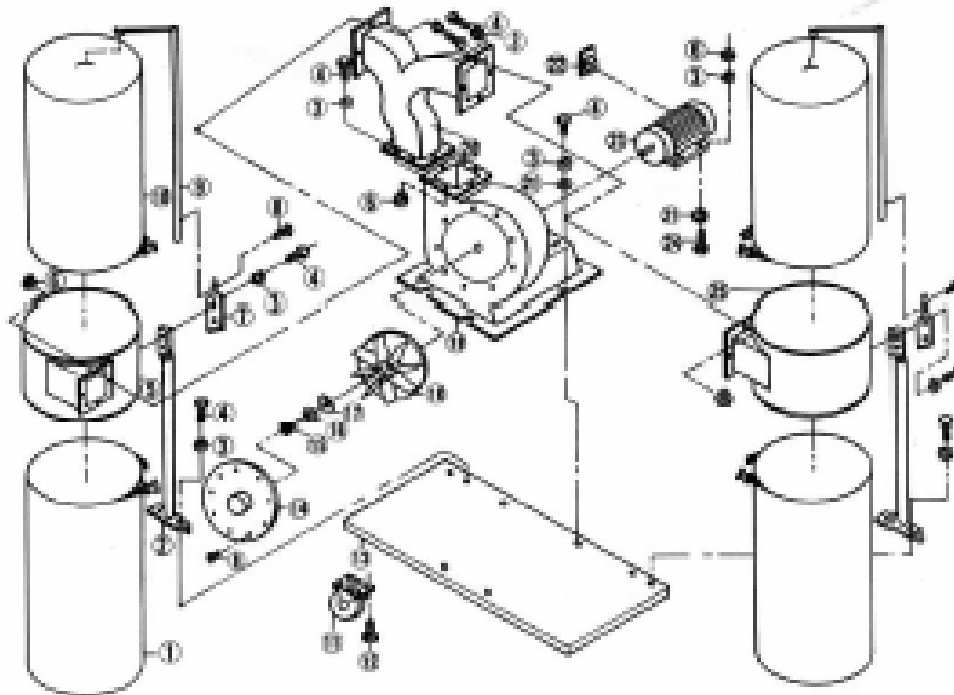


Fig 15



The Dust Collector is now ready to be placed into service. Before connecting to a power source, be sure the power source is properly grounded and is of proper voltage and amperage.

UFO-102B



• PARTS LIST •

Part No.	Description	Size	Quantity
1.	Collection bag		2
2.	Support		2
3.	Spring washer		30
4.	Screw	5/16"x3/4"L	26
5.	Collector		1
6.	Nut	5/16"	18
7.	Support insert		2
8.	Screw	1/4"x3/8"L	14
9.	Bag support		2
10.	Filter bag		2
11.	Caster		4
12.	Screw	5/16"x1/2"L	16
13.	Base plate		1
14.	Inlet cover		1
15.	Screw	1/4"x3/4"L	1
16.	Spring washer		1
17.	Washer		1
18.	Fan with plate		1
19.	Collector body		1
20.	Connector		1
21.	Washer		8
22.	Switch		1
23.	Motor		1
24.	Screw	5/16"x1"L	4
25.	Collector		1
26.	Shutter		1

Appendix G – SKF Bearing Grease



Re-lubrication



SKF Product Data Sheet

LGWA 2

SKF high load, extreme pressure, wide temperature range bearing grease

LGWA 2 is premium quality mineral oil based lithium complex grease with extreme pressure (EP) performance. LGWA 2 has such properties that it can be recommended for a wide range of industrial and automotive applications.

- Excellent lubrication at peak temperatures up to 220 °C (428 °F) for short periods
- Protection of wheel bearings operating under severe conditions
- Effective lubrication in wet conditions
- Good water and corrosion resistance
- Excellent lubrication under high loads and low speeds

Typical applications:

- Wheel bearings in cars, trailers and trucks
- Washing machines
- Electric motors



Bearing operating conditions

Temperature	Medium to high
Speed	Low to medium
Load	High
Vertical shaft	○
Fast outer ring rotation	○
Oscillating movements	○
Severe vibrations	○
Shock load or frequent start-up	+
Low noise	-
Low friction	○
Rust inhibiting properties	+
+ = Recommended ○ = Suitable - = Not suitable	

Available pack sizes LGWA 2

SYSTEM 24	35 g tube	200 g tube
420 ml cartridge	1 kg can	5 kg can
50 kg drum	180 kg drum	

Technical data

Designations	LGWA 2	
DIN 51825 code	KP2N-30	
NLGI consistency class	2	
Soap type	Lithium complex	
Colour	Amber	
Base oil type	Mineral ester	
Operating temperature range, °C (°F)	-30 to 140 (-22 to 284)	
Dropping point DIN ISO 2176, °C (°F)	> 250 (482)	
Base oil viscosity:		
40 °C, mm ² /s	185	
100 °C, mm ² /s	15	
Penetration DIN ISO 2137:		
60 strokes, 10 ⁻⁴ mm	265 - 295	
100 000 strokes, 10 ⁻⁴ mm	+50 max. (325 max.)	
Mechanical stability:		
Roll stability, 50 hrs at 80 °C, 10 ⁻⁴ mm	+50 max. change	
Roll stability, 72 hrs at 100 °C, 10 ⁻⁴ mm	-	
SKF V2F test	'M'	
Corrosion protection:		
SKF Emscor		
- standard ISO 11007	0 - 0	
- water washout test	0 - 0	
- salt water test (100% seawater)	-	
Water resistance	DIN 51 807/1, 3 hrs at 90 °C	
	1 max.	
Oil separation	DIN 51 817, 7 days at 40 °C, static, %	
	1 - 5	
Lubrication ability	SKF R2F, running test B	
	Pass at 100 °C (212 °F)	
Copper corrosion	DIN 51 811, 100 °C	
	2 max. (150 °C/300 °F)	
Rolling bearing grease life	SKF R0F test L50 life at 10 000 rpm, hrs	
	-	
EP performance	Wear scar DIN 51350/5, 1 400 N, mm	
	1,6 max.	
	4-ball test, welding load DIN 51350/4	
	2 600 min.	
Fretting corrosion	ASTM D4170 (mg)	
Designation	LGWA 2/(pack size)	
	* Typical value	

SKF Maintenance Products

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