Surface to Surface Inc.

Dependable & efficient mixers

Operators Manual

** FL243-11-6E **

USE IN CONJUNCTION WITH OEM MANUALS (ENCLOSED)

Unit Serial No. _____

Electric Motor(s)

Optim TEFC AEHH8N 40hp – Serial No._____

Optim TEFC AEHH8N 30hp – Serial No._____

Optim TEFC AEHH8N 2hp – Serial No._____

Certificate of Approval: #_____

Links relating to this Manual

www.stsmixers.com

www.twmi.com www.lenze.com

www.nord.com www.grovegear.com

Dealer

*** NOTICE ***

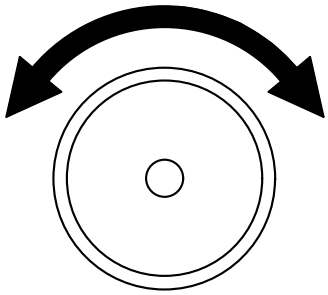
THIS UNIT IS TO BE INSTALLED, SET-UP, AND WIRED BY A QUALIFIED ELECTRICIAN TO BE COMMISSIONED BY THE END USER (CUSTOMER). ALL CODES AND REGULATIONS ARE TO BE FOLLOWED. SURFACE TO SURFACE ASSUMES NO RESPONSIBILITY FOR DAMAGES OR PERSONAL INJURIES CAUSED BY IMPROPER INSTALLATION.

If a problem or concern is found while installation is being performed, a call to the appropriate party is recommended.

Surface to Surface Inc. *1-800-567-0978*

STS-024 Rev. 01/04

*** CAUTION ***



FL243-711

WARNING

CHECK FOR THE PROPER ROTATION

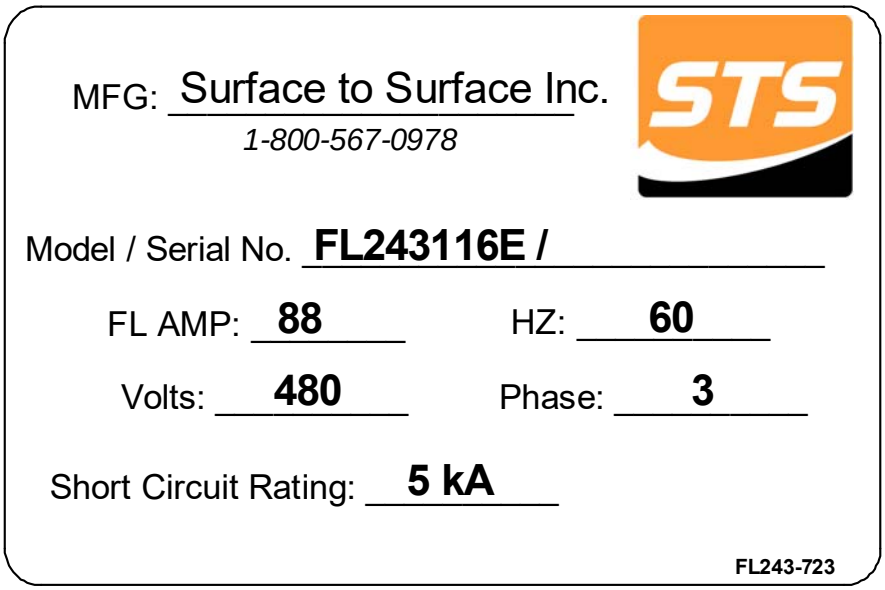
of all motors and augers when connecting the power source to the control panel terminals.

Serious equipment damage can occur

When connecting the customer supplied power source to the control panel, CHECK FOR THE PROPER ROTATION of all motors and augers. Decals indicate proper rotation.

If rotation is incorrect, reverse position of two of the incoming power wires at the control panel main terminal. This should correct the rotation of the motors. The control panel wiring has been configured and factory tested to assure proper rotation, and therefore no wiring needs to be changed "after" the main terminal.

*** INSTALLULATION ***



The above decal is located inside of the control panel to inform a qualified electrician aware of the power required.

If a remote genset (generator) will be used to power the FL243-11-6E unit, Surface to Surface Inc. recommends a genset unit capable of producing a minimum output of 100 Kw.

A larger Kw. output genset unit will be require if any additional extra devices / equipment are to be connected to this power source.

A qualified professional should be consulted on the actual total output required with the additional extra devices / equipment connected.

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Surface to Surface Inc.
5150 Forest Road, R.R.#3, Watford, Ontario, N0M 2S0
Tel: 1-800-567-0978

FL243-11-6 LIMITED WARRANTY

(6 Months / 500 Hours)

Surface to Surface Inc. (hereinafter "STS") warrants each new Industrial product of STS's manufacture to be free from defects in material and workmanship, under normal use and service for 6 months after initial purchase/retail sale or 500 operating hours, whichever occurs first. This Limited Warranty shall apply only to complete machines of STS's manufacture, parts are covered by a separate Limited Warranty. EQUIPMENT AND ACCESSORIES NOT OF STS'S MANUFACTURE ARE WARRANTED ONLY TO THE EXTENT OF THE ORIGINAL MANUFACTURER'S WARRANTY AND SUBJECT TO THEIR ALLOWANCE TO STS ONLY IF FOUND DEFECTIVE BY SUCH MANUFACTURER.

WARRANTY TERMS During the Limited Warranty period specified above, any defect in material or workmanship in any warranted item of STS Industrial Equipment not excluded below shall be repaired or replaced at STS's option without charge by any STS authorized independent dealer. The warranty repair or replacement must be made by a STS independent authorized dealer at the dealer's location. STS will pay for replacement parts and such authorized dealer's labor in accordance with STS's labor reimbursement policy. STS reserves the right to supply remanufactured replacement parts as it deems appropriate.

RETAIL PURCHASER RESPONSIBILITY: This Limited Warranty requires proper maintenance and periodic inspections of the Industrial Equipment as indicated in the Operator's/Maintenance Manual furnished with each new Industrial Equipment. The cost of routine or required maintenance and services is the responsibility of the retail purchaser. The retail purchaser is required to keep documented evidence that these services were performed. This STS New Industrial Equipment Limited Warranty may be subject to cancellation if the above requirements are not performed.

STS Equipment with known failed or defective parts must be immediately removed from service.

EXCLUSIONS AND LIMITATIONS

The warranties contained herein shall **NOT APPLY TO**:

(1) Any defect which was caused (in STS's sole judgment) by other than normal use and service of the Industrial Equipment, or by any of the following; (i) accident (ii) misuse or negligence (iii) overloading (iv) lack of reasonable and proper maintenance (v) improper repair or installation (vi) unsuitable storage (vii) non-STS approved alteration or modification (viii) natural calamities (ix) vandalism (x) parts or accessories installed on Industrial Equipment which were not manufactured or installed by STS authorized dealers (xi) the elements (xii) collision or other accident.

(2) Any Industrial Equipment whose identification numbers or marks have been altered or removed or whose hour meter has been altered or tampered with.

(3) Any Industrial Equipment which any of the required or recommended periodic inspection or services have been performed using parts not manufactured or supplied by STS or meeting STS Specifications including, but without limitation, engine tune-up parts, engine oil filters, air filters, hydraulic oil filters, and fuel filters.

(4) New Industrial Equipment delivered to the retail purchaser in which the equipment/warranty registration has not been completed and returned to STS within ten (10) days from the date of purchase.

(5) Any defect which was caused (in STS's sole judgment) by operation of the Industrial Equipment not abiding by standard operating procedures outlined in the Operator's Manual.

(6) Engine, battery, and tire Limited Warranties and support are the responsibility of the respective product's manufacturer. e.g. electric motors and gear boxes

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Tel: 1-800-567-0978

FL243-11-6 LIMITED WARRANTY *continued*

(7) Transportation costs, if any, of transporting to the STS dealer. Freight costs, if any, of transporting replacement parts to the STS dealer.
(8) The travel time of the STS dealer's service personnel to make a repair on the retail purchaser's site or other location
(9) In no event shall STS's liability exceed the purchase price of the product,
(10) STS shall not be liable to any person under any circumstances for any incidental or consequential damages (including but not limited to, loss of profits, out of service time) occurring for any reason at any time.
(11) Diagnostic and overtime labor premiums are not covered under this Limited Warranty Policy. Oils and fluids are not covered under this Limited Warranty.
(12) Depreciation damage caused by normal wear, lack of reasonable and proper maintenance, failure to follow operating instructions, misuse, lack of proper protection during storage.
(13) Accessory systems and electronics not of STS's manufacture are warranted only to the extent of such manufacturer's respective Limited Warranty if any.
(14) Wear items which are listed by product group below:
Belts, pulleys, bearings, seals, gaskets, chains, and chain retention rods.

EXCLUSIONS OF WARRANTIES: **EXCEPT FOR THE WARRANTIES EXPRESSLY AND SPECIFICALLY MADE HEREIN, STS MAKES NO OTHER WARRANTIES, AND ANY POSSIBLE LIABILITY OF STS HEREINUNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. STS RESERVES THE RIGHT TO MODIFY, ALTER AND IMPROVE ANY PRODUCT WITHOUT INCURRING ANY OBLIGATION TO REPLACE ANY PRODUCT PREVIOUSLY SOLD WITH SUCH MODIFICATION. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY, OR TO ASSUME ANY ADDITIONAL OBLIGATION ON STS'S BEHALF.**

NO DEALER WARRANTY. The selling dealer makes no warranty of its own and the dealer has no authority to make any representation or promise on behalf of STS or to modify the terms or limitations of this warranty in any way.

ELECTRONIC SIGNATURES. Each of the parties hereto expressly agrees to conduct transactions by electronic means. Accordingly, the parties agree and intend that all electronic transmissions including, without limitation, electronic signatures, shall be considered equivalent to an original writing as provided under Ontario law, as it may be amended from time to time.

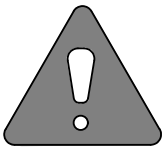
April 08, 2021
www.stsmixers.com rhw-dw

SAFETY STATEMENTS

Your personal safety and the safe operation of this unit are the concern of Surface to Surface Inc, and by reading and understanding this manual and understanding the safety statements, you will decrease the risk of personal and equipment damage.

Safety statements are listed here and throughout this manual to draw your attention to potential hazards that may be encountered while operating this piece of equipment. While reading this manual, you will notice that certain safety statements will relate directly to the operation or maintenance of that particular part of the unit and should be followed carefully. Decals on the unit also follow the same format as the warnings in this manual, and therefore should be kept in good repair to alert the operator and others of the potential hazard.

The OEM manuals also contain hazard warnings which pertain to their equipment/parts and should also be followed.



This safety alert symbol appears with most safety statements.
It means attention, become alert, your safety is involved!
Please read and abide by the message that follows the safety alert symbol.

DANGER

Danger (the word "DANGER" is in white letters with a red rectangle behind it) indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.

CAUTION

Caution (the word "CAUTION" is in black letters with a yellow rectangle behind it) indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING

Warning (the word "WARNING" is in black letters with an orange rectangle behind it) indicates an potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Caution "without the safety alert symbol" indicates an potentially hazardous situtation that can cause damage to the, machine, personal property and / or the environment or cause the machine to operate improperly.

FL243-11-6E

SAFETY STATEMENTS

The following caution statements have been drawn from the instructions in this manual. They have been assembled here for ready reference.

DANGER

IN AN EMERGENCY

Push the emergency stop switch to halt ALL of the motors on the unit.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without disconnecting & lock-out the power source.
Serious personal injury will result.

WARNING

NEVER USE BODY PARTS, OR FOREIGN OBJECTS

in an attempt to unplug or clean an auger.
Serious personal injury or damage will result.

WARNING

BEFORE PERFORMING ANY REPAIRS OR MAINTENANCE ON THE FLAIL BOX OR UPPER COMPONENTS,

lower the flail box & carriage down to the transport position to reduce serious falls and personal injury.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.

Serious personal injury will result.

CAUTION

AS THE UNIT IS RAISED OR LOWERED MULTABLE PINCH POINTS OCCUR

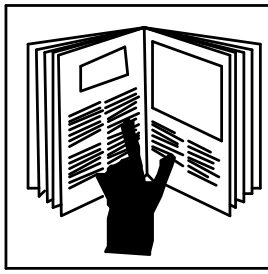
Do not position any part of your body near labled areas.

CAUTION

LIFTING LUGS OR THE LIFTING POINT(S) identified and labelled on the unit structure must be used in order to safely lift and transport the unit.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment.
This unit was designed for the mixing and shearing of a dry additive, into a liquid or semi-solid stream.
Other uses may create unforeseen safety issues and personal injury risk.



WARNING

REFER TO THE SAFETY STATEMENTS IN THE OEM MANUALS AND THIS MANUAL REGARDING THESE OPERATIONS.

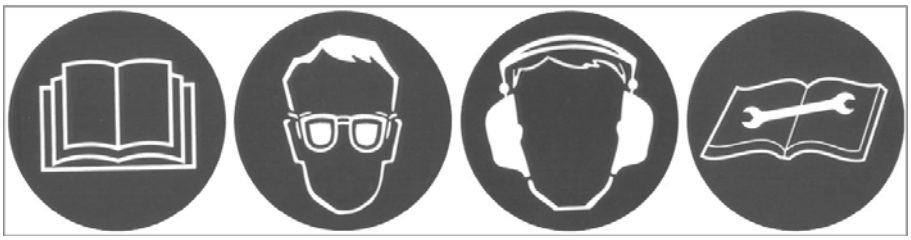
FL243-11-6E

Safety Markings

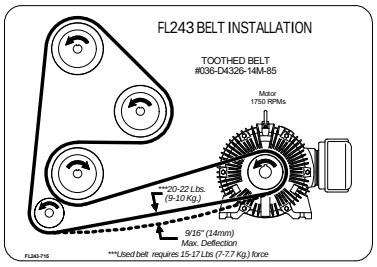
Hazard and warning markings have been placed at appropriate points on the unit. International symbols have been used, in order to ensure universal understanding of the nature of the hazard. Please comply with all warnings and markings to ensure safe use of the equipment. These include but are not limited to:

a) Personal Protection recommendations
b) Lifting points
c) Personal danger
d) Equipment danger
e) Operating instructions
f) Shaft rotation direction
g) Maintenance instructions
h) Safety instructions

SOME EXAMPLES FOUND ON THE EQUIPMENT

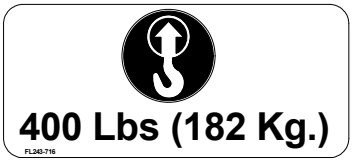


Personal Protection, Read and understand Operator's manual and Maintenance manual



Instructional Details

Lifting Point



Lift Weight

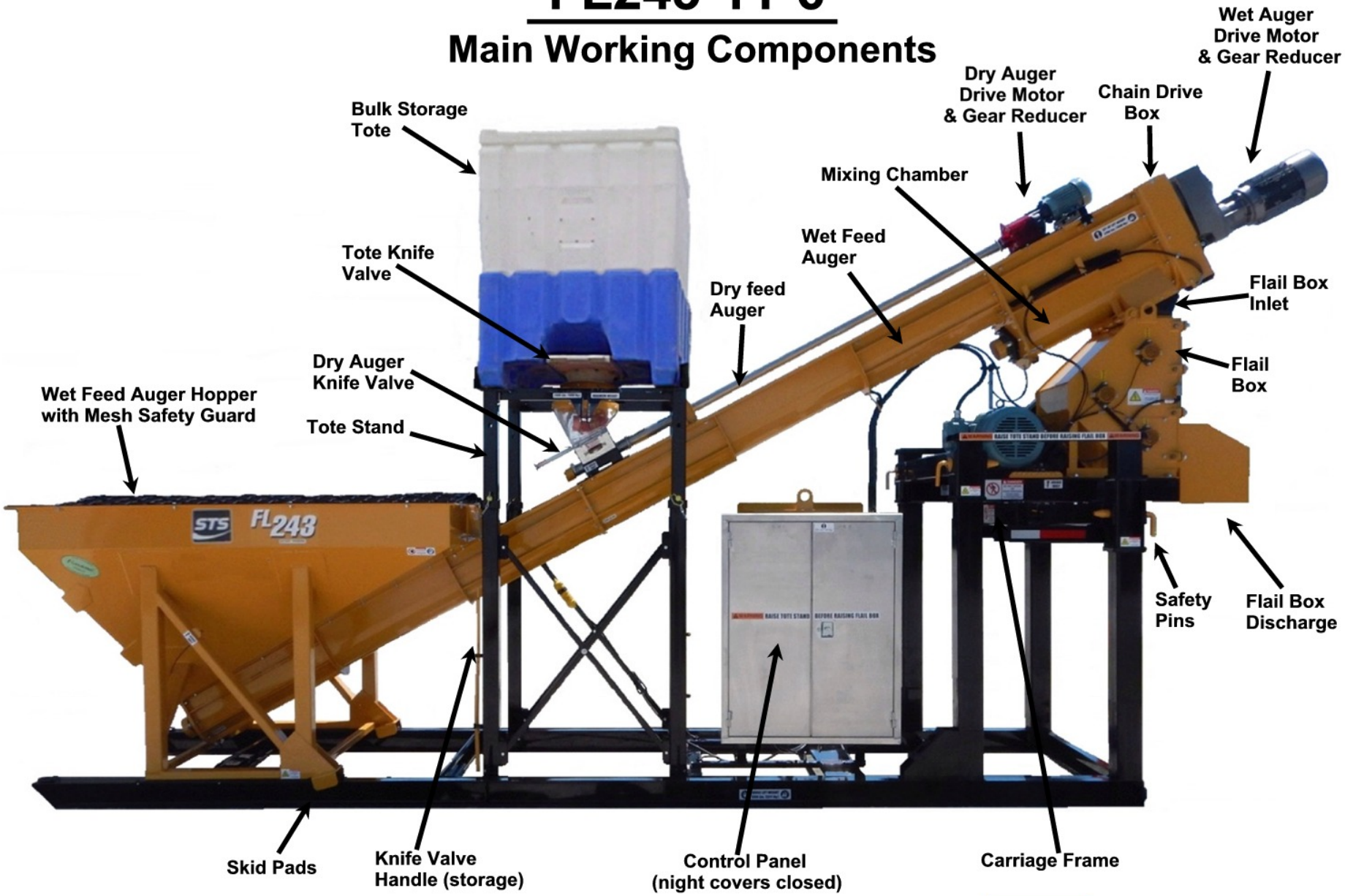
Shaft rotation direction

Maintenance Instructions

Safety Instructions

FL243-11-6

Main Working Components



Left side of unit in work mode shown

Surface to Surface Inc.
Dependable & efficient mixers

FL243-11-6E
Operators Manual

Congratulations on your acquisition of the patented (US10507443) FL243-11-6 semi-solid processing system. You have acquired the industry leading, fastest and most efficient mixing system manufactured for mixing semi-solid material together with a dry product to produce a low slump byproduct.
As a manufacturer of construction support equipment, we are well aware of the extreme conditions that equipment is exposed to on a daily basis. Surface To Surface Inc. strives to overcome these conditions, with better design and manufacturing practices. Please feel free to call our toll free number (1-800-567-0978) if you have any questions or concerns about your FL243-11-6E.

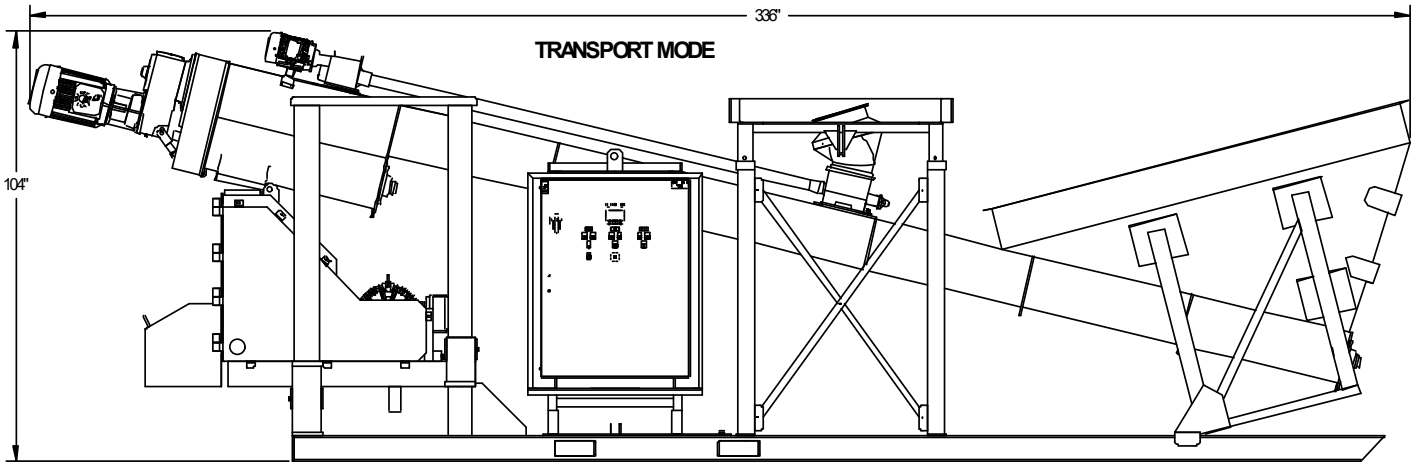
Thank you, for choosing the FL243 series semi-solid processor.

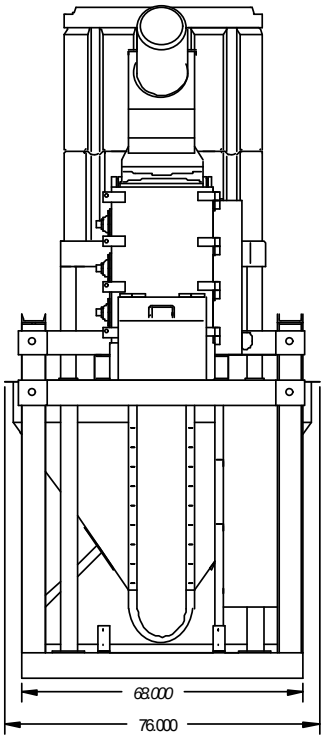
The FL243 series processing unit was designed to efficiently mix a high slump material (slurry) with a minimal amount of a secondary dry product, to create a by-product that has a low slump discharge. This by-product can now be handled as a "solid" material. Depending on the dry product used, characteristics of the "solid" by-product may lend to a secondary use or ease of disposal. The FL243 unit operates on a continuous process, not on a batch type process, which allows for larger output at days end.
The FL243 was designed for ease of set-up / teardown and can be operated by a single competent operator.
The FL243 unit consists of a large bulk hopper with a "U" type trough auger attached. Mounted on the end of this auger is a specially designed pre-mixing chamber were the metered dry product is added. The pre-mixing chamber discharges into a flail box which has revolving cylinders inside, which have flails attached and spin at a high rate of speed blending the 2 components thoroughly together. The flail box then spins out the by-product into a containment tank or containment area for removal.
The bulk dry product is mounted on a specially constructed stand where it is able to discharge into a sealed metering auger that carries the dry product to the premix chamber. All controls are mounted in a single control panel for the operator.

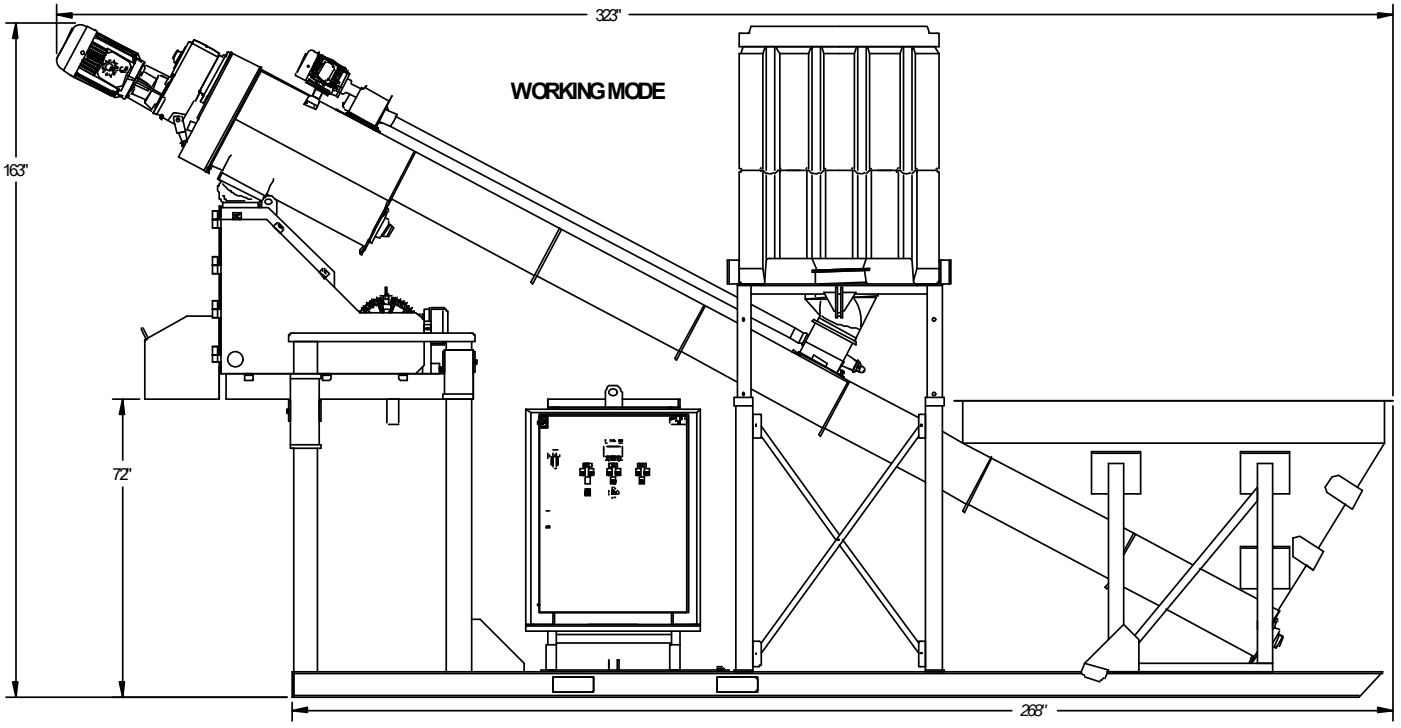
These components are all mounted on a frame type skid, built for lifting or solid mounting. For ease of interpretation, looking at the flail box discharge straight on will be considered looking at the front of the unit. Hence the large bulk hopper will be the back. The side with the belt guard will be referred to as the right side, and the side with the grease manifold will be considered the left side.

RECORD OF OWNERSHIP:

- Unit Serial No. _____
- Date Purchased/Leased:_____
- Dealer Purchased/Leased From:_____
- Special Custom Features:_____







SEMI-SOLIDS FLAIL SYSTEM

#FL243-11-6E

Weight: 7300 Lbs. (3311Kg.)

** Due to our continuing product improvement, specifications are subject to change without notice. **

Surface to Surface Inc. ®	
DWR. NUM.	DATE. 09 / 29 / 15
FL243-11-6E V1	REV. 01 / 25 / 16

Surface to Surface Inc.
Dependable & efficient mixers

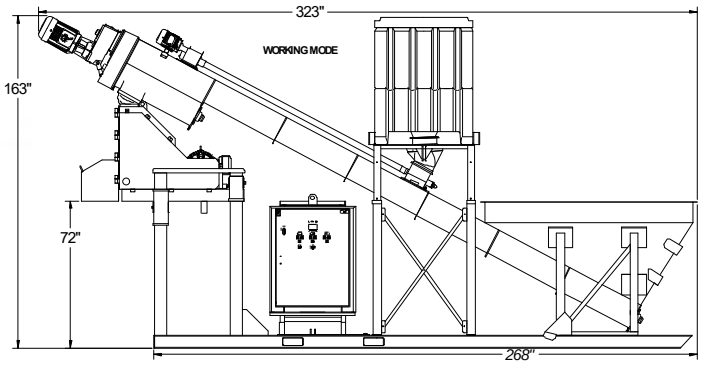
Semi-Solids Solidification Unit
Model FL243-11-6E

Surface to Surface Inc.

Electric

Features and Benefits: FL243-11-6E

The FL243 series processing unit (Patent #US10507443) was designed to efficiently mix a high slump material (slurry) with a minimal amount of a dry product, to create a by-product that has a low slump discharge. This by-product can now be handled as a "solid" material. Depending on the dry product used, characteristics of the "solid" by-product may lend to a secondary use or ease of disposal. The FL243 unit operates on a continuous process, not on a batch type process. This allows for larger output at days end. The unit is able to process approximately 86 -100 gpm., depending on the material characteristics.
The FL243 was designed for ease of set-up / teardown and can be operated by a single competent operator.



Specifications	FL243-11-6E Mixer	Benefits
Dimensions	Transport Mode Working Mode	104" H x 336" L x 76" W 163" H x 323" L x 76" W
Approx. Weight	11135lbs. (5051Kg.)	
Wet Feed Hopper Height	72" (3m^3)	Small sized equipment to load wet hopper.
Wet Feed Auger & Trough	11" OD x 3/8" Alloy Flighting & Trough	Large solids pass thru & extended wear.
Skid Frame	6" Steel Beam, Welded	Built for the rigors of the construction trade.
Electric Motors	Oversized, Fan Cooled Cast Iron 360V/460V	Industrial rated for longer service life.
Dry Product Auger	2 5/8" OD Flighting, Closed Tube Auger	Able to handle a multitude of dry products.
Flexible Rotary Mixing	Hardened Steel Flailing Chains	No prescreening of Sludge/Slurry required.
Rigid Sealed Tote	Sloped Bottom Tote with Knife Valve	Weatherproof storage /discharge of dry product.
Single Belt Drive	Industrial Grade Double Sided Cogged Belt	Positive drive, no slip, longer wear life.
Ground Level Operation	Control Panel & Daily Greasing Ground Level	No Climbing to operate or maintain the unit.

*** All Specifications Subject to Change Without Notice***

Check our website for the latest products and specifications
www.stsmixers.com

Surface to Surface Inc.
5150 Forest Road, R.R.#3, Watford, Ontario, N0M 2S0
Tel: 1-800-567-0978

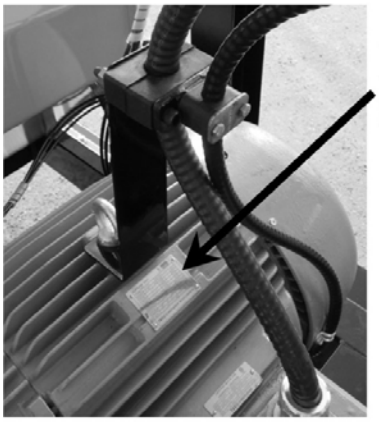
08/23/21

FL243-11-6

Identifying Your Machine & Components

Location of Tags and PIN Plates

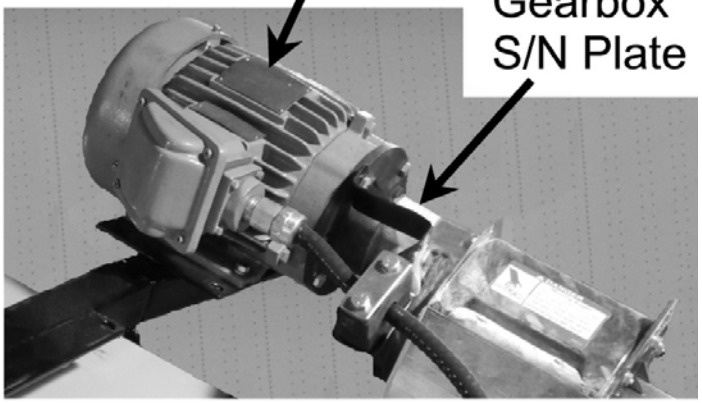
Unit
Serial Number



Flail Motor
S/N Plate

Auger Motor
S/N Plate

Gearbox
S/N Plate



Auger Motor
S/N Plate

Gearbox
S/N Plate

SECTION #II

Description, Care and Maintenance

FL243-11-6

Description, Care and Maintenance

Flail Box

The Flail box is a major component of the FL243 unit and is made up of many moving and wear items that require regular inspection and maintenance.

WARNING: BEFORE PREFORMING ANY REPAIRS OR MAINTENANCE ON THE FLAIL BOX OR UPPER COMPONENTS, LOWER THE FLAIL BOX & CARRIAGE DOWN TO THE TRANSPORT POSITION. (SEE FIG.12)

The flail box is designed as a container that houses 3 rotating horizontal cylinders (drums), each of which has rows of numerous short chains attached. Each rotating cylinder is welded to a shaft that runs through the cylinder center and has a bearing on each end. On one end of each shaft is a notched drive pulley. A single, wide notched belt is routed around each pulley and then back to the drive motor to spin the cylinders. Also mounted on the right side, is a notched idler pulley that the belt is also routed around. Although the belt and all of the pulleys are notched, they are NOT in any special timing order. The notches are for transferring power only and limiting slippage.

Access to the inside of the flail box is achieved through the hinged door on the front of the box and the drive belt and pulleys are accessed by removing the large belt guard.

The chains connected to the rotating drums will see the most wear over time as they are in contact with the abrasive slurry/sludge continually. These chains should be checked regularly for wear, cracks, or broken links and replaced.

To replace the chains on the drum refer to Fig. 1 below. Flail drum(s) will remain in the flail box for repairs.

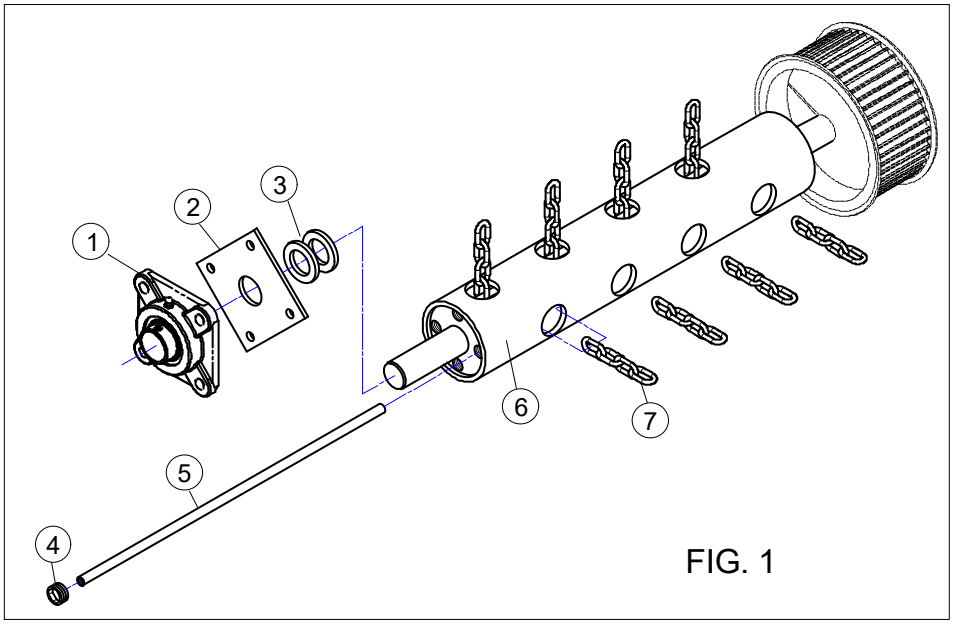


FIG. 1

- **Lock out power source on control panel.**
- **Remove the drive belt guard.**
- **Open the front door of the flail box.**
- **Loosen the drive belt tension (read highlighted note below) by moving the drive motor towards the flail box. To move the motor, loosen the 4 bolts that secure the motor to the motor mount. Back off the 2 adjuster bolts (equally) on the motor mount that will push the motor forward toward the flail box.**

Description, Care and Maintenance

Flail Box *continued*

- **Make note of the amount of rotations for the 2 adjuster bolts needed to reduce the belt tension, as this will be needed to reverse the action and retightening of the belt. Also turn each of the adjusting bolts the same amount of revolutions. This will help keep the motor square with belt alignment.**
- **Remove the grease hose connected to the bearing on the left side (not the belt side) of the drum to be worked on.**
- **Remove the 4 bolts that fasten the bearing to the flail box.**
- **Loosen the set screws on the bearing collar and slide the bearing #1 off of the shaft.**
- **Remove the plate #2. On the bottom shaft this plate #2 is larger and will require removing the 4 additional bolts that fasten it to the flail box.**
- **Slide off the rubber seal washers #3, and check for wear or damage. If needed new replacements should be used when reassembling.**
- **You will now have access to the end of the flail drum #6 and will see 4 hex head retaining plugs #4.**
- **Roll the drum to a position that puts one of the plugs #4 at the top (12 o'clock).**
- **Remove this plug #4 at the top 12 o'clock position, then roll the drum so this hole to the 3 o'clock position. The 3 o'clock position is the easiest to remove & install the chains #7.**
- **When the plugs #4 are removed you will have access to the retainer bar #5. This bar passes through the end link of each chain #7 inside the drum #6.**
- **This bar #5 is NOT fastened at either end of the drum #5 and floats inside.**
- **Pull the retaining bar #5 slowly from the drum as you grasp each chain as the bar passes through it. Do not let the chain #7 fall back into the drum. IF the retaining bar #5 is difficult to remove, the retaining bar has a threaded hole in the end (5/16 inch national coarse). A long bolt may be threaded into the hole to get a firmer grip on the rod for removal. In extreme cases the bar may be bent, flared, or jammed in the drum and a slide hammer may have to be fastened to the rod #5 and used to extract it.**
- **After the rod #5 is removed, check it for wear or damage and replace with a new one if needed.**
- **Insert the bar #5 back into the drum hole and as it reaches the chain hole, insert a new chain #7 end link into the hole and push the bar #5 through the end link of the chain. Push the bar #5 to the next drum chain hole and repeat inserting another chain. Repeat this process until all of the chains are on the bar #5 for this row.**
- **Inspect the hex head retaining plug #4 and replace if damaged.**
- **Apply a small amount of medium strength thread lock (blue Loctite) to the threads and install plug #4 back into the threaded hole in the drum #6 to retain the retaining bar from sliding out. Torque the hex head retaining plug to 60 ft. lbs.**
- **Roll the drum #6 and repeat the above steps for each of the rows of chain in the drum.**
- **After all of the chains are replaced in that drum, install the rubber seal washers #3 on the drum shaft, slide the plate #2 on the shaft, and slide the bearing on the shaft. Reinstall the bolts (from inside of the flail box) that fasten the plate #2 and bearing #1 to the flail box. Nut & lock washer will be outside of the flail box.**
- **Tighten up the setscrews on the bearing collar.**
- **Reconnect the grease hose to the bearing.**
- **Follow the previous steps for the remaining 2 drums.**

Description, Care and Maintenance

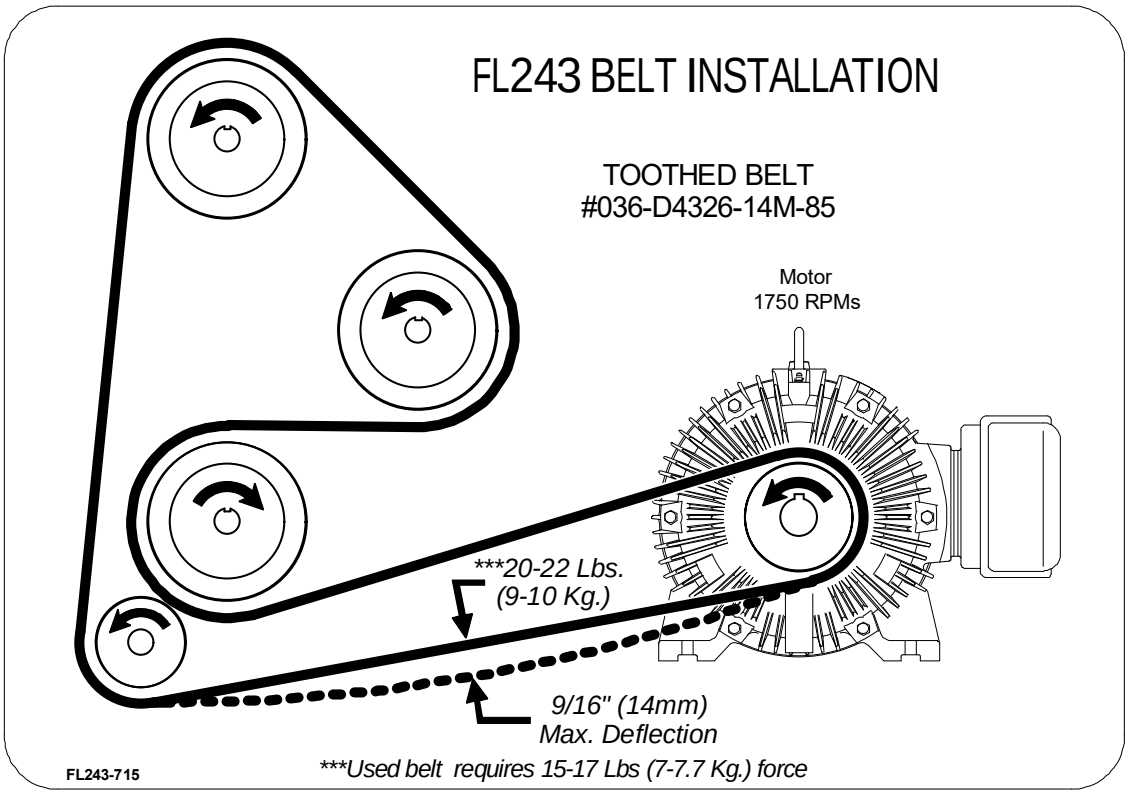
Flail Box *continued*

Once the chains have been replaced, the drive belt has to be tensioned to proper operating spec.

- **With all of the drums in place make sure that the belt is properly installed & centered on the pulleys.**
- **Rotate the 2 adjuster bolts on the drive motor, motor mount to pull the motor back away from the flail box, stretching the belt. Rotate these bolts the same amount of rotations as was used to loosen the belt at the beginning of this chain replacement operation (highlighted on page 18).**
- **Check the belt tension as described below or the decal on the flail box on the pulley side.**
- **Tighten the 4 bolts that secure the motor to the motor mount.**
- **Close and secure the flail box front door.**
- **Staying well clear of the pulleys and belt, quickly cycle the on/off switch of the flail drive motor to spin the belt and pulleys.**
- **Look to see the alignment of the belt on the pulleys is ok. If not, re-adjust.**
- **When belt alignment and tension are proper, re-install the drive belt guard.**

To tension the drive belt after the motor has been moved or belt starts to wear/stretch approx. every 1000 hours, refer to Fig.2 and the following instructions.

Fig.2



- **Lock out power source on control panel.**
- **Remove the drive belt guard.**
- **As shown in fig.2 check the belt tension on the lower run of the belt.**
- **Apply 20-22 lbs. (for new belt) or 15-17 lbs. (for used belt) of force to deflect the belt as shown.**

Description, Care and Maintenance

Flail Box *continued*

- **If the belt deflects less than the max. 9/16" then the belt tension is correct.**
- **If the belt deflection is greater than the max. 9/16" then the tension needs to be increased.**
- **To increase the belt tension, lock out power source on control panel.**
- **Loosen the 4 bolts that secure the motor to the motor mount.**
- **Rotate the 2 adjuster bolts on the drive motor, motor mount to pull the motor back away from the flail box, stretching the belt. Rotate each bolts the same amount of rotations. This keeps the motor square with the flail box and pulleys.**
- **When the proper belt tension is achieved, tighten the 4 bolts that secure the motor to the motor mount.**
- **Re-install the drive belt guard.**

On the end of each rotating drum shaft is a roller bearing that requires grease daily. All shaft bearings are individually supplied grease through tubes that connects to a manifold mounted on the carriage frame. This manifold (see Fig.3) is easy to access and no covers or guards need be removed. Each grease fitting requires 1-2 pumps of the grease gun to supply grease to each bearing for a 12 hour period. A grease fitting located on the left end (rotated & labeled) is for the mix auger shaft seal and should only receive 1-2 shots of grease every week (approx. 100 hr.). Caution should be used to not over pressure/grease and damage seals.

The idler pulley (see Fig.4) on the drive belt side of the flail box (can be seen when the drive belt guard is removed) should be greased with 1-2 pump of the grease gun every 1000 hours. *As a routine, grease this idler pulley when the drive belt guard is removed to check belt tension (1000 hours).*

Fig.3

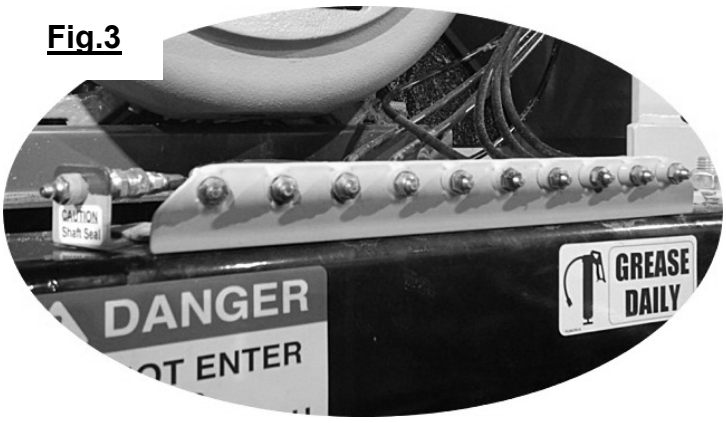
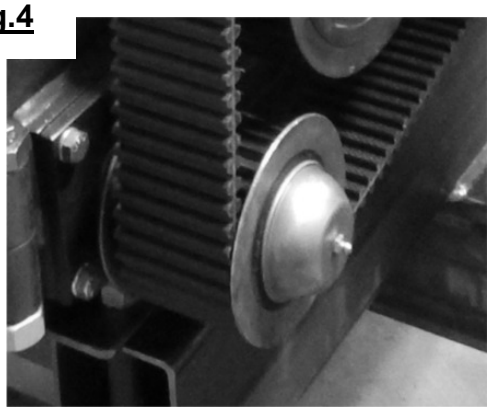
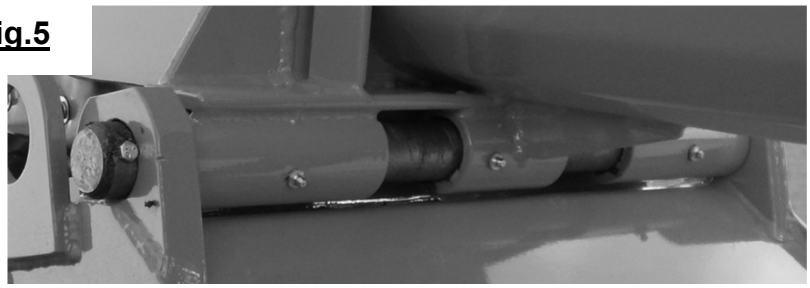


Fig.4



On the top of the flail box is a hinge (Fig.5) that connects the flail box to the wet feed auger. This hinge pivots when the FL234 unit is raised and lowered (set-up & transport mode). This hinge has 3 grease fittings and should be greased on a regular basis accordingly to the amount of raising and lowering cycles the unit is put through.

Fig.5



Description, Care and Maintenance

Flail Box *continued*

The flail box (Fig.6) has a large hinged door on the front of the unit to access the inside of the flail box. This door has four hinges mounted on the right side and should be lubricated with light oil to keep it free and working properly. On the left side of the door, four large bolts are used to secure the door closed. These bolts should be tight so as not to back off or vibrate loose. Also on the same side as the four bolts, is mounted a door safety switch. This door switch communicates with the control panel to stop the flails from rotating if the flail box door is open, or opens during operation.

