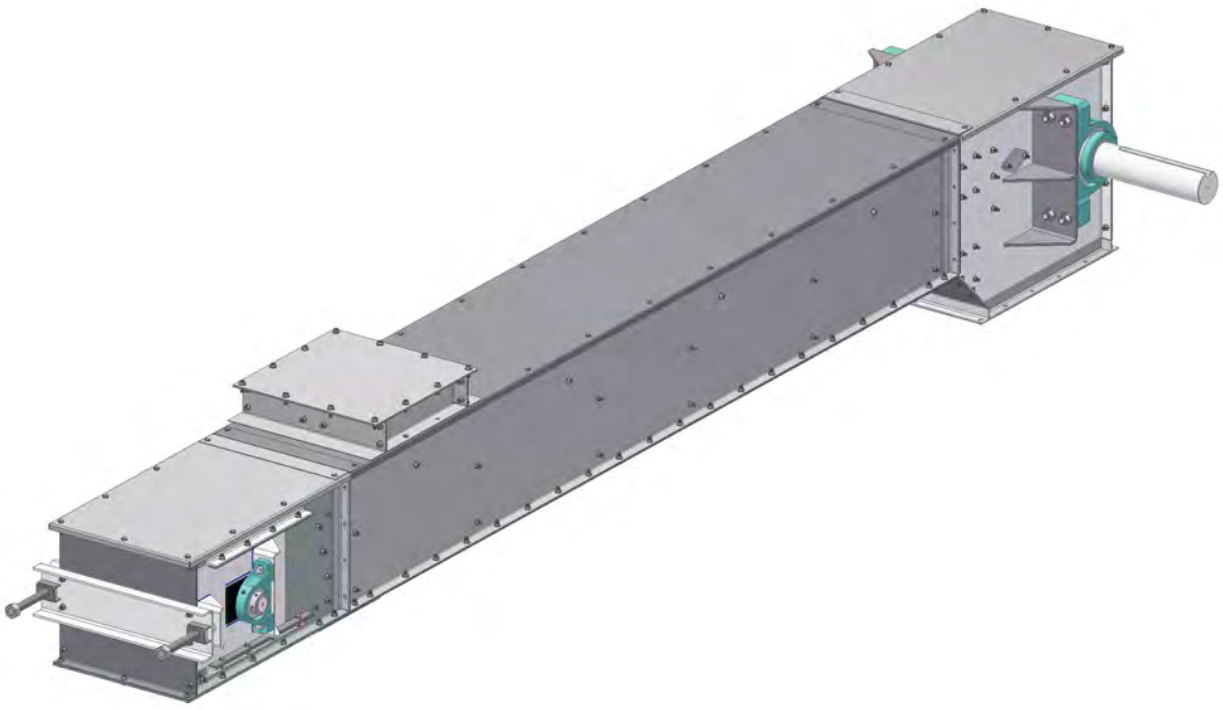
OPERATOR / INSTALLATION MANUAL

BROCK®

Easy-Flo Drag Conveyor
13" *[330 mm]* and 17" *[432 mm]* Tall



North American Edition

January 2020 **MCV2144B**

Maintenance

Inspection

In order to prevent serious and damaging problems, it is recommended that an **inspection schedule** be established. Keep the equipment in good operating condition at all times.

Routine use and vibration can cause hardware, set screws and sprockets to loosen. Check these components for tightness so there is no shifting of small parts, which can damage other components such as flighting. On-site contact by a forklift truck can shift Conveyor alignment. Re-align the Conveyor before usage causes wear and expensive repairs.

Keep maintenance records visible to Users so any issues can be monitored and documented.

Have an experienced conveyor specialist make routine inspections.

CAUTION! ***Make inspections and repairs only when all operations are stopped and electrical switches are locked out.***

1. Check the oil in bearings, reducers and motors.
2. Replace damaged or worn Sprockets, Flighting and Chain. Keep an inventory of spare parts available.
3. Check the Chain for slack and adjust or remove links if necessary.
4. Check for surface rust and make proper repairs.
5. Listen for unusual noises and resolve the problem.
6. Inspect Chain and Flights for loose bolts, damaged Flights and Chain condition.
7. Inspect V-belts for tension and condition. Replace worn V-belts (see "**Belt and Belt Guard**" on page 35.) NOTE: V-belts should always be replaced with a MATCHED SET.
8. Check Reducer regularly for sufficient oil and signs of leakage. Keep all breathers clean.
9. Check Bearings for sufficient lubrication and evidence of over-heating.
10. Check that all Sheave and Pulley attaching parts are secure.
11. Check all hardware and tighten as required.