DO NOT MANIPULATE THE DOOR SAFTEY SWITCH IN ANY WAY AS SERIOUS INJURY OR DEATH COULD OCCURE.

WHEN WORKING ON THIS UNIT PROPERLY LOCK OUT THE POWER SOURCE AT THE CONTROL PANEL AND DO NOT USE THE OPEN DOOR SWITCH AS A MAKESHIFT LOCKOUT.

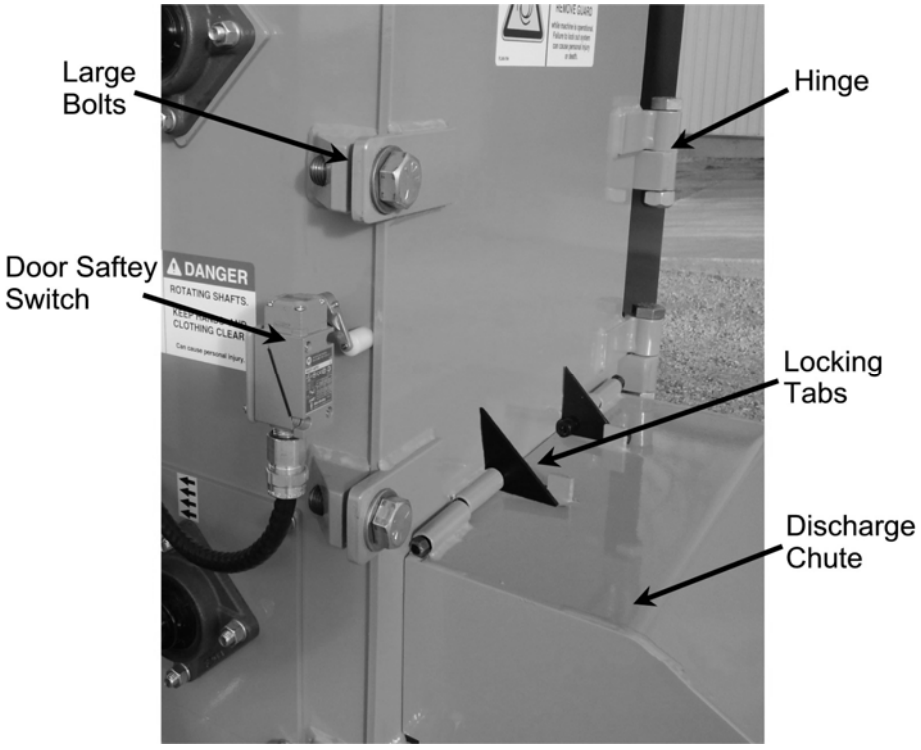
At the bottom of the door, is an opening were the flail box discharges the final treated product. This opening is shielded with a discharge chute designed to direct the discharge in a downward motion. The flail box should never be operated without the discharge chute attached.

The discharge chute is attached to the door by two socket head bolts. Also there are two locking tabs that the bolt passes through. These Tabs prevent the chute from being flipped up, or removed without tools.

The discharge chute should be cleaned if any buildup of discharge occurs as it could impede the downward motion of the discharge.

The discharge chute may need to be removed when lifting up the carriage frame during the setup operation, described further on in this manual. Caution should be taken to avoid personal injury, when removing the discharge chute as it is heavy and awkward to handle. To remove the discharge chute, slightly lift on the handle provided and remove the two bolts and locking tabs.

Fig.6



Description, Care and Maintenance

Flail Box *continued*

The inside of the flail box may accumulate debris buildup over time and will require periodic inspection and cleaning. The amount of accumulation or buildup will largely depend on the contents of the wet slurry/sludge and the dry product or amount of dry product being mixed in. Some slurry/sludge's may have a lot of foreign debris such as wood, plastic bags, or long grass that have a tendencies to "wrap" around the inner structure of the flails and flail box, thus impeding the flow toward the door opening. Also fast setting or overdosing of the dry product can lead to internal buildup on the inner surfaces of the flail box over time. Cleaning the inside of the flail box is simple and easy and is a good visual indicator of how the unit is functioning.

To clean the inside of the flail box

- **Lock out power source on control panel.**
- **Make sure the FL243-11-6 unit is in transport mode (flail box & carriage down)**
- **Remove the large bolts securing the door closed.**
- **Swing the door open, and visually check that the door safety switch arm rotates outward away from the switch box. If the arm does not move, check for debris that may cause binding of movement. Wash if necessary to keep the switch in proper working order.**
- **Clean the inside (wash down) and look for any debris that may be hung-up, wedged or tangled and remove. It should be noted that some accumulation on the internal surfaces will be present under normal operating conditions.**
- **Clean and check the top opening of the flail box were the auger drops the slurry/sludge into the box.**
- **Clean and check the discharge chute.**
- **While the inside is clean, visually check for worn or broken chains or any other abnormalities inside the box that can be seen without a teardown.**
- **If the visual inspection is OK, close the door and secure it with the large bolts.**

The flails in the flail box are powered by an electric motor that drives a notched belt around pulleys on each drum shaft (described earlier).
Care and maintenance of the motor is covered in this manual and the OEM manual supplied and should be read and understood. We suggest the following daily checks be carried out prior to using the system. Visually check all electrical connections and wiring for pinches, frays and loose or damaged parts. Check that all guards are in place and check the motor's cooling fan cover and fins are clean and clear of debris.

Description, Care and Maintenance

Wet Feed Auger Hopper

The wet feed auger hopper (Fig.7) is used to collect and funnel the slurry/sludge into the wet feed auger to keep a steady and constant supply to the flail box. It is attached to the wet feed auger directly and tilts (with the auger) when the flail box carriage is raised and lowered. The hopper is not fastened down to the main base frame, but "slides" on specially designed skies or skid pads, built onto the hopper support legs. These skid pads slide atop of plastic strips fastened to the top of the main base skid. The plastic strips should be kept clean to reduce the resistance and aide in the sliding of the skid pads along their length and allow the hopper support legs to sit flat when the flail box is raised up to the operating position.
The hopper should be checked regularly and cleaned as needed, of any solids build-up that has not carried down into the auger. Any build-up can usually be dislodged with a stream of high pressure water allowing it to fall into the auger to be carried up into the flail box.

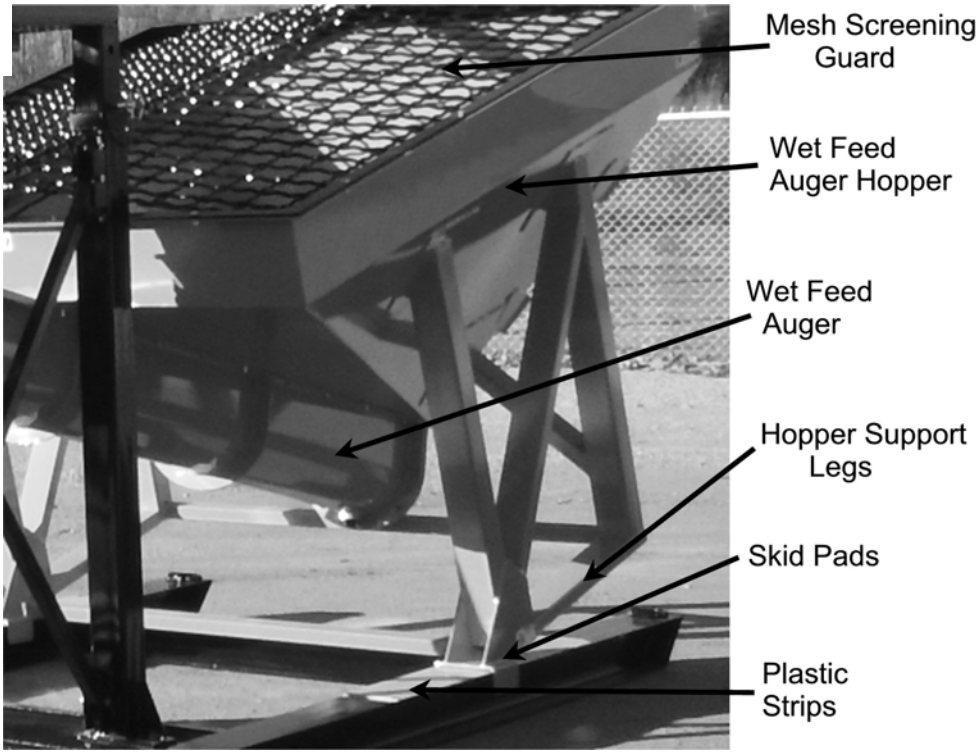
Bolted securely on top of the hopper is a mesh screening / safety guard. This mesh guard is designed to keep out large debris, trash, animals and human personnel.

THE FL243 SHOULD NEVER BE OPERATED WITHOUT THE MESH GUARD SECURLY COVERING THE HOPPER AS SERIOUS INJURY OR DEATH COULD OCCURE.

PROPERLY LOCK OUT THE POWER SOURCE AT THE CONTROL PANEL WHEN THE MESH GUARD IS REMOVED.

The mesh screening / safety guard will need to be cleaned regularly, if there is a considerable amount of large debris or trash in the slurry/sludge. Remove any large debris or trash that has collected atop of the mesh and a stream of high pressure water can be used to remove any other material deposits.

Fig.7



Description, Care and Maintenance

Wet Feed Auger Hopper *continued*

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY
without disconnecting & lock-out the power source.
Serious personal injury will result.

CAUTION

AS THE UNIT IS RAISED OR LOWERED MULTABLE PINCH POINTS OCCUR
Do not position any part of your body near labled areas.

WARNING

NEVER USE BODY PARTS, OR FOREIGN OBJECTS
in an attempt to unplug or clean an auger.
Serious personal injury or damage will result.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment.
This unit was designed for the mixing and shearing of a dry additive, into a liquid or semi-solid stream.
Other uses may create unforeseen safety issues and personal injury risk.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.
Serious personal injury will result.

Description, Care and Maintenance

OPTIONAL Vibrating Stone Grate

The vibrating stone grate (vibrating grizzly bar) (Fig.20) is mounted atop of the wet feed auger hopper. It consists of a sub frame that is bolted to the hopper top lip. Connected to the sub frame are 4 rubber isolators. These isolators allow the vibrating deck to move and carry debris off of the end of the deck and onto the ground. The isolators absorb most of the abuse and therefore need to be inspected for rips, tears, or separation, and that the bolts / nuts securing them to the sub-frame and vibrating deck are tight. The vibrating deck has slots approximately 2" apart thus allowing nothing over 2" wide into the hopper. The slope of the vibrating deck can be changed by adding or reducing the number of spacers under the isolators. Two electric vibrators are mounted to the underside of the vibrating deck. These provide the movement needed to force the debris off of the deck. A switch to turn the vibrators on / off is located on the side of the control panel box. The vibrators should be turned on BEFORE debris is piles on top of the deck, and when the vibrating deck is no longer needed, it should be turned off to avoid wear to isolators and bearings inside of the vibrators.
There are 4 over-center binders connected to the sub-frame with link chain. These binders are used when transporting the unit from site to site, to stop erratic movement of the deck and tearing of the isolators.

THE BINDERS NEED TO BE RELEASED AND FULLY DISENGAUGED FROM THE TOP VIBRATING DECK AND HUNG OVER THE SIDE, OUT OF THE WAY.

Maintenance to the vibrating stone deck is simply and should be performed regularly. Washing down, dislodging and removing any build-up or debris stuck in the deck is important and will directly affect the performance of the unit. A visual of the isolator's condition should be performed daily. All electrical cables and connections should be checked regularly and replaced if suspect.
The Vibrating stone grate can be installed to discharge from the left or right side of the hopper, by simply disconnecting the power cord (yellow twist-loc plug), connecting the over-center binders to the top vibrating deck, and removing the bolts holding the sub frame to the hopper. Center lift the vibrating stone deck and rotate 180 degrees and reinstall the sub frame bolts, disconnect the overs-center binders, and reconnect the power supply plug.

THE FL243 SHOULD NEVER BE OPERATED WITHOUT THE VIBRATING STONE GRATE SECURLY COVERING THE HOPPER AS SERIOUS INJURY OR DEATH COULD OCCURE.

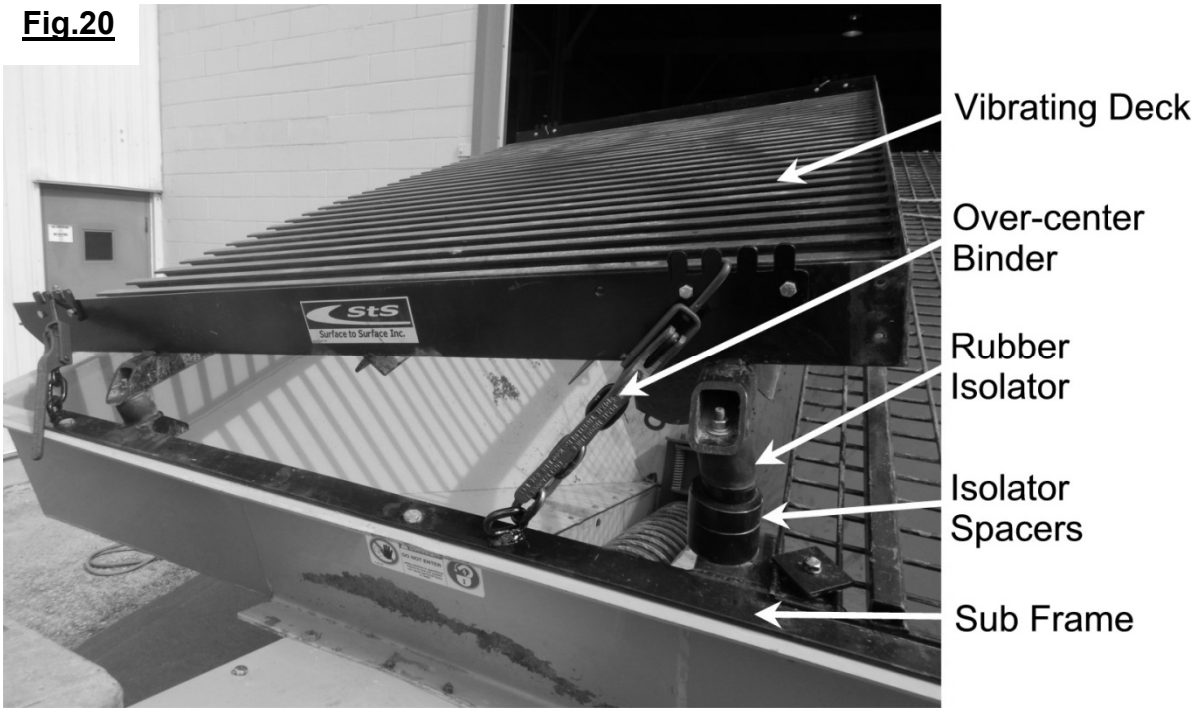
PROPERLY LOCK OUT THE POWER SOURCE AT THE CONTROL PANEL WHEN THE VIBRATING STONE GRATE IS REMOVED.

The mesh screening / safety guard (if installed) will need to be cleaned regularly, if there is a considerable amount of large debris or trash in the slurry/sludge. Remove any large debris or trash that has collected atop of the mesh and a stream of high pressure water can be used to remove any other material deposits.

Description, Care and Maintenance

Vibrating Stone Grate *continued*

Fig.20



DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without disconnecting & lock-out the power source.
Serious personal injury will result.

CAUTION

AS THE UNIT IS RAISED OR LOWERED MULTABLE PINCH POINTS OCCUR

Do not position any part of your body near labled areas.

WARNING

NEVER USE BODY PARTS, OR FOREIGN OBJECTS

in an attempt to unplug or clean an auger.
Serious personal injury or damage will result.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment.
This unit was designed for the mixing and shearing of a dry additive, into a liquid or semi-solid stream.
Other uses may create unforeseen safety issues and personal injury risk.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.

Serious personal injury will result.

Description, Care and Maintenance

Wet Feed Auger

The wet feed auger is an important part of the FL243 unit, supplying the flail box with a constant amount of slurry / sludge to process.
The wet feed auger is actually made up of 2 separate, but attached components. The first component is the main trough and auger. Connected to the top end of the main trough and auger is the mixing chamber with a mixing auger inside (see Fig.8)
The slurry / sludge is dumped into the wet feed auger hopper, were it is funneled down into the main auger trough and auger, and carried up and deposited into the mixing chamber. As the slurry / sludge "falls" into the mixing chamber, the dry product is introduced (explained in detail later in this manual) into the chamber also, where the mixing auger combines the two components together and carries them to the mixing chamber outlet, into the flail box inlet.
The wet feed auger is variable speed controlled and can be set to a speed (at the control panel explained later in this manual) that the operator deems proper for the type and condition of slurry / sludge.
The mixing auger rotates at a faster speed than the main auger, but the two augers are connected by a roller chain drive to keep the same speed ratio between them. On the top end of the augers is the chain drive box, inline drive gearbox and electric drive motor.
Welded on the outside bottom of the mixing chamber is the hinge that connects the wet feed auger to the flail box (see Fig.5). Covering the top length of the trough are covers, guards or specially designed plates that keep the auger troughs sealed.

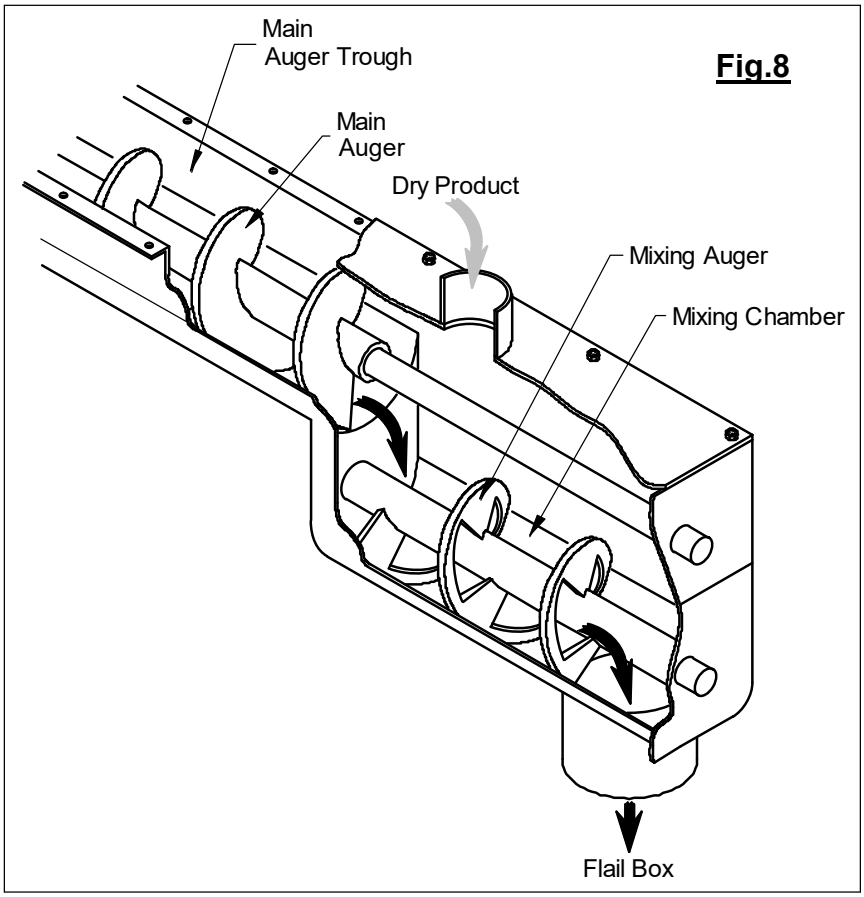


Fig.8

Description, Care and Maintenance

Wet Feed Auger *continued*

Since the inside of the auger troughs and augers are covered and "out of sight", the trough covers should routinely be removed to visually inspect for any large build-up of debris or foreign material. Also check for any wear or damage to the auger flighting. The internal inspection of the mixing auger and mixing chamber are of the most important due to the fact that the dry product is introduced here and as the dry product becomes moist, it has a tendency to become sticky. Build-up may also occur in this area if overdosing (with dry product) is not stopped soon enough.

The mixing auger itself is physically designed to aid in the mixing action and therefore may have holes, slots, notches or protrusions, not normally found on a smooth flight auger. These mixing enhancements can sometimes have a catch-all effect for things like long grass or foreign debris.

The mixing chamber outlet and flail box inlet are connected together with a rubber skirt that should be checked for wear & tear and excessive build-up and cleaned if necessary.

The auger shafts rotate on roller bearings that need to be kept clean and lubricated daily. At the bottom end of the wet feed auger, (inside the hopper) is a spring action retainer (see Fig.9B) that allows the auger to "float" on the bottom of the trough. This auger end shaft has no bearing to lubricate, only a hardened shaft that requires no lubrication. The only maintenance required is to adjust the 1" bolt on the top to adjust so as to maintain a slight downward pressure on the auger, with the springs.

The remaining 3 bearings are individually supplied grease through tubes that connects to a manifold mounted on the carriage frame.

This manifold (see Fig.3) is easy to access and no covers or guards need be removed. Each grease fitting requires 1-2 pumps of the grease gun to supply grease to each bearing for a 12 hour period.

On the bottom end of the mix auger (behind the shaft bearing) is a packing block (Fig.9) that seals the shaft from the bearing. This block contains 2 lip seals with a grease cavity in between the seals. There is a grease fitting connected to the grease manifold, to apply grease to this block.

The roller chain that drives the mixing auger from the main auger has an adjustable slack adjuster mounted inside of the chain drive box (Fig.9A). This adjuster will only need to be readjusted as the chain stretches or becomes worn.

Fig.9

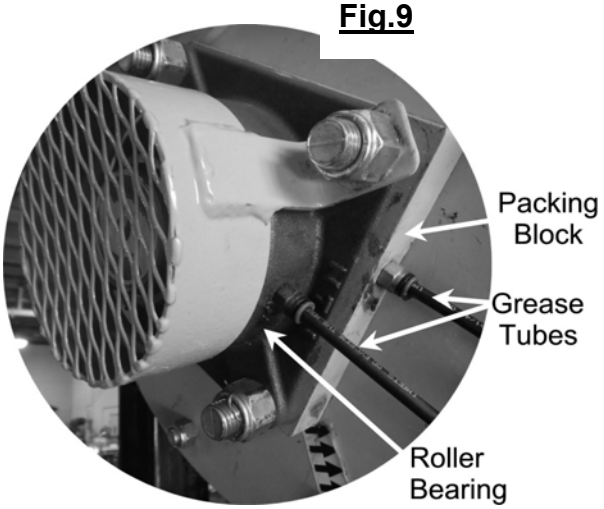
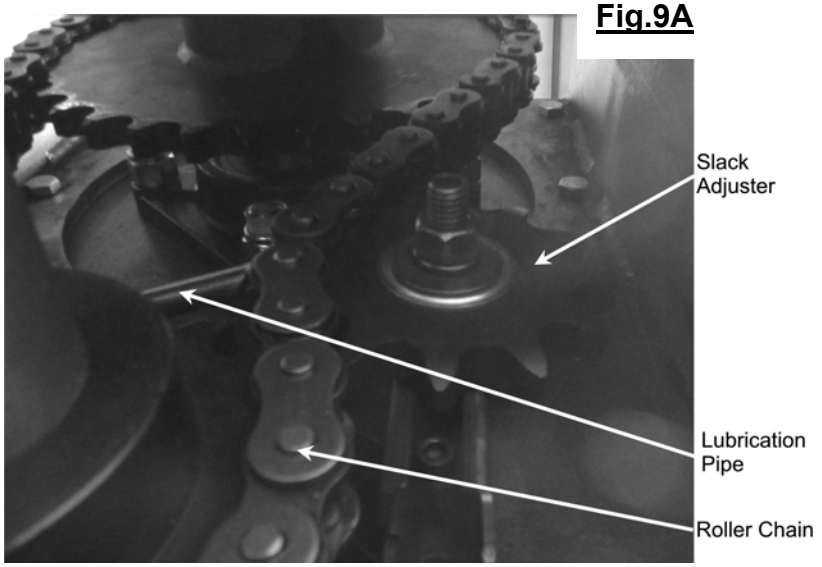


Fig.9A



Description, Care and Maintenance

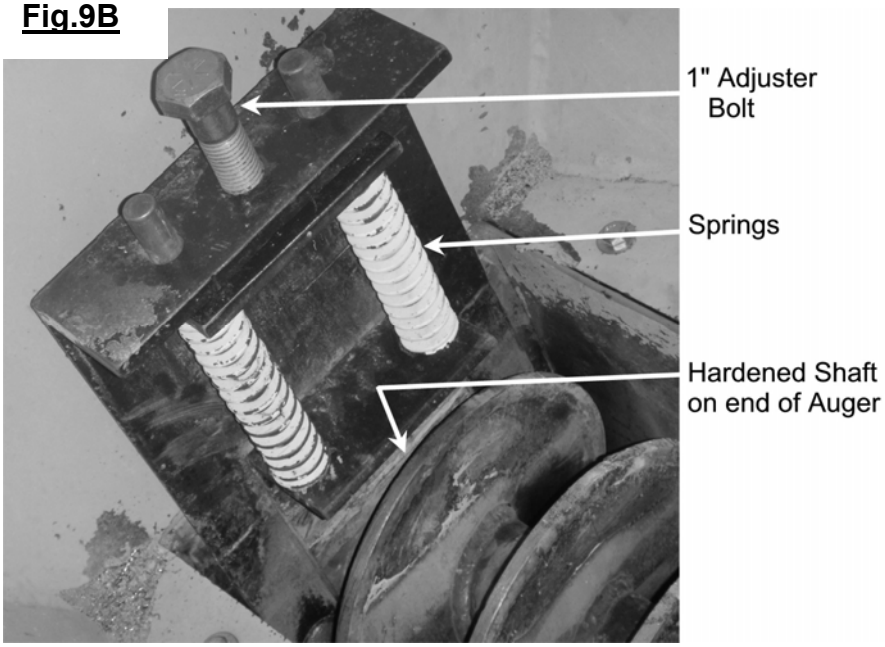
Wet Feed Auger *continued*

The roller chain is grease lubricated. A lubrication pipe directs the grease onto the roller chain. The lubrication pipe, is supplied grease through a grease tube that connects to the manifold (see Fig.3) mounted on the carriage frame.

The wet feed auger is driven by an electric motor, rotating an inline gear reducer.

Care and maintenance of the motor and gear reducer are covered in this manual and the OEM manuals supplied and should be read and understood. We suggest the following daily checks be carried out prior to using the system. Visually check all electrical connections and wiring for pinches, frays and loose or damaged parts. Check that all guards are in place and check the motor's cooling fan cover and fins are clean and clear of debris. Check the gear reducer shaft seals are sealed tight and no oil is leaking around the shafts. Also check that the vent plug on top of the gear reducer is not plugged or blocked.

Fig.9B



WARNING

BEFORE PERFORMING ANY REPAIRS OR MAINTENANCE ON THE FLAIL BOX OR UPPER COMPONENTS,

lower the flail box & carriage down to the transport position to reduce serious falls and personal injury.

WARNING

NEVER USE BODY PARTS, OR FOREIGN OBJECTS

in an attempt to unplug or clean an auger. Serious personal injury or damage will result.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.

Serious personal injury will result.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without disconnecting & lock-out the power source. Serious personal injury will result.

DANGER

IN AN EMERGENCY

Push the emergency stop switch to halt ALL of the motors on the unit.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment. This unit was designed for the mixing and shearing of a dry additive, into a liquid or semi-solid stream. Other uses may create unforeseen safety issues and personal injury risk.

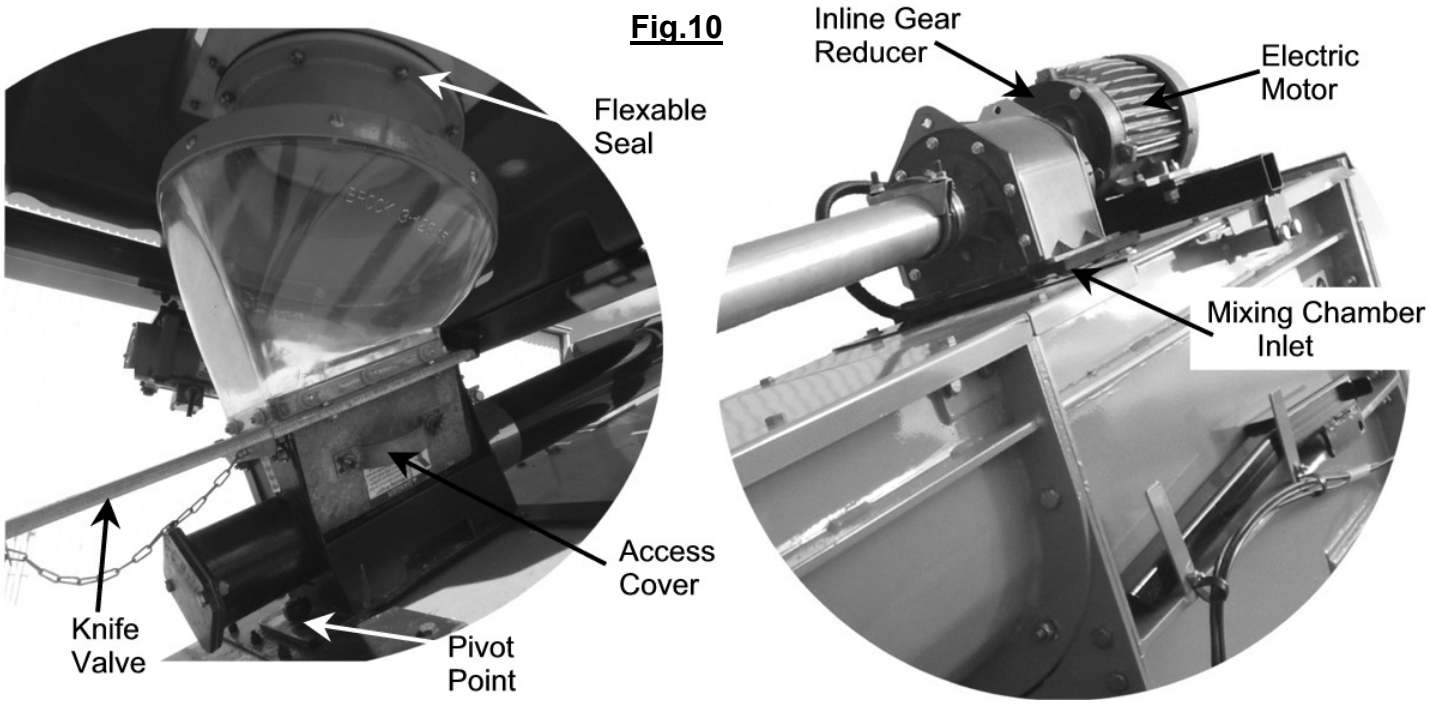
FL243-11-6

Description, Care and Maintenance

Dry Product Auger

The dry product auger (Fig.10) is a small size auger used to transport a metered amount of dry product from the bulk storage tote (explained later in this manual) up and into the mixing chamber. This dry product auger has an oversized inlet that has a flexible seal on top. This allows the bulk storage tote valve spout to fit into the oversize inlet even if it is not precisely aligned and still maintain a tight seal. A clear round funnel type viewing chamber directs the dry product into the dry auger. Between the viewing chamber and the dry auger is a sliding knife valve. This knife valve can be closed if access to the auger through the access cover on the side, is needed. Use the attached chain to keep this knife valve closed.
A straight section of auger tube and flighting, carry the dry product from the oversize inlet to the mixing chamber inlet. The speed of this auger is used to meter the dry product. The faster it rotates, the more product it carries up to the mix chamber. The motor is speed controlled and can be set to a speed (at the control panel explained later in this manual) that the operator deems proper for the type and condition of slurry / sludge being treated. This unit is driven by an electric motor and inline direct drive gear reducer, mounted at the outlet end of the auger.
The dry product auger has all of its components solidly connected together, to form a single rigid unit that, because it is fastened to a single point mounting plate (under the oversize inlet), can be easily "pivoted" as one unit away from the mixing auger inlet and off to the left side, for calibrating product volume versus speed. This procedure will be explained in detail later in this manual.

Fig.10



On the bottom right hand side of the inlet is an access cover that, when removed, allows entry into the bottom of the auger inlet. This is used if there is a need to clean out the dry product for a change-over of product, or if there is a blockage from "chunks " or "debris " from the tote, keeping the auger from being full, to achieve consistent metering.

Description, Care and Maintenance

Dry Product Auger *continued*

Maintaining the dry product auger is relatively easy as there are not many moving parts or adjustments to be made. On the bottom end of the auger inlet, the auger has no bearing, but rides / floats on the bottom of the tube. There is a cover on the end of the tube, secured with 2 bolts, that can be removed to expose the feed auger. Welded on the end of the auger is a hex nut that may be used to rotate the auger by hand if the auger ever becomes jammed or unmovable with the motor. The other end of the auger is connected to the gear reducer (mounted to the electric motor).

Care and maintenance of the motor and gear reducer are covered in this manual and the OEM manuals supplied and should be read and understood. We suggest the following daily checks be carried out prior to using the system. Visually check all electrical connections and wiring for pinches, frays and loose or damaged parts. Check that all guards are in place and check the motor's cooling fan cover and fins are clean and clear of debris. Check the gear reducer shaft seals are sealed tight and no oil is leaking around the shafts.

When there is no bulk storage tote mounted above the clear dry product auger inlet, the flexible rubber seal and its opening should be tightly sealed with plastic or other such device to stop water or other foreign material from entering the inlet.

DANGER

IN AN EMERGENCY

Push the emergency stop switch to halt ALL of the motors on the unit.

WARNING

NEVER USE BODY PARTS, OR FOREIGN OBJECTS

in an attempt to unplug or clean an auger. Serious personal injury or damage will result.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without disconnecting & lock-out the power source. Serious personal injury will result.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.

Serious personal injury will result.

WARNING

BEFORE PERFORMING ANY REPAIRS OR MAINTENANCE ON THE FLAIL BOX OR UPPER COMPONENTS,

lower the flail box & carriage down to the transport position to reduce serious falls and personal injury.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment. This unit was designed for the mixing and shearing of a dry additive, into a liquid or semi-solid stream. Other uses may create unforeseen safety issues and personal injury risk.

FL243-11-6

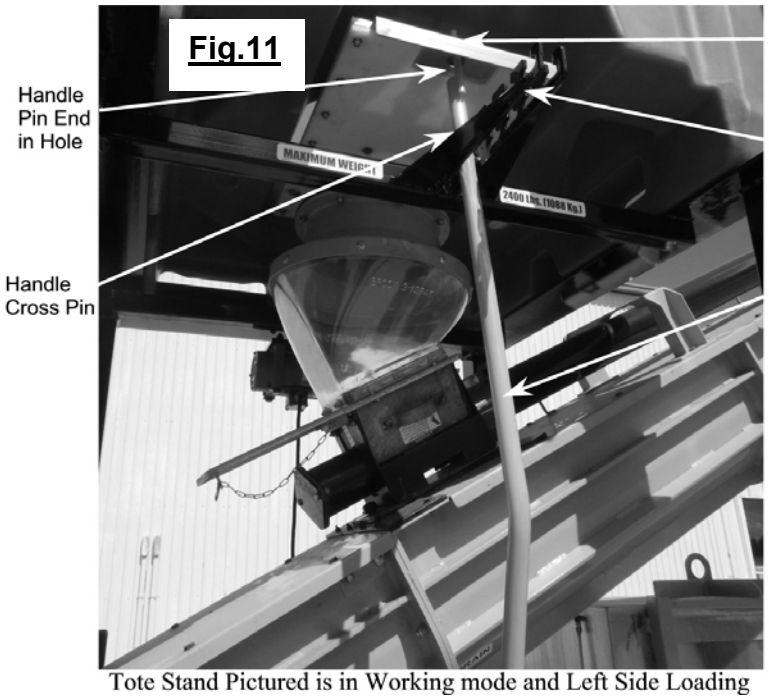
Description, Care and Maintenance

Bulk Storage Tote Stand

The bulk storage tote stand (or tote stand for short) (Fig.11) is the square frame like structure with 4 legs that is mounted above the dry product auger oversized inlet.
The tote stand is a simple device that positions and holds the bulk storage tote over the dry product auger inlet. When a new, full tote is lifted up onto the tote stand, the knife valve spout on the tote, is correctly centered, and has the proper depth, to match the flexible rubber seal of the dry product auger.
Mounted on the open side (front) of the tote stand is the notched hinge. On one of the base skid legs, is stored a specially designed handle for opening the knife valve from ground level.
After the tote is positioned in the stand, to install the handle, simply raise the handle so that the pin end is upward; insert the pin end into the hole of the stainless steel (s/s) knife of the tote valve. Position the handle between the notched hinge of the tote stand, and engage the cross pin (midway on the handle) in the hinge notches. Now by pushing the handle toward the wet feed auger, the knife valve will slide open. The knife valve can be stiff to move. Reversing this action will close the knife valve. Lifting the handle and changing which notch the cross pin is positioned into will change the leverage and stroke to open and close the s/s knife valve easier and more efficiently.

THE SPECIAL VALVE HANDLE MUST BE DISCONNECTED AND STORED AWAY BEFORE REMOVING THE BULK STORAGE TOTE FROM THE STAND.

The tote stand is raised and lowered manually as needed and each leg has a pin to secure it in position. When the tote stand is in either of its two positions (working mode or transport mode) the stand rests upon the pins in the appropriate holes.
If needed for a special jobsite setup, a left side loading or a right side loading of the tote stand can be configured quickly.
The tote stand can be lifted completely out of the 4 base skid legs and rotated 180 degrees, and then put back into the 4 base skid legs. If equipped with an optional vibrator, it can be unplugged, moved, and reconnected.



Tote Stand Pictured is in Working mode and Left Side Loading


Note the Stand leg(s) rest upon the pins

CAUTION

AS THE UNIT IS RAISED OR LOWERED MULTABLE PINCH POINTS OCCURE

Do not position any part of your body near labled areas.

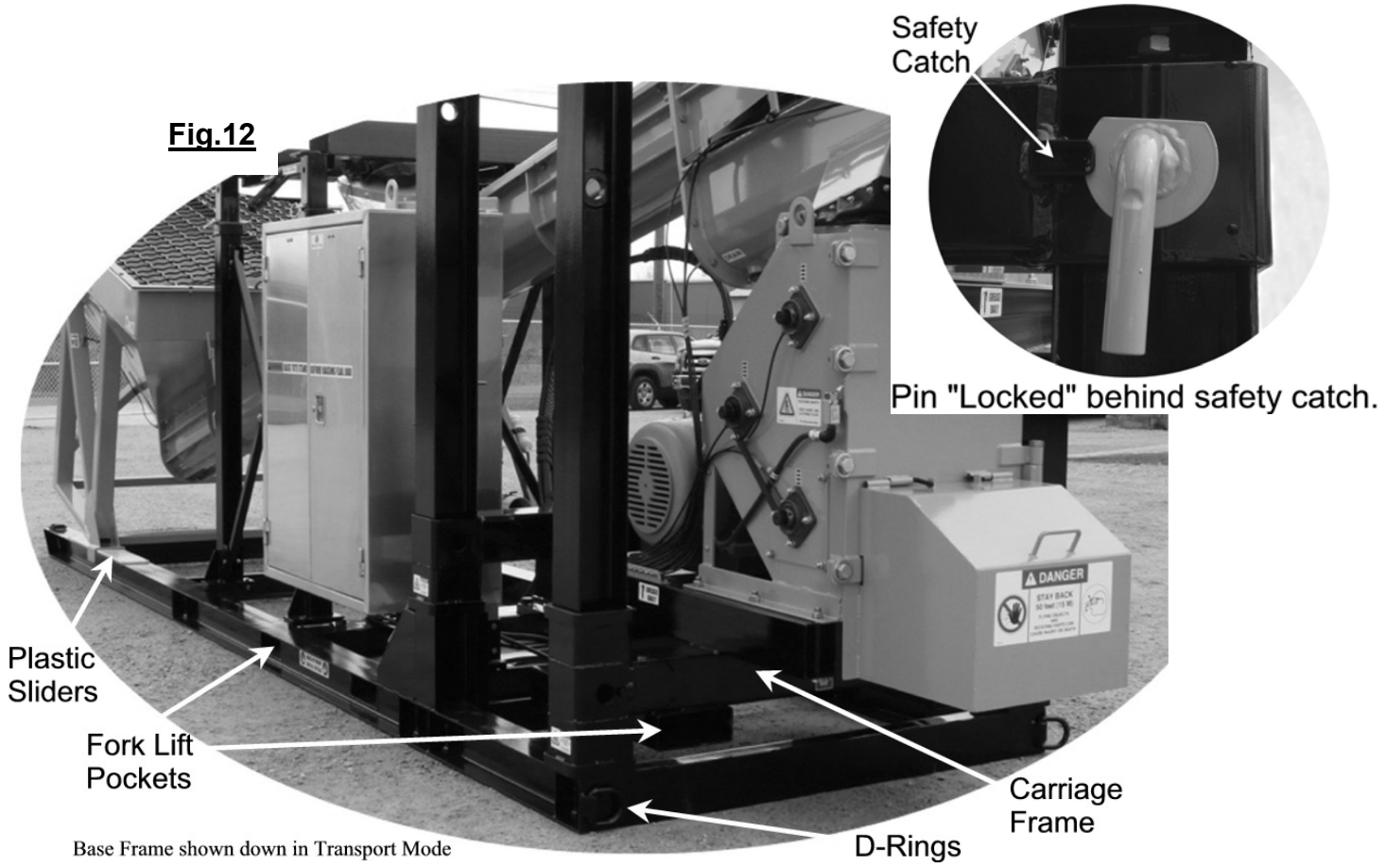
Description, Care and Maintenance

Base Frame

The base frame of the FL243 unit (Fig.12) is designed to allow the components to be raised or lowered (in height) without separating any individual parts, to achieve a low height transportation mode or a tall height operating mode.
The base skid is built around 2 drag type beams. Fork lift pockets and D-type pull rings are incorporated into the skid design to make handling and set-up easier. Welded on the front of the base skid is a four post, vertical frame, which acts as a positing guide and support structure, for the carriage frame.
The carriage frame, (which is part of the base frame) can be raised or lowered, on this four post frame. Large locking pins are used to secure the carriage and flail box in the work (raised) position.
On the back end of the base frame, fastened on top of the drag beams are two plastic sliders that are used to aid in the movement of the wet feed auger hopper (explained earlier in Wet Feed Auger Hopper). These plastic sliders should be kept as clean as possible when setting up the unit for operation mode or letting it down for transport mode.
A daily walk around, visual inspection should be made of the bas frame, looking for such things as bent support braces, cracked welds, missing bolts or pins, or other such abnormalities.

⚠ WARNING RAISE TOTE STAND BEFORE RAISING FLAIL BOX **⚠ WARNING**

Fig.12



Base Frame shown down in Transport Mode

Description, Care and Maintenance

Base Frame

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without disconnecting & lock-out the power source.
Serious personal injury will result.

WARNING

BEFORE PERFORMING ANY REPAIRS OR MAINTENANCE ON THE FLAIL BOX OR UPPER COMPONENTS,

lower the flail box & carriage down to the transport position to reduce serious falls and personal injury.

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.

Serious personal injury will result.

CAUTION

AS THE UNIT IS RAISED OR LOWERED MULTABLE PINCH POINTS OCCUR

Do not position any part of your body near labled areas.

Description, Care and Maintenance

Control Panel

The control panel (Fig.13a), also known as the operator station, is a large upright, covered box were all of the controls; fuses, and wiring, switches and main power supply are installed. The control panel helps to keep sensitive parts isolated from weather related issues. There are also night cover doors that can be locked to help protect the external controllers & indicators.
The control panel can be located on the left or right side of the FL243 unit as per the job site set-up requirements.
To change the control panel from one side to the other side (see Fig.13b)

- **The FL243 unit must be set-up in the operating mode.**
- **Lock out power source**
- **Connect a short lifting device to the lifting bale atop of the control panel.**
- **Lift just enough to take weight of control panel.**
- **Disconnect ground cable connecting control panel to grounding lug on base frame.**
- **Loosen, and remove the stabilizing bar connected to the back of the control panel and down to the base frame.**
- **Remove the four bolts that hold the control panel box posts into the vertical pockets welded to the base frame.**
- **Lift the control panel (with posts) out of the vertical pockets, rotate control panel and position posts into vertical pockets on the other side of unit base frame.**
- **Install bolts into these vertical pockets with the posts.**
- **Reconnect stabilizer bar and tighten.**
- **Reconnect ground cable connecting control panel to grounding lug on base frame.**
- **Remove from lifting device.**

The control panel and the immediate area surrounding it should be kept clean and clutter free as this is a work station and also an emergency shut down location.

We suggest the following daily checks be carried out prior to using the system. Visually check all electrical connections and exposed wiring for pinches, frays and loose or damaged parts. Check that all switches, indicator lights and controllers are in good physical / mechanical condition.

This control panel and its components, as with all electrical equipment should be cleaned with care. All safety precautions, including disconnecting main power source and power source lock out will apply when using any water or liquid cleaner.

Wiping with a damp cloth is usually all that is necessary to keep the control panel and controllers clean and working properly.

Description, Care and Maintenance

Control Panel

Fig.13a

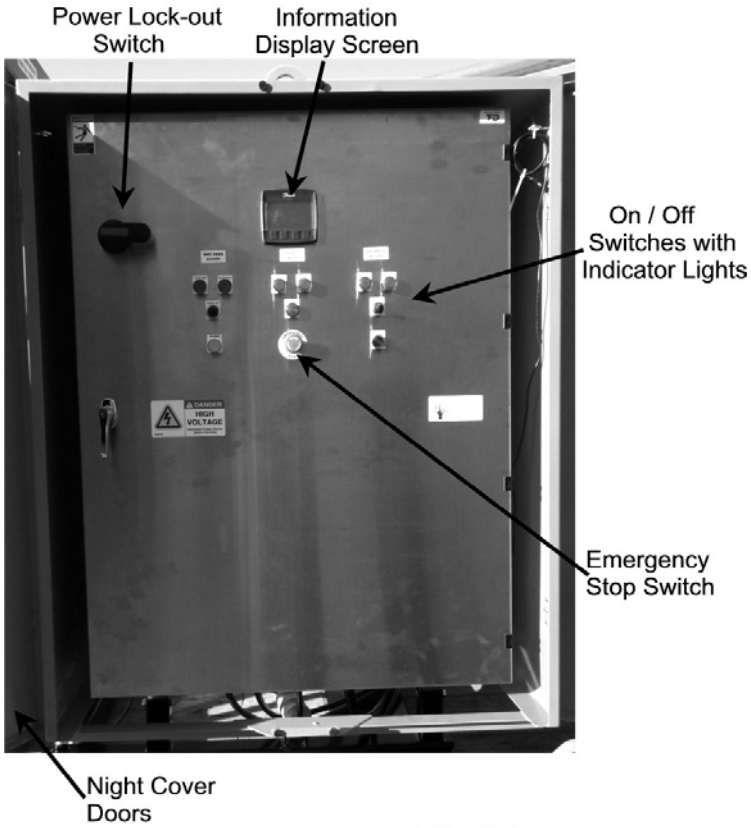
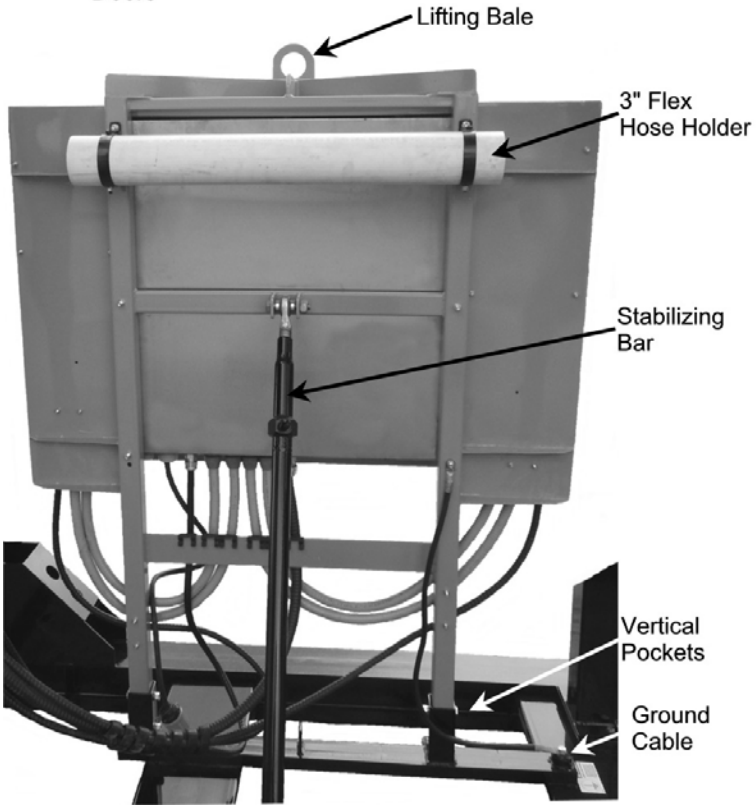


Fig.13b



SECTION #III

Set-up and Installation of Unit in Detail

FL243-11-6

Set-up and Installation of FL243 Unit in detail

The FL243 unit was designed to be used as a portable unit. Because of this design it has a very simple set-up process that is broken down in 6 basic steps,

(1) Unload from truck or trailer and position on flat, level, stable ground with a clear working area around it.

There are fork tubes cut into the main base frame (see Fig.14) to slide the forks of the appropriate size lift truck. Make sure that the FL243 unit is properly balance on the forks before lifting or moving. Placing the forks into the tubes under the main base frame DOES NOT secure the unit to the forks when lifting or moving, therefore the unit should be secured to the forks with chain, cable or other fastening devices that will restrict movement.

(2) Raise the tote stand and install safety pins in legs to secure in place.

Approach the tote stand from the right or left side, position the lifting forks under the top frame of the tote stand (see Fig.14) being careful not to hit the dry product auger inlet. Lift approximately 1" – 2" to take the weight off of the pins, hold this position, and remove the 4 pins. Slowly raise the tote stand until the next set of holes are fully exposed, hold this position. Install the 4 pins into the exposed holes. Lower the tote stand until it comes to rest on the 4 pins.

(3) Raise the flail box and install and lock the large safety pins in the carriage / vertical post holes to secure in place.

Approach the FL243 unit from the front (flail discharge end) and position the lifting forks under the flail carriage into the fork pockets (see Fig.14). If the forks are short of proper length, the flail discharge chute may have to be removed or longer forks may be required. Slowly, lifting upward, and keeping the lifting forks horizontal (flat). Move the carriage to a height that the large safety pins can be installed and locked into position. To lock, rotate the flat of the washer 90 degrees to allow the safety pin and washer to push past the safety catch welded to the carriage. Once past the safety catch rotate 90 degrees (handle down) to trap the pin and washer behind the safety catch. If removed, reattach the flail discharge chute.

(4) Lift and set the dry product tote on the tote stand making sure the spout is down inside of the large auger inlet rubber seal.

Lift up the dry product tote with the lifting forks so the tote knife valve is facing the fork lift. Approach the tote stand from the open (handle pivot) side. Raise and position the tote over the tote stand and lower it down to allow the valve spout to enter the rubber seal of the auger inlet. Install the knife valve handle.

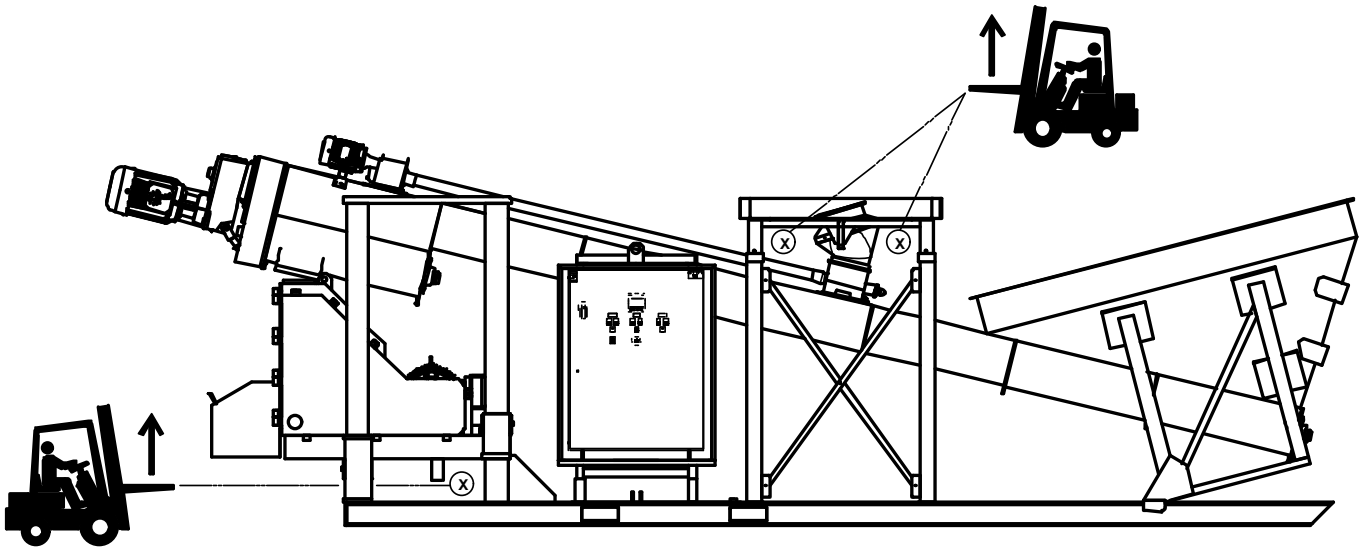
(5) If the final product is to be discharged into a bin or container, install it under the flail discharge chute.

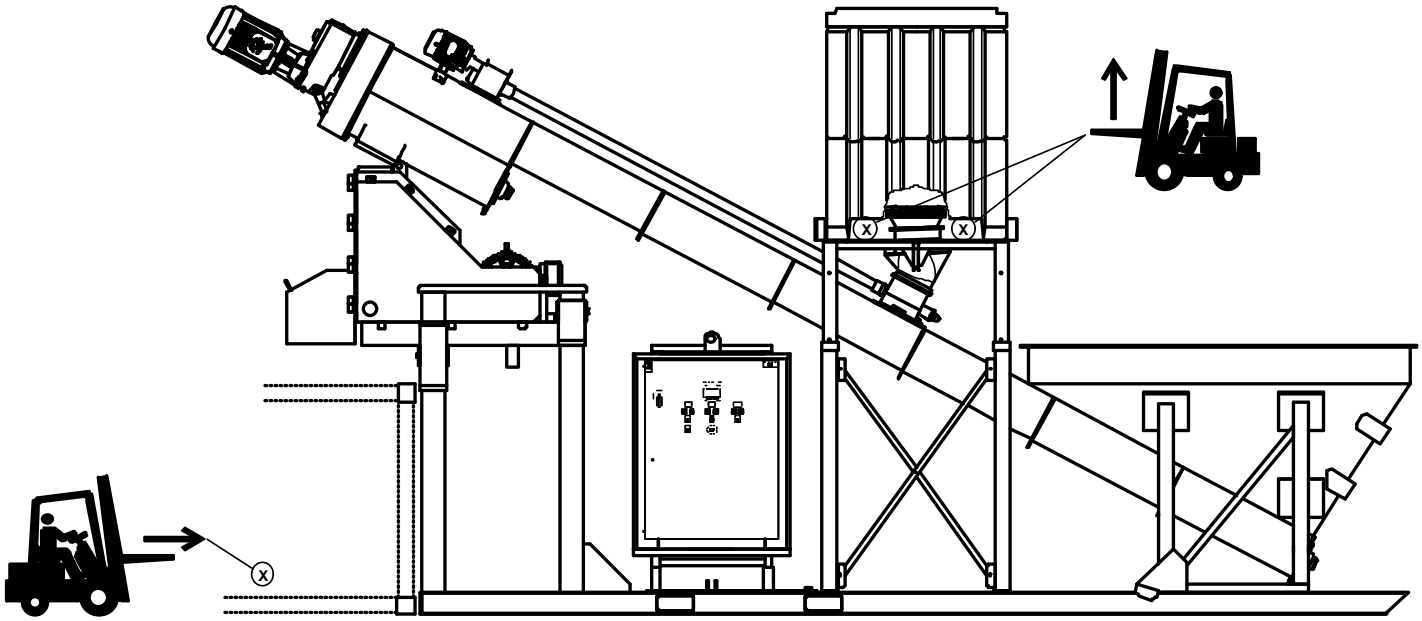
(6) Using a qualified electrician connect power source to control panel.

Install grounding stake.
Follow all local codes and safety laws.

Set-up and Installation of FL243 Unit in detail

Fig.14





SECTION #IV

Operating the FL243 Unit

Operating the FL243 Unit

Site Setup & Pre-Check

SITE SETUP

- **CHECK** for overhead hazards before unloading the unit to the ground.
- **UNLOAD** the unit by using the main base frame fork pockets (marked) with appropriate equipment.
- **SET** and position the unit on solid level surface to avoid settling or upset.
- **SET** and position the unit to have a clear unobstructed working area of 20ft (6m) on all 4 sides.
- **CONNECT** and secure all electrical cables onto the unit according to your layout.
- **PROTECT** any electrical cables that connect between the FL243 and the power source, from possible damage or from being driven upon by a vehicle.
- **INSTALL** grounding stake for unit.
- **CONNECT** and mount the magnetic strobe light in a position that is visual to the operator. Usually high on the base frame up-rites.

UNIT PRE-CHECK

- **READ and UNDERSTAND** the operator's manual for proper starting and running procedures.
- **CHECK** to assure all electrical switches, connections and wiring are free of damage and misuse.
- **CHECK** to assure that all of the cooling fan inlets on the motors are clean and clear of debris for proper airflow.
- **CHECK** to assure all guards are in place.
- **CHECK** the tote has adequate dry product inside and the lid is secured with the ratchet strap.

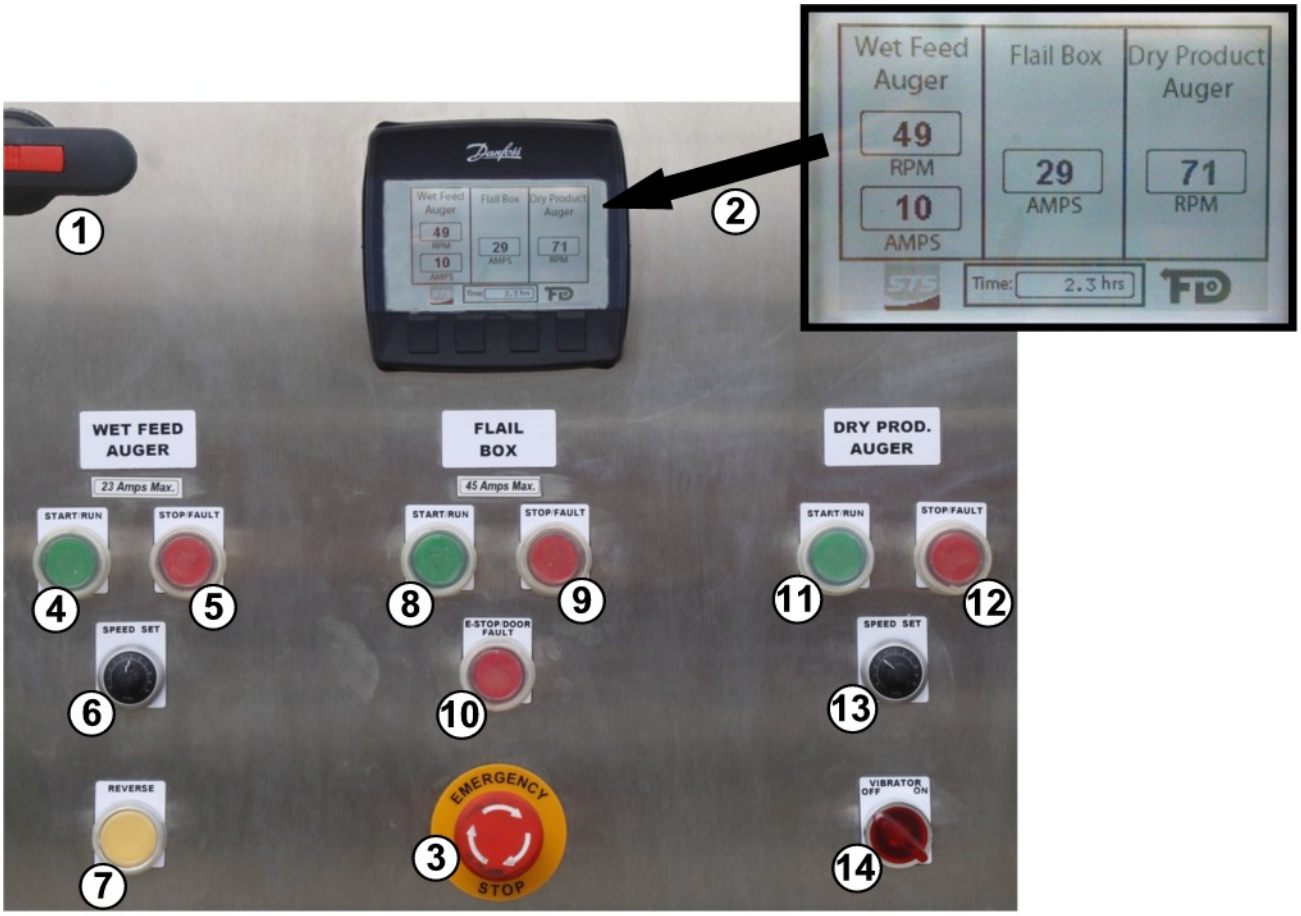
Operating the FL243 Unit

The Control Panel Explained

DANGER

IN AN EMERGENCY

Push the emergency stop switch to halt ALL of the motors on the unit.



1 Power Disconnect Switch.
2 System Information Display.
3 Emergency All Stop Button.

WET FEED AUGER

4 Start / Run Green Button.
5 Stop / Fault Red Button.
6 Speed Set Rotary Knob.
7 Reverse Rotation Button (Push & Hold)

FLAIL BOX

8 Start / Run Green Button.
9 Stop / Fault Red Button.
10 E-Stop Door Fault Red Light

DRY PRODUCT AUGER

11 Start / Run Green Button.
12 Stop / Fault Red Button.
13 Speed Set Rotary Knob.
14 Tote Vibrator on-off Switch.

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Operating the FL243 Unit

The Control Panel Explained

1 Power Disconnect Switch: This switch is rotated ¼ turn to connect or disconnect the main power suppling the control panel. The switch has to be rotated to the off position (labeled) to open the panel door. The handle it's self has an insert that will pivot outward to expose the lock out eyes for a paddle lock or a lockout device. ROTATE THE SWITCH TO THE OFF POSITION BEFORE SHUTTING DOWN ANY CONNECTED GENSET as damage may occur to sensitive electrical components.

2 System Information Display: The display screen is divided into three labeled columns. Each column displays data for a particular motor on the FL-243 unit.

"Wet Feed Auger" column shows the rpm's of the auger. It also shows the amperage draw of the motor as it is working. This will help indicate if the auger is overloaded or has debris wrapped around the flighting that is binding or any other problem that make the motor work harder.

"Flail Box" column shows the amperage of the motor driving the flail drums. This will help indicate if the flail drum(s) have debris or the likes caught / wrapped with the chains, or if the box is overloaded or even plugged.

"Dry Product Auger" column displays the rpm's of the auger. This is used to apply the correct amount of dry product entering the flail box.

"Time" displayed is the accumulated working hours that the flail box has been operating. This is useful for maintenance of the equipment.

3 Emergency All Stop Button: By pushing the button in (which will stay in) will shut down ALL the motors on the FL-243 unit. To release the button (from the in position to the out position) rotate the button clockwise, and the button will spring back out to the run position, BUT no motors will restart.

4 Wet Feed Auger Start / Run Green Button: When pushed in, the button will illuminate green and the Wet Feed Auger will rotate to the preset speed.

5 Wet Feed Auger Stop / Fault Red Button: When pushed in, the button will stop the rotating auger. This button will illuminate (RED) when there is a fault in the system, for example the auger jams. The illuminated button will have to be pushed again to remove the fault.

6 Speed Set Rotary Knob: This knob is rotated clockwise to increase the rpm's of the Wet Feed Auger and counter clockwise to decrease the rpm's. The actual rpm's are displayed on the System Information Display. Auger speed is approx. 0-113 rpm's. It is a good practice to operate the auger at full speed.

7 Reverse Rotation Button: This button is used to reverse the rotation of the Wet Feed Auger. Reversing the rotation of the auger is useful if the auger has become jammed or stuck and has triggered the fault shutdown. To reverse the auger, the button has to be held in. when the button is released, the auger will stop rotating. The auger will only reverse rotation if the Wet Feed Auger Stop / Fault red button is NOT illuminated. If it is illuminated, push red button to remove fault, then reverse.

CAUTION: DO NOT ROTATE IN REVERSE, ANY MORE THAN NEEDED TO RELIEVE PROBLEM, AS FLIGHTING DAMAGE MAY OCCURE!. MOST TIMES REVERSE IS NOT NEEDED BECAUSE THE AUGER UNWINDS. IF STILL JAMMED, 1/8 to 1/4 OF A REVOLUTION WILL USUALLY WORK.

8 Flail Box Start / Run Green Button: When pushed in, the button will illuminate green and the Flail Box flails will start to slowly rotate and increase their speed (ramp up) to the factory preset speeds.

9 Flail Box Stop / Fault Red Button: When pushed in, the button will stop the rotating flails. This button will illuminate (RED) when there is a fault in the system, for example the flails jam. The illuminated button will have to be pushed again to remove the fault.

Operating the FL243 Unit

The Control Panel Explained

10 E-Stop / Door Fault Red Light: This light will illuminate (RED) when the Emergency All Stop Button is pushed in. It will also illuminate (RED) if the Flail Box door is not properly shut and secured. If the E-Stop button was pushed to trigger this red button to illuminate, the E-stop button will have to be rotated clockwise to release and pop the E-Stop button back out. Then the (#9) stop/fault red button will have to be pushed in to reset the fault.

11 Dry Product Auger Start / Run Green Button: When pushed in, the button will illuminate green and the Dry Product Auger will rotate to the preset speed.

12 Dry Product Auger Stop / Fault Red Button: When pushed in, the button will stop the rotating auger. This button will illuminate (RED) when there is a fault in the system, for example the auger jams. The illuminated button will have to be pushed again to remove the fault.

13 Speed Set Rotary Knob: This knob is rotated clockwise to increase the rpm's of the Dry Product Auger and counter clockwise to decrease the rpm's. The actual rpm's are displayed on the System Information Display. Auger speed is approx. 0-360 rpm's.

14 Tote Vibrator On-Off Switch: This switch turns the small vibrator, mounted to the tote (dry product) stand. Certain dry products are used that have properties that cause then to bridge or rat hole when feeding the dry product auger. For these products, simply turn the switch to the on position and leave it set there. The vibrator only comes on when the dry feed auger is operating and shuts off when the auger is not operating. If the vibrator is not needed turn the switch to the off position. This will reduce wear and tear on parts that vibrate.

15 The Magnetic Red Strobe Light: This light is stored inside of the control panel. Connect it with the plug on the 2 wire, usually wrapped around the cord holder near the operators manual box. It can be mounted on any metal surface, so as to be seen by the operator. When there is a fault (as explained earlier) the red light will strobe on & off until the fault is removed. This will make the operator aware of any problems to the system.

It should be noted that when the Power Disconnect Switch is switched to the on position, the light will strobe on & off 2 times to show the system is ready

FL243-11-6

Operating the FL243 Unit

Starting and Testing the FL243 Unit

***** This is a simple start-up & system check after being moved and set up at a new site or job location.**

- **For this explanation, we will consider the electrical hook-up has been completed by a qualified electrician hired by the customer, and the rotation of all motors has been checked and is correct.**
- **All switch functions (on – off) will be referred to as "switch on, switch off."**
- **Make sure there is NO LOCK OUT or TAG on the power disconnect switch handle. If there is, than the unit should not be switched on until the problem is rendered OK. If no tag or lock is present, rotate the switch handle clockwise to turn the power on in the control panel.**
- **Make sure the wet feed auger is empty, the tote knife valve is closed, and the flail box discharge chute is clear.**
- **Push the "start/run" button labeled Flail Box. The button will light green. You should hear the flails start to spin at a low speed and ramp up to full speed in approx. 10 seconds. On the display screen (center) the "AMPS" that the flail motor is drawing will be indicated under the Flail Box heading. Listen for unusual noises or sounds (grinding, banging, whining, etc.) as the motor should sound smooth and not under load stress.**
- **Push the "start/run" button labeled Wet Feed Auger. The button will light green. You should hear / see the auger in the hopper rotating. The auger will be rotating at the speed (RPM) indicated on the display screen (left side) under the Wet Feed Auger heading. Test the speed control, by rotating the small knob dial mounted directly under the start/run button, labeled speed set. Rotate clock wise to speed up, counter clock wise to slow down. Listen for unusual noises or sounds (grinding, banging, whining, etc.) as the motor and auger should sound smooth and not under load stress.**

  Also on the display screen under the RPM of the Wet Feed Auger, is the "AMPS" the auger motor is drawing. This is useful to indicate the material load that the Wet Feed Auger is moving or spiking with rocks and the overall working condition of the wet feed system.
- **Push the "start/run" button labeled Dry Product Auger. The button will light green. You should hear the auger rotating. It will be rotating at the speed (RPM) indicated on the display screen (right side) under the Dry Product Auger heading. Test the speed control, by rotating the small knob dial mounted directly under the start/run button, labeled speed set. Rotate clock wise to speed up, counter clock wise to slow down. Listen for unusual noises or sounds (grinding, banging, whining, etc.) as the motor and auger should sound smooth and not under load stress.**
- **By pushing the RED Emergency Stop Button, all functions will stop immediately. Rotate the Red button counter clock wise, to release the button back to the out / run position and remove the fault by pushing the flail box (#9) stop/fault red button.**
- **With any or all of the functions operating, each function can be shut off independently, by pushing the "OFF" switch under the appropriate labeled function.**

Operating the FL243 Unit

Typical Processing Operation

- **With the FL243 unit set up properly, powered and pre-tested as explained earlier, the process of treating slurry / sludge with a dry product can begin.**
- **Start the flail box and let it ramp up to full speed before the next step.**
- **Start the wet feed auger at full speed and then fill wet feed auger hopper with slurry / sludge to be treated and let it carry slurry / sludge up to the mix chamber. When some of the slurry / sludge starts to exit the flail box proceed to the next step.**
- **Start the dry product auger (make sure the tote knife valve is OPEN). This will now carry the dry product up into the mix chamber.**
- **The process is now operating as one unit and the treated slurry / sludge will be accumulating in the bin (or pile) under the flail box discharge chute.**
- ***Special Note:***

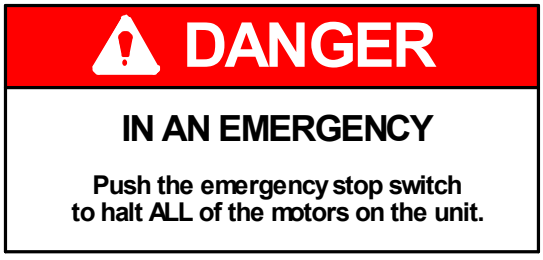
The speed (RPM's) of the wet feed auger and the speed (RPM's) of the dry product auger have a profound effect on the finial output. If the speed of the wet feed auger is too fast, and the speed of the dry product auger is to slow, the finial product may be undertreated and an unacceptable high slump may occur.

On the other end of the process, if the speed (RPM's) of the wet feed auger is too slow, and the speed (RPM's) of the dry product auger is too fast, the combined product in the mixing chamber may setup into a sticky solid mass that may plug the mixing chamber discharge into the flail box.

The speeds (RPM's) of both augers can be changed up or down as the unit is operating, by turning the small knobs on the front cover.

As a general rule, operate the wet feed auger at the fastest speed (Max. RPM's) and only change the speed (RPM's) of the dry product auger to achieve the best possible results.

- **Keeping the wet feed hopper full will help in keeping a consistent volume of slurry / sludge entering the mixing chamber.**
- **Always be aware of the dry product tote powder level inside so you do not run out or have a bridging problem with the dry product. This can be observed in the clear round funnel type viewing chamber.**
- **When stopping, pausing, or finishing up the job remember:**
  - **1st Switch off dry product auger.**
  - **2nd Switch off wet feed auger.**
  - **3rd The flails are to be switched OFF last, after being able to run for approx. 1-2 minutes with no material entering the flail box.**



Operating the FL243 Unit

Pausing the Process Operation (changing tote)

- **As the FL243 unit process slurry / sludge, it will consume the dry product in the tote and will need to be replaced with a new full tote.**
  - **1st Switch off dry product auger.**
  - **2nd Switch off wet feed auger.**
- **Close knife valve of tote.**
- **Remove & store valve handle.**
- **Lift tote up and away from rubber seal.**
- **Lower down the empty tote and set aside.**
- **Lift the new full tote onto the tote stand making sure the spout is inside the rubber seal.**
- **Install valve handle and open tote knife valve**
  - **1st Switch on wet feed auger.**
  - **2nd Switch on dry feed auger when the slurry / sludge starts to exit the flail box.**
- **Continue processing operation.**

Pausing the Process Operation (move or change out final product container)

- **As the FL243 unit process slurry / sludge and discharges it into a container, this container will need to be moved or exchanged for an empty one.**
  - **1st Switch off dry product auger.**
  - **2nd Switch off wet feed auger.**
  - **3rd The flails are to be switched OFF last, after being able to run for approx. 1-2 minutes with no material entering the flail box.**
- **Move or exchange discharge container.**
  - **1st Switch on flail box.**
  - **2nd Switch on wet feed auger.**
  - **3rd Switch on dry feed auger when the slurry / sludge starts to exit the flail box.**
- **Continue processing operation.**

FL243-11-6

Operating the FL243 Unit

Red Remote Magnetic Strobe Light (fault indicator)

- **The FL243-11-6 unit has been equipped with a magnetic red strobe light that can be mounted in various positions on the unit, making it visible to the operator.**
- **This light is activated by the control panel when there is a fault detected in the operating systems.**
- **When a fault is detected the unit will shut down the related operating system(s), the red strobe light will begin "Flashing" and one of the red indicator button lights (labeled stop/fault) on the control panel will be illuminated. The illuminated red light will be beside the green start/run button of the operating system that has the fault.**
- **Detect what caused the fault (example auger is jammed), resolve the problem (reverse the auger), and start the unit to continue normal operation.**

Reversing the Wet Feed Auger (auger becomes jammed)

- **As the FL243 unit processes slurry / sludge, debris may become wedged "jammed" between the auger flighting and the auger trough and overload the auger motor, thus creating a "Fault" which will shut down the wet feed auger and also the dry product auger. The red & green light (under flail box) on the control panel will illuminate. This will also activate the magnetic remote red strobe light to alert the operator of the issue.**

***** <u>THE FLAIL BOX WILL CONTINUE TO ROTATE</u> *****

1. ***Push the red illuminated stop/fault button to clear the fault. The red light in the button will stay lit and the green start/run button light will go out. The red remote strobe light will stop flashing.***
2. ***Push the green start/run button. The red stop/run button light will go out and the green light will be lit.***
3. ***Push the red stop/fault button. The green start/run button light will go out and red stop/fault stays out.***
4. ***Push the green start/run button. If the auger rotates, and when it is up to speed, start the dry feed auger when the slurry / sludge starts to exit the flail box.***

If it faults again right away (auger does not rotate) it is jammed with debris, and the auger will have to be reversed as explained below.

- **To reverse the auger to clear the wedged debris:**
  Follow the above steps 1-3.
  Push and hold the Yellow Reverse button until the auger turns in the reverse direction, (usually about 1/8 to 1/4 revolution of mix auger is enough). You can look up at the end shaft of the mixing auger to see rotation.
  Do not rotate the auger any longer than needed to dislodge the debris. 1/8 to 1/4 revolution
  Release the Yellow Reverse button.
- **Push the green start button for the wet feed auger, and if it rotates and when it is up to speed, start the dry feed auger when the slurry / sludge starts to exit the flail box.**
- **Continue processing as before.**

Dry Product Vibrator

- **The FL243-11-6 unit is equipped with a Dry Product vibrator and a switch, mounted on the control panel to turn the vibrator on or off.**
- **The vibrator is mounted on the tote stand and is used for some dry products that do not flow well in the tote container to the outlet, and into the Dry Product Auger.**
- **The vibrator only operates when the Dry Product Auger is operating.**
- **When the switch is in the off position the vibrator will not operate when the Dry Product Auger is operating**

Operating the FL243 Unit

Typical Warm Weather Shutdown & Storage

Daily Shut Down

It is good practice to empty the wet feed auger hopper when shutting down for the day.

- **Switch off dry product auger.**
- **Switch off wet feed auger.**
- **After approx. 1 minute switch off flails.**
- **Wait approx. 3-5 minutes, then switch on wet feed auger and flails.**
- **Let run approx. 1 minute. (this step is to a sure any material setting up inside the mix auger is discharged).**
- **Switch off wet feed auger and flails.**
- **Rotate to disconnect power lock-out switch.**
- **Close night covers on box**

IF the dry product tote is removed from the tote stand and left off, the dry product auger inlet (with rubber seal) should be completely sealed off from rain (or snow). When the tote is on the tote stand it acts as protection from the wet elements.

Typical Cold Weather Shutdown & Storage

Additional Winter and Freezing Weather Shut Down

- **Remove any liquids or wet solids that could freeze the auger to the trough in the wet feed hopper and auger(s).**
- **Clear back any finished processed product around the flail box discharge chute.**
- **In extreme cold conditions it may be necessary to "close in" the FL243 unit.**
- **It may be convenient to use steam or other sources of heat to combat freeze up of the unit.**

FL243-11-6

Operating the FL243 Unit

Calibrating the Dry Feed Auger

The dry products that you intend to use in the FL243 unit for treating the slurry / sludge may differ in volume weight from product to product, therefore the auger speed may have to be set at a different speed to output the same amount of dry product per minute.
In other words, for every revolution of the auger, a different volume weight may come out of the auger tube and into the mix chamber.
This is usually true if a totally different product is used. An example of this might be a dry product for HDD slurry solidification versus a dry product for hydrocarbon-contaminated slurry.

To record a new calibration sheet for the dry product that you intend to use is not difficult and is critical in the proper dosage rate. Under dosage may not work and over dosage costs money.

The items required are as follows; Stop watch or a device (wrist watch) to time each step, a container, (pail or bucket) to hold the product when it comes out of the auger, a set of scales (the finer the scales the more accurate the data) to weigh the product in the container, and the dry product to be used. A blank calibration sheet is included in this manual and can be copied to record data.

How to calibrate the dry product

You Will Need:

2 Clean five gallon open top plastic pails. A weighing device (scale) capable of weighing 1 to 50 lbs. A timing device (stop watch or other item), PPE (safety glasses & dust mask), and a pen and paper or a copy of the calibration sheet located the end of this manual.

The unit must be powered on to operate the dry feed auger.

1. If not already down in transport mode, lower the flail box and carriage down to transport mode.
2. Rotate the dry product auger & motor off to the side onto the swing arm and secure (see Fig.15)
3. Attach auger funnel & attach flex metering tube (3” flex hose).
4. Raise flail box and carriage up to the work (mode) position & install the 4 large lock pins.
5. Make sure the tote is mounted on the unit & at least half full of dry product and knife valve is open.
6. Weigh the empty containers (pail, etc.) and record this on the calibration sheet under “Container WT.(lbs.)”
7. Put one container (pail) under the flex metering tube and rest the container on the ground. Place the other container (pail) next to the first one.
8. Push the start button (Dry Product Auger)
9. Set auger controller at 40 RPM.
10. When the dry product is flowing out of the flex metering tube, and the rpms are constant, Quickly switch the flex metering tube over into the 2nd pail and start the timer.
11. Time the dry product falling into container (pail) for exactly 1 minute.
12. At the 1 minute point, Quickly switch the flex metering tube back into the 1st container (pail).
13. Push the stop button (Dry Product Auger)
14. Now weigh the 2nd container (that has the dry product that was timed inside)
15. Subtract the container weight.

Operating the FL243 Unit

Calibrating the Dry Feed Auger

16. Take this answer and write it in the square beside 40 RPMS on the calibration sheet or on a piece of paper.
17. Dump the containers (pails) back into the tote (or another storage container that can then be dumped back into the tote at a later time). During calibration, be sure that the tote has a significant amount of dry powder for calibrating.
18. Repeat steps 7 to 17 for each of the RPMs. on the calibration sheet.
19. Lower the flail box and carriage down to transport mode.
20. Remove auger funnel & flex metering tube (3” flex hose).
21. Rotate auger & motor back over auger inlet hole and secure.
22. Remove swing arm and secure.
23. You are now finished calibrating the auger speed to the weight of this dry product.

Operating the FL243 Unit

Calibrating the Dry Feed Auger

WARNING: BEFORE PREFORMING THIS OPERATION, LOWER THE FLAIL BOX & CARRIAGE DOWN TO THE TRANSPORT POSITION. DO NOT CLIMB UP ON THE UNIT IN WORK MODE.

Fig.15

Step 1
Remove swing arm from side holder and slide it into the open end of motor mount tube.

Step 2
Remove the 2 (1/2") bolts that secure the motor plate to the motor mount tube and install 1 of the bolts in the end of the swing arm so the arm will not slide out of the motor mount tube. Now slide the motor & auger drive assembly to the end of the swing arm (left side of "wet feed auger").

Step 3
Once the motor & auger drive assembly are slid out to the end of the swing arm, install the remaining (1/2") bolt through the motor plate and tab on the end of the swing arm.

Step 4
Attach the auger funnel & the 3 " flex hose to the auger discharge housing.
The unit is now set up to calibrate powder to RPMs.
When finished calibrating, reverse the steps to put the unit back into work / process mode.

FL243-11-6 UNIT

Unit serial number: _____

Dry Product Auger calibration Sheet

Dry Product number: _____

AUGER RPM's	*Pounds Per Min. (less container wt.)*
40	
60	
80	
100	
120	
140	
160	
180	

AUGER RPM's	*Pounds Per Min. (less container wt.)*
200	
220	
240	
260	
280	
300	
320	
340	
350	

Container WT. (lbs.)

_____

How to calibrate the dry product

You Will Need:

2 Clean five gallon open top plastic pails. A weighing device (scale) capable of weighing 1 to 50 lbs..
A timing device (stop watch or other item), PPE (safety glasses & dust mask), and a pen and paper
or a copy of the calibration sheet located the end of this manual.
The unit must be powered on to operate the dry feed auger.

1. If not already down in transport mode, lower the flail box and carriage down to transport mode.
2. Rotate the dry product auger & motor off to the side onto the swing arm and secure (see Fig.15).
3. Attach auger funnel & attach flex metering tube (3" flex hose).
4. Raise flail box and carriage up to the work (mode) position & install the 4 large lock pins.
5. Make sure the tote is mounted on the unit & at least half full of dry product and knife valve is open.
6. Weigh the empty containers (pail, etc.) and record this on the calibration sheet under "Container WT.(lbs.)".
7. Put one container (pail) under the flex metering tube and rest the container on the ground. Place the other container (pail) next to the first one.
8. Push the start button (Dry Product Auger).
9. Set auger controller at 40 RPM.
10. When the dry product is flowing out of the flex metering tube, and the rpms are constant, Quickly switch the flex metering tube over into the 2nd pail and start the timer.
11. Time the dry product falling into container (pail) for exactly 1 minute.
12. At the 1 minute point, Quickly switch the flex metering tube back into the 1st container (pail).
13. Push the stop button (Dry Product Auger).
14. Now weigh the 2nd container (that has the dry product that was timed inside).
15. Subtract the container weight.
16. Take this answer and write it in the square beside 40 RPMS on the calibration sheet or on a piece of paper.
17. Dump the containers (pails) back into the tote (or another storage container that can then be dumped back into the tote at a later time). During calibration, be sure that the tote has a significant amount of dry powder for calibrating.
18. Repeat steps 7 to 17 for each of the RPMs. on the calibration sheet.
19. Lower the flail box and carriage down to transport mode.
20. Remove auger funnel & flex metering tube (3" flex hose).
21. Rotate auger & motor back over auger inlet hole and secure.
22. Remove swing arm and secure.
23. You are now finished calibrating the auger speed to the weight of this dry product.

Motor: 2hp (1800 rpms)
Gear reducer: 5 to 1
Solid Shaft Auger
2.625"OD x 5/8" shaft x 2.6" Pitch

SECTION #V

Troubleshooting the FL243 Unit

FL243-11-6

Troubleshooting the FL243 Unit

The FL243 unit is of a simple design with limited moving parts and few consumable pieces. The basic system works with a large hopper being kept full of a slurry / sludge mixture. An auger in the bottom of this hopper carries the mixture upwards and into a mixing chamber. In this mixing chamber a dry product is added into the mixture and slightly blended together, then falling out of the mixing auger and into the flail box. Three drums with multiple chains attached to each, spin at high speeds inside the flail box, and coming into contact with the mixture and smashing the mixture into very small components and then group back together as they leave the flail box to form a well-mixed mass.

The following, may aid in any problems that may arise.

- *Wet feed auger not rotating or carrying slurry / sludge up into mix chamber*
  Auger not turned on. - Press auger "on" button.
  Auger "on" indicator not working. - check electrical fuses, etc.
  Auger speed too slow to carry light slurry up incline. - Speed up auger.
  An auger bolt in connector shaft broken. - Replace bolt.

- *Mixing auger not rotating but feed auger is.*
  Broken roller chain- fix chain.
  Sprocket loose on shaft- tighten/replace key.

- *Dry product not being carried up into mixing chamber.*
  Tote empty - replace with full tote
  Tote knife valve closed - Open valve
  Dry Auger knife valve closed - Open valve
  Dry product bridging / Turn on vibrator
  Auger not turned on. - Press auger "on" button.
  Auger "on" indicator not working. - check electrical fuses, etc.
  Auger speed too slow to carry up incline. - Speed up auger

- *No product coming from flail box discharge*
  Mixing auger discharge plugged. – Unplug discharge.
  Flail box plugged with build-up – Stop, lock out, and clean inside

- *Final product has high slump*
  Mixing Ratio incorrect – recalculate dry product to sludge rates, and reset.
  Improper mixing in flail box – box is overloaded. Slow down processing amount.

- *Fault indicator lit (red light)*
  A fault detected in function that indicator is labeled – Fix fault

- *Remote Magnetic Red Light On, Unit shut off*
  Fault detected in system – Fix fault and restart

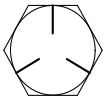
For problems that cannot be solved by the above steps or the trouble shooting section in the OEM manuals included in this manual or the supplied OEM manuals, call your local distributor or STSI (1-800-567-0978) and talk to a company representative who would be glad to assist you with your problem.

SECTION #VI

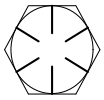
Periodic Maintenance & Repair Information

FL243-11-6

Bolt Torque Specifications



Grade 5



Grade 8

SAE SIZE	Lubricated *		Dry **		Lubricated *		Dry **	
	N.m	ft-lbs	N.m	ft-lbs	N.m	ft-lbs	N.m	ft-lbs
1/4	9.5	7	12	9	13.5	10	17	12.5
5/16	20	15	25	18	28	21	35	26
3/8	35	26	44	33	50	36	63	46
7/16	55	41	70	52	80	58	100	75
1/2	85	63	110	80	120	90	150	115
9/16	125	90	155	115	175	130	225	160
5/8	170	125	215	160	215	160	300	225
3/4	300	225	375	280	425	310	550	400
7/8	490	360	625	450	700	500	875	650
1	725	540	925	675	1050	750	1300	975

** "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.*

*** "Dry" means plain or zinc plated without any lubrication.*

Metric size

Thread size x pitch mm	N.m	ft-lbs
M6 X 1.0	10.8 ± 1.0	8.0 ± 0.5
M8 x 1.25	25.5 ± 2.9	19.0 ± 2.0
M10 x 1.5	49.0 ± 4.9	36.0 ± 4.0
M12 x 1.75	88.3 ± 9.8	65.0 ± 7.0
M14 x 1.5	137.0 ± 9.8	101.0 ± 7.0
M16 x 1.5	226.0 ± 9.8	167.0 ± 7.0

Apply 60% torque to bolts that are not listed.

Apply 80% torque when tightened to aluminum alloy.

Basic FL243-11-6 Periodic Maintenance Schedule***

***The following items have been listed as basic items to Check. The OEM manuals should be followed.
STSI is not held liable for any discrepancies or errors in the Schedule

General Maintenance items	Every 8 Hour (Daily)	Every 50 Hour (Weekly)	Every 100 Hour	Every 200 Hour (Monthly)	Every 400 Hour	Every 1000 Hour	Every 2000 Hours (or yearly)
Check the General Condition – Visually for Cracks, Leaks, Loose Hardware	✓						
When first start up (not under load) listen for unusual noise or vibrations	✓						
Grease all (11) fittings on manifold mounted on the carriage frame – see Fig.3	1-2 pumps						
Check electrical cables for damage or loose mounting	✓						
Check all guards and shields are in place & secure	✓						
Check gearboxes for fluid leaks.	✓						
Check flail box door bolts are all in-place and tight.	✓						
Check flail box discharge is not blocked by debris or piled material.	✓						
Flail Box Components							
Open front door and wash inside housing		✓					
Check flail chains for wear or breakage		✓					
Check chain shafts and drums for wear and damage		✓					
Check for foreign debris build-up		✓					
Clean motor cooling fins and check bolts & nuts		✓					
Check drive belt for wear and slack adjustment						✓	
Grease idler pulley (under drive belt guard)						1-2 pumps	
Lubricate flail motor (see OEM manual)							✓
Auger Components							
Remove auger top covers and inspect. Wash trough & flighting if necessary			✓				
Visual check auger flighting and connecting pins, bolts & nuts			✓				
Check & adjust wet auger spring hold down pressure			✓				
Check/clean Dry auger discharge (red box) for debris and excessive build-up		✓					
Check/clean Dry auger inlet box for debris and solid material build-up		✓					
Wet Auger Gear Reducer (See OEM Manual)							10,000 Hrs
Dry Auger Gear Reducer (See OEM Manual)							Tear Down

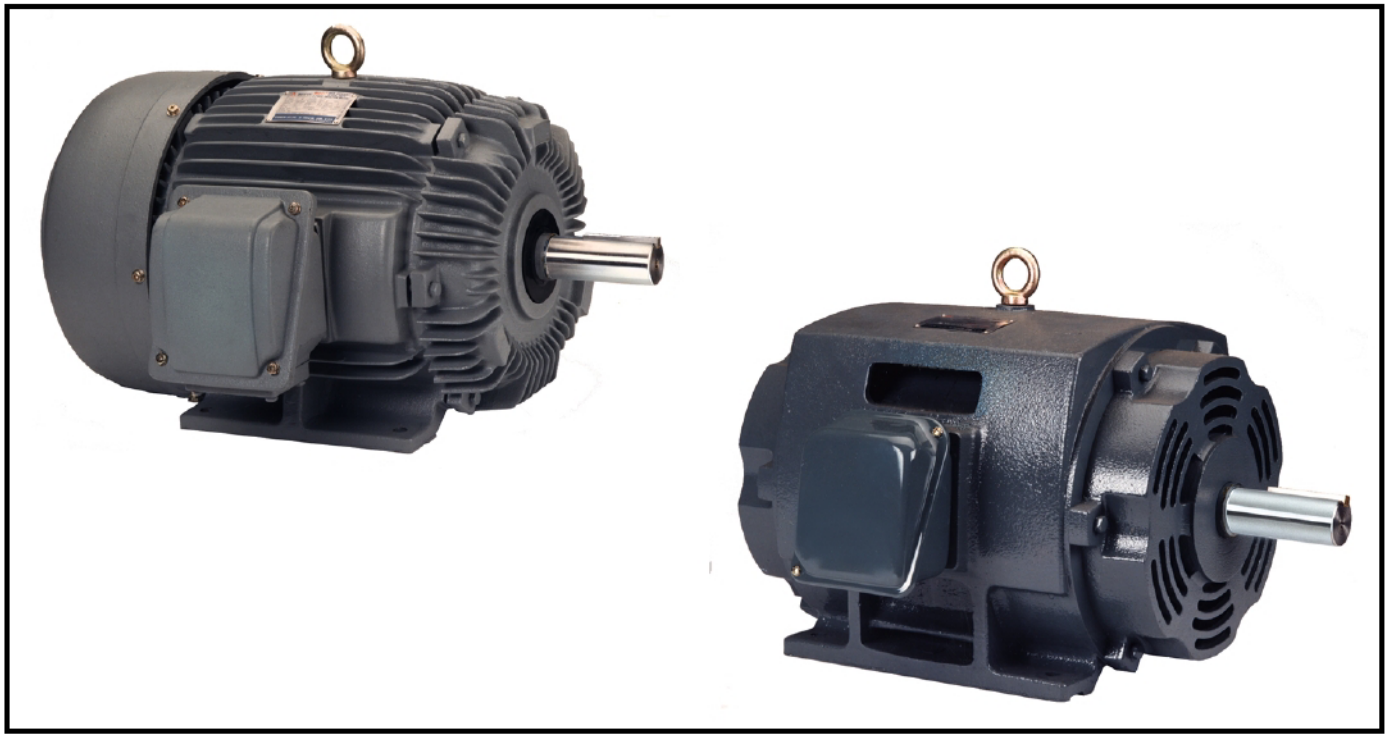
NOTES:

SECTION #VII

OEM General Information

TECO—Westinghouse

INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR THREE PHASE INDUCTION MOTORS



Frames 143T - 449T

18060 -109 Ave Edmonton, AB T5S 2K2
Phone: 800-661-4023 780-444-8933 Fax: 888-873-8964

RECEIVING

1. Check nameplate data.
2. Check whether any damage has occurred during transportation.
3. After removal of shaft clamp, turn shaft by hand to check that it turns freely.
4. If motor is to be reshipped (alone or installed to another piece of equipment) the shaft must again be clamped to prevent axial movement.
   Note: Remove the bearing clamp before turning the shaft on 284T-449TZ frame motors.

WARNING
THE FOLLOWING SAFETY PRECAUTIONS MUST BE OBSERVED:

1. Electric rotating machinery and high voltage can cause serious or fatal injury if improperly installed, operated or maintained. Responsible personnel should be familiarized with NEMA MG2; Safety Standards for Construction and Guide Selection. Installation and Use of Electric Motors and Generators; National Electric Code and all local safety requirements.
2. When servicing, all power sources to the motor and to the accessory devices should be de-energized and disconnected and all rotating parts should be at standstill.
3. Lifting means, when supplied, are intended for lifting the motor only. When two lifting devices are supplied with the motor a dual chain must be used.
4. Suitable protection must be used when working near machinery with high noise levels.
5. Safeguard or protective devices must not be by-passed or rendered inoperative.
6. The frame of this machine must be grounded in accordance with the National Electric Code and applicable local codes.
7. A suitable enclosure should be provided to prevent access to the motor by other than authorized personnel. Extra caution should be observed around motors that are automatically or have automatic re-setting relays as they may restart unexpectedly.
8. Shaft key must be fully captive or removed before motor is started.
9. Provide proper safeguards for personnel against possible failure of motor-mounted brake, particularly on applications involving overhauling loads.
10. Explosion proof motors are constructed to comply with the label service procedure manual, repair of these motors must be made by TECO-Westinghouse Motor Company or U/L listed service center in order to maintain U/L listing.

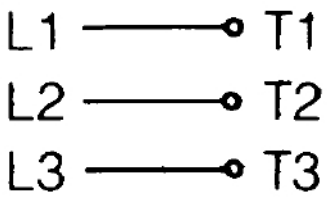
LOCATION

1. Drip-proof motors are intended for use where atmosphere is relatively clean, dry, well ventilated and non-corrosive.
2. Totally enclosed motors may be installed where dirt, moisture, or dust are present and in outdoor locations.
3. Explosion-proof motors are built for use in hazardous locations as indicated by Underwriters label on the motor.
4. Chemical duty enclosed motors are designed for installation in high corrosion or excessive moisture locations.
   Note: in all cases, no surrounding structure should obstruct normal flow or ventilating air through or over the motor.

POWER SUPPLY & CONNECTIONS

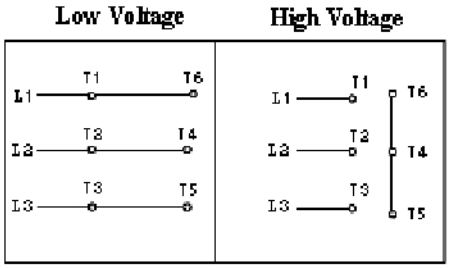
1. Wiring of motor and control, overload protection and grounding should be in accordance with National Electrical Code and all local safety requirements.
2. Nameplate voltage and frequency should agree with power supply. Motor will operate satisfactorily on line voltage within -10% of nameplate voltage; or frequency with -5% and with a combined variation not to exceed -10%. 230-volt motors can be used on 208-volt network systems, but with slightly modified performance characteristics as shown on the nameplate.
3. Dual voltage and single voltage motors can be connected for the desired voltage by following connection diagram shown on the nameplate or inside of the conduit box.
4. All Explosion Proof motors have Temperature Limiting Devices in the motor enclosure to prevent excessive external surface temperature of the motor in accordance with U/L standards. Terminals of thermal protectors (P1 & P2) should be connected to the motor control equipment, according to the connection diagram inside of the conduit box.
5. Standard connection diagram for three phase, not thermally protected, dual rotation motors are shown in diagrams A through E.
   (Note: To change rotation, Interchange any two line leads)

A. 3 Lead, Single Voltage

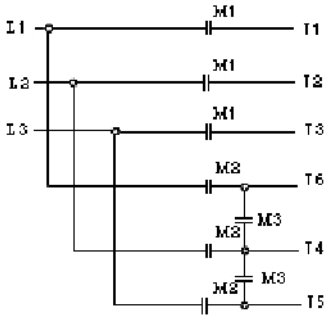


B. 6 Lead, Dual Voltage & Voltage Ration 1 to 3

B-1 Across the Line Start & Run



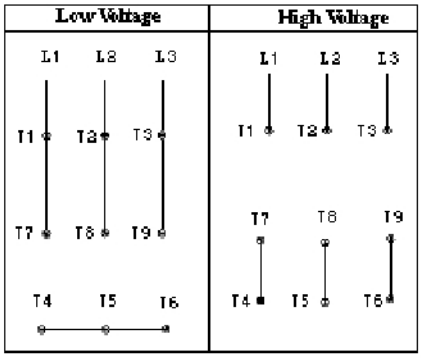
B-2 Wye Start & Delta Run
(Low Voltage only)



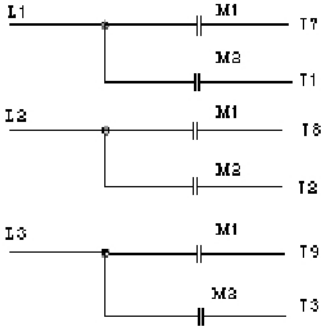
	START	RUN
M1	CLOSE	CLOSE
M2	OPEN	CLOSE
M3	CLOSE	OPEN

C. 9 Leads; Dual Voltage & Voltage Ratio 1 to 2, Wye Connected

C-1 Across the Line Start & Run



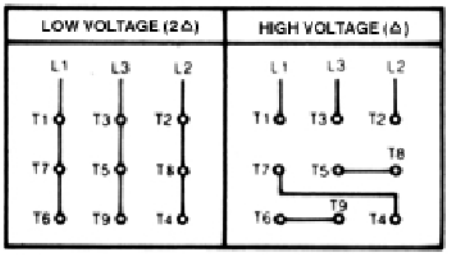
C-2 Part Winding Start
(Low Voltage only)



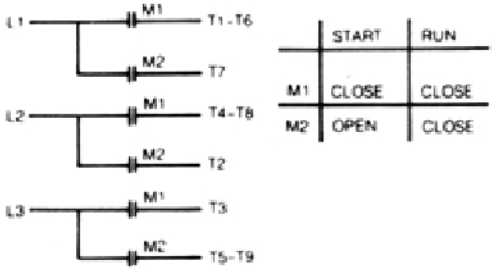
	START	RUN
M1	CLOSE	CLOSE
M2	OPEN	CLOSE
Tie Together	(T4-T5-T6)	

D. 9 Leads; Dual Voltage & Voltage Ration 1 to 2, Delta Connected

D-1 Across the Line Start & Run

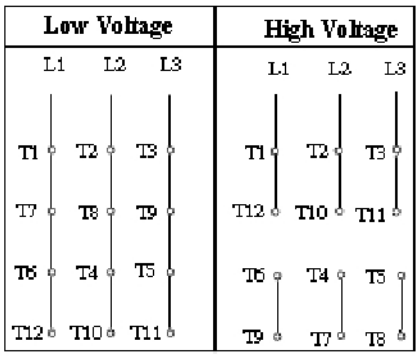


D-2 Part Winding Start
(Low Voltage only)

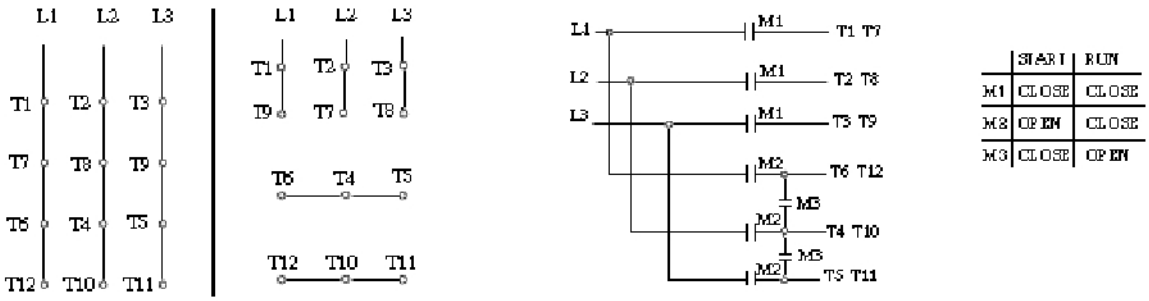


E. 12 Leads, Dual Voltage

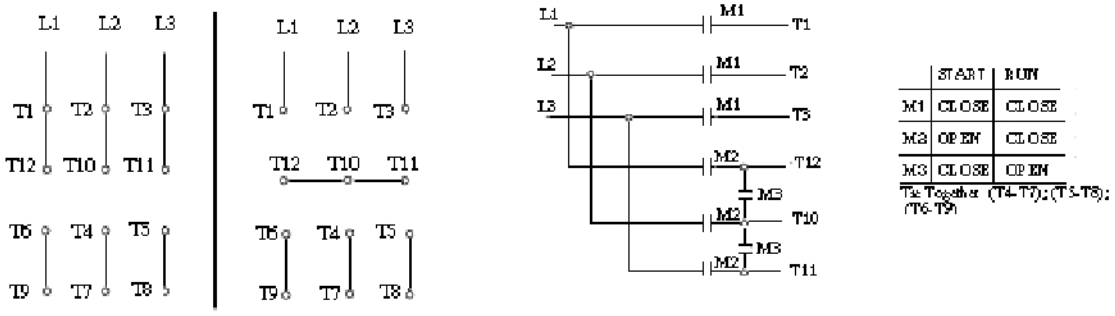
E-1 Across the Line Start & Run



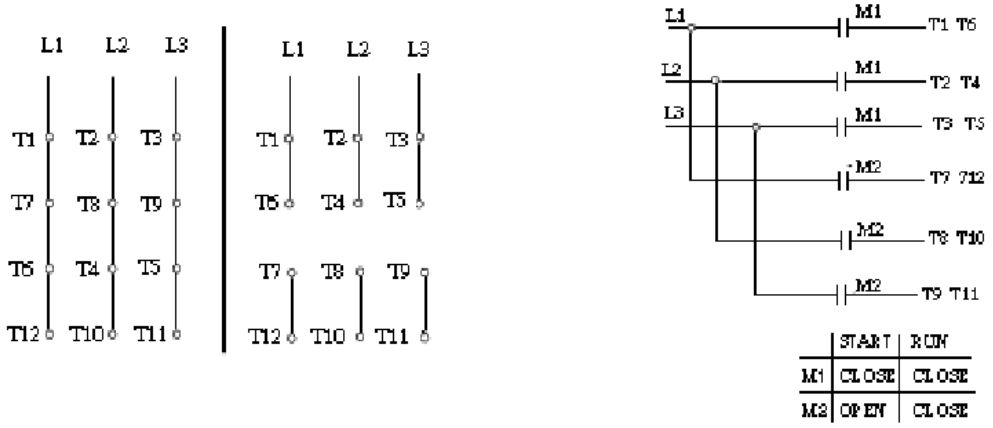
E-2-1 Wye Start & Delta Run (Low Voltage only)



E-2-2 Wye Start & Delta Run (High Voltage only)



E-3 Part Winding Start (Low Voltage only)



*Important: For Part Winding Start, M2 contactor should be closed within two (2) seconds after M1 contactor is closed.
Only 4 pole and above (e.g., 6P, 8P) motors are satisfactory for Part Winding Start at low voltage.

START UP

1. Disconnect load and start motor. Check direction of rotation. If rotation must be changed, ALLOW THE MOTOR TO STOP COMPLETELY. Interchange any two leads of a three-phase motor.
2. Connect load. The motor should start quickly and run smoothly. If no, shut power off at once. Recheck the assembly including all connections before restarting.
3. If excessive vibration is noted, check for loose mounting bolts too flexible motor support structure or transmitted vibration from adjacent machinery. Periodic vibration checks should be made; foundations often settle.
4. Operate under load for short period of time and check operating current against nameplate.

TESTING

If the motor has been in storage for an extensive period or has been subjected to adverse moisture conditions, it is best to check the insulation resistance of the stator winding with a megometer. Depending on the length and conditions of storage it may be necessary to regrease or change rusted bearings.
If the resistance is lower than one megohm the windings should be dried in one of the following two ways:

1. Bake in oven at temperatures not exceeding 194¡F until insulation resistance becomes constant.
2. With rotor locked, apply low voltage and gradually increase the current through windings until temperature measured with a thermometer reaches 194¡F. Do not exceed this temperature.

MAINTENANCE

INSPECTION

Inspect motor at regular intervals. Keep motor clean and ventilation openings clear.

LUBRICATION

1. Frame 143T-256T: Double shielded and pre-lubricated ball-bearing motors without grease fittings and don't need relubrication, except on MAX-E1¤ and MAX-E2¤ products which have regreasable features.
2. Frames 280TS, 320-449TZ(TS): Motors having grease fittings and grease discharge devices at brackets. Motors are shipped with grease for initial running. It is necessary to relubricate anti-friction bearing motors periodically, depending on size and type of service. See Table 2 to provide maximum bearing life. Excessive or too frequent lubrication may damage the motor.

TABLE 2

Horsepower	Standard Conditions	Severe Conditions	Extreme Conditions
1 Thru 30 Hp, 1800 rpm and below	7 years	3 years	180 days
40 Thru 75 Hp, 1800 rpm and below	210 days	70 days	30 days
100 Thru 150 Hp, 1800 rpm and below	90 days	30 days	15 days
1 Thru 20 Hp, 3600 rpm	5 years	2 years	90 days
25 Thru 75 Hp, 3600 rpm	180 days	60 days	30 days
100 Thru 150 Hp, 3600 rpm	90 days	30 days	15 days

Note:

A. Standard conditions: 8 hours operation per day, normal or light loading, clear and 40¡C ambient conditions.

B. Severe conditions: 24-hour operation per day or light shock loading, vibration or in dirty or dusty conditions.

C. Extreme conditions: With heavy shock loading or vibration or dusty conditions.

D. For double shielded bearings, above data (lubrication frequency) means that the bearing must be replaced.

3. Be sure fittings are clean and free from dirt. Using a low-pressure grease gun, pump in the recommended grease until new grease appears at grease discharge hole.
4. Use the ALVANIA R3 grease or equivalent lithium based grease unless special grease is specified on the nameplate.
5. If relubrication is to be performed with the motor running, stay clear of rotating parts. After regreasing, allow the motor to run for ten to thirty minutes.

RENEWAL PARTS

1. Use only genuine TECO-Westinghouse renewal parts or as recommended by TECO-Westinghouse Motor Company.
2. When you order renewal parts please specify complete information to TECO-Westinghouse office/agent such as type, frame no., poles, horsepower, voltage, series no., quantity, etc.

FOR FURTHER INFORMATION PLEASE CONTACT

TECO-WESTINGHOUSE MOTORS (CANADA) INC.

GROVE GEAR

Ratio Multiplier Speed Reducers

Installation, Lubrication and Maintenance Instructions

A Regal Brand

REGAL

Selection Information

Read **ALL** instructions prior to operating reducer. Injury to personnel or reducer failure may be caused by improper installation, maintenance or operation.

Written authorization from Grove Gear is required to operate or use reducers in man lift or people moving devices.

Check to make certain application does not exceed the allowable load capacities published in the current catalog.

Buyer shall be solely responsible for determining the adequacy of the product for any and all uses to which Buyer shall apply the product. The application by Buyer shall not be subject to any implied warranty of fitness for a particular purpose.

Safety Alert

⚠WARNING

- For safety, Buyer or User should provide protective guards over all shaft extensions and any moving apparatus mounted thereon. The User is responsible for checking all applicable safety codes in his area and providing suitable guards. Failure to do so may result in bodily injury and/or damage to equipment.
- Hot oil and reducers can cause severe burns. Use extreme care when removing lubrication plugs and vents.
- Make certain that the power supply is disconnected before attempting to service or remove any components. Lock out the power supply and tag it to prevent unexpected application of power.
- Reducers are not to be considered fail safe or self-locking devices. If these features are required, a properly sized, independent holding device should be utilized. Reducers should not be used as a brake.
- Any brakes that are used in conjunction with a reducer must be sized or positioned in such a way so as to not subject the reducer to loads beyond the catalog rating.
- Lifting supports including eyebolts are to be used for vertically lifting the gearbox only and no other associated attachments or motors.
- Use of an oil with an EP additive on units with backstops may prevent proper operation of the backstop. Injury to personnel, damage to the reducer or other equipment may result.
- Overhung loads subject shaft bearings and shafts to stress which may cause premature bearing failure and/or shaft breakage from bending fatigue, if not sized properly.

⚠CAUTION

- Test run unit to verify operation. If the unit tested is a prototype, that unit must be of current production.
- If the speed reducer cannot be located in a clear and dry area with access to adequate cooling air supply, then precautions must be taken to avoid the ingestion of contaminants such as water and the reduction in cooling ability due to exterior contaminants.
- Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.

Important Information

In the event of the resale of any of the goods, in whatever form, Resellers/Buyers will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such sale:

> The manufacturer makes no warranties or representations, express or implied, by operation of law or otherwise, as to the merchantability or fitness for a particular purpose of the goods sold hereunder. Buyer acknowledges that it alone has determined that the goods purchased hereunder will suitably meet the requirements of their intended use. In no event will the manufacturer be liable for consequential, incidental or other damages. Even if the repair or replacement remedy shall be deemed to have failed of its essential purpose under Section 2-719 of the Uniform Commercial Code, the manufacturer shall have no liability to Buyer for consequential damages.

Resellers/Buyers agree to also include this entire document including the warnings above in a conspicuous place and in a conspicuous manner in writing to instruct users on the safe usage of the product.

This instructions manual should be read together with all other printed information such as catalogs, supplied by Grove Gear.

General Operation

1. Run the motor which drives the reducer and check the direction of reducer output rotation. Consult motor nameplate for instructions to reverse the direction of rotation.
2. Attaching the load: On direct coupled installations, check shaft and coupling alignment between speed reducer and loading mechanism. On chain/sprocket and belt/pulley installation, locate the sprocket or pulley as close to the oil seal as possible to minimize overhung load. Check to verify that the overhung load does not exceed specifications published in the catalog.
3. High momentum loads: If coasting to a stop is undesirable, a braking mechanism should be provided to the speed reducer output or the driven mechanism.

CAUTION The system of connected rotating parts must be free from critical speed, torsional or other type vibration, no matter how induced. The responsibility for this system analysis lies with the purchaser of the speed reducer.

Installation

1. Mount the unit to a rigid flat surface using grade 5 or higher fasteners. The mounting fasteners should be the largest standard size that will fit in the base mounting hole. Shim as required under flange or base feet which do not lie flat against the mounting surface.
2. For shipment of standard units, pipe plugs are installed in the unit and a vent plug is packed separately. After mounting the unit in position, remove the appropriate pipe plug and install the vent plug in the location shown on page 5. These conditions are not covered by warranty. Check for correct oil level. Contact the factory for level and vent recommendations on non-standard mounting positions. Units with optional internal pressure compensating system do not use vents. See internal pressure compensating system under **Lubrication** for further information.
3. Units supplied with an internal pressure compensation system, do not require a vent and can be used as supplied from the factory. Do not loosen the nut holding the stem of the pressure compensator, and do not block the hole in the stem. Do not blow pressurized air into the hole, and avoid spraying washdown chemicals directly into the hole.
4. Connect motor to speed reducer.

WARNING For safety, purchaser or user should provide protective shields over all shaft extensions and any moving apparatus mounted on the unit. The user is responsible for checking all applicable safety codes in his area and providing suitable shields.

WARNING Make certain that all tools and other items are clear from rotating parts before starting machine. Stand clear, and start machine slowly to be sure all components are secure and operating properly.

WARNING Special consideration should be given to high inertia loads connected to the output shaft. Consult the factory for further details.

CAUTION DO NOT CHANGE MOUNTING POSITIONS WITHOUT CONTACTING FACTORY.
Altering the mounting position may require special lubrication provisions which must be factory installed.

CAUTION Do not operate the reducer without making sure it contains the correct amount of oil. Do not overfill or underfill with oil, or injury to personnel, reducer or other equipment may result. Units with an internal pressure compensation system are lubed and sealed for life, so in most applications it will not be necessary to drain or re-fill the unit.

CAUTION A unit cannot be used as an integral part of a machine superstructure which would impose additional loads on the unit other than those imposed by the torque being transmitted either through a shaft-mounted arrangement, and any shaft mounted power transmitting device. (e.g., sprockets, pulleys, couplings)

CAUTION For safe operation and to maintain the unit warranty, when changing a factory installed fastener for any reason, it becomes the responsibility of the person making the change to properly account for fastener grade, thread engagement, load, tightening torque and the means of torque retention.

CAUTION Inspect shafts and components for paint, burrs, or other imperfections before installing components. Do not use excessive force or pounding to install components onto unit shafts, as this may cause damage to shafts, bearings, or gears.

CAUTION Test run unit to verify operation. If the unit being tested is a prototype, that unit must be of current production configuration.

Synthetic Lubricants

All standard reducers ordered from the factory are filled with Mobil Glygoyle 460 Polyglycol (PAG) lubricant to operate within a -10° to120° F ambient temperature range. Prior to startup, verify that the oil is at the level shown on the drawings on page 5. Lubricant type is stamped on all nameplates.

Change Intervals: Standard compounded lubricants (non-synthetic) should be changed every six months or 2500 operating hours, whichever comes first. Factory installed synthetic lubricants should be changed only when performing maintenance that requires gearbox disassembly.

⚠CAUTION Oil should be changed more often if reducer is used in a severe environment (i.e. dusty, humid).

⚠CAUTION In the Food and Drug Industry (including animal food), consult the lubrication supplier for recommendation of lubricants which are acceptable to the Food and Drug Administration and/or other authoritative bodies having jurisdiction. Factory supplied **PAG** oil is acceptable for incidental food contact (NSF H1) for use in and around food processing areas.

⚠CAUTION Do not mix different oils in the reducer. Grove Gear reducers are shipped standard with **PAG** lubricant – this lubricant is not compatible with conventional mineral or PAO synthetic oils.

Internal pressure compensating system: Reducers with the optional internal pressure compensating system do not require a vent and can be used as supplied from the factory.

The precision-made gears and bearings in Grove Gear Speed Reducers require high-grade lubricants of the proper viscosity to maintain trouble-free performance.

For temperature ranges not shown, contact factory.

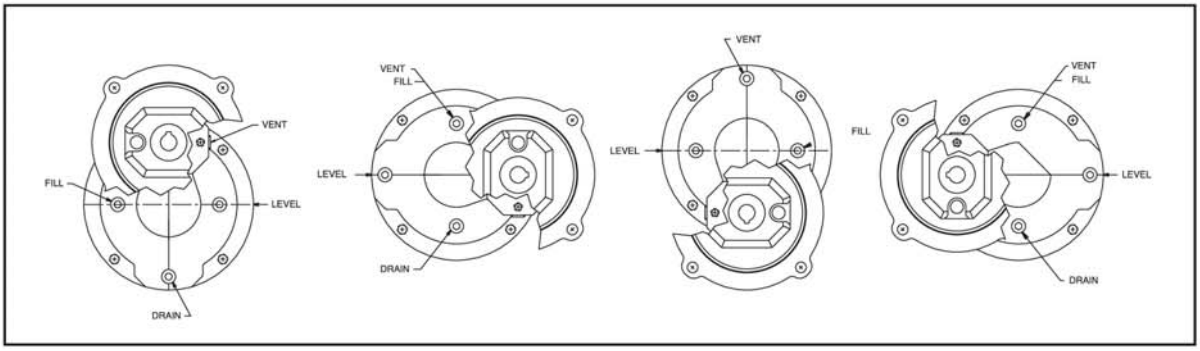
For lubrication of worm reducers (secondaries of helical worm reducers), contact factory.

Oil & Weight Specifications

Product	Amount	Weight
TX	3/4 PINT	11 LBS
Stainless TX	5/8 PINT	22 LBS
TX3 (Cast Iron)	1 PINT	45 LBS

⚠CAUTION Always check for proper oil level after filling. Capacities vary somewhat with model and mounting position. Oil should rise to bottom edge of level hole. Do not overfill.

TX3 Mounting Positions & Vent Plug, Level and Drain Locations



Stainless & TX non-vent and universal oil fill

Maintenance - Standard Units

Your Grove Gear reducer has been tested and adjusted at the factory. Dismantling or replacement of components must be done by Grove Gear to maintain the warranty.

Frequently check the oil level of the reducer. If oil level is low, (refer to reducer vent and level position chart) add proper lubrication through the filler plug until it comes out the oil level plug.

Inspect vent plug often to insure it is clean and operating.

⚠CAUTION Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.

Seals: The Grove Gear line of speed reducers utilize premium quality seals which are the state-of-the-art in sealing technology. Seals are, however, a wear item and eventually need to be replaced. Replacement can be easily accomplished by following the steps below:

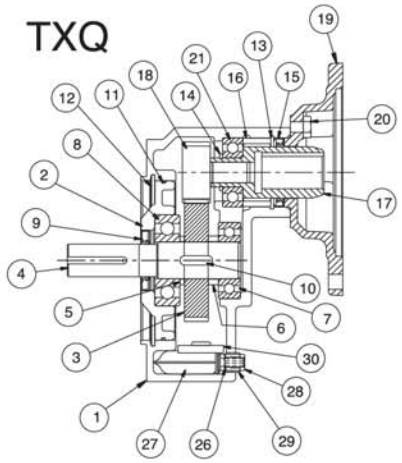
1. Remove the worn seal without damaging the shaft surface or the seal bore. This can be done by drilling a .062 diameter hole in the seal casing (being careful not to drill into the bearing behind the seal). Screw a #10 sheet metal screw into the hole and pry out the seal.
2. Clean the seal bore of sealant.
3. Before installing the new seal, use electrical tape to cover any keyways on the shaft to prevent seal lip damage.
4. Grease the seal lips with bearing grease and apply a sealant to the seal bore.
5. Slide the seal into the shaft being careful not to fold the inner lip over on any shaft steps.
6. Press the seal into its bore with a sleeve that presses on the seal casing, being careful to keep the seal square in its bore.

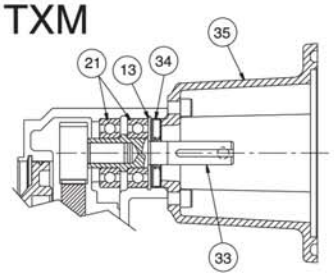
Maintenance

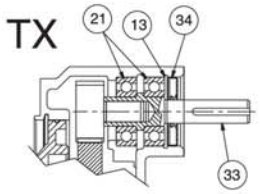
Inspect the stem of the pressure compensating system often to ensure it is clean and operating properly.

CAUTION Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.

Parts List







TXQ 1, 2 & 3 PARTS LIST;

ITEM #	DESCRIPTION
1	HOUSING
2	COVER, OUTPUT
3	GEAR, OUTPUT
4	OUTPUT SHAFT
5	SPACER, OUTPUT
6	SPACER, OUTPUT
7	BEARING, OUTPUT
8	BEARING, OUTPUT
9	SEAL, OUTPUT
10	KEY, OUTPUT
11	"O" RING, OUTPUT
12	SNAP RING, OUTPUT
13	SNAP RING, INPUT
14	SNAP RING, INPUT
15	SEAL, INPUT
16	SPACER, INPUT
17	QUILL, COUPLING
18	PINION, INPUT

ITEM #	DESCRIPTION
19	FLANGE, QUILL INPUT
20	BOLT, INPUT
21	BEARING, INPUT
26	"O" RING, INT. PRES. COMP.
27	INT. PRES. COMPENSATION
28	NUT, INT. PRES. COMP.
29	PLUG, STEM
30	SPLASH GUARD

} Units with an internal pressure compensation system

TX & TXM (2 & 3) PARTS LIST
(SOLID INPUT)

ITEM #	DESCRIPTION
33	SHAFT, INPUT
34	SEAL, INPUT
35	FLANGE, MOTOR (TXM ONLY)

Class of Service

All capacity ratings are based on American Gear Manufacturers Association (AGMA) Standards. Load conditions must be within cataloged ratings published in the current Grove Gear Catalog (available upon request).

GROVE GEAR

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Union Grove, WI 53182 U.S.A.
PH: 262-878-1221
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www.grovegear.com

A Regal Brand

REGAL

www.regalbeloit.com

NORD.COM/DOCS
DOCUMENT COLLECTION

Order Number: 201629519-100
Model Type: SK5282AF N250TC-160LH/4 CUS TW

HELICAL & BEVEL REDUCER LUBRICATION

1. Importance of proper lubrication

Proper gearbox lubrication is essential in order to reduce friction, heat, and component wear. Lubricants reduce heat and wear by inserting a protective "fluid boundary" between mating parts and preventing direct metal to metal contact. Lubricants also help prevent corrosion and oxidation, minimize foam, improve heat transfer, optimize reducer efficiency, absorb shock loads and reduce noise.

Most NORD reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified reducer size and mounting position.

2. Standard oil type

The following tables indicate the standard oil fill type used. Please see user manual U11000 for more specific information and for optional helical and bevel gear lubricants:

Serviceable Gear Units	
Helical In-line	Standard Oil Fill: ISO VG 220, Mineral Oil
Clincher Parallel-Shaft	
Right-Angle Bevel	
NORDBLOC® Series In-line	
NORDBLOC®.1 Series In-line	
Standard Series In-line	

IMPORTANT NOTE

For shipping purposes, the following large Clincher™ gear units are supplied without oil:
• Clincher™ Sizes SK11282, SK11382 and SK12382

Maintenance-free / Lubricated For Life Gear Units	
Clincher™ sizes SK0182NB, SK0282NB & SK1382NB	Standard Oil Fill: ISO VG220 SHC/PAO Synthetic Oil
NORDBLOC® Sizes SK172, SK272, SK371F, SK372, SK373, SK320	

IMPORTANT NOTE

Maintenance-free units are supplied as sealed units with no vent-plug. Consult NORD prior to ordering if interested in ordering any of the above sizes as serviceable gear units.

IMPORTANT NOTE

Consult the sticker adjacent to the fill plug to determine the type of lubricant installed at the factory. Some units have special lubricants designed to operate in certain environments or intended to extend the service life or service temperature range of the lubricant. If in doubt about which lubricant is needed for a certain application, please contact NORD Gear.

3. Lubrication replacement

If the gear unit is filled with mineral oil, the lubricant should be replaced at least after every 10,000 operating hours or after every two years. If the gear unit is filled with synthetic oil, the lubricant should be replaced at least after every 20,000 operating hours or after every four years. Often gear reducers are exposed to extreme ambient conditions, hostile environments, wet conditions, or dirty and dusty operating areas. Especially in these situations, it is important to establish a condition-based oil service interval.

4. Oil viscosity

Viscosity, or the oil's resistance to shear under load, is often considered the single most important property of any gear oil.

- Often one will consider making a viscosity correction to the oil to improve the performance when operating the gear unit at low temperature or high temperature.
- In cases of extreme load conditions, gear pairs and antifriction bearings may be more susceptible to sliding or scuffing wear. In these operating conditions, it may also be beneficial to consider an increased lubrication viscosity and/or a lubrication with improved antiwear additive packages.

IMPORTANT NOTE

The user should consult with their primary lubrication supplier before considering changes in oil type or viscosity.

5. Maximum oil sump temperature limit

To prevent reducer overheating, the reducer's maximum oil sump temperature limit must not be exceeded for prolonged periods of operation (up to 3 hours continuous operation depending upon reducer size).

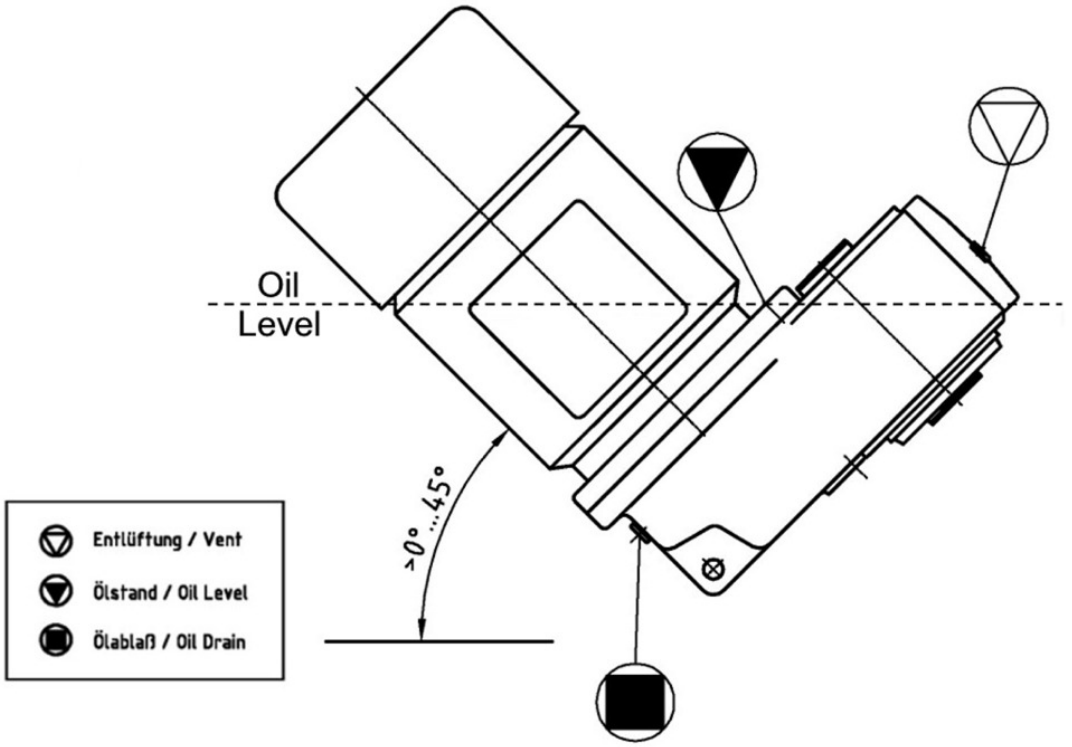
Oil Type	Maximum Oil Temperature Limit	
	NORD	AGMA 9005-D94
Mineral	80-85°C (176-185°F)	95°C (203°F)
Synthetic	105°C (220°F)	107°C (225°F)

IMPORTANT NOTE

Use caution when specifying gear reducers for high temperature service. If there is concern about exceeding the allowable safe operating temperatures, please consult NORD to discuss alternatives.

Follow this guide for proper oil level reguarding the FL243-11-6 Unit

To check and fill proper oil level,
raise the flail unit to working mode and install large safety pins in carriage frame. Remove plug and check, fill through the vent.



DRIVESYSTEMS

Order Number: 201629519-100
Model Type: SK5282AF N250TC-160LH/4 CUS TW

6. The importance of routine oil analysis

Routine oil analysis, sound lubrication practices, and good tracking of oil performance trends will help establish proper lubrication maintenance and change-out intervals. To maximize equipment reliability, NORD Gear generally recommends a condition-based lubrication maintenance program. One may take exceptions to this general recommendation on sealed-for-life or maintenance-free gear units or smaller and less costly gear units. In these instances, the replacement cost of the gear unit is often small compared to the costs associated with this type of oil analysis program.

STOP ***HARMFUL SITUATION*** **STOP**

NORD suggests replacing the gear oil if oil analysis indicates any of the following:

- Viscosity has changed by approximately 10% or more.
- Debris particles (silicon, dust, dirt or sand) exceed 25 ppm.
- Iron content exceeds 150-200 ppm.
- Water content is greater than 0.05% (500 ppm).
- The total acid number (TAN) tests indicate a significant level of oxidative break-down of the oil, and a critical reduction in performance; If the TAN number measured changes by more than 5% over the new oil, then an oil change would be recommended.

7. Mounting position and oil fill quantity

All NORD Gear reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified reducer size and mounting position. ***For additional information, please see the seperate mounting position diagrams and the corresponding oil fill quantity tables for the specified gear unit.***

The gearbox nametag will indicate the mounting position that was provided. ***For mounting orientations other than shown in the mounting position charts, please consult NORD Gear.***

STOP ***HARMFUL SITUATION*** **STOP**

Actual oil volume can vary slightly depending upon the gear case size, mounting and ratio. Prior to commissioning the reducer, check the oil-fill level using the reducer's oil-level plug and drain or add additional oil as needed. The minimum acceptable oil level is 0.15 in (4mm) below the oil level hole.

8. Oil plug locations

All gear units are assembled with the oil fill-level, oil-drain and vent plugs installed in their proper locations, according to the specified mounting position. All standard plugs are metric and utilize sealing gaskets between the head of the plug and the reducer housing.

9. Drain and fill-level plugs

All reducer drain plugs are metric socket head cap screws. For easier identification, it is NORD's standard practice to provide a hex-head screw for the fill-level plug. For ease of draining the used oil from the gear reducer, use the socket head screw located at the lowest part of the gearbox.

Drain Plug

Fill Level Plug

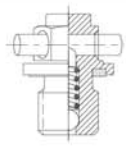
10. Vent plug locations

Reducer venting allows for air pressure differences that occur during operation, between the inner space of the reducer and the atmosphere, while ensuring leak-free operation. The AUTOVENT™ is standard for all vented gear units, unless otherwise noted.

AUTOVENT™ - The AUTOVENT™ helps prevent bearing and gear damage by behaving like a check valve to block the entry of foreign material (water, dust, corrosives, etc.). The breather opens at approximately 2-3 psi during operation and closes tightly as the gearbox cools. This option is perfect for humid conditions and wash-down environments, helping to maintain proper oil cleanliness, and reducing foaming and oxidation. NORD may choose to offer one of two style options as shown in Figure 1. The Type 2 AUTOVENT™ comes closed upon delivery with a transportation sealing plug (see Warning).

Figure 1 AUTOVENT™ Types

Type 1



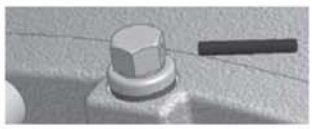
Type 2 with transportation plug

Open Vent - An optional open vent can be supplied by NORD. The open vent comes closed upon delivery with a transportation sealing plug (see Warning).

⚠ ***WARNING*** ⚠

To prevent build-up of excessive pressure, sealed vents must be activated as shown prior to gear unit start up.

Sealed vent



Activated vent

Filtered Vent - NORD may offer an optional filtered vent, which allows gases to permeate, but does not allow dust and debris to pass through the vent.

CLINCHER™ OIL FILL QUANTITIES

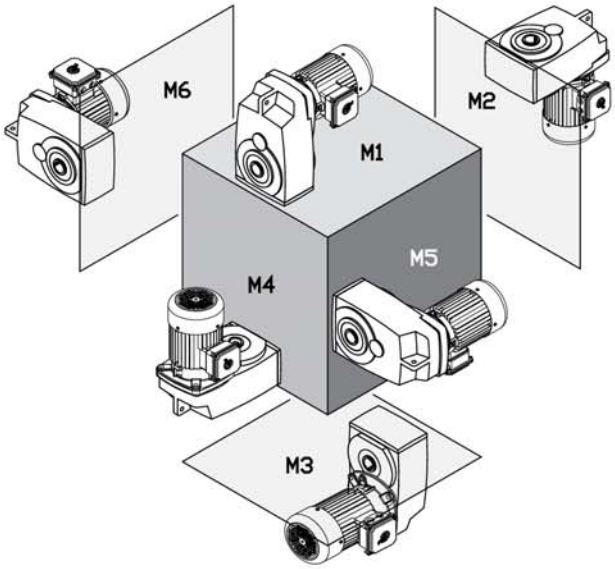
CLINCHER™ lubrication

Unless otherwise noted below, the following NORD Gear reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified reducer size and mounting position. For additional information, please refer to the "Oil Plug & Vent Locations" documentation for your gear unit.

HARMFUL SITUATION

Actual oil volume can vary slightly depending upon the gear case size, mounting and ratio. Prior to commissioning the reducer, check the oil-fill level using the reducer's oil level plug and drain or add addition oil as needed. The minimum acceptable oil level is 0.15 in (4mm) below the oil level hole.

For mounting orientations other than shown please consult NORD Gear. Reducer modifications may be required.



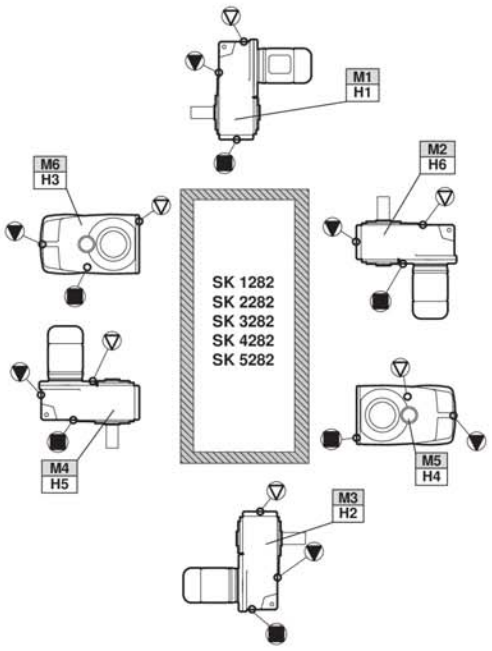
Type	M1		M2		M3		M4		M5		M6	
	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters
SK 0182NB	0.42	0.40	0.58	0.55	0.58	0.55	0.42	0.40	0.42	0.40	0.42	0.40
SK 0282NB	0.74	0.70	1.16	1.10	0.85	0.80	1.16	1.10	0.95	0.90	0.95	0.90
SK 1282	1.00	0.95	1.37	1.30	0.95	0.90	1.37	1.30	1.06	1.00	1.06	1.00
SK 1382NB	1.48	1.40	2.43	2.30	2.32	2.20	2.32	2.20	2.11	2.00	2.11	2.00
SK 1382	1.53	1.45	1.69	1.60	1.22	1.15	1.80	1.70	1.16	1.10	1.16	1.10
SK 2282	1.80	1.70	2.43	2.30	1.80	1.70	2.32	2.20	2.01	1.90	2.01	1.90
SK 2382	2.43	2.30	2.85	2.70	2.22	2.10	3.38	3.20	2.11	2.00	2.11	2.00
SK 3282	2.96	2.80	4.23	4.00	3.49	3.30	4.02	3.80	3.17	3.00	3.17	3.00
SK 3382	4.02	3.80	4.54	4.30	3.17	3.00	5.81	5.50	3.17	3.00	3.17	3.00
SK 4282	4.44	4.20	5.71	5.40	4.65	4.40	5.28	5.00	4.44	4.20	4.44	4.20
SK 4382	6.45	6.10	7.29	6.90	5.18	4.90	8.88	8.40	5.28	5.00	5.28	5.00
SK 5282	7.93	7.50	9.30	8.80	7.93	7.50	9.30	8.80	7.61	7.20	7.61	7.20
SK 5382	13.2	12.5	12.7	12.0	7.08	6.70	14.8	14.0	8.77	8.30	8.77	8.30
SK 6282	18.0	17.0	16.4	15.5	13.2	12.5	18.5	17.5	11.6	11.0	14.8	14.0
SK 6382	16.9	16.0	13.7	13.0	10.6	10.0	19.0	18.0	14.8	14.0	13.2	12.5
SK 7282	26.9	25.5	22.2	21.0	21.7	20.5	28.5	27.0	16.9	16.0	22.2	21.0
SK 7382	23.2	22.0	22.2	21.0	16.9	16.0	26.4	25.0	24.3	23.0	23.2	22.0
SK 8282	39.6	37.5	34.9	33.0	32.2	30.5	46.5	44.0	32.8	31.0	32.8	31.0
SK 8382	36.5	34.5	34.3	32.5	26.4	25.0	40.2	38.0	37.0	35.0	31.7	30.0
SK 9282	79.0	75.0	74.0	70.0	59.0	56.0	85.0 †	80.0 †	69.0	65.0	62.0	59.0
SK 9382	78.0	74.0	74.0	70.0	45.4	43.0	79.0 †	75.0 †	69.0	65.0	63.0	60.0
SK 10282	95.0	90.0	95.0	90.0	42.3	40.0	95.0 †	90.0 †	63.0	60.0	87.0	82.0
SK 10382	90.0	85.0	95.0	90.0	77.0	73.0	106 †	100 †	85	80.0	85.0	80.0
SK 11282*	174	165	169	160	153	145	206 †	195 †	106	100	148	140
SK 11382*	169	160	164	155	148	140	222 †	210 †	164	155	143	135
SK 12382*	169	160	164	155	148	140	**222 †**	**210 †**	164	155	143	135

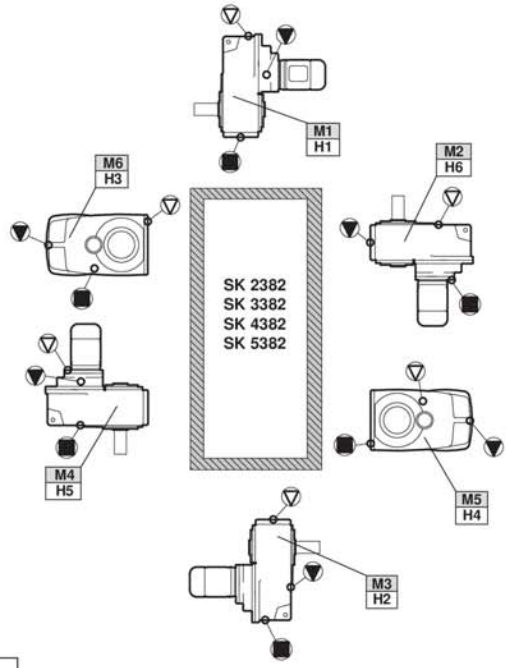
*** For shipping purposes the larger Clincher™ gear units are supplied without oil.**

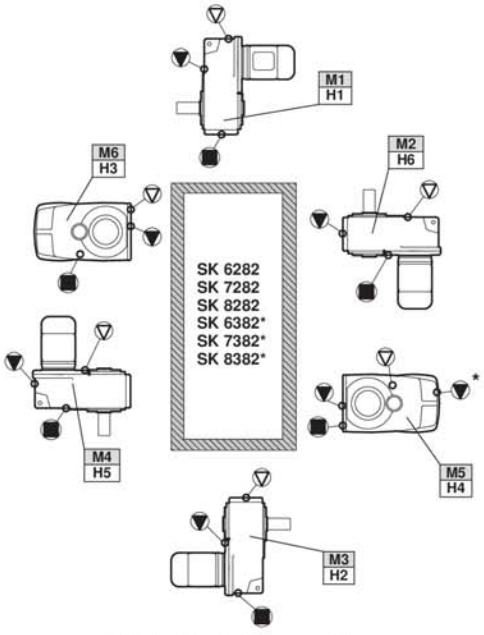
† Oil quantities shown are for the gearbox only. When the OT (oil tank) option is used, the oil must be filled to the level shown on the dipstick which is located inside of the oil tank. Even when the gear unit is filled by NORD, the user MUST add more oil untill the oil is filled to the proper level.

Oil plug connections

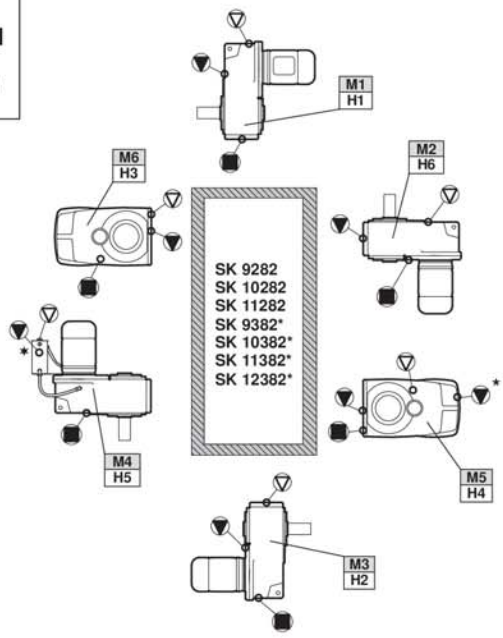
Prior to commissioning the reducer, check the oil-fill level using the reducer's oil-level plug and drain or add additional oil as needed. The minimum acceptable oil level is 0.15 in (4mm) below the oil level hole. ***For mounting orientations other than shown please consult NORD Gear. New plug locations may be required.***







* Oil level for 3 stage gear units



* Oil level for 3 stage gear units

* Oil fill level should be verified using the dip stick located in the oil tank for the M4/H5 position.

▽ = Vent
▼ = Oil Level
■ = Oil Plug

Troubleshooting

This section identifies some of the most common issues involved with NORD Gear speed reducers , and provides recommendations to assist you in defining and answering your questions as you work with our products. You may also contact our Engineering/Application departments if your questions are not answered in the table below.

Problem With the Reducer		Possible Causes	Suggested Remedy
Runs Hot	Overloading	Load exceeds the capacity of the reducer	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce the load.
	Improper lubrication	Insufficient lubrication	Check lubricant level and adjust up to recommended levels
		Excessive lubrication	Check lubricant level and adjust down to recommended levels.
		Wrong lubrication	Flush out and refill with correct lubricant as recommended
Runs Noisy	Loose foundation bolts	Weak mounting structure	Inspect mounting of reducer. Tighten loose bolts and/or reinforce mounting and structure.
		Loose hold down bolts	Tighten bolts
	Failure of bearings	May be due to lack of lubricant	Replace bearing. Clean and flush reducer and fill with recommended lubricant.
		Overload	Check rated capacity of reducer.
	Insufficient lubricant	Level of lubricant in reducer not properly maintained.	Check lubricant level and adjust to factory recommended level.
Output shaft does not turn	Internal parts are broken or missing	Overloading of reducer can cause damage	Replace broken parts. Check rated capacity of reducer.
		Key missing or sheared off on input shaft.	Replace key.
		Coupling loose or disconnected	Properly allign reducer and coupling. Tighten coupling.
Oil Leakage	Worn seals	Caused by dirt or grit entering seal.	Replace seals. Autovent may be clogged. Replace or clean.
	Unit runs hot or leaks	Overfilled reducer	Check lubricant level and adjust to recommended level.
		Vent clogged.	Clean or replace, being sure to prevent any dirt from falling into the reducer.
	Incorrect fill level	Improper mounting position, such as wall or ceiling mount of horizontal reducer.	Check mounting position on the name tag & verify with mounting chart in manual.

17. Inspection

Inspect the motor after every 500 operating hours.

⚠ WARNING ⚠

If it is necessary to clean the motor exterior, do not use shop air. Shop air can force contaminents into the motor and may cause parts damage or result in blowing debris causing injury.

Table 8 - Inspection Guidelines

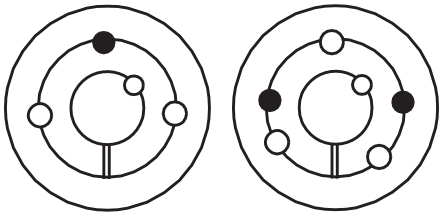
Inspect	Check	Action
Motor Exterior	Check the external surfaces for contamination. Accumulation of dirt and fibrous deposits must be removed.	Clean the motor external surfaces using clean, lint-free cloths.
		Clean deposits from between cooling fins using a vacuum cleaner and a stiff-bristled nylon brush.
	Check the external surfaces for oil film and greasy deposits.	Clean the oil film and greasy deposits from the motor surface using clean, lint-free cloths.
		If necessary, moisten the cloth with an approved non-flammable, residue-free solvent. Do not pour solvent on the motor.
	Check for evidence of damage or overheating.	If the motor has physical damage, replace the motor.
Motor Mountings	Make sure the mounting hardware is secure.	If the mounting hardware is not secure, check the motor/gearbox alignment, and tighten the mounting hardware.
Motor Electrical Connections	Check that all electrical connections are secure.	If the electrical connections are not secure, tighten them.
	Check the electrical connections for evidence of arcing.	Loose electrical connections can cause arcing, which is evident by discoloration and charring. If you find evidence of arcing, replace the damaged connections.
Insulation Resistance	Using an ohmmeter, check and record the resistance of motor winding insulation.	Compare the current resistance reading to previous readings. If the resistance drops significantly, perform an internal inspection for insulation damage or deterioration.
Motor Brake	On motors that have a brake, use a feeler gauge to check the air gap in between the brake pad and the rotor according to the appropriate user manual.	If the air gap exceeds the maximum allowed for that brake configuration provided in the manual, adjust the air gap or replace the brake pad according to user manual U35000.

23. Troubleshooting

Fault	Likely Cause	Corrective Action
Motor fails to start.	• Motor is mis-wired • Brake is may not be releasing. • Fan guard damaged and contacting fan. • Motor protection device has tripped or does not switch • 1-Ph Capacitor or start switch has failed.	• Verify and correct motor wiring. • Troubleshoot brake per User Manual U35000. • Replace damaged fan guard. • Check motor protection device for correct setting and correct error. • Discharge capacitor and use a volt-ohm meter to check the capacitor for an open circuit - replace if needed. Inspect switch and connections. Replace if contacts look burned or pitted.
Fuses blow or motor protection faults immediately.	• Short circuit in line. • Lines connected incorrectly. • Fuse or circuit breaker tripped. • Motor is overloaded or equipment jammed. • Stator is shorted or went to ground.	• Rectify short circuit. • Check circuit diagram and make corrections. • Replace fuse or circuit breaker. • Make sure load is free. Verify motor amp draw compared to nameplate rating. • A damaged or blown stator will show a burn mark. Stator must be repaired or replaced.
Motor hums and has high current consumption	• Brake may not be releasing. • Rotor may be rubbing stator. • Defective or incorrect stator winding.	• Troubleshoot brake per User Manual U35000. • Send motor to a repair specialist.
Severe speed loss under load or excessive acceleration time.	• Overload. • Excessive voltage drop. • Damaged or failing motor bearings. • Damaged or worn gear unit. • 1-Ph Capacitor or start switch has failed.	• Check load conditions and make certain system is unobstructed. Reduce load or consider a larger motor. • Verify service voltage is within specification. Check if nearby equipment is affecting incoming power. Make sure connection harness and wiring is adequate. • Replace motor bearings. • Replace or repair damaged gear unit. • See instructions under "Motor fails to start".
Motor runs the incorrect direction.	• Incorrect wiring.	• Rewire motor according to system schematic and/or switch two incoming motor phases.
Motor heats up excessively or thermal overload protection trips	• Overload. • Ambient temperature is too high. • Inadequate cooling. • Operation is outside the allowed duty cycle. • Motor protection device may be defective. • Excessive supply voltage. • System short or damaged stator.	• Make sure load is free. Verify motor amp draw compared to nameplate rating. Reduce load or consider a larger motor. • Do not operate above the rated conditions. • Correct cooling air supply. Open and clear cooling air passages. Retrofit with forced ventilator fan if needed. • Adjust operating duty cycle or contact a specialist to select a suitable motor or drive. • Replace motor protection device. • Adapt motor supply voltage. • Check for loose, cut or damaged wires. Check stator winding for defects or burn damage.
Excessive Noise or Vibration	• Motor bearings contaminated or damaged. • Excessive motor shaft end play. • Misaligned or imbalanced load.	• Test motor by itself. If bearings are bad noise may be heard or roughness detected. Replace bearings. Add lubrication if bearings have grease fittings. • Check shaft endplay with motor and system power disconnected. If shaft movement is excessive replace motor shaft bearings. • Check all mating shaft connections for proper alignment and correct all imbalanced load conditions.
1 Ph Start Capacitor Failures	• Motor is not coming up to speed quickly enough. • Motor is being cycled frequently • Start switch is defective or damaged.	• Verify motor size to load conditions. Motor should come up to speed in no more than 2-3 seconds. • Verify duty cycle and consult specialist for recommendations. • Replace start switch.
1 Ph Run Capacitor Failures	• Possible power surge to motor caused by transient voltage or lightening. • Excessive ambient temperature.	• Install proper surge protection. • Verify ambient conditions do not exceed nameplate value.

Taper Bushing Installation

IMPORTANT NOTE: Please follow the instructions on this sheet in order for the Martin bushing to perform satisfactorily.



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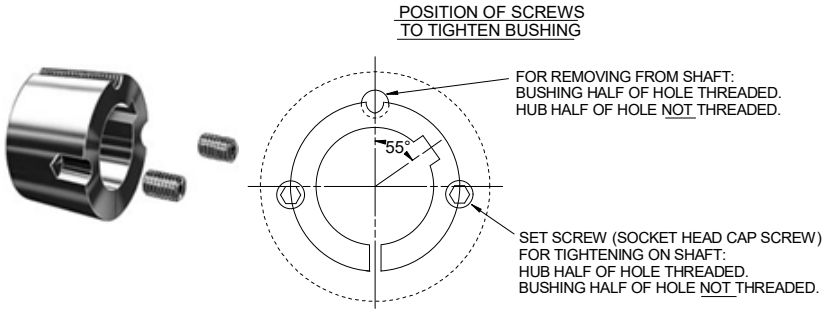


INSTALLATION

1. Clean all oil, dirt, and paint from shaft, bushing bore, outside of bushing and component (sprocket, sheave...etc.) bore.
2. Insert bushing into component. Match the hole pattern, not the threaded holes (each hole will be threaded on one side only.)
3. Thread set or cap screws into those half threaded holes indicated by ❍ on above diagram. Mount assembly on shaft.
4. Alternately torque set or cap screws* to recommended torque setting in chart below.
5. On 3535 and larger bushings use a block, sleeve or drift and hammer large end of bushing (do not hammer bushing directly).
6. Repeat steps 4 and 5 until torque wrench reading, after hammering, is the same as before hammering.
7. Fill all unoccupied holes with grease.

REMOVAL

1. Remove all set or cap screws
2. Insert set or cap screws in holes indicated by ● on drawing. Loosen bushing by alternately tightening set or cap screws.
3. To reinstall, complete all seven (7) installation instructions.

RECOMMENDED TORQUE TABLE

Bushing No.	Set or Cap Screw	Wrench Torque in. / lbs.
2012	7/16 - 14 Socket Set Screw	280
2517, 2525	1/2 - 13 Socket Set Screw	430
3020, 3030	5/8 - 11 Socket Set Screw	800

* If two bushings are used on same component and shaft, fully tighten one bushing before working on the other.

CAUTION

WARNING: USE OF ANTI-SEIZE LUBRICANT ON TAPERED CONE SURFACES OR ON BOLT THREADS WHEN MOUNTING MAY RESULT IN DAMAGE TO SHEAVES AND SPROCKETS. THIS VOIDS ALL MANUFACTURER'S WARRANTIES.

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 given above must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. All rotating power transmission products when used in a drive are potentially dangerous and must be guarded by the user as required by applicable laws, regulations, standards, and good safety practice. (Refer to ANSI Standard B15.1.)

VIBCO
INSTRUCTION MANUAL

Heavy Duty Electric Vibrators

WARNING: Failure to read and follow these installation instructions and safety precautions could result in personal injury, equipment damage, shortened service life or unsatisfactory equipment performance. All information in this document is vital to the proper installation and operation of the equipment. It is important that all personnel who will be coming in contact with this product thoroughly read and understand this manual.

1 START

THANK YOU FOR CHOOSING A VIBCO VIBRATOR!

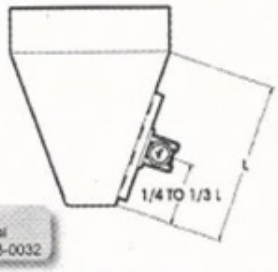
2 MOUNTING INSTRUCTIONS CHECKLIST

- ☐ Determine vibrator placement on bin.
- ☐ Determine length of channel iron and style of mounting plate.
- ☐ Select method of ***STITCH*** welding mounting plate to channel iron.
- ☐ ***STITCH*** weld channel iron to bin.
- ☐ Attach vibrator to mounting plate. Check the mounting plate for warping & shim if necessary. **DO NOT OVER TIGHTEN THE BOLTS.**
- ☐ Install safety chain or cable.
- ☐ Connect wiring for vibrator using the NEC Standards.
- ☐ Take a voltage reading at vibrator while running. VOLTS = _____
- ☐ Take an amp reading while vibrator is running. AMPS = _____
- ☐ Compare readings to standard values.
- ☐ ***FILL OUT WARRANTY CARD AND MAIL TO VIBCO!!!!***

ADDITIONAL DETAILS AVAILABLE ONLINE AT www.vibco.com

3 VIBRATOR PLACEMENT

For coarse materials: mount vibrator 1/3 of the distance from the discharge opening to the top of the sloped portion of the bin.
For fine materials: mount vibrator 1/4 of the distance from the discharge to the top of the sloped portion of the bin.



FOR ALTERNATE MOUNTS
refer to full detail instruction manual online at www.vibco.com or call 800-633-0032

4 PLATES & CHANNEL SELECTION

VIBRATOR FORCE in LBS	MTNG PLATE THICKNESS	CHANNEL IRON SIZE	FACTOR A
101 - 500	1/4" - 3/8"	5" x 6.7 lbs 3" x 5 lbs	2
501 - 1200	1/2"	4" x 5.4 lbs 6" x 7.3 lbs	3
1201 - 3000	5/8"	6" x 8.2 lbs / 8" x 10.5 lbs	1
3001 - 9000	3/4" - 1"	8" x 8.0 lbs / 8" x 10.5 lbs 8" x 8.5 lbs / 8" x 11.5 lbs	1

BIN WALL THICKNESS	FACTOR B
14ga (.0747) - 12ga (.1046)	4
1/8" - 7/64"	3
1/4" - 3/8"	4
5/8" - 1/2"	3
1/2" & up	2

FACTOR A + B	USE CH. IRON LENGTH
11	N/A
10	6 - 8 FT. (60 - 80%)
9	6 - 7 FT. (70 - 80%)
8	4 - 5 FT. (50 - 70%)
7	3 - 5 FT. (50 - 80%)
6	2 - 4 FT. (33 - 80%)
5	1 - 2 FT. (20 - 80%)
4	N/A

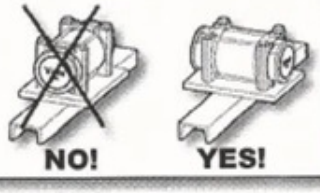
NOTE:
1. Longer channel iron will not affect vibrator performance, but total channel length should not exceed length of bin wall.
2. Percentages shown indicate % of bin wall height your channel iron should be for shorter bins.
3. To match your vibrator on chart above, model number suffixes generally correspond to pounds of force generated. For any questions, consult VIBCO.

5 MOUNTING HARDWARE

⚠ **VIBRATOR & MOUNTING PLATE MUST BE MOUNTED PERPENDICULAR TO CHANNEL IRON, NOT PARALLEL. OTHERWISE, IT WILL CAUSE FLEXING & THE VIBRATOR WILL OVERLOAD & BURN OUT.**

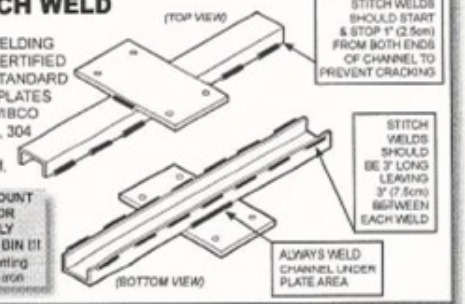
A MOUNTING PLATE MUST BE USED to ensure proper stability for the vibrator.

Always start & stop welds 1 in. from ends to prevent heat concentration. Then weld 2 to 3 inches, skip 1 to 2 inches and repeat until the plate is securely mounted.



6 STITCH WELD

BE SURE ALL WELDING IS DONE BY A CERTIFIED WELDER. ALL STANDARD CHANNEL AND PLATES PROVIDED BY VIBCO ARE A36 STEEL, 304 STAINLESS OR 6061 ALUMINUM.

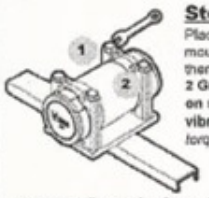


⚠ **DO NOT MOUNT VIBRATOR DIRECTLY TO SURFACE OF BIN !!!** Always use mounting plate & channel iron.

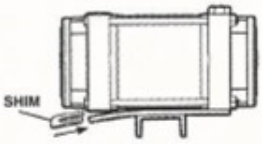
800-633-0032 for Mounting Plates & Brackets, Spare & Replacement Parts *and* 24/7 Technical Support

7 BOLTING PROCEDURE

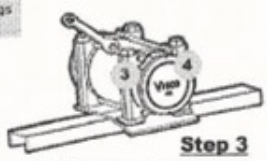
NOTE: Shimming the feet is necessary to avoid strain on the shaft & bearings that can cause high amperage draw & burn out the vibrator.



Step 1
Place vibrator on mounting plate, then insert & tighten **2 Grade 5 bolts on same end of vibrator**. *See proper torque values right.*



Step 2
Now, look at feet on other end of vibrator. If a gap exists between the mounting plate & feet, welding warped the mounting plate. Shim space under feet.



Step 3
After gap has been filled with shim(s), insert & tighten the other TWO Grade 5 bolts.

GRADE 5 BOLT SIZE	MAX TORQUE ft-lbs
1/4"	9
5/16"	18
3/8"	32
1/2"	78
5/8"	160
3/4"	260
1"	580
1-1/4"	1105

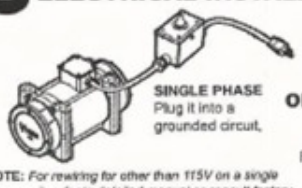
For other bolt grades, please consult VIBCO.

Now put vibrator in place. Make sure it is secured tightly. Retighten bolts after first 10 to 15 minutes of operation and check periodically to maintain proper tightness. Damage to both bin and vibrator can occur if vibrator is not mounted securely. NOTE: no matter how thick the mounting plate, it can still warp during welding, especially if VIBCO's instructions are not followed.

8 RESTRAINT

ALWAYS INSTALL SAFETY CABLE or CHAIN
Mount one end to the vibrator and the other to the hopper or bin ***above*** the vibrator
NEVER ATTACH TO THE MOUNTING PLATE!

9 ELECTRICAL INSTALLATION



SINGLE PHASE Plug it into a grounded circuit,

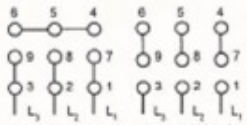
OR

3 PHASE Have vibrator installed by a qualified electrician ***warranty will be VOID*** if vibrator is not connected to proper overload protection. For proper sized overload protection consult a qualified electrician or contact a VIBCO representative.

NOTE: *For rewiring for other than 115V on a single phase unit, refer to detailed manual or consult factory.*

Follow numbers on leads.
NOTE: Some wires may be color-coded as follows:

1 - blue	4 - yellow	7 - pink
2 - white	5 - dark gray	8 - red
3 - orange	6 - purple	9 - light gray



and then . . . TAKE AN AMPERAGE READING WHILE THE VIBRATOR IS RUNNING

Operating amperage should not exceed the value listed on the vibrator label. If it does, it is most likely due to faulty mounting. Check your mounting welds, and re-tighten bolts if necessary. **See TROUBLESHOOTING for more info.**

REV136-12

800-633-0032 • vibrators@vibco.com • www.vibco.com

VIBCO
INSTRUCTION MANUAL

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MAXIMUM OPERATING TEMPERATURE
Skin temperature of vibrator should not exceed 180°F (82°C). If it exceeds this, consult VIBCO for alternate solutions.

10 LUBRICATION

HIGH TEMPERATURE UNITS CONSULT FACTORY!

Grease Specifications
Lubriko M21 general purpose grease or equal Sodium Calcium based NLGI grade 2 grease. Minimum temperature range 0°- 225°F. Minimum viscosity 70 - 80 SUS (at 212°F).

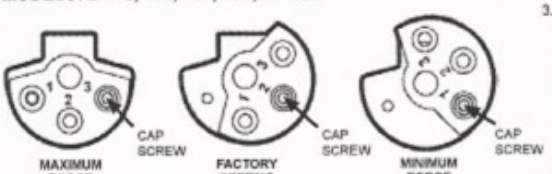
Use 2.5 to 3 grams (two pumps with standard manual grease gun). Do not over grease!

MODEL #	INTERMITTENT DUTY	CONTINUOUS DUTY
2P-800, 2P-1700, 2P-2500, 2P-3500, 2P-4500, 2P-5500	Lubricate every 400-500 hours	Lubricate every 2 weeks
4P-1400, 4P-2000, 4P-3000, 4P-5000, 4P-10000	Lubricate every 1000-2000 hours	Lubricate every 4 weeks
6P-1000, 6P-1500, 6P-2500, 6P-5000	Lubricate every 1500-3000 hours	Lubricate every 6 weeks
8P-500, 8P-750, 8P-1250, 8P-2500	Lubricate every 3000-4000 hours	Lubricate every 8 weeks

Models 2P-75, 2P-100, 2P-150, 2P-200, 2P-450, 4P-350, 4P-700, 4P-1000, and 6P-500 are pre-lubricated for life.

11 CHANGING OUTPUT SETTINGS

MODELS: 2P-75, 100, 150, 200; 4P-350



MAXIMUM FORCE *Intermittent Duty Only*
FACTORY SETTING *Maximum Setting for Continuous Duty*
MINIMUM FORCE *Optimum Setting for Long Life of Vibrator*

To change the force:
1. Disconnect from power.
2. Remove both end covers.
3. Remove the cap screw that holds the outer eccentric to the inner eccentric and turn the outer eccentric so that the numbered hole aligns with the threaded hole in the inner eccentric. **NOTE: You must set both ends of the vibrator to the same setting.**
4. Replace the cap screw.
5. Replace both end covers.

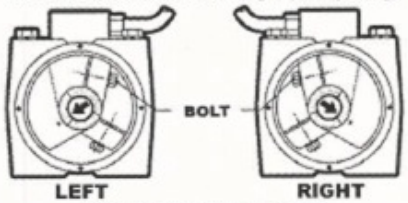
NOTE: If you INCREASE force of vibrator, you MUST take a new amperage draw reading to ensure vibrator is still operating within specified limits.

NOTE: ONLY RUN INTERMITTENTLY when set to higher than factory set output forces (maximum running time of 30 min in any one hour period).

MODELS: 2P-450, 800, 1700, 2500; 4P-600, 700, 1000, 1400, 2000, 3000, 5000, 10000
6P - ALL MODELS; 8P- ALL MODELS

To adjust eccentric settings:
1. Remove both end covers from vibrator.
2. Loosen the bolt that holds the outer, labeled eccentric to the shaft. **NOTE:** *some models have only one eccentric per side.*
3. Turn the eccentric on the shaft to adjust force output. Align the arrow on the shaft to the desired setting. The higher the number, the greater the force.
   NOTE: *You must set both ends of the vibrator to the same setting.*
4. Tighten eccentric bolts and reinstall end covers.

NOTE: *These vibrators are set to Setting #3 (Factory Setting).*



Settings 1 - 3 are continuous duty rated
Settings 4 - 6 are intermittent duty rated only

For vibrators mounted in tandem (*side to side, not end-to-end*) **to produce linear motion on table & feeder applications:**

To produce linear motion you must make sure vibrators rotate opposite from one another. Force output labels should be opposite to one another when viewed from the same side (one increases clockwise, the other counter-clockwise as in picture above). Follow instructions as above, & be sure you set both vibrators & both ends to the same setting. Consult VIBCO for more details.

NOTE: If you INCREASE force of vibrator, you MUST take a new amperage draw reading to ensure vibrator is still operating within specified limits.

NOTE: Only run intermittently when set to higher than factory set output forces (maximum running time of 30 min in any one hour period).

12 TROUBLESHOOTING

MY MATERIAL STILL ISN'T MOVING!
1. Did you put your vibrator in the right location? Did you mount your vibrator properly?
2. Do you have the right vibrator for the job? Does it provide enough force? Do you have the vibrator set to the maximum force? (see left) Is it the right frequency? Still not sure? Call VIBCO Technical Support at 800-633-0032.

THE VIBRATOR WON'T START!
1. Check power supply to unit. Are you getting the proper voltage? Has the thermal overload protection tripped?
2. Check stator continuity. If "open" stator winding is burned or has a short, replace stator. If unsure how to check continuity, call VIBCO or consult a licensed electrician.

VIBRATOR STOPS RUNNING!
1. Check power supply to unit.
2. Has the thermal overload protection tripped? Single phase units are supplied with overload switches. Three phase units must be connected to three phase motor starters with proper overload protection. If overload protection has tripped, wait a minimum of two (2) minutes then reset by switching firmly off and then on again.
3. Are you running the vibrator in a wet or wash down environment? Consult VIBCO about wash down rated models.
4. Are you running the vibrator in a high temperature environment? Consult VIBCO about high temp rated models. Refer to full detail instructions for proper mounting in high temp applications.
5. Are you running the vibrator continuously? All VIBCO heavy duty models are rated for continuous duty but only at certain eccentric settings. See diagrams to left for proper output force settings for continuous duty.

NOTE: ***For best performance and vibrator life cycle, it is best to run them intermittently. Consult VIBCO for available timers.***

6. Are you repeatedly stopping and starting the vibrator? This can overload the vibrator. Use the following guidelines for proper timing of starts and stops:

Single phase (2P-75, 100 & 150):
For run times of 10 seconds or less, use 1:7 ratio for run time vs. off time. (example: 5 seconds on to 35 seconds off). For run times longer than 10 seconds, use 1:1 ratio.

Single phase (2P-200, 450, 800; 4P-350, 700, 1000, 1400; 6P-300, 500):
These are capacitor start models and rated for a MAXIMUM of 30 starts per hour.

Three phase:
For run times of 10 seconds or less, use 1:7 ratio for run time vs. off time. (example: 5 seconds on to 35 seconds off). For run times longer than 10 seconds, any cycle is acceptable.

NOTE: Proper force for full hopper can be excessive for empty or near empty hopper.

Warranty
All warranty claims must be submitted to VIBCO for approval prior to any repairs being done. Failure to do so will void any and all warranty coverage. All repairs will be done at the VIBCO factory.

Errors, Shortages & Complaints
Complaints concerning goods received or errors should be made at once. Claims must be made within five days after receipt of goods. Clerical errors are subject to correction. Damage during shipping must be reported to the carrier, not VIBCO.

Returning Parts **
Parts should not be returned to VIBCO without prior authorization. Call VIBCO's customer service department at 800-633-0032 (800-465-9709 in Canada) for a Return Goods Authorization (RGA) number. A return authorization will be emailed or faxed to you. Use this as your packing slip. Return shipping must be prepaid. Material returned may be subject to a 10% restocking fee. All returned shipments should clearly display your name, address and original invoice number to ensure proper credit.

** Orders for custom equipment built to customer's specifications are not returnable.

Product Changes
VIBCO reserves the right to make changes in pattern, design or materials when deemed necessary, without prior notice or obligation to make corresponding changes in previous models. To be sure of exact mounting dimensions, it is recommended that you obtain a certified dimensional drawing from the factory.

Ordering Spare Parts
Parts can be ordered through authorized distributors or from VIBCO's Spare Parts Department. The following data should be provided when placing your spare parts order:

From label:	Model number of unit.
From spare parts list:	Reference number, part number, description & quantity required.
Shipping instructions:	Specify shipping point and method of shipping.

For custom mounting applications or any other questions:

800-633-0032

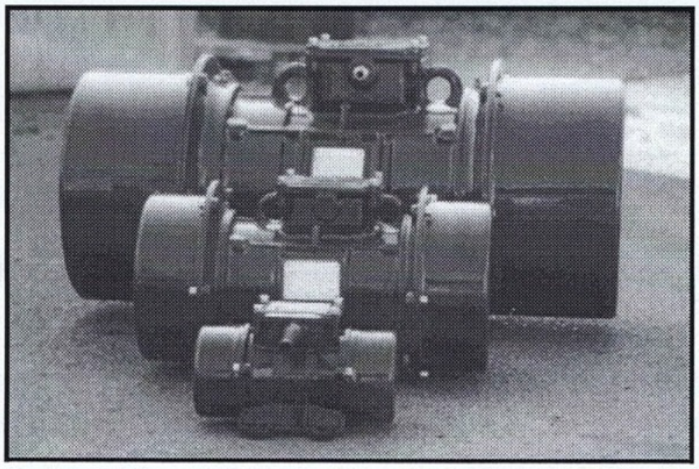
or

vibrators@vibco.com

OPERATOR'S MANUAL

VE

ROTARY ELECTRIC VIBRATOR



GENERAL PRECAUTIONS AND SAFETY

To ensure a correct installation it is recommended that the installation should be done by qualified personnel only.

Always install the vibrator with *thermal overload protection!*

If an overload protection is not used, the vibrator can be destroyed and warranty would be void.

Do not allow motor current to exceed nameplate rating.

If vibrator is operated continuously with line current above nameplate rating, it will be damaged!

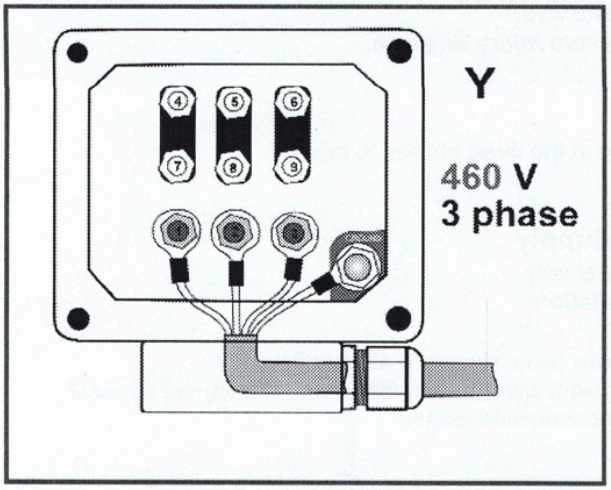
Thermistors and thermostats are intended for motor winding protection or to limit external motor surface temperatures.They complement but do not replace overload protection.
Fuses are surge protectors and will complement thermal overloads.
Fuses can **not** be used **as** thermal overloads and **do not replace** thermal overloads.

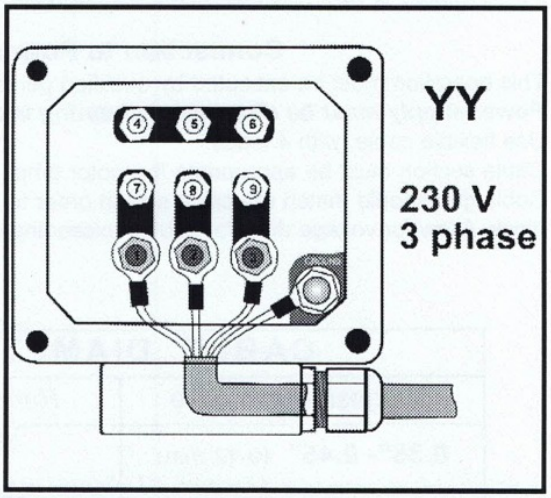
Do **not** use **multiple vibrators** with only a **single overload**
Each motor needs its own dedicated overload.

Vibrator is designed for an ambient temperature range of -24° to 105°
For operations beyond these limits please consult factory since bearing lubrication schedules are different and vibrator might require a rating change.

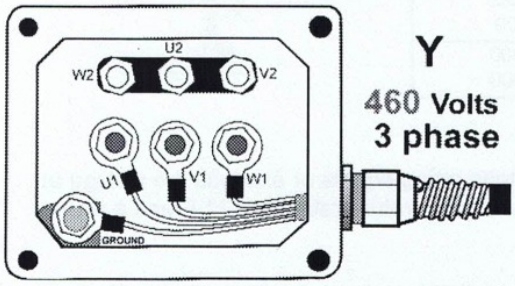
WIRING DIAGRAMS

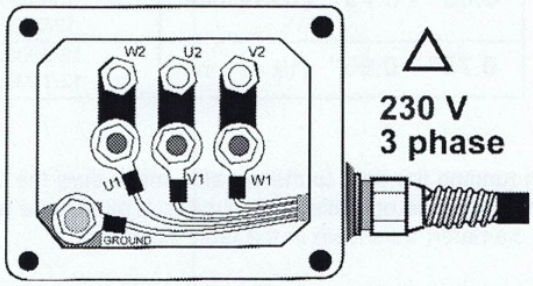
9 LEADS



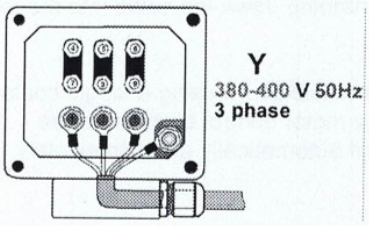


6 LEADS

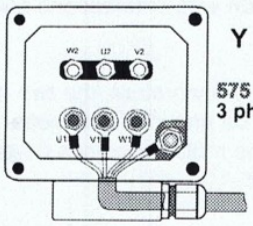




380 Volts-50Hz



575 Volts -60Hz



*FOR 115 Volts **SINGLE PHASE** WIRING PLEASE PROCEED TO THE LAST PAGE*

ELECTRICAL INSTALLATION

Terminal block comes with nine leads
Standard voltage connections are
Y = 460 (575) volts three-phase
YY = 230 volts three-phase

Vibrator must be grounded using power supply ground wire.
Failure to properly ground vibrator can cause severe injury or death.

Amps Reading

Using an amp meter, check that the current absorbed in the three phases is equal or lower to the amps indicated in the nameplate

Connection to Power Supply

This operation must be executed by qualified personnel only.
Power supply must be disconnected during installation!
Use flexible cable, with 4 leads.
Cable section must be appropriate for motor amps draw (max. density = 4A/mmq)
Cable grip should match the cable size in order to prevent water or humidity from entering the terminal block. Allow for voltage drop for cables exceeding recommended length.

CABLE DIAMETER	
Suggested min. size	*Range of models*
0.35"- 0.45" (9-12 mm)	36/95 -35/400 18/150
0.5" - 0.75" (12-15 mm)	36/660-36/4000 18/450 -18/4600 12/600 - 12/2800
0.65" - 0.75" (16-19 mm)	36/5000-36/12000 18/6000-18/18000 12/6000-12/17500
0.75" - 0.85" (19 - 21 mm)	18/20000-18/25000 12/18000-12/25000

When running the cord to the vibrator, make sure the cord voltage rating equals or exceeds the voltage at which you will be operating the vibrator. It must have a minimum temperature rating of 221 F and a minimum diameter(as shown in the table above)

If the wire does not have the right diameter, the cord grip will not tighten properly and the vibrator could be damaged by moisture or material getting into the terminal block. If the cord is damaged, it could short the power supply or short to ground causing damage to the vibrator.

When wiring vibrator, leave slack in electrical cable so that cable does not become too tight during vibration cycle causing stress on wire connections and preventing moisture form running down the cable into the terminal block.

For equipment using two vibrators, the two motors must be electrically interlocked. If using a single contactor, each motor must be provided with separate overload protection. The motor control circuit must be arranged so that if one motor becomes de-energized, the other motor will automatically and immediately become de-energized.

MECHANICAL INSTALLATION

Never weld structure with vibrator mounted and wired! Welding may cause damage to motor windings and bearings.
Vibrators last longer and are more effective when bolted to a rigid mount.
Mounting plate must be totally flat!
Warped surface can cause body stress and possible cracks.
Take an amp reading to make sure that the unit is not drawing more than the specified amps. In situations of high amp draw, reinforce the mounting area or relocate it until rated amp draw is achieved.

BOLTS

When changing or moving a vibrator please ***use only new Grade 5 (or 8) bolts!***
Old bolts can break and cause damage to vibrator or structure.

Always use tooth lock washers or compression spring lock washers
Locking nuts are also recommended.
Do **not** use split **lock washers**:damage to the vibrator could result.
Do not use regular washers: bolts will get loose and vibrators could fall.

Cross tighten mounting bolts!
If not, the vibrator casting could be damaged
At startup retighten after two hours of operation!
Periodicallycheck bolts to ensure tightness.

MOUNTING BOLTS & TORQUE SPECS				
	AMERICAN		*METRIC*	
FRAME SIZE	Bolt Size	Torque	Bolt Size	Torque
	Grade 5	Ft-lbs	Grade 8.8	Kgm
0	5/16".-18 NC	17	M8	2
1	5/16".-18 NC	17	M8	2
2	1/ 2"-13 NC	75	M12	8
3	1/ 2"-13 NC	75	M12	8
4A	5/8" - 11 NC	132	M16	20
4B	5/8" - 11 NC	132	M16	20
15A	5/8" - 11 NC	132	M16	20
15B	5/8" - 11 NC	132	M16	20
20	3/4" - 10 NC	290	M20	40
30	7/8" -9 NC	430	M22	55
50	1" - 8 NC	650	M24	70
70	1"-1/8" - 8 NC	650	M28	90
70B	1"-1/8" - 8 NC	650	M28	90
120A	1-1/4" -- 8 NC	1100	M 30	130
120B	1-1/4" -- 8 NC	1100	M 30	130
120C	1-1/4" -- 8 NC	1100	M 30	130

FRAME TABLE							
00	01	2	3	4A	4B	15A	15B
VE1/36/95 VE3/36/95	VE*/36/120 VE*/36/250 VE*/36/400 VE3/18/150	VE1/36/660 VE3/36/660 VE3/18/450	VE1/36/1050 VE3/36/1050 VE3/18/900 VE3/18/1200 VE3/12/600	VE3/36/1650 VE3/18/1500 VE3/12/800	VE3/36/2200 VE3/36/2800 VE3/18/2200 VE3/12/1000	VE3/36/3000 VE3/18/3500 VE3/12/2000 VE3/09/1500	VE/36/4000 VE3/18/4600 VE3/12/2800 VE3/09/2000
20	30	50	70	70B	120A	120B	120C
VE3/36/5000 VE3/18/6000 VE3/12/4000 VE3/09/3000	VE3/36/7000 VE3/18/8000 VE3/12/6000 VE3/09/5000	VE3/36/10000 VE3/18/10000 VE3/12/10000 VE3/09/8000	VE3/36/12000 VE3/18/15000 VE3/12/15000 VE3/09/12000	VE3/36/20000 VE3/18/17500 VE3/12/18000 VE3/09/14000	VE3/18/18000 VE3/12/18700 VE3/09/15000 VE3/09/18000	VE3/18/20000 VE3/12/20000 VE3/09/21000	VE3/18/25000 VE3/12/25000 VE3/09/24000

FORCE ADJUSTMENT

Eccentric Weights

When checking shaft rotation, remove end caps only if absolutely necessary and do not let vibrator run more than 5 seconds; keep hands away from the rotating weights.

Weights will crush fingers. Unprotected weights can be deadly

Never operate the vibrator with the end caps removed!

Do not run vibrator with eccentric weights removed. Bearing can get severely damaged.

Standard Weight Setting

Vibrators come factory set at

70% (of max force) **at 3600 rpm**

30% at 1800 rpm

50% at all other speeds

How to adjust eccentric weights

Force output adjustment is obtained by changing eccentric weights settings.

1. Make sure the power supply is off and the cable is disconnected.
2. Remove the end caps

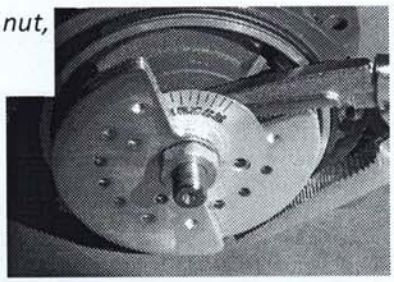
Eccentrics are made of two overlapping steel masses.

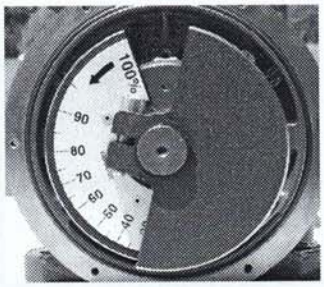
3. Once the blocking end-bolt has been pulled out the outer mass can be adjusted to the needed position.
4. Adjust to the lowest setting required to move the material.

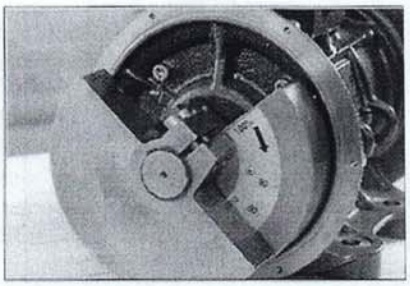
this will increase life and reduce energy costs.

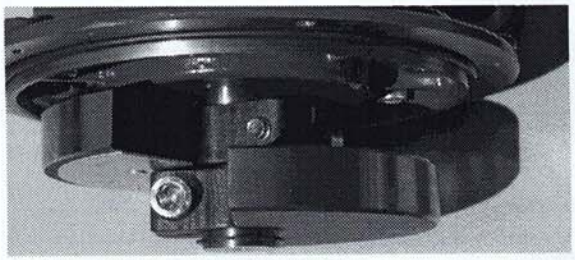
5. Adjust both sets of eccentric weights to the same setting number (mirror images), or force output will be uneven and damage vibrator.
6. While reinstalling end caps, o-rings should be carefully placed into their original position(Frame Size 4 and higher).

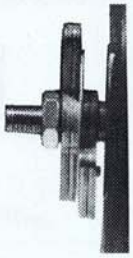
With smaller vibrators, when untightening the shaft nut, the use of a vice grip might be helpful

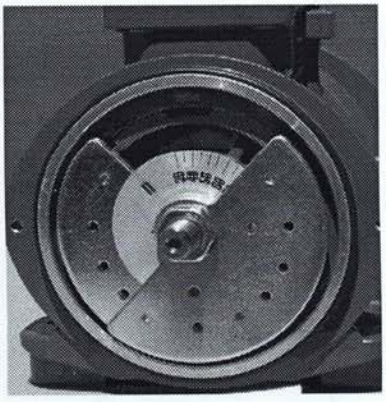












BEARING LUBRICATION

Two options are recommended for electric vibrators.

Option1. **GREASE REPLENISHMENT**

Bearing come pregreased: they are not to be greased when new!
Apply proper electric vibrator grease every 1200 hours (1000 hours for speeds of 3600 rpm).
Make sure not to exceed the amount specified in the lubrication table
Do not mix grease types!. The refilling grease must be the same as the grease used previously.
Before pushing the grease through the fittings, make sure the fittings are clean, in order to avoid dust in the bearings.

Option 2. **GREASE SUBSTITUTION**

Replace with brand new grease every 5000 hours.
Take bearing apart, clean and reapply brand new grease.
Clean bearings thoroughly and reapply new grease not to exceed the amount specified in the lubrication table.

LUBRICATION TABLE

VE **FRAME**	**BEARING** MODEL	**SKF** SUFFIX	**FAG** SUFFIX	GREASE **ADDITION**		GREASE **SUBSTITUTION**	
				WORKING HOURS	QUANTIY PER BEARING OUNCES	WORKING HOURS	QUANTIY PER BEARING OUNCES
0	6202	ZZ.C3	-	none	(sealed)	none	(sealed)
1	6202-6302	ZZ.C3	-	none	(sealed)	none	(sealed)
2	6303	ZZ.C3	-	none	(sealed)	none	(sealed)
3	6306	ZZ.C3	-	none	(sealed)	none	(sealed)
4A	6307	ZZ.C3	-	none	(sealed)	none	(sealed)
4B	NJ 307 E	CP.C4	TVP2.C4	1200	1/4	5000	1/2
15A	NJ 308 E	CP.C4	TVP2.C4	1200	1/3	5000	2/3
15B	NJ 2308 E	CP.C4	TVP2.C4	1200	1/2	5000	1
20	NJ 2309 E	CP.C4	TVP2.C4.QP51	1200	2/3	5000	1
30	NJ 2311 E	CP.C4	TVP2.C4.QP51	1200	1	5000	1 1/2
50	NJ 2313 E	CP.C4	TVP2.C4.QP51	1200	2	5000	3
70	NJ 2315 E	CP.C4	TVP2.C4.QP51	1200	2	5000	4
70B	NJ 2317 E	CMA.C4	M1A.C4.QP51	1000	3	5000	5
120A	NJ 2317 E	CMA.C4	M1A.C4.QP51	1000	3	5000	5
120B	NJ 2318 E	CMA.C4	M1A.C4.QP51	1000	3	5000	6
120C	NJ 2320 E	CMA.C4	M1A.C4.QP51	1000	5	5000	9

FRAME TABLE

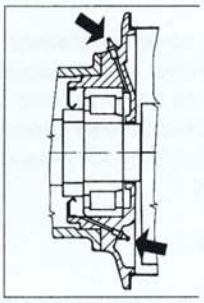
00	01	2	3	4A	4B	15A	15B
VE1/36/95 VE3/36/95	VE1/36/120 VE3/36/120 VE1/36/250 VE2/36/250 VE1/36/400 VE3/36/400 VE3/18/150	VE1/36/660 VE3/36/660 VE3/18/450	VE1/36/1050 VE3/36/1050 VE3/18/900 VE3/18/1200 VE3/12/600	VE3/36/1650 VE3/18/1500 VE3/12/800	VE3/36/2200 VE3/36/2800 VE3/18/2200 VE3/12/1000	VE3/36/3000 VE3/18/3500 VE3/12/2000 VE3/09/1500	VE/36/4000 VE3/18/4600 VE3/12/2800 VE3/09/2000
20	**30**	**50**	**70**	**70B**	**120A**	**120B**	**120C**
VE3/36/5000 VE3/18/6000 VE3/12/4000 VE3/09/3000	VE3/36/7000 VE3/18/8000 VE3/12/6000 VE3/09/5000	VE3/36/10000 VE3/18/10000 VE3/12/10000 VE3/09/8000	VE3/36/12000 VE3/18/15000 VE3/12/15000 VE3/09/12000	VE3/36/20000 VE3/18/17500 VE3/12/18000 VE3/09/14000	VE3/18/18000 VE3/12/18700 VE3/09/15000 VE3/09/18000	VE3/18/20000 VE3/12/20000 VE3/09/21000	VE3/18/25000 VE3/12/25000 VE3/09/24000

Do not overgrease!

Overgreasing will force the bearing temperature to rise. When the temperature exceeds the maximum safety limit, bearings will malfunction causing the vibrator to fail.
For optimal performance

use only Factory certified grease "KLUEBER STAUBURANGS NBU 8 EP".

For additional information and pricing please call directly KLUEBER CORPORATION at 603-434-7704
If a different grease is used, vibrator can be damaged and warranty will be void.
Do not grease any other part of the motor.



Bearing Specifications

Vibrators have special long lasting bearings with a unique code specifying:

1. Bearing type
2. Cage size
3. Fit
4. (QP 51 in FAG bearings)

Example NJ-2310-E-TVP2-C4.
When replacing the bearings make sure the new bearings have the same exact and complete code. If it can not be found by the bearing house please contact the manufacturer.

Substituting originals with improper bearings (not matching the exact code) will cause the vibrator to fail.
Bearing fit for the VE Series is C4

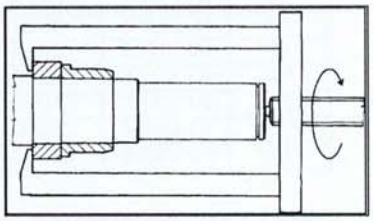
Running the vibrator with eccentric weight removed will damage bearings.

Bearing Replacement Procedure

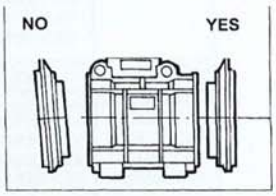
This operation must be executed by qualified personnel only.

To proceed and replace the bearings operate as follows

1. Remove screws, lateral covers, retaining rings, weights and keys.
2. Extract bearing housing.
3. Using the two tapped holes in the bearing housing and two bolts, push out slowly bearing and seal. Make sure you push evenly at both sides.
4. Extract rotor shaft from the body.
5. With a bearing extractor, pull out bearing's inner ring.
6. Check the bearing housing and the rotor shaft. Should they be damaged or worn, they must be replaced.
7. Remount the bearings. With the use of a press, push them completely into their housing.
8. Force new grease in between the roller cage and the outer ring.
9. The rest of the vibrator assembly, follow the disassembly procedure in reverse.



During re-assembly always use new screws, washers and seals,making sure that the seals are not damaged during installation.



CAUTION! ***During bearing disassembly and reassembly, it is imperative for the flange to be kept perfectly in line with the vibrator body!*** Any misalignment could cause permanent damage to the bearings.

WINDING MAINTENANCE

INCORRECT VOLTAGE

Even a 5% difference on a larger motor could have a negative effect.

Besides a thorough maintenance and testing program, one of the best ways to guarantee economical performance and long motor life is to make sure your motors operate at nameplate voltage.
Applying too high a voltage may reduce the motor's efficiency and increase core losses. This, in turn, shortens the motor life by overheating the insulation system.

Low voltage can also shorten motor life. Operating on too low a voltage reduces the motor's effective horsepower. For example, a 5-hp motor operated at 10% below rated voltage becomes a 4-hp motor. The motor will try to drive the load it was intended to drive, become overloaded, draw more current and overheat. The result -- premature failure.

VOLTAGE FLUCTUATIONS

Voltage fluctuations due to poor power supply or wrong cable size need to be kept under control. Frequent or extended voltage variations can be fatal for the motor.
Proper safeguards should be installed.

VOLTAGE UNBALANCE

Unbalance also can be lethal for the motor. Operating a three-phase motor with an unbalanced voltage can also cause serious overheating that will shorten its life dramatically.
Voltage unbalance should not exceed 2%.

MOISTURE

Moisture is detrimental to long motor life because it will deteriorate the insulation. To prevent condensation, one of two common methods are usually effective. One is to install electric heaters in the motor. The other is to apply a low dc voltage to one phase of the motor windings whenever the motor is at rest. With either method, the objective is to keep the temperature of the windings 10°F to 20°F above the ambient temperature.
Protect electric vibrators from excessive water. This series is not designed to operate submerged.

INSULATION

Class F insulation enhances the safety under continuous operating conditions and at high ambient temperatures. The motor winding is drip impregnated with synthetic resin to withstand high "g" forces.
Mechanical protection IP 65-7

TEMPERATURE

- External temperature range is -40° to +110° F.
- Vibrator's body temperature should not exceed 210° F
- Bearing max temperature is 240° F

STORAGE

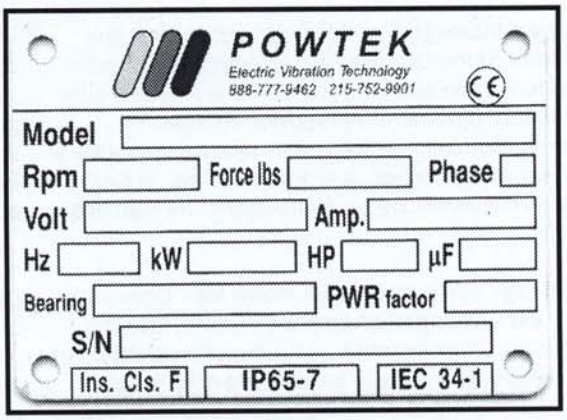
If the vibrator motor is to be stored for a long period the location must be covered. Ambient temperature should be between 40° and 120° F and relative humidity should not be higher than 60%.

NOISE

After a longer operating period, the increased radial clearance of the bearing, together with the elimination of the excess grease, causes a normal increase of the noise of the vibrator motor. In certain applications, the combination of machine/vibrator motor can cause noise emissions high enough to require the use of individual ear protectors.

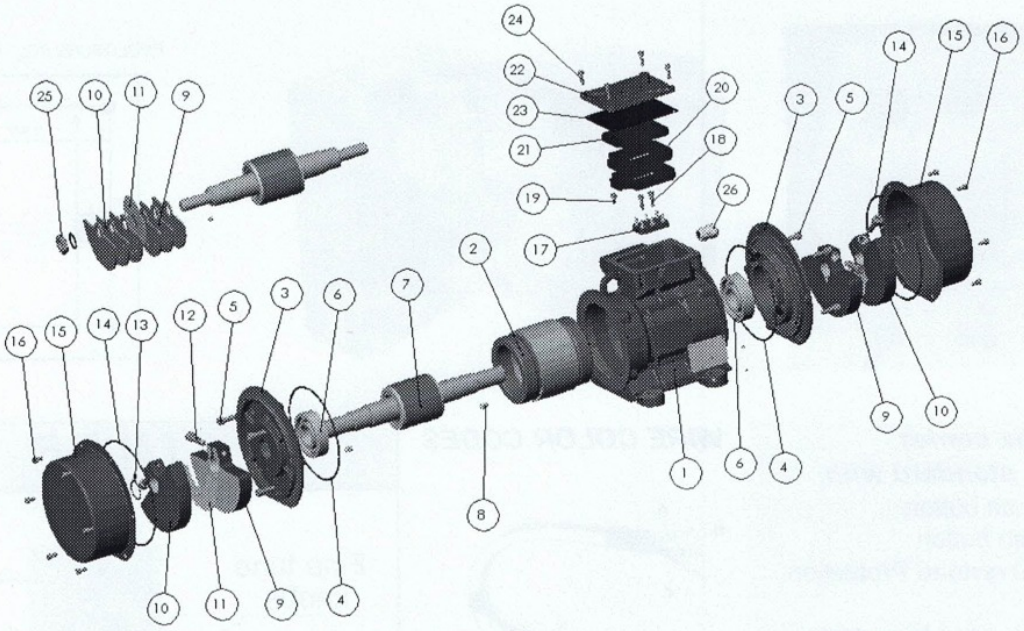
NAME PLATE

Name Plate contains important data regarding manufacturer's specifications.



Model:	Model Number
Rpm:	Vibrations per Minute
Force Lbs:	Centrifugal Force in Lbs (1Lb Force Output = 4.45 Newton)
Phase:	**3** for Three-Phase or **1** for Single Phase
Volt:	Voltage (usually 115v or 230/460v)
AMP:	AMP draw at the above voltage
Hz:	Power Supply Frequency (Usually 60Hz)
KW in:	Absorbed Power in Kilowatts
HP out:	Produced Power in Hp
Conn.:	Wiring Diagram (Usually 2- see page 3)
nF:	Size of the Capacitor in Microfarad (Single Phase Only)
PWR factor	Also called "Cos Fee" is the Motor Efficiency Factor
Bearing	Bearing model
S/N:	Serial Number
INS:	Insulation Class
IP:	Electrical Protection Rating **IP-65** 6= Totally protected against dust 5= Protected against low pressure jets of water from all directions
IEC:	International Electric Code Regulation

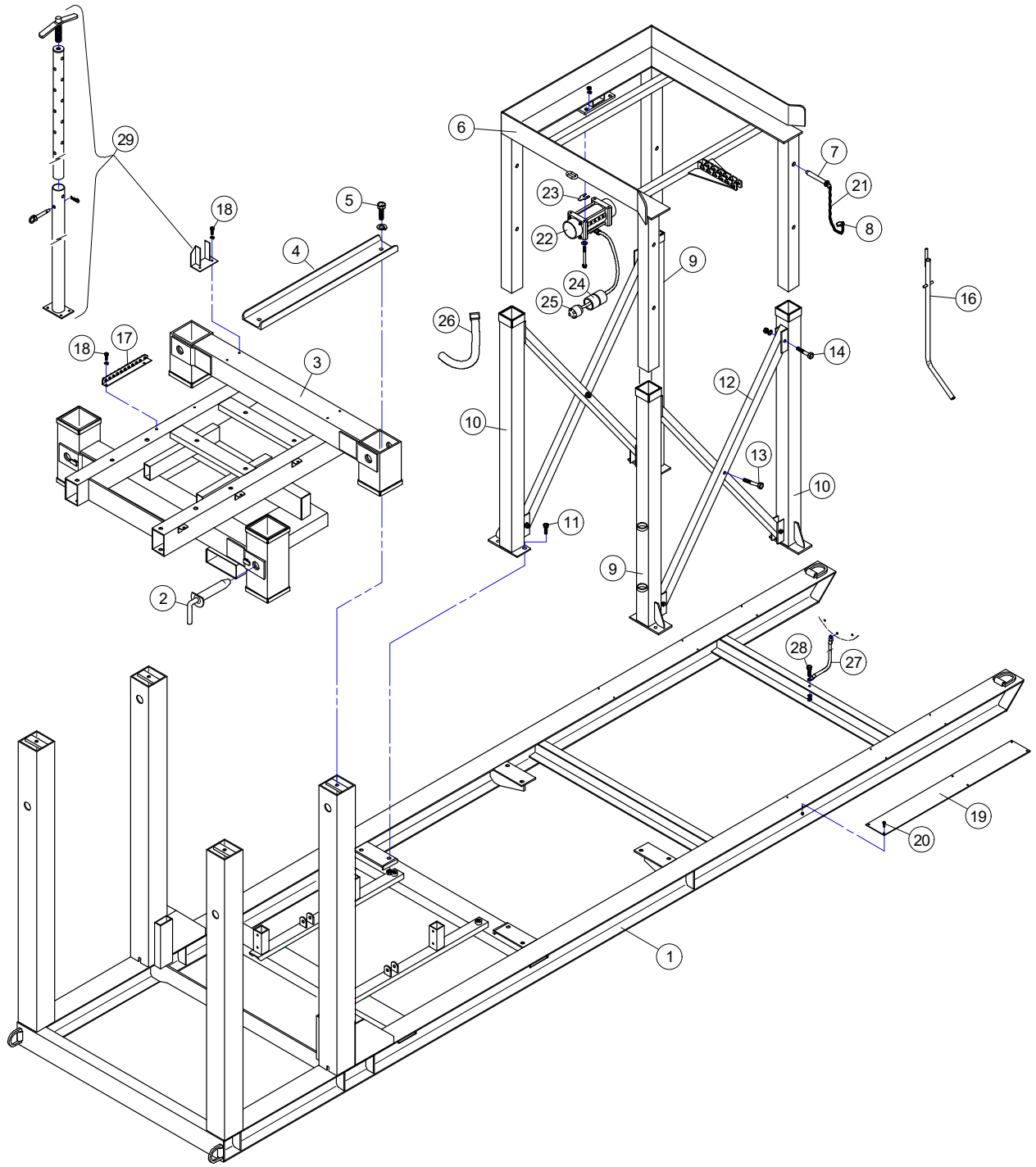
PARTS LIST



PART	DESCRIPTION	PART	DESCRIPTION
1	Housing	14	O-Ring
2	Stator	15	End Cap
3	Bearing Housing	16	End Cap Screw
4	O-Ring	17	Terminal Block
5	Screw	18	Wire Connector Screw
6	Bearing	19	Ground Screw
7	Rotor	20	Lower Rubber Block
8	Key	21	Upper Rubber Block
9	Inner Weight	22	Terminal Block Cover
10	Outer Weight	23	Gasket
11	Adjusting Dial Plate	24	Lid Screw
12	Eccentric Weight Blocking Screw *	25	Eccentric Weight Blocking Screw **
13	Retaining Ring	26	Cable Grip
* frame 4 and higher ** frame 0 to 3			

SECTION #VIII

(FL243-11-6E v5 Parts Manual)



FL243-ASSM-1 Base Frame

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Base Frame (6ft)	FL243-130	1	B
2	Lock Pin	FL243-147	4	Y
3	Base Frame Carriage	FL243-140	1	B
4	Base Frame Carriage Top Bar	FL243-146	2	B
5	3/4" x 1 1/2" Bolt	076-13359	4	
	3/4" L/W	076-33632	4	
6	Tote Stand Top	FL243-171	1	B
7	3/4" Draw Pin	076-0157185	4	
8	Linch Pin	076-0120710	4	
9	Tote Stand Right Skid Leg	FL243-172-R	2	B
10	Tote Stand Left Skid Leg	FL243-172-L	2	B
11	1/2" x 1 1/2" Bolt	076-13209	8	
	1/2" Top Lock Nut	076-37268	8	
12	Tote Stand Cross Brace	FL243-175	4	B
13	1/2" x 4" Bolt	076-13219	2	
	1/2" F/W	076-33012	2	
	1/2" L/W	076-33626	2	
	1/2" Nut	076-36310	2	
14	1/2" x 3" Bolt	076-13215	8	
	1/2" L/W	076-33626	8	
	1/2" Nut	076-36310	8	
15				
16	Tote Handle	FL243-178	1	Y
17	Grease Manifold	FL243-290	1	Y
18	3/8" x 3/4" Bolt	076-13103	6	
	3/8" L/W	076-33622	6	
19	Rail Slider	FL243-149-A	2	
20	1/4" x 1" FHCS	076-24225	12	
	1/4" Top Lock Nut	076-37264	12	
21	1/8" Welded Chain G30	084-0200035	4 @ 12"	
22	Vibrator	054-4P-1000-3	1	
	C/W 1/2" x 6 1/2" Bolt, F/W, L/W, Nut		4	
23	Motor Shim S/S	034-QA SHIM PACK	1	
24	Waterproof Plug Boot	089-BL1	1	
25	Twist-loc 4 prong 60A Plug	089-AHL1630 P	1	
26	Hook & Loop Securing Strap	030-888-421	2	
27	Grounding Cable	FL243-359-33	1	
28	1/2" x 1 1/2" Bolt	076-13209	1	
	1/2" L/W	076-33626	1	
	1/2" Nut	076-36310	1	
29	Adjustable Motor Support	FL243-940	1	B

Assembly Note:
Slide carriage to the top of posts and hold.
Install #4 channels and tighten bolts #5.
Lower carriage for assembly.

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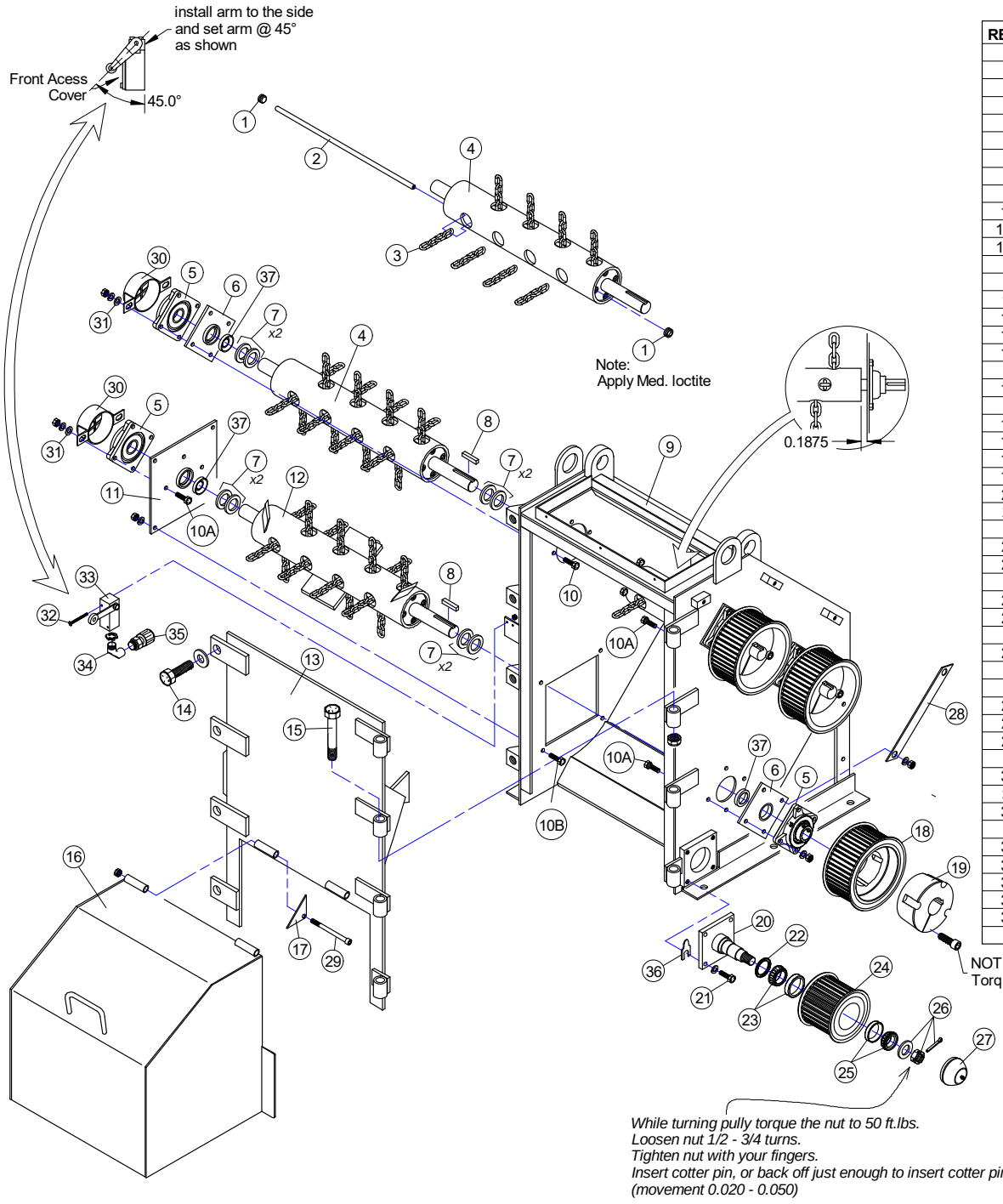
DWR. NUM.	DATE. 10 / 11 / 15
FL243-ASSM-1	REV. 08 / 24 / 21

FL243-ASSM-2 Flail Box



REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3/4" NC x 3/4" Set screw	076-25772	24	
2	Chain Retension Shaft	FL243-038	12	
3	Flail Chain Square Type	FL243-039-B	48	
4	Flail Drum (no fins)	FL243-030	2	
5	1 1/2" Flanged Bearings	036-208-108D1	6	
6	Small Bearing Plate	FL243-040-A	5	Y
7	Shaft Rubber Seal (0.250)	FL243-041-B	15	
8	3/8" Key	036-47915	3	
9	Flail Housing	FL243-003E	1	Y
10	1/2" x 2" Bolt	076-13211	8	
10A	1/2" x 1 3/4" Bolt	076-13210	16	
10B	1/2" x 1 1/4" Bolt	076-13208	4	
	1/2" L/W	076-33626	28	
	1/2" Nut	076-36310	28	
11	Large Bearing Plate	FL243-040-B	1	Y
12	Flail Drum (with fins)	FL243-036	1	
13	Flail Front Door	FL243-017	1	Y
14	1" x 2 3/4" Bolt	076-13464	4	
	1" F/W	076-33022	4	
15	1" x 5 1/2" Bolt	076-15474	4	
	1" Top Lock Nut	076-37278	4	
16	Discharge Cover	FL243-045	1	Y
17	Outlet Chute Safety Stop	FL243-048	2	B
18	48 Toothed Pulley	036-P48-14M-85TL-3020	3	
19	Tappered Bushing *see note	036-3020_1-1/2	3	
20	Idler Shaft with Flange	FL243-243	1	Y
21	1/2" x 1 1/2" Bolt	076-13209	4	
	1/2" L/W	076-33626	4	
22	Shaft Grease Seal	036-CR17617	1	
23	Cone Bearing	036-LM29749	1	
	Cone Bearing Cup (race)	036-LM29710	1	
24	28 Toothed Pulley	FL243-242	1	
25	Cone Bearing	036-LM67048	1	
	Cone Bearing Cup (race)	036-LM67010	1	
26	Flat Washer		1	
	Castle Nut		1	
	Cotter Pin		1	
27	Dust Cover	FL243-247	1	Y
28	Grease Tube Keeper	FL243-293-B	2	B
29	1/2" x 7" SHCS Stainless Steel	076-0171197	2	
	1/2" Top Lock Nut	076-37030	2	
30	Flail Shaft Bearing Cover	FL243-377	3	Y
31	1/2" SAE F/W (for covers only)	076-33086	6	
32	10/32 x 1 1/2" machine screw	076-0146509	2	
	10/32 L/Nut	076-0170988	2	
33	Door Switch	089-MTR4947-LS	1	
34	1/2" NPT Street 90° Conduit Elbow	089-CI7204	1	
35	Electric Cable Strain	089-ST050-464	1	
36	Motor Shim S/S	034-QA SHIM PACK	*as required*	
37	Lip Seal	036-99149	6	

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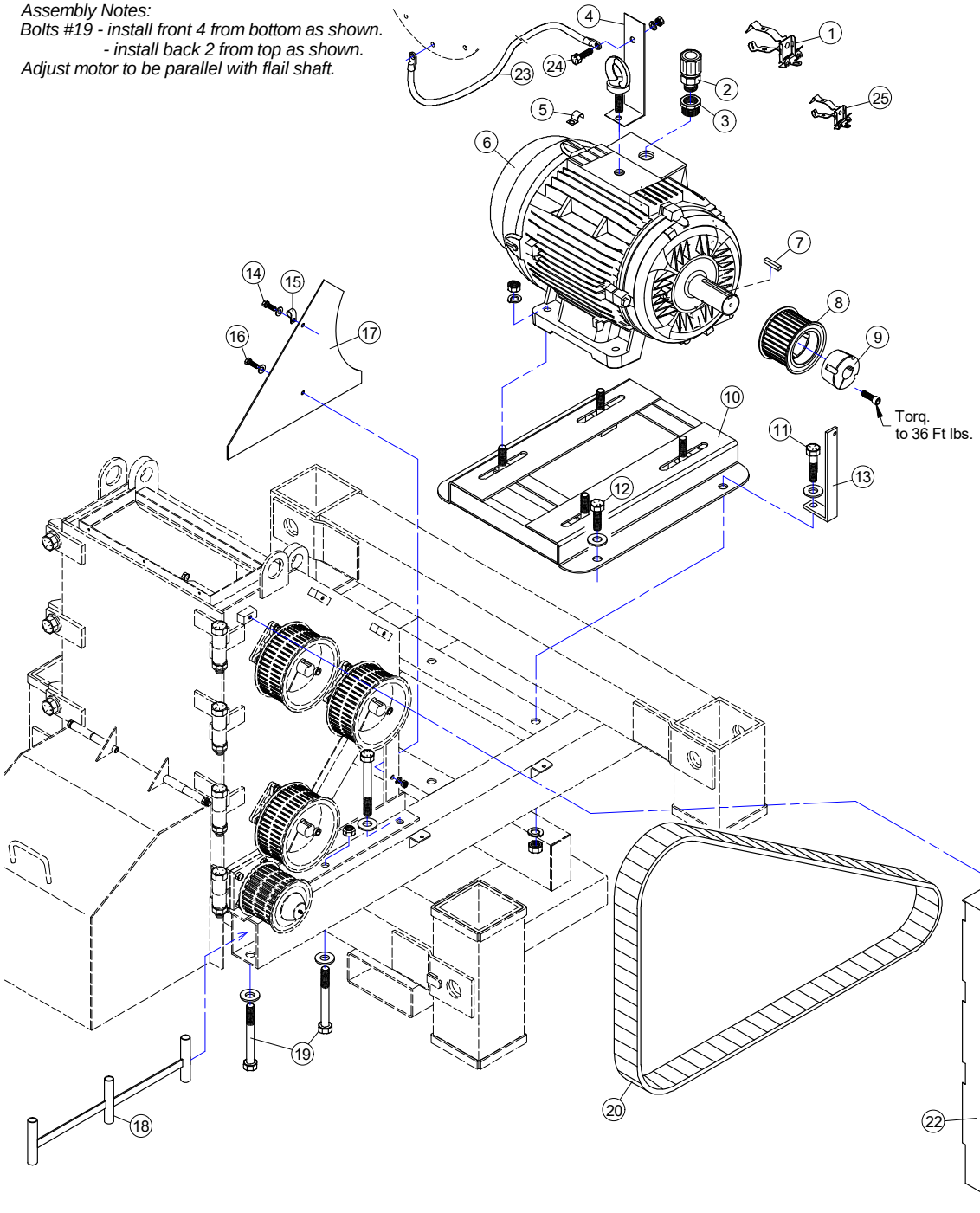
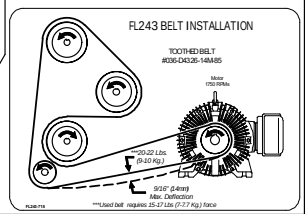
DWR. NUM.	DATE. 10 / 11 / 15
FL243-ASSM-2	REV. 12 / 21 / 22

Assembly Notes:
Bolts #19 - install front 4 from bottom as shown.
- install back 2 from top as shown.
Adjust motor to be parallel with flail shaft.



FL-243-ASSM-3 Flail Box on Carriage

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Push on Cable Clamp	089-BG-16-U-5-8	1	
2	Electrical Cable Strain	089-ST075-468	1	
3	2" x 3/4" Bushing	089-RB20075	1	
4	Cable Support	FL243-338-B	1	B
5	1/2" Conduct Clamp	089-CI1304	2	
6	40 HP Motor	034-40HP MOTOR	1	
7	1/2" x 4" Key Stock	036-47917	1	
8	32 Toothed Pulley	036-P32-14M-85TL-2517	1	
9	Tappered Bushing *see note	036-2517 2-1/8	1	
10	Adjustable Motor Mount	034-324B2-G	1	
11	5/8" x 2" Bolt	076-13311	1	
12	5/8" x 1 1/2" Bolt	076-13309	3	
	5/8" L/W	076-33630	4	
	5/8" F/W	076-33016	4	
	5/8" Nut	076-36314	4	
13	Belt Guard Motor Mount	FL243-297-A	1	B
14	1/4" x 1" Bolt	076-13005	1	
	1/4" L/W	076-33618	1	
15	Wire Loom Clamp	089-XBO R12	1	
16	3/8" x 1" Bolt	076-13105	1	
	3/8" L/W	076-33622	1	
	3/8" F/W	076-33008	1	
	3/8" Nut	076-36306	1	
17	Drive Belt Back Guard	FL243-299	1	B
18	Tube Stiffener	FL243-148	2	B
19	3/4" x 7 1/2" Bolt	076-13378	6	
	3/4" F/W	076-33018	6	
	3/4" Top Lock Nut	076-37274	6	
20	Toothed Drive Belt	036-D4326-14M-85	1	
21	3/8" x 1" Bolt	076-13105	4	
	3/8" L/W	076-33622	4	
	3/8" F/W	076-33008	4	
22	Drive Belt Guard	FL243-295	1	B
23	Grounding Cable	FL243-359-20	1	
24	1/2" x 1" Bolt	076-13205	1	
	1/2" L/W	076-33626	1	
	1/2" Nut	076-36310	1	
25	Push on Cable Clamp	089-BG-8-12-4-5-8	1	



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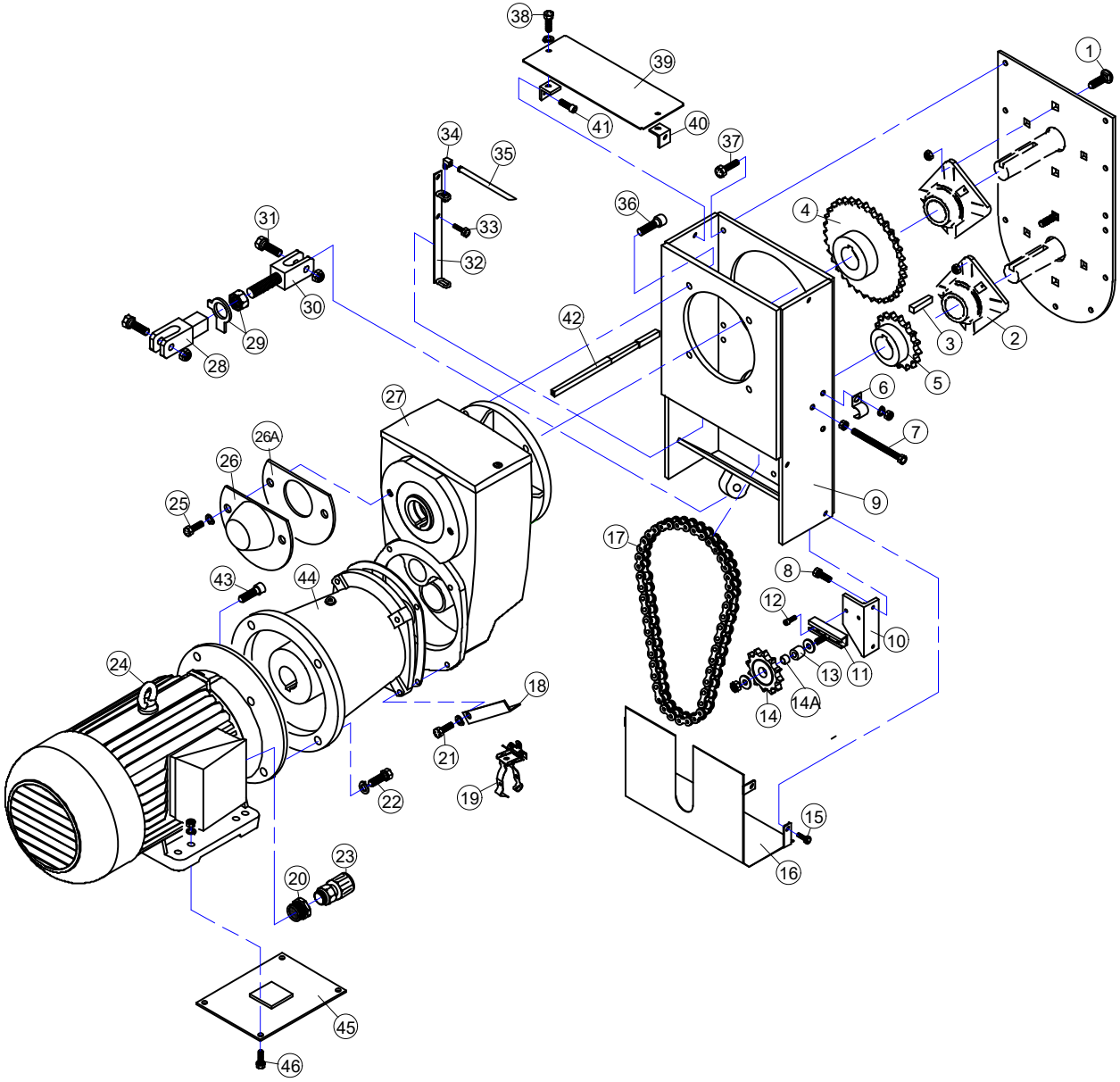
DWR. NUM.	DATE. 12 / 11 / 15
FL243-ASSM-3	REV. 12 / 21 / 22

FL-243-ASSM-4 11in 2 Section Auger Power Head



REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3/4" x 2 1/2" Carriage Bolt	076-21901	8	
	3/4" L/Nut	076-37039	8	
2	2 7/16" Flanged Bearing	036-212-207D1	2	
3	5/8" Key Stock	036-47919	3"	
4	34T x 80 sprocket	036-80BS34-2 7/16	1	
5	24T x 80 sprocket	036-80BS24-2 7/16	1	
6	1/2" Conduct Clamp	089-CI1304	1	
7	Idler Slide Adjuster	#FL243-234-D	1	
	3/8" Nut	076-36306	1	
8	3/8" x 1 1/2" Bolt	076-13109	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
9	20 hp Nord Gearbox Mount	FL243-230	1	Y
10	Idler Slide Rail Mount	FL243-234-B	1	Y
11	Slide Rail	FL243-234-C	1	Y
	Idler Mount Kit	036-E5006	1	
12	5/16" x 1" SHCS	076-23255	2	
	5/16" L/W	076-33620	2	
	5/16" Nut	076-36304	2	
13	Sprocket to Rail Spacer	FL243-234-E	1	Y
14	12T x 80 Idler Sprocket	036-80BB12H	1	
14A	Sprocket Bushing	036-SS-1624-10-SYM	1	
15	3/8" x 1" Bolt	076-13105	4	
	3/8" L/W	076-33622	4	
16	Gearbox Front Guard	FL243-239	1	Y
17	#80 Roller Chain	036-801R	56 Rollers	
	#80 Roller Chain Connector link	036-80-1 C/LINK	1	
18	Motor Cable Support	FL243-338-A	1	Y
19	Push on Cable Clamp	089-BG-16-U-5-8	1	
20	Reducing Bushing 2" x 3/4"	089-RB20075	1	
21	M12 x 1.75 x 40 Bolt (apply loc tite)	076-38708	4	
	M12 L/W	076-40385	4	
22	M12 x 1.75 x 50 Bolt (apply loc tite)	076-38710	4	
	M12 L/W	076-40385	4	
23	Electrical Cable Strain	089-ST075-468	1	
24	30 Hp Electric Motor	034-PDH0304	1	
25	7/16" x 1" Bolt	076-13155	2	
	7/16" L/W	076-33624	2	
26	Shaft Cover Plate	036-85219700	1	
26A	Shaft Cover Plate Gasket	FL243-248	1	
27	Nord Gear Reducer	036-SK5282-250TC-160LH4	1	
28	Top Support Link	FL243-237	1	B
29	1" NC Nut	076-36320	1	
	1" Two Tab Washer	076-657-130	1	
30	Bottom Support Link	FL243-236	1	B
31	3/4" x 3" Bolt	076-13365	2	
	3/4" L/Nut	076-37274	2	
32	Grease Hose Guide	FL243-292	1	Y
33	3/8" x 1 1/4" Bolt	076-13107	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
34	1/8" NPT Brass St. 90° Elbow	019-WEA 3400X2	1	
35	Steel Grease Tube	FL243-293-A	1	Y
36	5/8" x 2 1/4" SHCS	076-23512	4	
	5/8" Toplock Nut	076-37272	4	
37	1/2" x 2 1/4" Bolt GR 8	076-15212	13	
	1/2" Nylock Nut	076-37030	13	
38	3/8" x 3/4" Bolt	076-13103	2	
	3/8" L/W	076-33622	2	
39	Gearbox Top Guard	FL243-238-A	1	Y
40	Top Guard Mount	FL243-238-B	2	Y
41	3/8" x 3/4" SHCS (apply loc tite)	076-23303	2	
42	Gearbox & Sprocket Key	FL243-249	1	
43	1/2" x 1 1/2" SHCS (apply loc tite)	076-23409	4	
44	Nord Gear Box Adaptor	036-NEMA-N280TC	1	
45	Motor Support Plate	FL243-942	1	B
46	1/2" x 1 3/4" NC Bolt	076-13210	4	
	1/2" L/W	076-33626	4	
	1/2" Nut	076-36310	4	

Assembly Notes:
Item #4 & #5 sprockets have collars toward motor drive.
Install #4 & #5 sprockets on shafts before installing #9 gear box mount.

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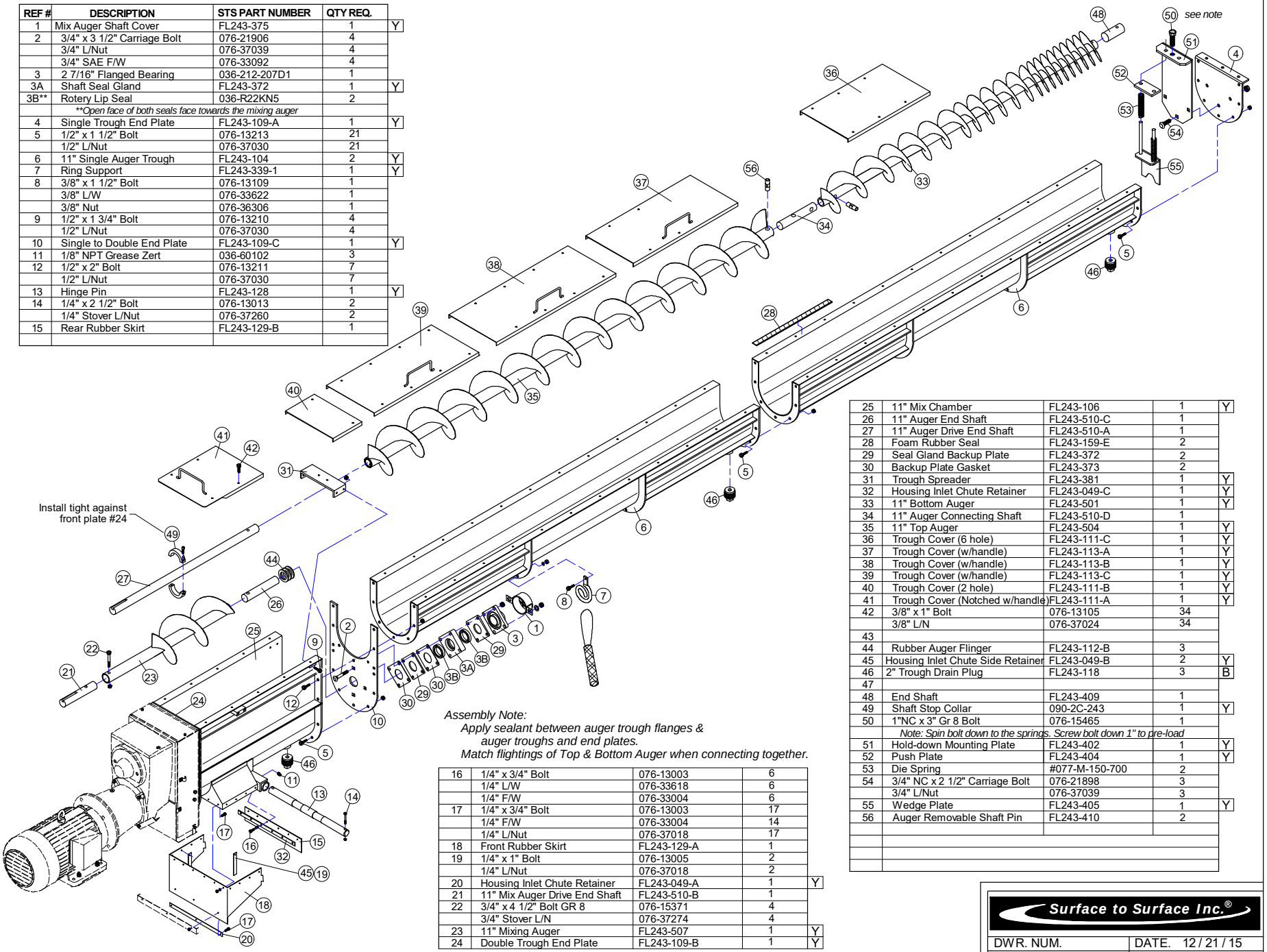
DWR. NUM.	DATE. 12 / 18 / 15
FL243-ASSM-4	REV. 08 / 30 / 21

FL-243-ASSM-5 11in 2 Section Auger

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Mix Auger Shaft Cover	FL243-375	1	Y
2	3/4" x 3 1/2" Carriage Bolt	076-21906	4	
	3/4" L/Nut	076-37039	4	
	3/4" SAE F/W	076-33092	4	
3	2 7/16" Flanged Bearing	036-212-207D1	1	
3A	Shaft Seal Gland	FL243-372	1	Y
3B**	Rotery Lip Seal	036-R22KN5	2	
	***Open face of both seals face towards the mixing auger*			
4	Single Trough End Plate	FL243-109-A	1	Y
5	1/2" x 1 1/2" Bolt	076-13213	21	
	1/2" L/Nut	076-37030	21	
6	11" Single Auger Trough	FL243-104	2	Y
7	Ring Support	FL243-339-1	1	Y
8	3/8" x 1 1/2" Bolt	076-13109	1	
	3/8" L/W	076-33622	1	
	3/8" Nut	076-36306	1	
9	1/2" x 1 3/4" Bolt	076-13210	4	
	1/2" L/Nut	076-37030	4	
10	Single to Double End Plate	FL243-109-C	1	Y
11	1/8" NPT Grease Zert	036-60102	3	
12	1/2" x 2" Bolt	076-13211	7	
	1/2" L/Nut	076-37030	7	
13	Hinge Pin	FL243-128	1	Y
14	1/4" x 2 1/2" Bolt	076-13013	2	
	1/4" Stover L/Nut	076-37260	2	
15	Rear Rubber Skirt	FL243-129-B	1	



25	11" Mix Chamber	FL243-106	1	Y
26	11" Auger End Shaft	FL243-510-C	1	
27	11" Auger Drive End Shaft	FL243-510-A	1	
28	Foam Rubber Seal	FL243-159-E	2	
29	Seal Gland Backup Plate	FL243-372	2	
30	Backup Plate Gasket	FL243-373	2	
31	Trough Spreader	FL243-381	1	Y
32	Housing Inlet Chute Retainer	FL243-049-C	1	Y
33	11" Bottom Auger	FL243-501	1	Y
34	11" Auger Connecting Shaft	FL243-510-D	1	
35	11" Top Auger	FL243-504	1	Y
36	Trough Cover (6 hole)	FL243-111-C	1	Y
37	Trough Cover (w/handle)	FL243-113-A	1	Y
38	Trough Cover (w/handle)	FL243-113-B	1	Y
39	Trough Cover (w/handle)	FL243-113-C	1	Y
40	Trough Cover (2 hole)	FL243-111-B	1	Y
41	Trough Cover (Notched w/handle)	FL243-111-A	1	Y
42	3/8" x 1" Bolt	076-13105	34	
	3/8" L/N	076-37024	34	
43				
44	Rubber Auger Flinger	FL243-112-B	3	
45	Housing Inlet Chute Side Retainer	FL243-049-B	2	Y
46	2" Trough Drain Plug	FL243-118	3	B
47				
48	End Shaft	FL243-409	1	
49	Shaft Stop Collar	090-2C-243	1	Y
50	1"NC x 3" Gr 8 Bolt	076-15465	1	
	Note: Spin bolt down to the springs. Screw bolt down 1" to pre-load			
51	Hold-down Mounting Plate	FL243-402	1	Y
52	Push Plate	FL243-404	1	Y
53	Die Spring	#077-M-150-700	2	
54	3/4" NC x 2 1/2" Carriage Bolt	076-21898	3	
	3/4" L/Nut	076-37039	3	
55	Wedge Plate	FL243-405	1	Y
56	Auger Removable Shaft Pin	FL243-410	2	

Assembly Note:
Apply sealant between auger trough flanges & auger troughs and end plates.
Match flightings of Top & Bottom Auger when connecting together.

16	1/4" x 3/4" Bolt	076-13003	6	
	1/4" L/W	076-33618	6	
	1/4" F/W	076-33004	6	
17	1/4" x 3/4" Bolt	076-13003	17	
	1/4" F/W	076-33004	14	
	1/4" L/Nut	076-37018	17	
18	Front Rubber Skirt	FL243-129-A	1	
19	1/4" x 1" Bolt	076-13005	2	
	1/4" L/Nut	076-37018	2	
20	Housing Inlet Chute Retainer	FL243-049-A	1	Y
21	11" Mix Auger Drive End Shaft	FL243-510-B	1	
22	3/4" x 4 1/2" Bolt GR 8	076-15371	4	
	3/4" Stover L/N	076-37274	4	
23	11" Mixing Auger	FL243-507	1	Y
24	Double Trough End Plate	FL243-109-B	1	Y

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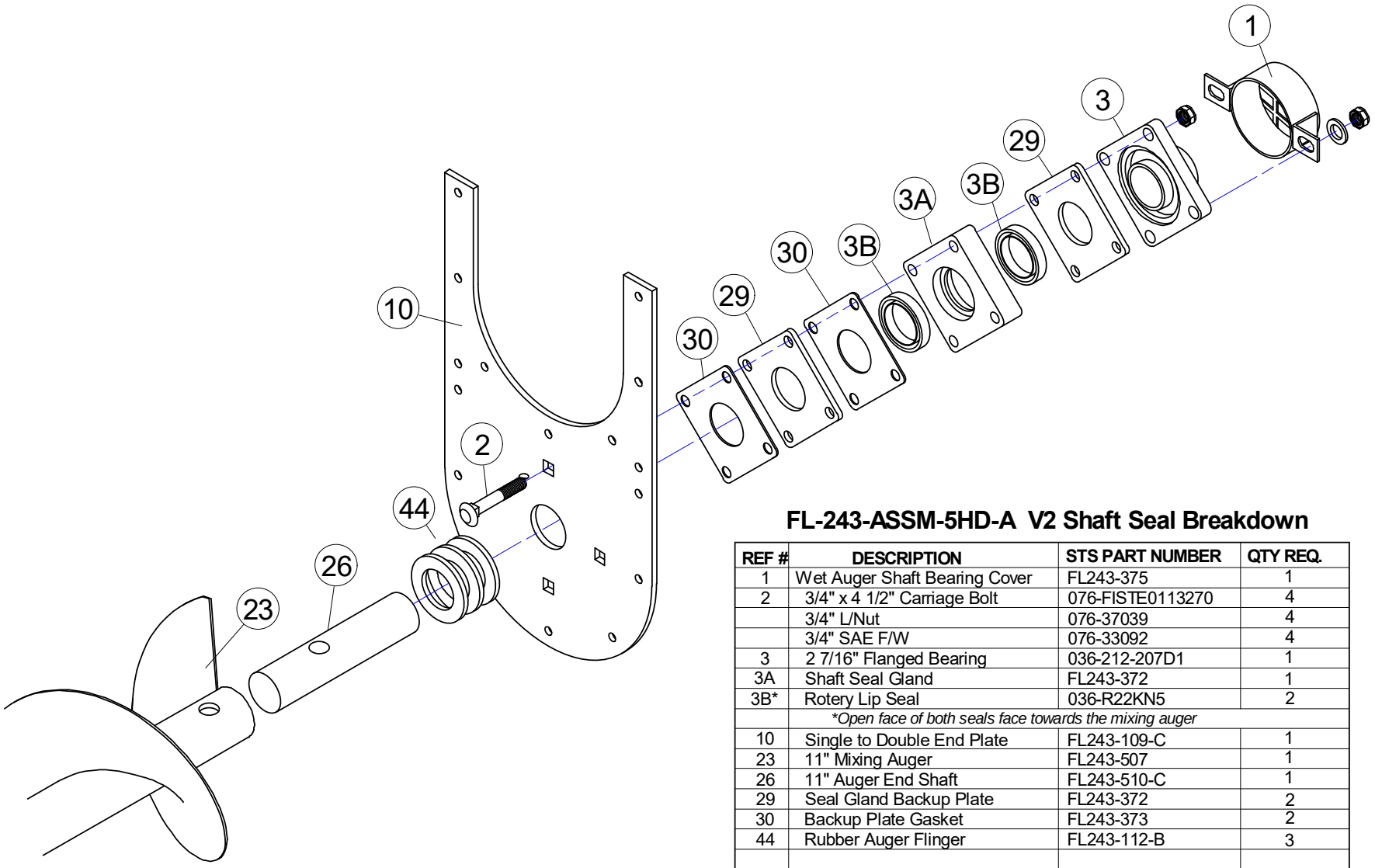
DWR. NUM.	DATE. 12 / 21 / 15
FL243-ASSM-5	REV. 10 / 06 / 21



FL-243-ASSM-5HD-A V2 Shaft Seal Breakdown

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.
1	Wet Auger Shaft Bearing Cover	FL243-375	1
2	3/4" x 4 1/2" Carriage Bolt	076-FISTE0113270	4
	3/4" L/Nut	076-37039	4
	3/4" SAE F/W	076-33092	4
3	2 7/16" Flanged Bearing	036-212-207D1	1
3A	Shaft Seal Gland	FL243-372	1
3B*	Rotery Lip Seal	036-R22KN5	2
	Open face of both seals face towards the mixing auger		
10	Single to Double End Plate	FL243-109-C	1
23	11" Mixing Auger	FL243-507	1
26	11" Auger End Shaft	FL243-510-C	1
29	Seal Gland Backup Plate	FL243-372	2
30	Backup Plate Gasket	FL243-373	2
44	Rubber Auger Flinger	FL243-112-B	3

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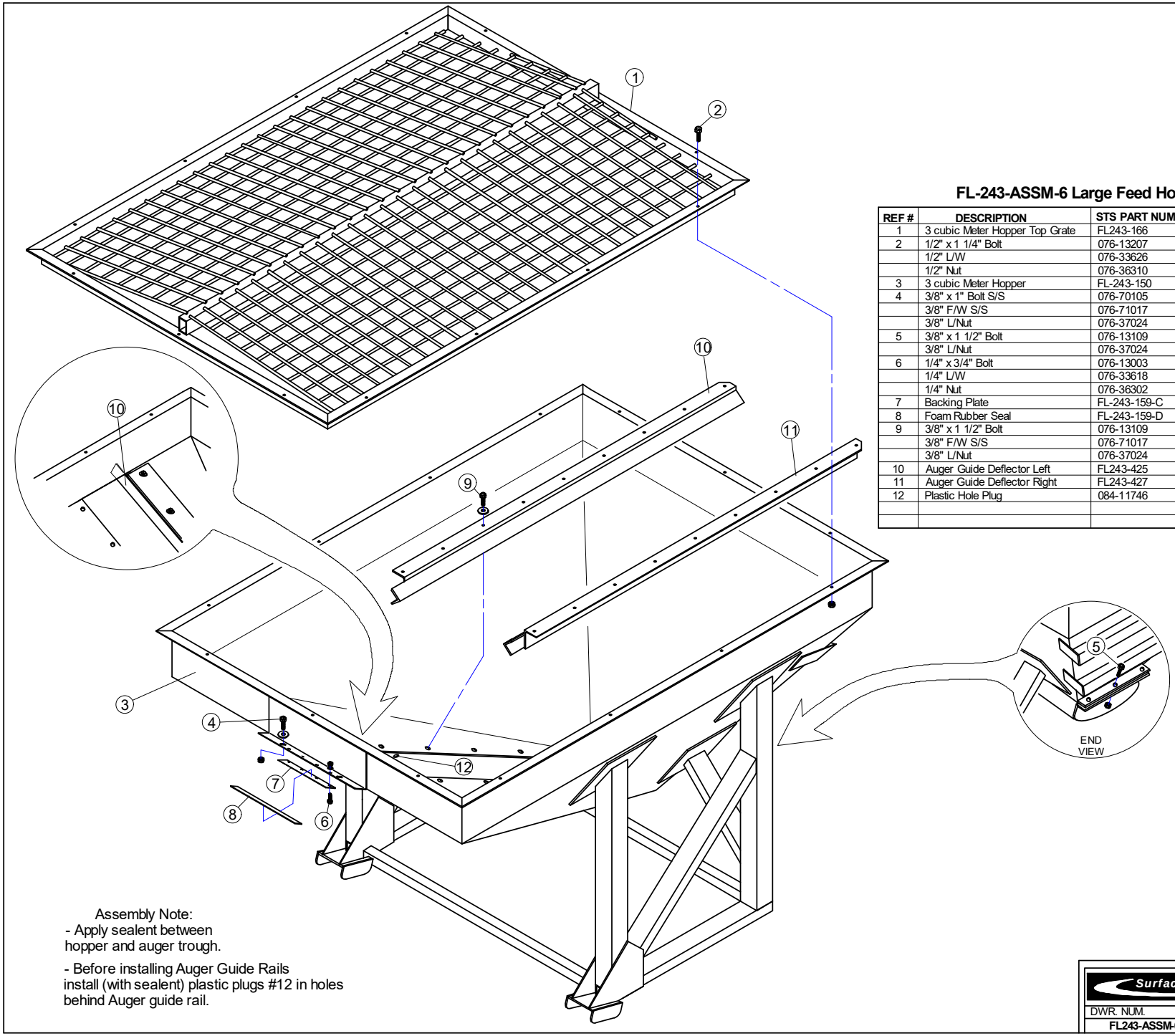
DWR. NUM.	DATE. 01 / 14 / 21
FL243-ASSM-5A	REV. 10 / 06 / 21



FL-243-ASSM-6 Large Feed Hopper

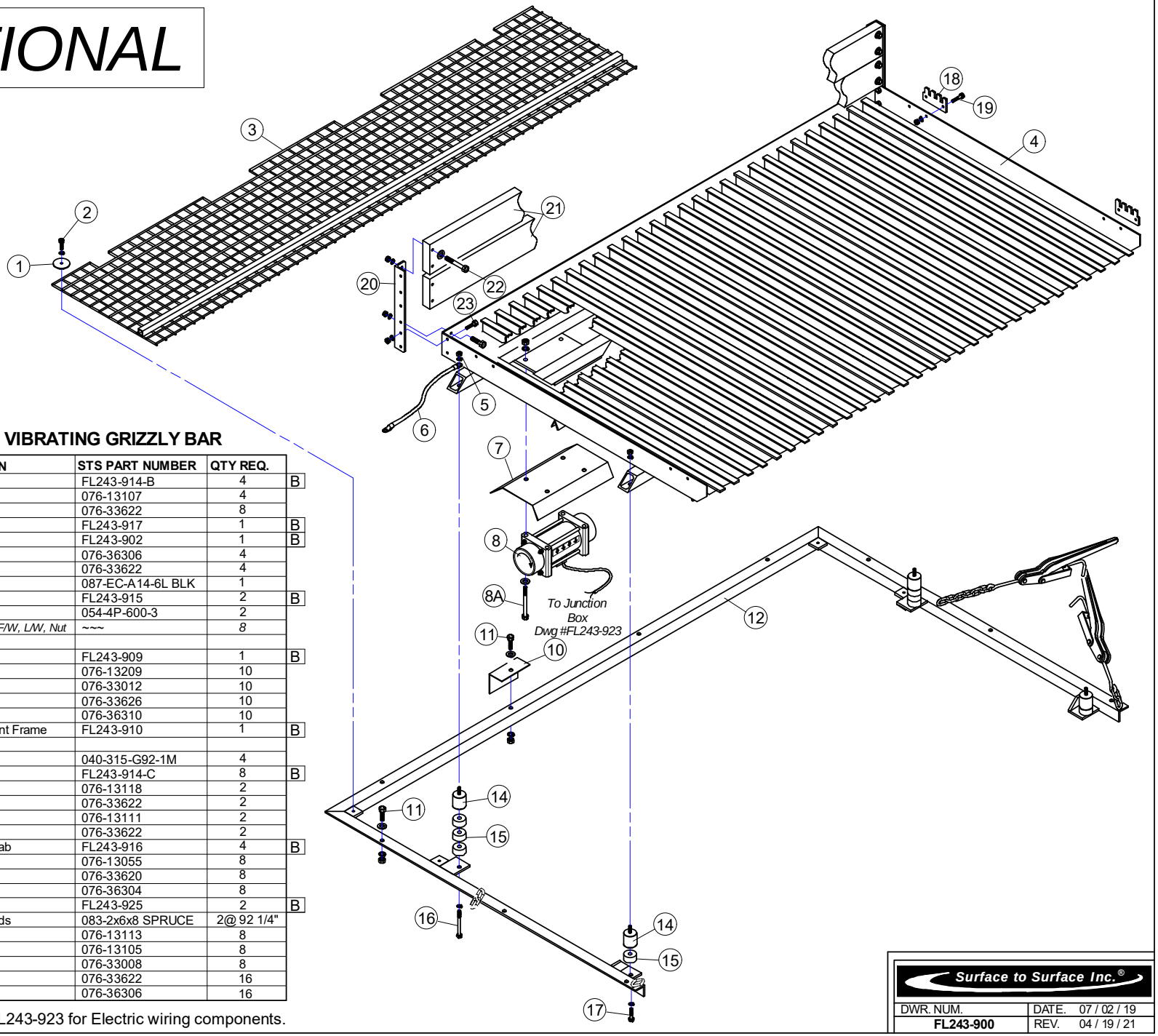
REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3 cubic Meter Hopper Top Grate	FL243-166	1	B
2	1/2" x 1 1/4" Bolt	076-13207	14	
	1/2" L/W	076-33626	14	
	1/2" Nut	076-36310	14	
3	3 cubic Meter Hopper	FL-243-150	1	Y
4	3/8" x 1" Bolt S/S	076-70105	2	
	3/8" F/W S/S	076-71017	2	
	3/8" L/Nut	076-37024	2	
5	3/8" x 1 1/2" Bolt	076-13109	3	
	3/8" L/Nut	076-37024	3	
6	1/4" x 3/4" Bolt	076-13003	4	
	1/4" L/W	076-33618	4	
	1/4" Nut	076-36302	4	
7	Backing Plate	FL-243-159-C	1	Y
8	Foam Rubber Seal	FL-243-159-D	1	
9	3/8" x 1 1/2" Bolt	076-13109	20	
	3/8" F/W S/S	076-71017	20	
	3/8" L/Nut	076-37024	20	
10	Auger Guide Deflector Left	FL243-425	1	Y
11	Auger Guide Deflector Right	FL243-427	1	Y
12	Plastic Hole Plug	084-11746	2	

Assembly Note:
- Apply sealent between hopper and auger trough.
- Before installing Auger Guide Rails install (with sealent) plastic plugs #12 in holes behind Auger guide rail.

Surface to Surface Inc.®

DWR. NUM.	DATE. 09 / 08 / 21
FL243-ASSM-6-A	REV.

OPTIONAL



FL-243-900 VIBRATING GRIZZLY BAR

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Hold Down Washer	FL243-914-B	4	B
2	3/8" x 1 1/4" Bolt	076-13107	4	
	3/8" L/W	076-33622	8	
3	Back Grate	FL243-917	1	B
4	T Grate Deck	FL243-902	1	B
5	3/8" Nut	076-36306	4	
	3/8" L/W	076-33622	4	
6	Grounding Strap	087-EC-A14-6L BLK	1	
7	Vibrator Shield	FL243-915	2	B
8	Vibrator	054-4P-600-3	2	
8A	*C/W 1/2" x 6 1/2" Bolt, F/W, L/W, Nut*	~~~	*8*	
9				
10	Junction Box Mount	FL243-909	1	B
11	1/2" x 1 1/2" Bolt	076-13209	10	
	1/2" F/W	076-33012	10	
	1/2" L/W	076-33626	10	
	1/2" Nut	076-36310	10	
12	Shaker Hopper Mount Frame	FL243-910	1	B
13				
14	Rubber Isolator	040-315-G92-1M	4	
15	Isolator Spacer	FL243-914-C	8	B
16	3/8" x 3 3/4" Bolt	076-13118	2	
	3/8" L/W	076-33622	2	
17	3/8" x 2" Bolt	076-13111	2	
	3/8" L/W	076-33622	2	
18	Binder Hold-down Tab	FL243-916	4	B
19	5/16" x 1" Bolt	076-13055	8	
	5/16" L/W	076-33620	8	
	5/16" Nut	076-36304	8	
20	Back Stop Corner	FL243-925	2	B
21	2" x 6" Spruce Boards	083-2x6x8 SPRUCE	2@ 92 1/4"	
22	3/8" x 2 1/2" Bolt	076-13113	8	
23	3/8" x 1" Bolt	076-13105	8	
	3/8" F/W	076-33008	8	
	3/8" L/W	076-33622	16	
	3/8" Nut	076-36306	16	

Also see Drawing #FL243-923 for Electric wiring components.

Surface to Surface Inc.®

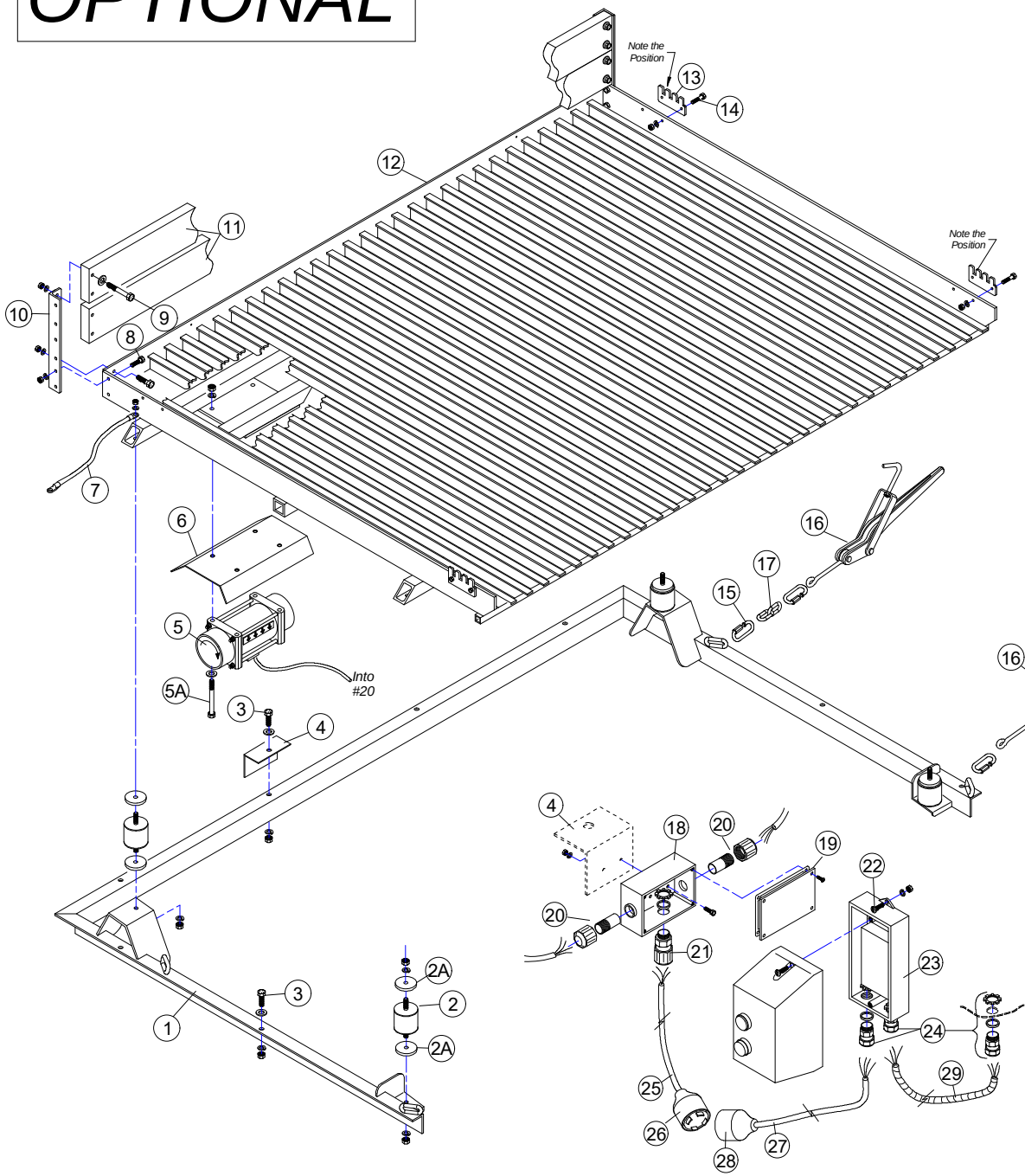
DWR. NUM.	DATE. 07 / 02 / 19
FL243-900	REV. 04 / 19 / 21

OPTIONAL

FL-243-950 HD VIBRATING GRIZZLY BAR

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	HD Shaker Hopper Mount Frame	FL243-960	1	B
2	Rubber Isolator	040-9213K36	4	
	1/2" L/W	076-33626	8	
	1/2" Nut	076-36310	8	
2A	Isolator Spacer	FL243-966	8	B
3	1/2" x 1 1/2" Bolt	076-13209	10	
	1/2" F/W	076-33012	10	
	1/2" L/W	076-33626	10	
	1/2" Nut	076-36310	10	
4	Junction Box Mount	FL243-909	1	B
5	Vibrator	054-4P-1000-3	2	
5A	*C/W 5/8" x 8" Bolt, F/W, L/W, Nut*	~~~	*8*	
6	Vibrator Shield	FL243-965	2	B
7	Grounding Strap	FL243-969	1	
8	3/8" x 1" Bolt	076-13105	8	
9	3/8" x 2 1/2" Bolt	076-13113	8	
	3/8" F/W	076-33008	8	
	3/8" L/W	076-33622	16	
	3/8" Nut	076-36306	16	
10	Back Stop Corner	FL243-925	2	B
11	2" x 6" Spruce Boards	083-2x6x8 SPRUCE	2@ 92 1/4"	
12	HD Tee Grate Deck	FL243-952	1	B
13	Binder Hold-down Tab	FL243-916	4	B
14	5/16" x 1" Bolt	076-13055	8	
	5/16" L/W	076-33620	8	
	5/16" Nut	076-36304	8	
15	5/16" Quicklink Chain Connector	076-45214	6	
16	Hold Down Binder	FL243-967	4	O
17	3/8" Chain	085-0210011	2 @ 2 links	

B= Black O= Orange

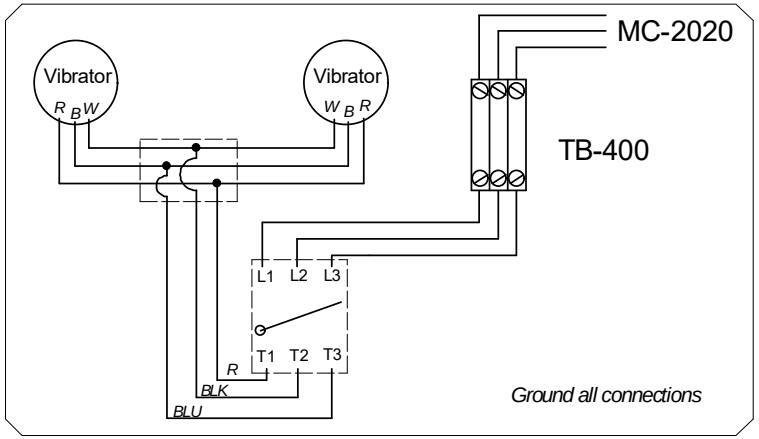


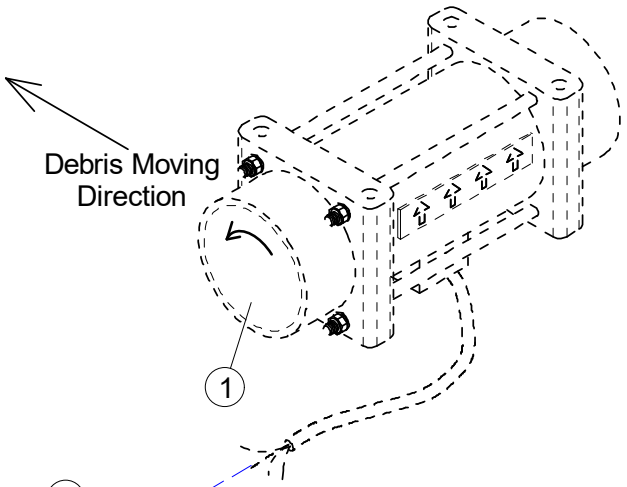
18	Junction Box	#FL243-909-A	1
19	Junction Box Cover c/w Gasket	#089-BRC15/10	1
20	Glue-in Strain Relief	#089-SRC15	2
21	Thread in Strain Relief	#089-TSRC15	1
22	Machine screw & L/W & Nut	~~~	2
23	Start / Stop Switch	034-M1P009	1
24	1/2" NPT Strain Relief (metal)	089-CG50-650	3
	Steel/nylon sealing washer	089-STG050	3
	1/2" Conduit locking nut	089-CI1704	3
25	Power Wire 4c / 14	089-SOW4C14	140 inches
26	Male Twist Lock Plug	089-AHL1630P	1
	Male Weatherproof Boot	089-BL2	1
27	Power Wire 4c / 14	089-SOW4C14	90 inches
28	Female Twist Lock Plug	089-AHL1630C	1
	Female Weatherproof Boot	089-BL1	1
29	Armorcoat 14 / 3C	#FL243-352-B	1
	Large Marr Connector (wirenut)	~~~	4
	Velcro Strap 15 3/4"	030-888-421	2

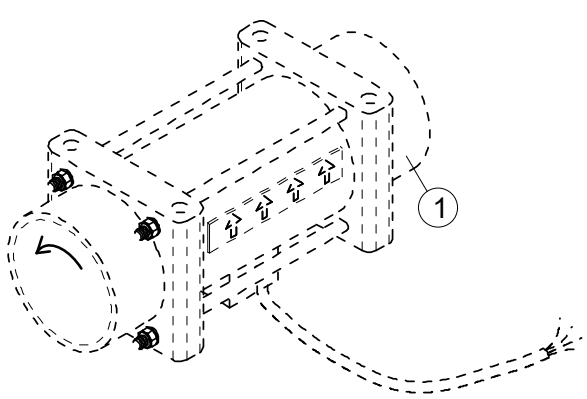
NOTE: see Dwg. #FL243-923 for wiring detail.

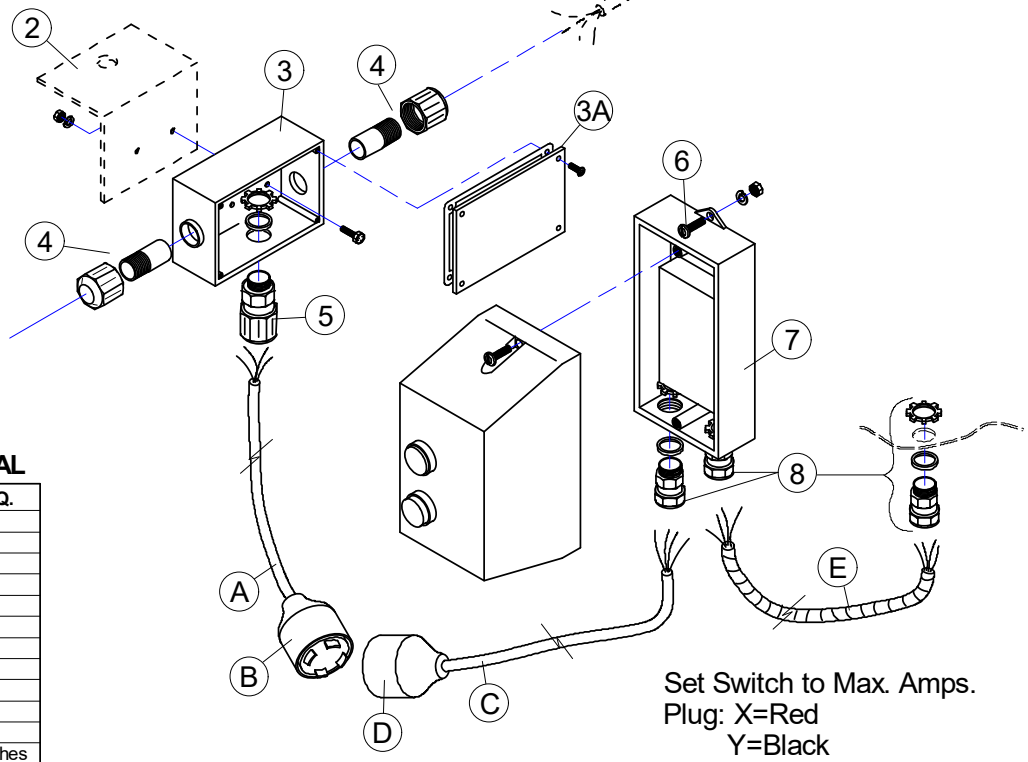
Surface to Surface Inc.®

DWR. NUM.	DATE. 08 / 13 / 21
FL243-950	REV. 02 / 01 / 22









#FL243-923 KIT
FL-243-900 VIBRATING GRIZZLY BAR ELECTRICAL

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.
1	Vibrator	054-4P-1000-3	2
2	Junction Box Mount	FL243-909	1
3	Junction Box	#FL243-909-A	1
3A	Junction Box Cover c/w Gasket	#089-BRC15/10	1
4	Glue-in Strain Relief	#089-SRC15	2
5	Thread in Strain Relief	#089-TSRC15	1
6	Machine screw & L/W & Nut	~~~	2
7	Start / Stop Switch	034-M1P009	1
8	1/2" NPT Strain Relief (metal)	089-CG50-650	3
	Steel/nylon sealing washer	089-STG050	3
	1/2" Conduit locking nut	089-CI1704	3
A	Power Wire 4c / 14	089-SOW4C14	140 inches
B	Male Twist Lock Plug	089-AHL1630P	1
	Male Weatherproof Boot	089-BL2	1
C	Power Wire 4c / 14	089-SOW4C14	90 inches
D	Female Twist Lock Plug	089-AHL1630C	1
	Female Weatherproof Boot	089-BL1	1
E	Armorcoat 14 / 3C	#FL243-352-B	1
	Large Marr Connector (wirenut)	~~~	4
	Velcro Strap 15 3/4"	030-888-421	2

Set Switch to Max. Amps.
Plug: X=Red
Y=Black
Z=White

Surface to Surface Inc.®

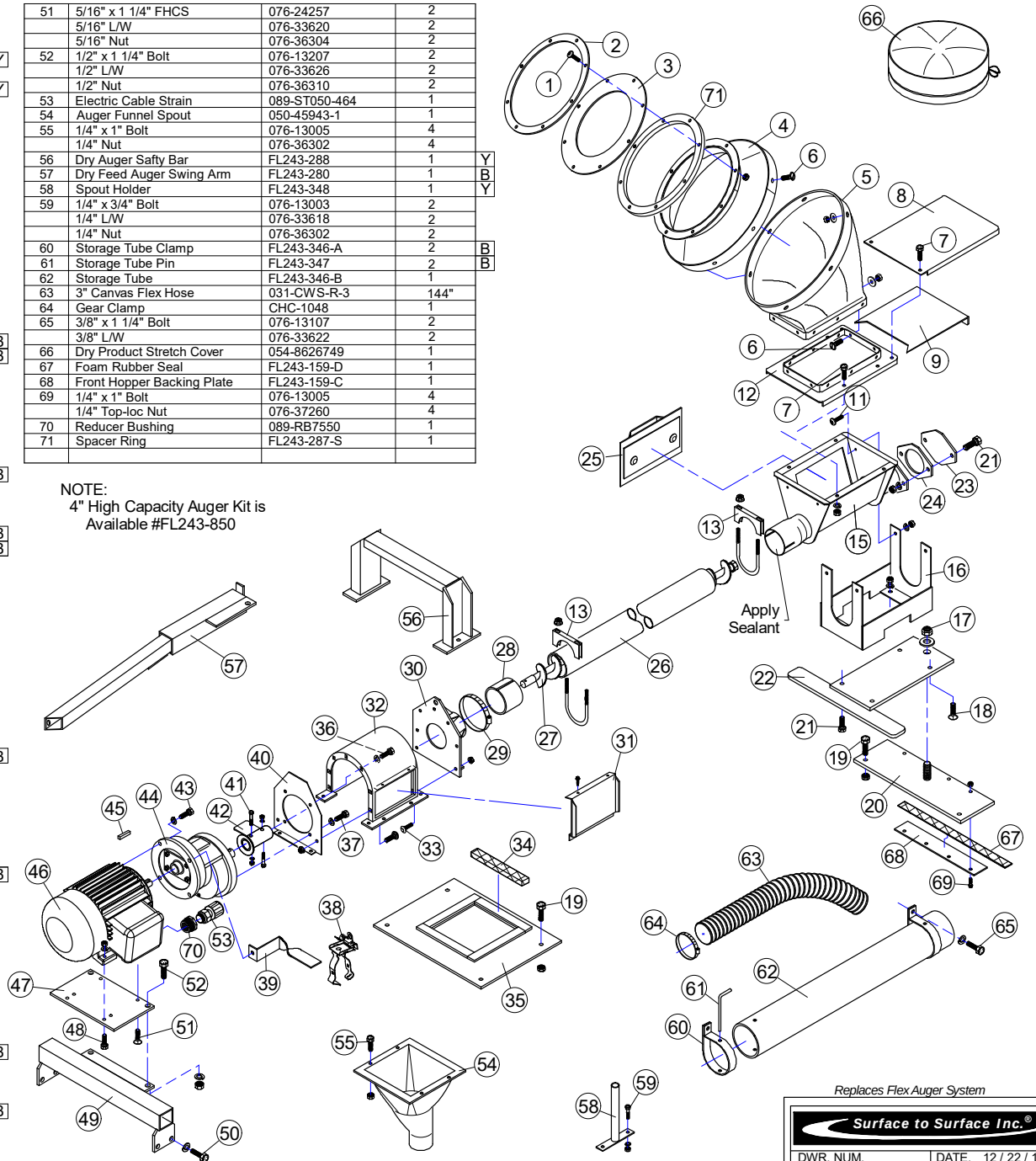
DWR. NUM.	DATE. 09 / 08 / 21
FL243-923	REV. 10 / 06 / 21

FL-243-ASSM-7 Standard 2 5/8" Dry Auger Feed System

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3/8" x 1 1/4" BHCS (s/s)	076-73816	8	
	3/8" L/Nut	076-70862	8	
2	Retaining Ring	FL243-287-A	1	Y
3	Tote Seal Rubber Gasket	FL243-286	1	
4	Tote Seal Adaptor Pipe	FL243-283	1	Y
5	Clear Transition Boot	050-4347C	1	
6	5/16" x 1" FH Slotted Bolt	076-27743	18	
	5/16" Plastic F/W	076-76062	18	
	5/16" Plastic Hex Nut	076-1176051	18	
7	5/16" x 3/4" Bolt	076-13053	6	
	5/16" L/W	076-33620	6	
	5/16" Nut	076-36304	6	
8	Slide Shield	050-4876	1	
9	Slide (Knife)	050-4357	1	
10				
11	1/4" x 3/4" BHCS	076-24051	4	
	1/4" L/W	076-33618	4	
	1/4" Nut	076-36302	4	
12	Transfer Plate	050-4359	1	
13	2 3/4" Exhaust Clamp	031-MC7234A	2	
14				
15	Dry Auger Inlet Box	FL243-881	1	B
16	Dry Auger Inlet Box Stand	FL243-263	1	B
17	3/4" NC Stover Lock Nut	076-37274	1	
	3/4" SAE F/W	076-33092	1	
18	3/8" x 1" FHCS	076-24286	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
19	3/8" x 1" Bolt	076-13105	6	
	3/8" L/Nut	076-37024	6	
20	Dry Auger Inlet Box Swivel Plate	FL243-266	1	B
21	3/8" x 1" Bolt	076-13105	6	
	3/8" L/W	076-33622	6	
	3/8" Nut	076-36306	6	
22	Inlet Box Swivel Base	FL243-267	1	B
23	Inlet Box Cap	FL243-882-B	1	B
24	Inlet Box Gasket	FL243-882-G	1	
25	Clean-Out Cover Assembly	050-6197	1	
26	Outer Steel Pipe	FL243-884	1	
27	2 1/2" Dry Auger	FL243-883	1	
28	Plastic to Steel Bushing Pipe	050-6524	1	
29	Gear Clamp	CHC-1048	1	
30	Tube Anchor Plate (Red Plastic)	050-45925	1	
31	Cover Plate	050-46030	1	
	Screw #10 x 5/8"L	#076-2166-879	2	
32	Control Unit Body	050-43601	1	
33	1/4" x 3/4" Carriage Bolt	076-21153	14	
	1/4" Flaired L/Nut	076-37337	14	
34	1/2" Foam Gasket	088-FOAM	31"	
35	Dry Feed Auger Discharge Plate	FL243-277	1	B
36	3/8" x 1" Bolt	076-13105	2	
	3/8" L/W	076-33622	2	
	3/8" F/W	076-33008	2	
37	3/8" x 3/4" Bolt	076-13103	2	
	3/8" L/W	076-33622	2	
	3/8" F/W	076-33008	2	
38	Push on Cable Clamp	089-BG-8-12-12-U-5-8	1	
39	Dry Auger Motor Cable Clamp	FL243-339-B	1	B
40	Gearhead End Plate	FL243-273	1	
41	5/16" NC x 2" Bolt	076-13061	2	
	5/16" L/W	076-33620	2	
	5/16" Nut	076-36304	2	
42	Auger Drive Adaptor	FL243-869	1	
43	3/8" x 1" Bolt	076-13105	4	
	3/8" L/W	076-33622	4	
44	Gearbox (with drilled shaft)	FL243-274	1	
45	1/4" Keystock	036-47913	x	
46	2HP Electric Motor	034-2HP MOTOR 3PH	1	
	C-Face Flange 140T	034-CFE 140T	1	
47	2hp Auger Motor Base Plate	FL243-271-A	1	B
48	5/16" x 1 1/4" Bolt	076-13057	2	
	5/16" L/W	076-33620	2	
	5/16" Nut	076-36304	2	
49	Dry Auger Motor Support	FL243-269	1	B
50	1/2" x 1" Bolt	076-13205	4	
	1/2" L/W	076-33626	4	

51	5/16" x 1 1/4" FHCS	076-24257	2	
	5/16" L/W	076-33620	2	
	5/16" Nut	076-36304	2	
52	1/2" x 1 1/4" Bolt	076-13207	2	
	1/2" L/W	076-33626	2	
	1/2" Nut	076-36310	2	
53	Electric Cable Strain	089-ST050-464	1	
54	Auger Funnel Spout	050-45943-1	1	
55	1/4" x 1" Bolt	076-13005	4	
	1/4" Nut	076-36302	4	
56	Dry Auger Safty Bar	FL243-288	1	Y
57	Dry Feed Auger Swing Arm	FL243-280	1	B
58	Spout Holder	FL243-348	1	Y
59	1/4" x 3/4" Bolt	076-13003	2	
	1/4" L/W	076-33618	2	
	1/4" Nut	076-36302	2	
60	Storage Tube Clamp	FL243-346-A	2	B
61	Storage Tube Pin	FL243-347	2	B
62	Storage Tube	FL243-346-B	1	
63	3" Canvas Flex Hose	031-CWS-R-3	144"	
64	Gear Clamp	CHC-1048	1	
65	3/8" x 1 1/4" Bolt	076-13107	2	
	3/8" L/W	076-33622	2	
66	Dry Product Stretch Cover	054-8626749	1	
67	Foam Rubber Seal	FL243-159-D	1	
68	Front Hopper Backing Plate	FL243-159-C	1	
69	1/4" x 1" Bolt	076-13005	4	
	1/4" Top-loc Nut	076-37260	4	
70	Reducer Bushing	089-RB7550	1	
71	Spacer Ring	FL243-287-S	1	

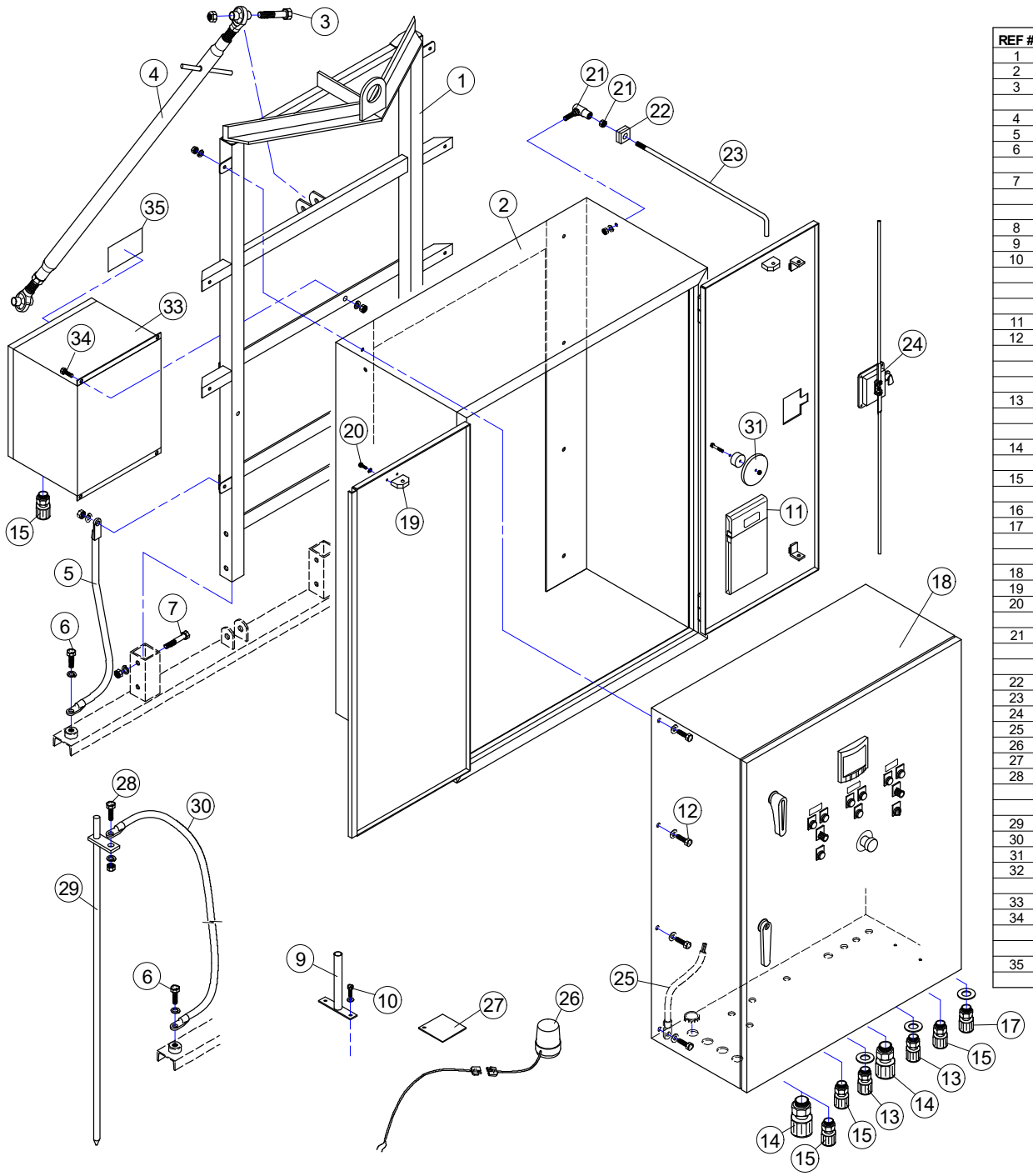
NOTE:
4" High Capacity Auger Kit is Available #FL243-850



Replaces Flex Auger System

Surface to Surface Inc.®

DWR. NUM.	DATE. 12 / 22 / 15
FL243-ASSM-7	REV. 10 / 06 / 21



FL243-ASSM-8 Control Panel

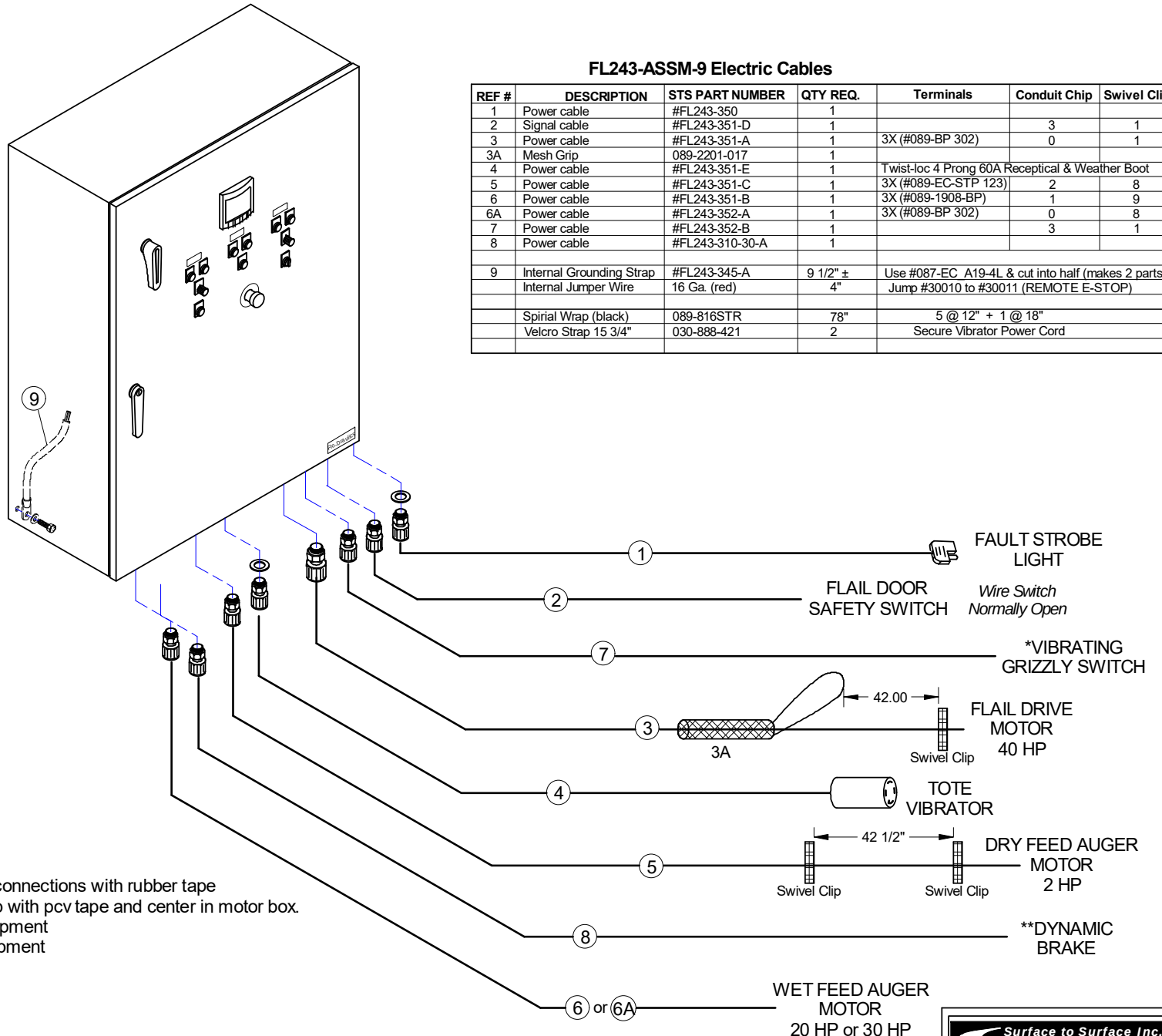
REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Control Panel Post	FL243-314	1	Y
2	Control Panel Lock Box	FL243-312	1	
3	3/4" x 3 1/2" Bolt	076-13367	2	
	3/4" Top lock Nut	076-37274	2	
4	Control Panel Brace	FL243-335	1	B
5	Ground Strap	FL243-345-B	1	
6	1/2" x 3/4" Bolt	076-13203	2	
	1/2" L/W	076-33626	2	
7	1/2" x 3" Bolt	076-13215	4	
	1/2" L/W	076-33626	4	
	1/2" Nut	076-36310	4	
8				
9	Spout Holder	FL243-348	1	Y
10	1/4" x 1" Bolt	076-13005	2	
	1/4" F/W	076-33004	2	
	1/4" L/W	076-33618	2	
	1/4" Nut	076-36302	2	
11	Operator Manual Holder (tape)	084-9000-07	1	
12	3/8" x 1" Bolt	076-13107	8	
	3/8" rubber sealing flat washer	076-33157	8	
	3/8" L/W	076-33622	8	
	3/8" Nut	076-36306	8	
13	1/2" Strain Relief	089-ST050-465	2	
	1/2" Conduit L/Nut	089-CI1704	2	
	Sealing Gasket	089-STG050	1	
14	3/4" Strain Relief	089-ST075-468	2	
	3/4" Conduit L/Nut	089-CI1706	2	
15	1/2" Strain Relief	089-ST050-464	4	
	1/2" Conduit L/Nut	089-CI1704	4	
16				
17	1/2" Strain Relief (for strobe)	089-CG50-250	1	
	1/2" Conduit L/Nut	089-CI1704	1	
	Sealing Gasket	089-STG050	1	
18	Control Cabnet	FL243-310	1	
19	Panel Door Block	FL243-354	2	
20	1/4" x 3/4" Bolt x S/S	076-70003	4	
	1/4" F/W x S/S	076-0173192	4	
21	Ball Joint	076-11120157	2	
	3/8" L/W	076-33622	2	
	3/8"-24 NF Nut	076-36256	2	
22	Door Arm Bumper	FL243-355-B	2	
23	Door Arm	FL243-355-A	2	Y
24	Door Latch & Lock Kit	XXX	1	
25	Internal Grounding Strap	FL243-345-A	1	
26	Magnetic Strobe Light	FL243-350	1	
27	Strobe Light Storage Plate	FL243-357	1	B
28	1/2" x 1" Bolt	076-13205	1	
	1/2" L/W	076-33626	1	
	1/2" Nut	076-36310	1	
29	Ground Stake	FL243-360	1	Y
30	Ground Stake Cable	FL243-361	1	
31	Strobe Light Cord Wrap	FL243-349	1	
32	1/4" x 1 3/4" Bolt	076-13010	1	
	1/4" L/Nut	076-36302	1	
33	Secondary Panel for Dyn Brake	FL243-310-30	1	
34	5/16" x 1" Bolt	076-13055	1	
	5/16" L/W	076-33620	1	
	5/16" Nut	076-36304	1	
35	Danger Heat Decal	FL243-721	1	

Surface to Surface Inc.®

DWR. NUM.	DATE. 08 / 01 / 17
FL243-ASSM-8	REV. 09 / 08 / 21

FL243-ASSM-9 Electric Cables

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	Terminals	Conduit Chip	Swivel Clip
1	Power cable	#FL243-350	1			
2	Signal cable	#FL243-351-D	1		3	1
3	Power cable	#FL243-351-A	1	3X (#089-BP 302)	0	1
3A	Mesh Grip	089-2201-017	1			
4	Power cable	#FL243-351-E	1	Twist-loc 4 Prong 60A Receptical & Weather Boot		
5	Power cable	#FL243-351-C	1	3X (#089-EC-STP 123)	2	8
6	Power cable	#FL243-351-B	1	3X (#089-1908-BP)	1	9
6A	Power cable	#FL243-352-A	1	3X (#089-BP 302)	0	8
7	Power cable	#FL243-352-B	1		3	1
8	Power cable	#FL243-310-30-A	1			
9	Internal Grounding Strap	#FL243-345-A	9 1/2" ±	Use #087-EC A19-4L & cut into half (makes 2 parts)		
	Internal Jumper Wire	16 Ga. (red)	4"	Jump #30010 to #30011 (REMOTE E-STOP)		
	Spirial Wrap (black)	089-816STR	78"	5 @ 12" + 1 @ 18"		
	Velcro Strap 15 3/4"	030-888-421	2	Secure Vibrator Power Cord		



NOTES:

Wrap all motor connections with rubber tape
then wrap with pcv tape and center in motor box.

* Optional Equipment

** Optional Equipment

Canadian Code:

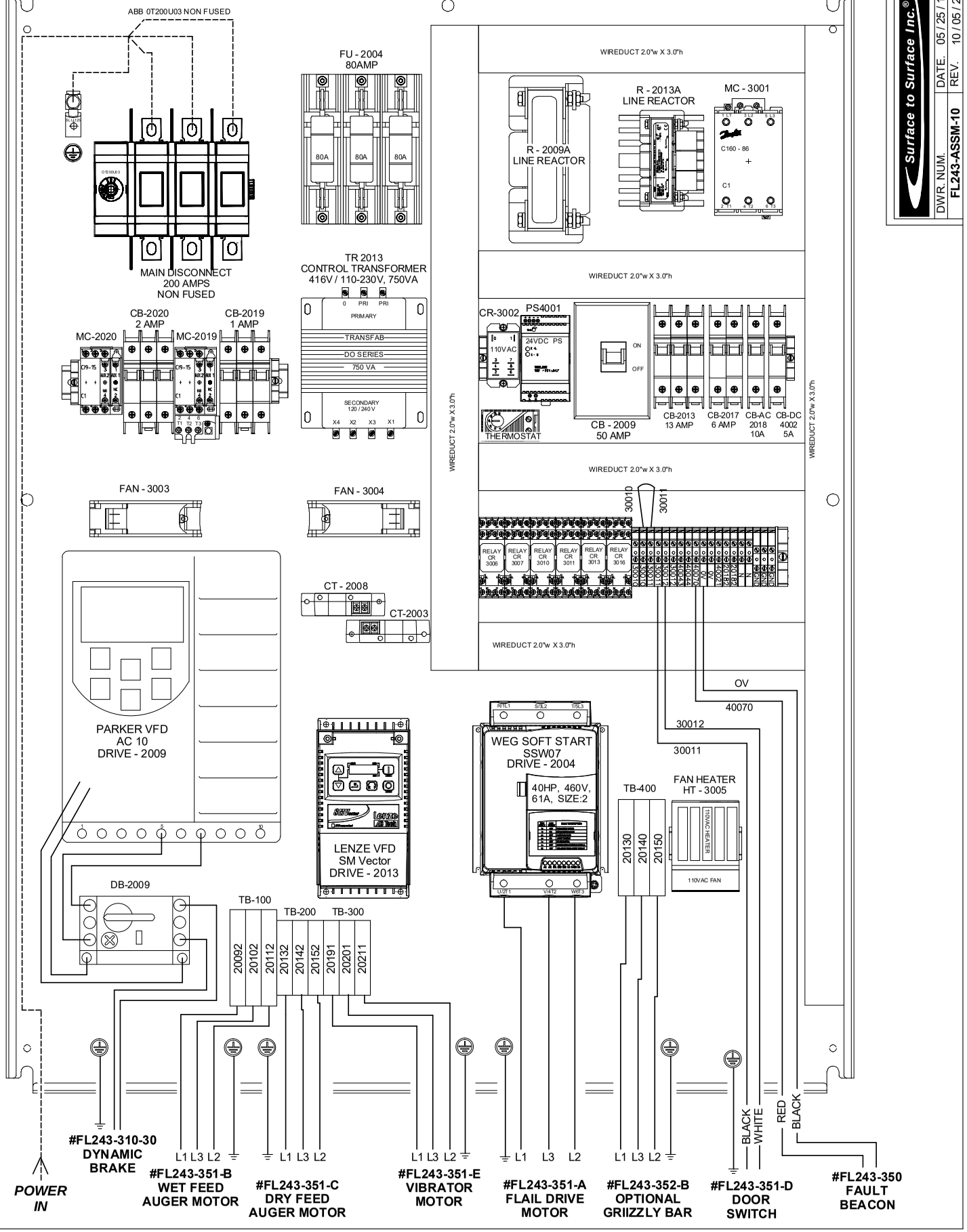
RED L1

BLACK L2

BLUE L3

Surface to Surface Inc.®

DWR. NUM.	DATE. 03 / 14 / 16
FL243-ASSM-9	REV. 09 / 10 / 19


Surface to Surface Inc.®
DWR. NUM. FL243-ASSM-10
DATE. 05 / 25 / 17
REV. 10 / 05 / 21
ABB 0T200U03 NON FUSED
MAIN DISCONNECT
200 AMPS
NON FUSED
FU - 2004
80AMP
80A
80A
80A
TR 2013
CONTROL TRANSFORMER
416V / 110-230V, 750VA
PRIMARY
TRANSFAB
DO SERIES
750 VA
SECONDARY
120 / 240 V
CB-2020
2 AMP
CB-2019
1 AMP
MC-2020
MC-2019
WIREDUCT 2.0"w X 3.0"h
R - 2009A
LINE REACTOR
R - 2013A
LINE REACTOR
MC - 3001
C160 - 86
C1
CR-3002
PS4001
24VDC PS
110VAC
ON
OFF
THERMOSTAT
CB - 2009
50 AMP
CB-2013
13 AMP
CB-2017
6 AMP
CB-AC
2018
10A
CB-DC
4002
5A
FAN - 3003
FAN - 3004
30010
30011
RELAY CR 3006
RELAY CR 3007
RELAY CR 3010
RELAY CR 3011
RELAY CR 3013
RELAY CR 3016
CT - 2008
CT-2003
PARKER VFD
AC 10
DRIVE - 2009
LENZE VFD
SM Vector
DRIVE - 2013
WEG SOFT START
SSW07
DRIVE - 2004
40HP, 460V,
61A, SIZE:2
OV
40070
30012
30011
TB-400
20130
20140
20150
FAN HEATER
HT - 3005
110VAC FAN
DB-2009
TB-100
TB-200
TB-300
20092
20102
20112
20132
20142
20152
20191
20201
20211
#FL243-310-30
DYNAMIC
BRAKE
POWER
IN
L1 L3 L2
#FL243-351-B
WET FEED
AUGER MOTOR
L1 L3 L2
#FL243-351-C
DRY FEED
AUGER MOTOR
L1 L3 L2
#FL243-351-E
VIBRATOR
MOTOR
L1
L3
L2
#FL243-351-A
FLAIL DRIVE
MOTOR
L1 L3 L2
#FL243-352-B
OPTIONAL
GRIIZZLY BAR
BLACK
WHITE
#FL243-351-D
DOOR
SWITCH
RED
BLACK
#FL243-350
FAULT
BEACON

REMOTE GREASE HOSE ASSEMBLY

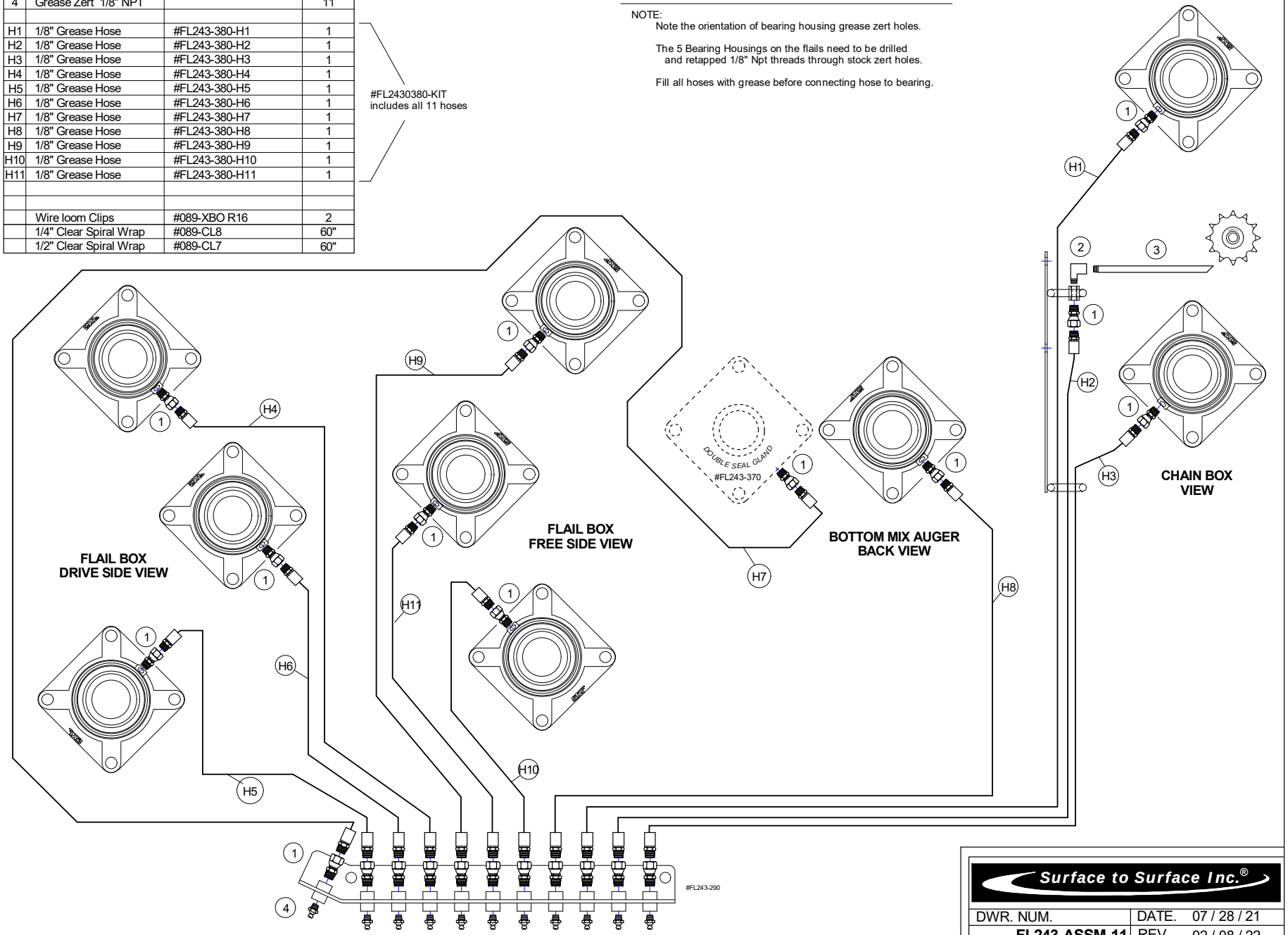
NOTE:
Note the orientation of bearing housing grease zert holes.

The 5 Bearing Housings on the flails need to be drilled and retapped 1/8" Npt threads through stock zert holes.

Fill all hoses with grease before connecting hose to bearing.

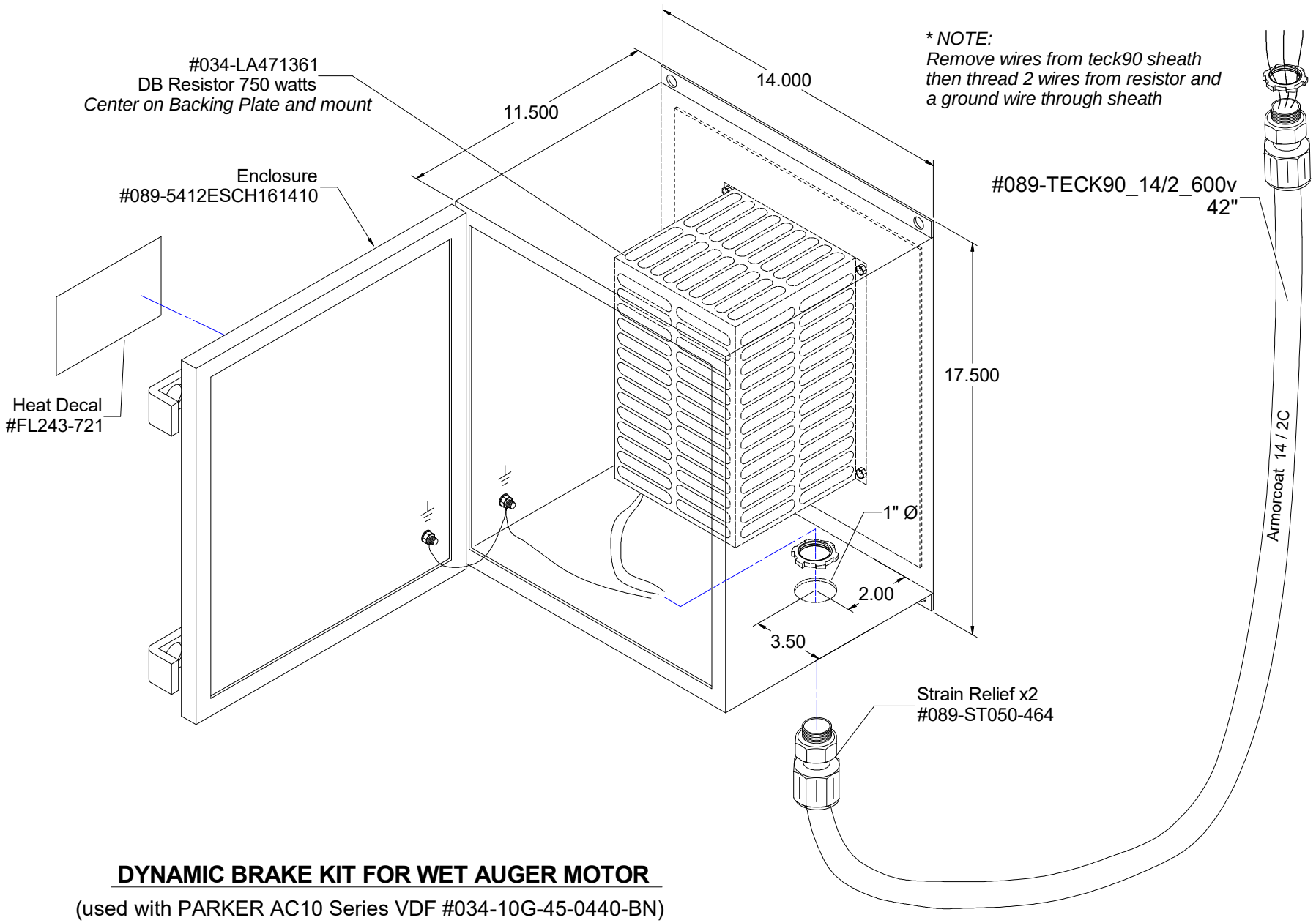
Ref	Discription	Part Number	Qty
1	Straight Pipe Swivel	#029-0107-2-2	22
2	Brass Street Elbow	#019-216200	1
3	1/8" Pipe	#FL243-293-A	1
4	Grease Zert 1/8" NPT		11
H1	1/8" Grease Hose	#FL243-380-H1	1
H2	1/8" Grease Hose	#FL243-380-H2	1
H3	1/8" Grease Hose	#FL243-380-H3	1
H4	1/8" Grease Hose	#FL243-380-H4	1
H5	1/8" Grease Hose	#FL243-380-H5	1
H6	1/8" Grease Hose	#FL243-380-H6	1
H7	1/8" Grease Hose	#FL243-380-H7	1
H8	1/8" Grease Hose	#FL243-380-H8	1
H9	1/8" Grease Hose	#FL243-380-H9	1
H10	1/8" Grease Hose	#FL243-380-H10	1
H11	1/8" Grease Hose	#FL243-380-H11	1
	Wire loom Clips	#089-XBO R16	2
	1/4" Clear Spiral Wrap	#089-CL8	60"
	1/2" Clear Spiral Wrap	#089-CL7	60"

#FL2430380-KIT
includes all 11 hoses



Surface to Surface Inc.®

DWR. NUM.	DATE. 07 / 28 / 21
FL243-ASSM-11	REV. 02 / 08 / 22



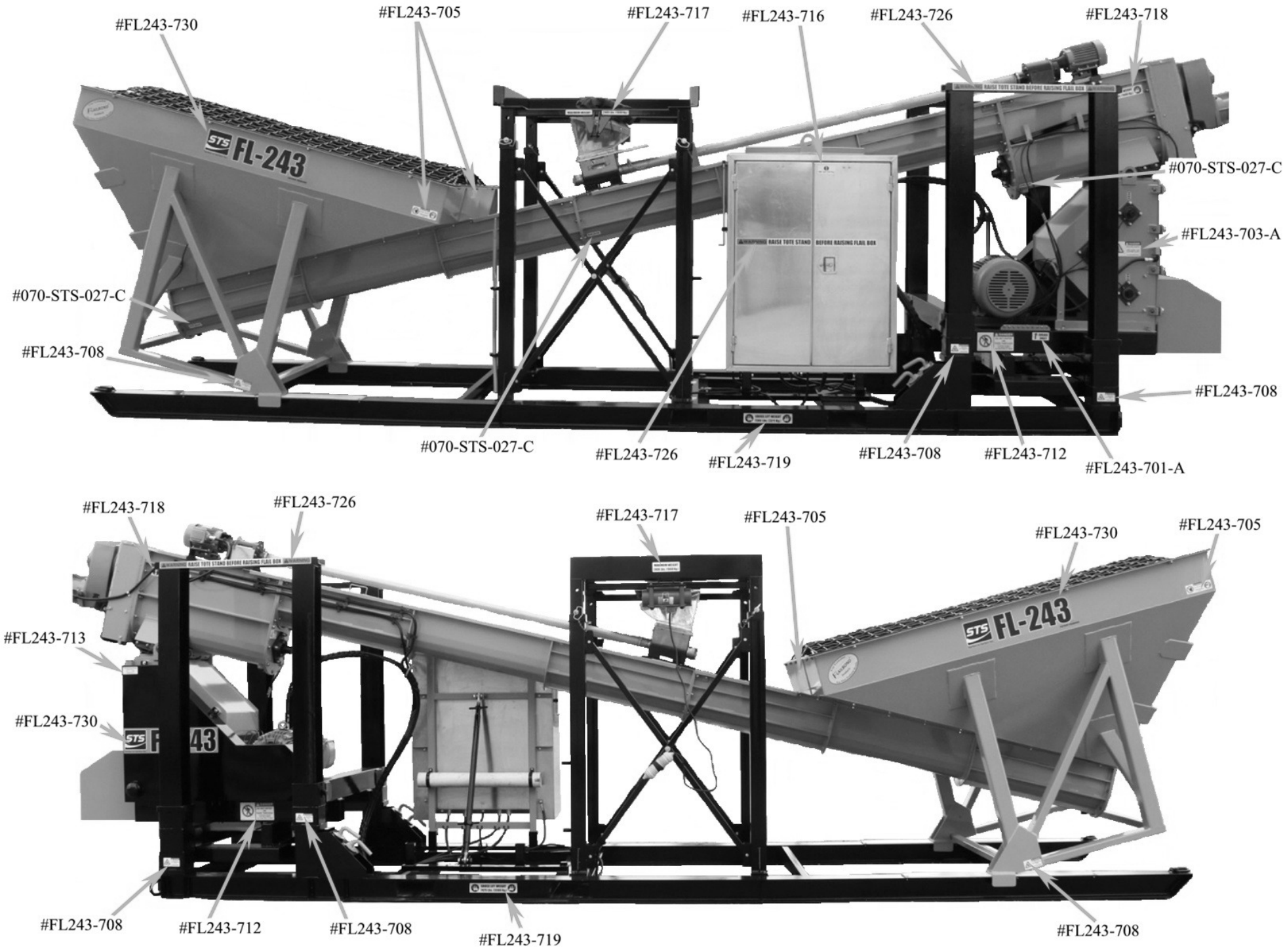
DYNAMIC BRAKE KIT FOR WET AUGER MOTOR

(used with PARKER AC10 Series VDF #034-10G-45-0440-BN)

#FL243-310-30 for 30hp Motor

Surface to Surface Inc.®

DWR. NUM.	DATE. 08 / 10 / 21
FL243-ASSM-12	REV. 09 / 20 / 21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#FL243-705
#FL243-717
#FL243-716
#FL243-726
#FL243-718
#070-STS-027-C
#FL243-703-A
#070-STS-027-C
#FL243-708
#FL243-708
#070-STS-027-C
#FL243-726
#FL243-719
#FL243-708
#FL243-712
#FL243-701-A
#FL243-718
#FL243-726
#FL243-717
#FL243-705
#FL243-730
#FL243-705
#FL243-713
#FL243-730
#FL243-708
#FL243-712
#FL243-708
#FL243-719
#FL243-708

#FL243-705

#FL243-730

#FL243-718

#070-STS-027-C

#STS-Pipemarker 3"

#FL243-703-A

#STS-Pipemarker 3"

#FL243-726

#FL243-708

#FL243-701-A

S/N Plate

#FL243-712

#FL243-709

#FL243-704

#FL243-706

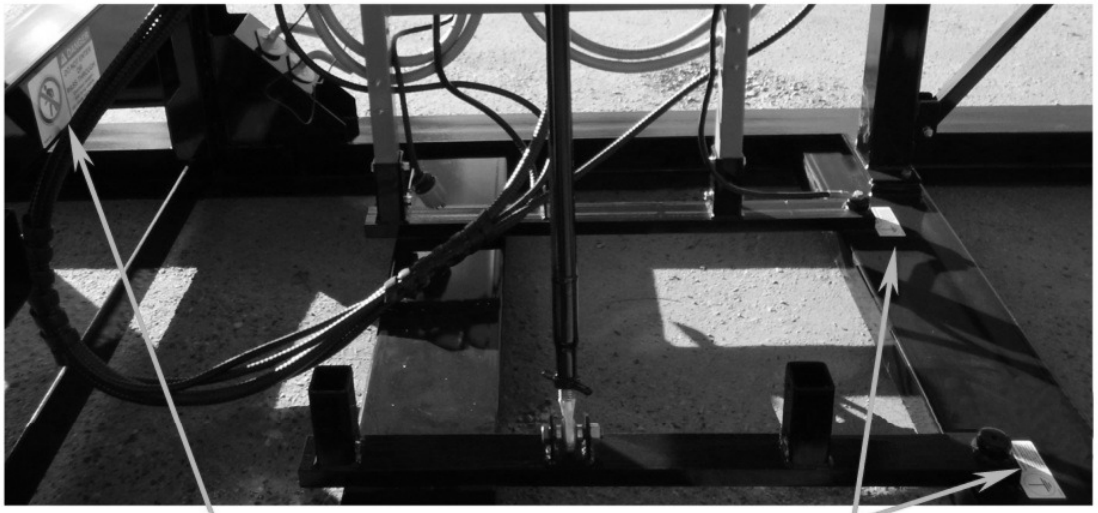
#FL243-713

#FL243-726

#FL243-708

#FL243-712

#FL243-708



#FL243-712

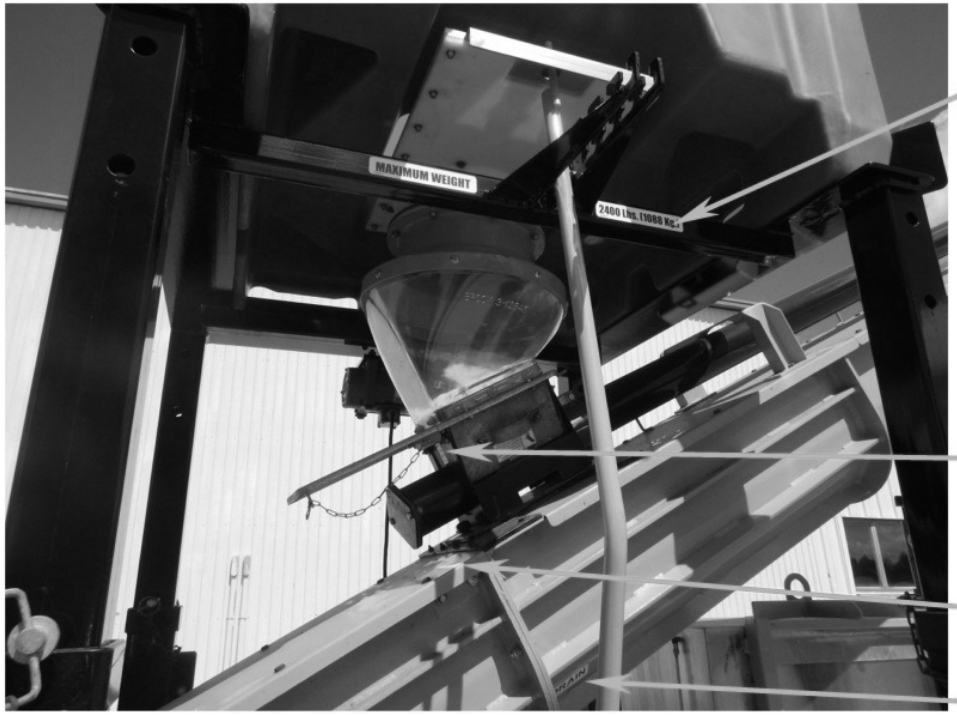
#FL243-710

#FL243-718

#FL243-703-B

#STS-Pipemarker 3"

#FL243-712

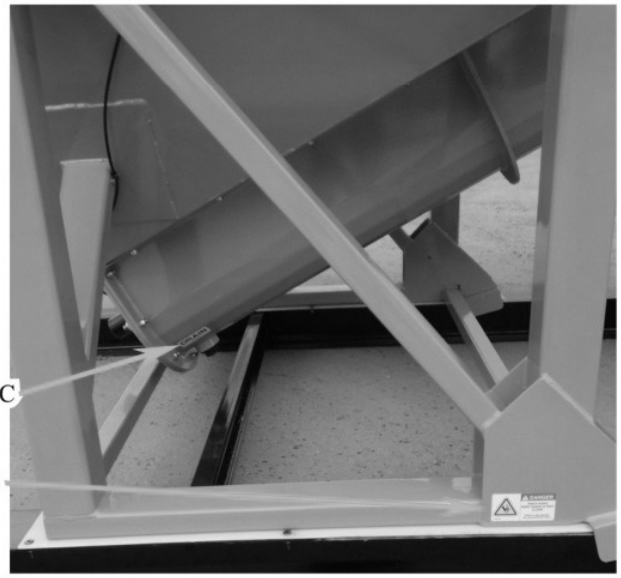


#FL243-717
x 4 sides

#STS-Pipemarker 3"

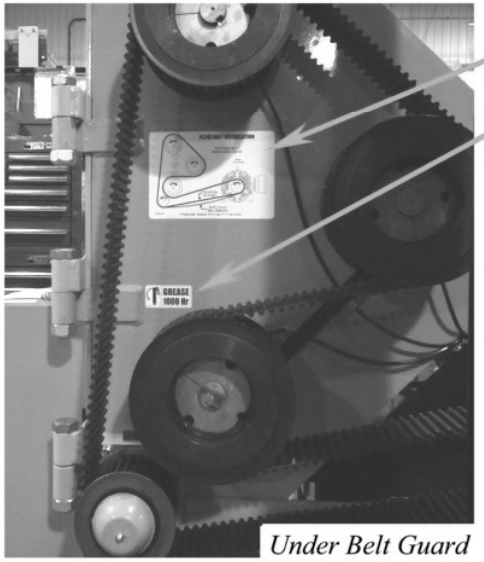
#FL243-709
x 5 covers

#070-STS-027-C

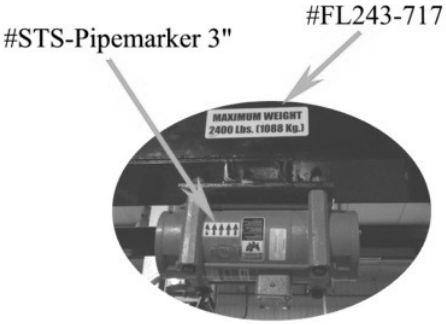


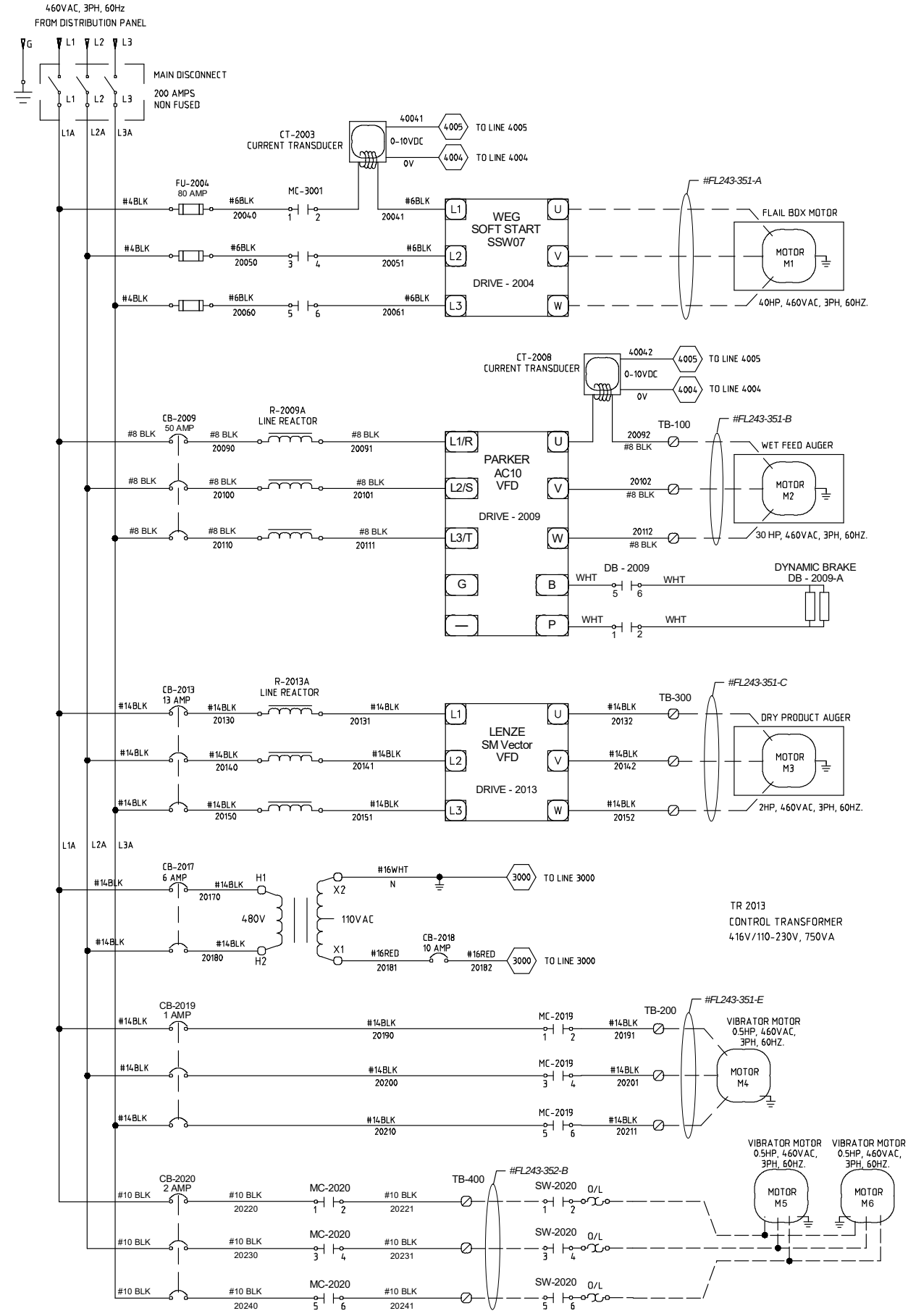
#070-STS-027-C

#FL243-708



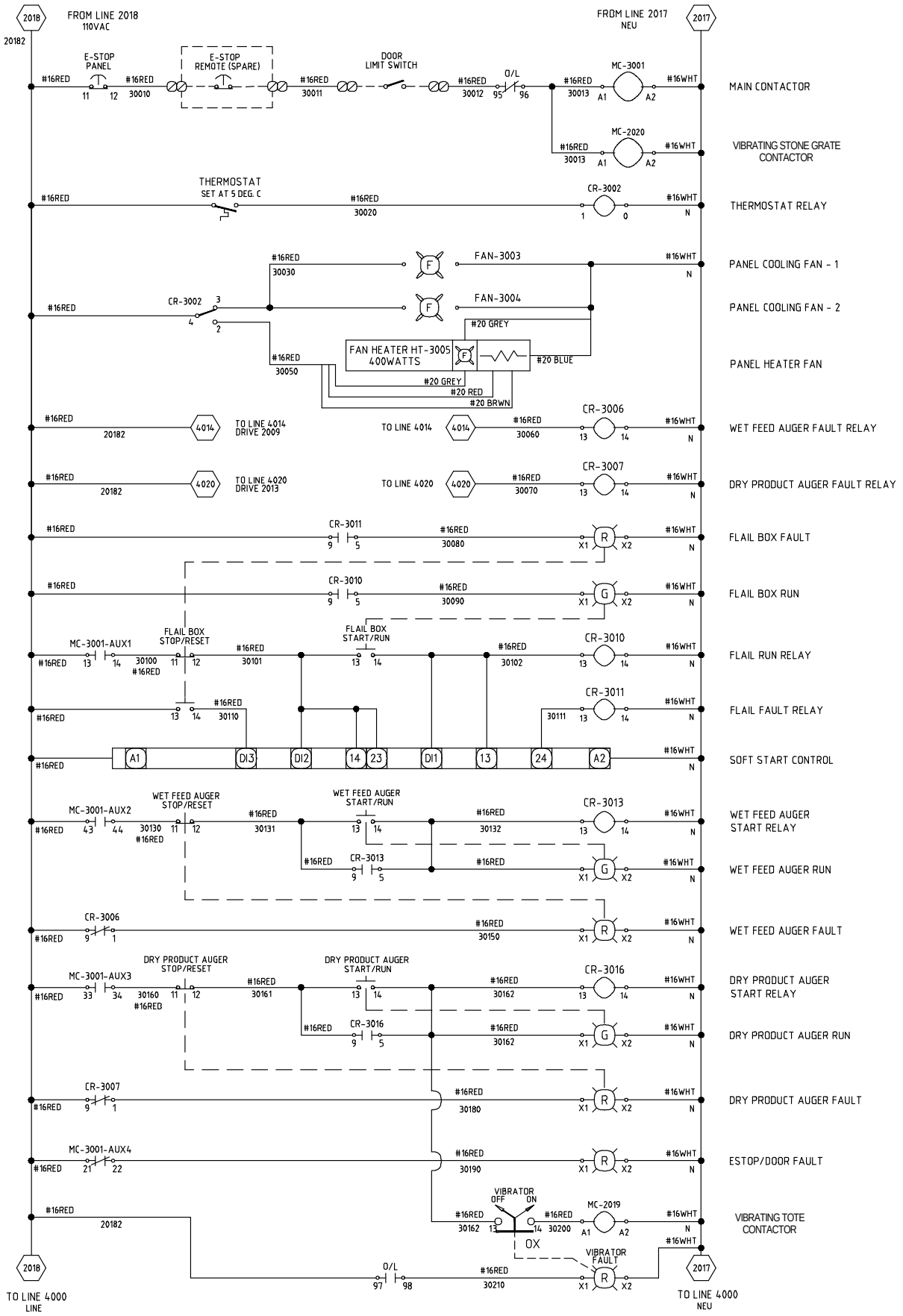
Under Belt Guard





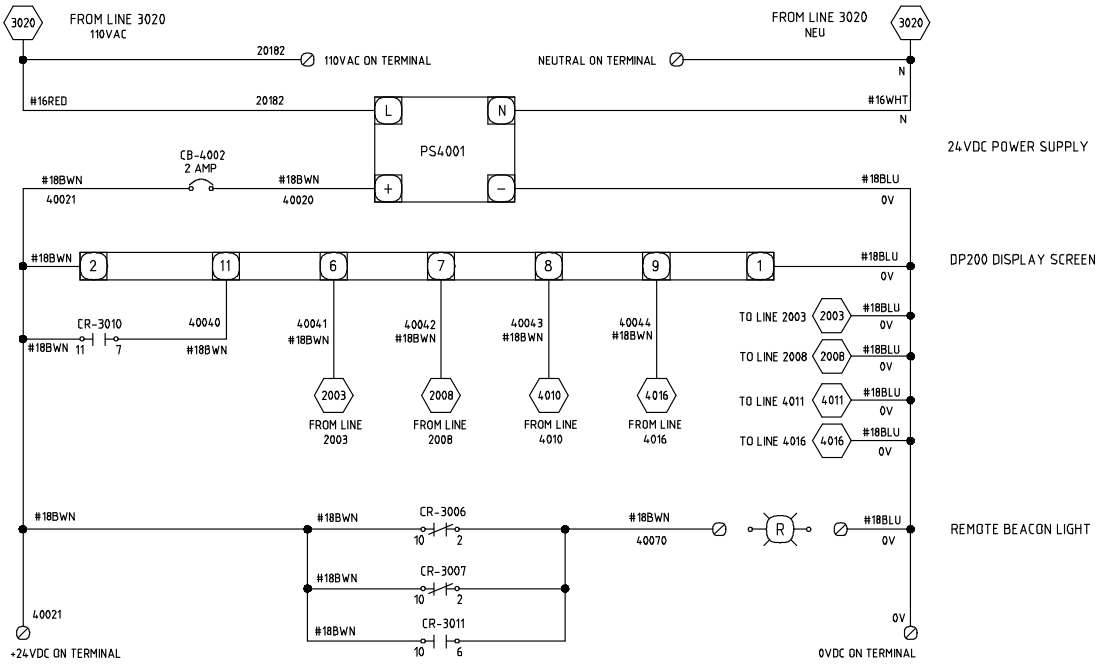
FL243

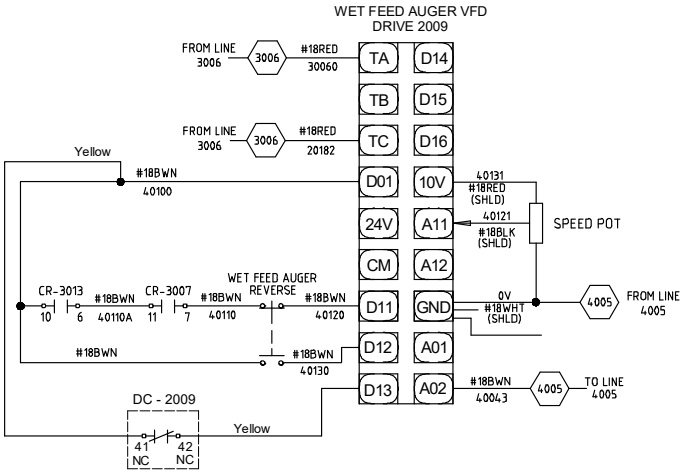
STS	DWR. NUM.
	Schem. Page 1
	DATE. 10 / 04 / 21
	REV.

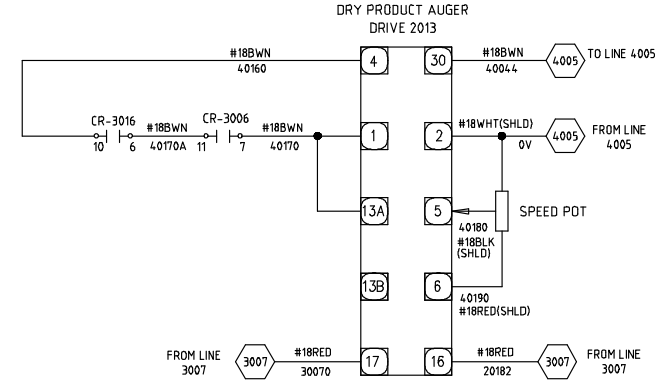


FL243

STS	DWR. NUM.
	Schem. Page 2
	DATE. 10 / 04 / 21
	REV.





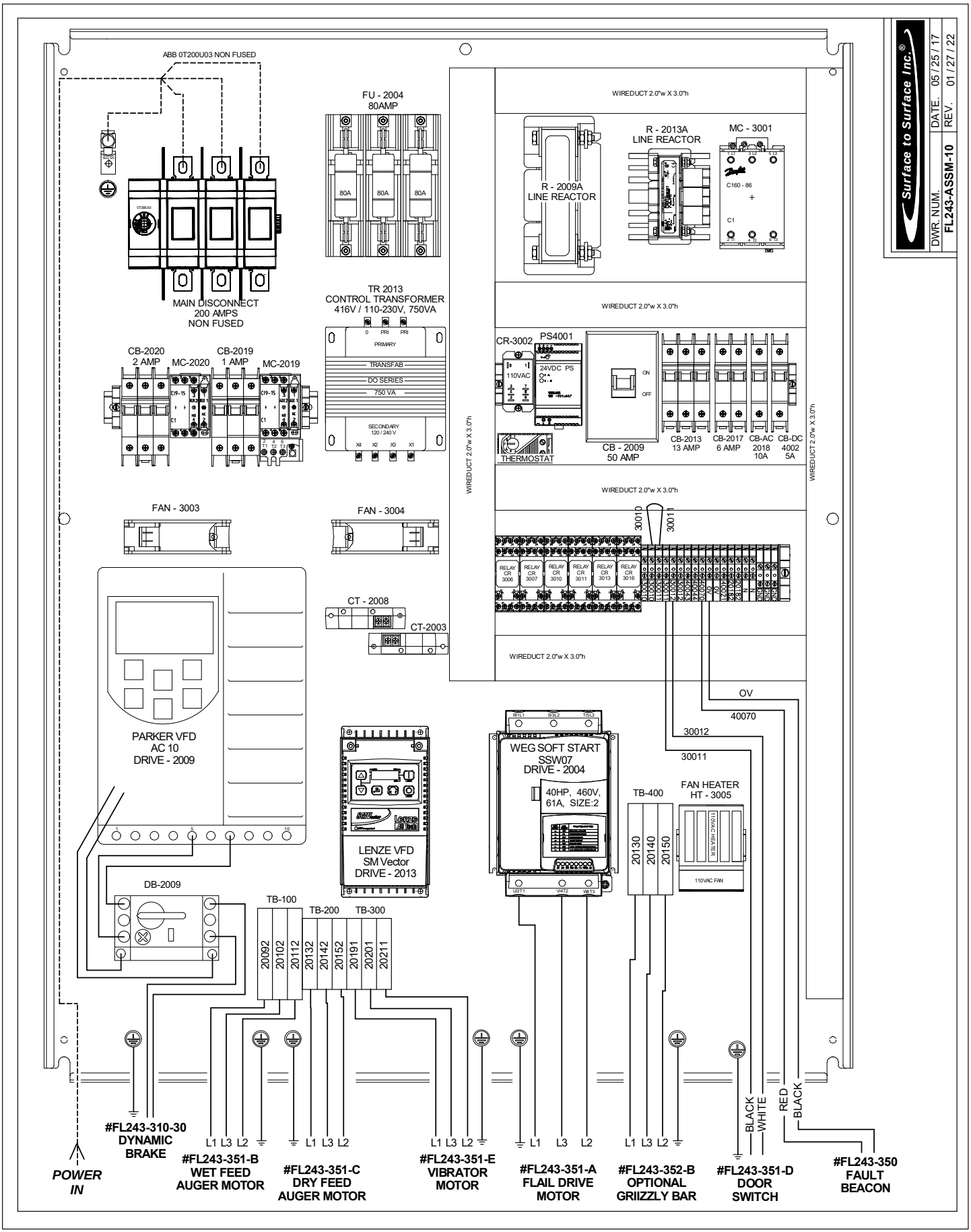


DRIVE CONTROL TERMINALS		VFD PARAMETERS :
4	: COMMON	P100 : 1
1	: START/STOP	P101 : 1
13A	: FWD RUN	P121 : 13
13B	: NOT CONNECTED	P140 : 3
16,17	: RELAY N/O CONACT	P150 : 2
30	: ANALOG OUT, 2-10V	
2	: ANALOG REF., -VE	
5	: ANALOG IN, 0-10V	
6	: ANALOG REF., +VE	REST ARE DEFAULTS

SOFT START PARAMETERS :	P220 : 1	P229 : 1	P230 : 1	P219 : 1
	P264 : 1	P278 : 8	(REST ARE DEFAULTS)	

FL243

STS	DWR. NUM.
	Schem. Page 3
	DATE. 10 / 04 / 21
	REV.


Surface to Surface Inc.®
DWR. NUM. FL243-ASSM-10
DATE. 05 / 25 / 17
REV. 01 / 27 / 22
ABB 0T200U03 NON FUSED
MAIN DISCONNECT
200 AMPS
NON FUSED
FU - 2004
80AMP
80A
80A
80A
TR 2013
CONTROL TRANSFORMER
416V / 110-230V, 750VA
PRIMARY
TRANSFAB
DO SERIES
750 VA
SECONDARY
120 / 240 V
CB-2020
2 AMP
MC-2020
CB-2019
1 AMP
MC-2019
WIREDUCT 2.0"w X 3.0"h
R - 2009A
LINE REACTOR
R - 2013A
LINE REACTOR
MC - 3001
C160 - 86
C1
CR-3002
PS4001
110VAC
24VDC PS
ON
OFF
THERMOSTAT
CB - 2009
50 AMP
CB-2013
13 AMP
CB-2017
6 AMP
CB-AC
2018
10A
CB-DC
4002
5A
30010
30011
RELAY CR 3006
RELAY CR 3007
RELAY CR 3010
RELAY CR 3011
RELAY CR 3013
RELAY CR 3016
FAN - 3003
FAN - 3004
CT - 2008
CT-2003
PARKER VFD
AC 10
DRIVE - 2009
LENZE VFD
SM Vector
DRIVE - 2013
WEG SOFT START
SSW07
DRIVE - 2004
40HP, 460V,
61A, SIZE:2
OV
40070
30012
30011
TB-400
20130
20140
20150
FAN HEATER
HT - 3005
110VAC HEATER
110VAC FAN
DB-2009
TB-100
TB-200
TB-300
20092
20102
20112
20132
20142
20152
20191
20201
20211
#FL243-310-30
DYNAMIC
BRAKE
POWER
IN
L1 L3 L2
#FL243-351-B
WET FEED
AUGER MOTOR
L1 L3 L2
#FL243-351-C
DRY FEED
AUGER MOTOR
L1 L3 L2
#FL243-351-E
VIBRATOR
MOTOR
L1 L3 L2
#FL243-351-A
FLAIL DRIVE
MOTOR
L1 L3 L2
#FL243-352-B
OPTIONAL
GRIIZZLY BAR
BLACK
WHITE
#FL243-351-D
DOOR
SWITCH
RED
BLACK
#FL243-350
FAULT
BEACON

FL243-11-6 UNIT

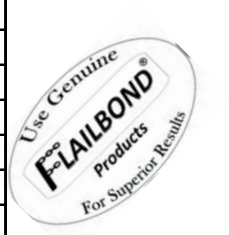
Unit serial number: _____

Dry Product Auger calibration Sheet

Dry Product number: _____

AUGER RPM's	*Pounds Per Min. (less container wt.)*
40	
60	
80	
100	
120	
140	
160	
180	

AUGER RPM's	*Pounds Per Min. (less container wt.)*
200	
220	
240	
260	
280	
300	
320	
340	
350	



Container WT. (lbs.)

_____

How to calibrate the dry product

You Will Need:

2 Clean five gallon open top plastic pails. A weighing device (scale) capable of weighing 1 to 50 lbs..
A timing device (stop watch or other item), PPE (safety glasses & dust mask), and a pen and paper or a copy of the calibration sheet located the end of this manual.
The unit must be powered on to operate the dry feed auger.

1. If not already down in transport mode, lower the flail box and carriage down to transport mode.
2. Rotate the dry product auger & motor off to the side onto the swing arm and secure (see Fig.15).
3. Attach auger funnel & attach flex metering tube (3" flex hose).
4. Raise flail box and carriage up to the work (mode) position & install the 4 large lock pins.
5. Make sure the tote is mounted on the unit & at least half full of dry product and knife valve is open.
6. Weigh the empty containers (pail, etc.) and record this on the calibration sheet under "Container WT.(lbs.)".
7. Put one container (pail) under the flex metering tube and rest the container on the ground. Place the other container (pail) next to the first one.
8. Push the start button (Dry Product Auger).
9. Set auger controller at 40 RPM.
10. When the dry product is flowing out of the flex metering tube, and the rpms are constant, Quickly switch the flex metering tube over into the 2nd pail and start the timer.
11. Time the dry product falling into container (pail) for exactly 1 minute.
12. At the 1 minute point, Quickly switch the flex metering tube back into the 1st container (pail).
13. Push the stop button (Dry Product Auger).
14. Now weigh the 2nd container (that has the dry product that was timed inside).
15. Subtract the container weight.
16. Take this answer and write it in the square beside 40 RPMS on the calibration sheet or on a piece of paper.
17. Dump the containers (pails) back into the tote (or another storage container that can then be dumped back into the tote at a later time). During calibration, be sure that the tote has a significant amount of dry powder for calibrating.
18. Repeat steps 7 to 17 for each of the RPMs. on the calibration sheet.
19. Lower the flail box and carriage down to transport mode.
20. Remove auger funnel & flex metering tube (3" flex hose).
21. Rotate auger & motor back over auger inlet hole and secure.
22. Remove swing arm and secure.
23. You are now finished calibrating the auger speed to the weight of this dry product.

Motor: 2hp (1800 rpms)
Gear reducer: 5 to 1
Solid Shaft Auger
2.625"OD x 5/8" shaft x 2.6" Pitch