Setting Belt Tension

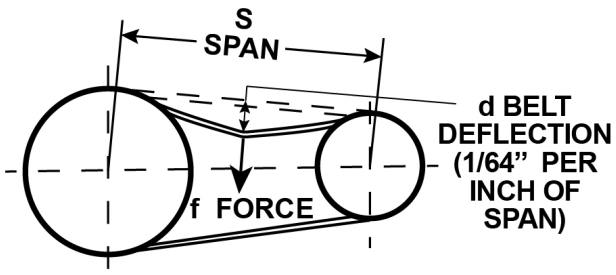
Remove the front of the Belt Guard. Adjust the V-belts to the correct tension by moving the Motor Mount (Item 1) up or down. The Motor Mount is moved by adjusting the nuts (Item 3) on the mounting bolts (Item 4). After all adjustments are made, re-tighten the Motor Mount nuts and replace the front of the Belt Guard.

General Rules of Tensioning:

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

Tensioning Procedure:

1. Measure the span length.
2. At the center of the span apply a force (perpendicular to the span) large enough to deflect the 1/64, for every inch of span length. For example, one deflection of a 100 inch span would be 100/64 or 1-9/16 inches.
3. Double check the following:
   - Parallel position of the sheave shafts.
   - Correct alignment of sheave grooves.
4. Tension belts
5. Check tension frequently during the first 24-48 hours of run-in operation.



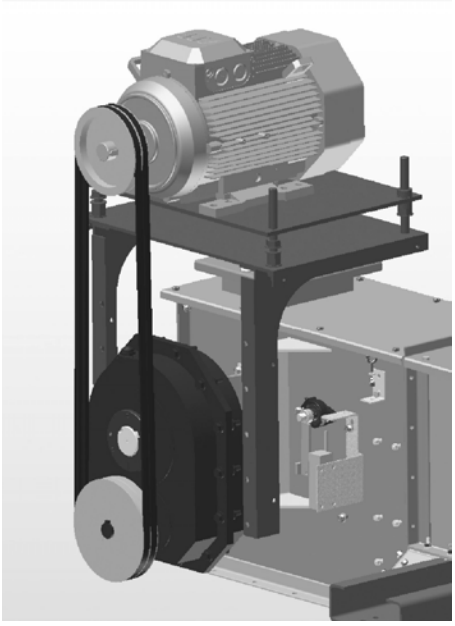


Figure 36.
Belt Adjustment
(Belt Guard not shown)

Adjusting the Chain

The Chain is properly tensioned when there is about 1/2" *[13]* deflection between return rollers. On Drag Conveyors using return rails, the Chain is properly tensioned when there is approximately 1/8" *[3]* deflection between flights.

If the Chain is loose, adjust to the correct tension with the take-up. **Always adjust each side of the take-up in equal increments to keep from skewing the Sprocket.**

Item	Description
1	Take-up Bolt
2	Tail Section

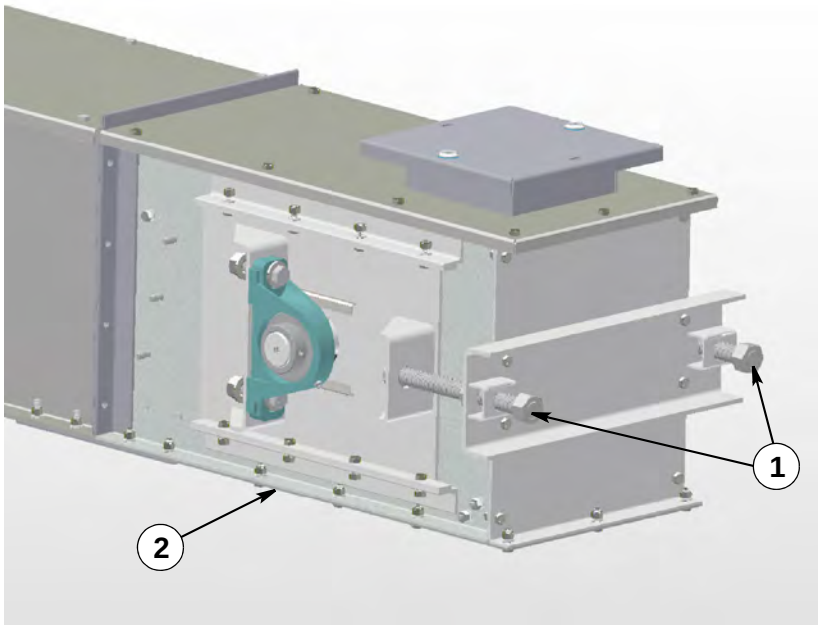


Figure 37.
Take-up

If all of the take-up is used and there is still slack in the Chain, remove links from the cottered portion of the Chain. Locate the cotter pin section. Cottered sections should have **colored** UHMW Flights attached to them. Move the Chain until that section is located on top. Loosen the take-up completely. Remove the cotter pin. Remove the required links of Chain. Re-install the cotter pin. Finish adjusting the Chain with the take-up.

Repairing or Replacing a Broken Chain

To repair an existing Chain already on the Conveyor, basic safety precautions should be followed:

- All power to the Conveyor should be locked out and tagged out.
- Use the take-ups to loosen tension on the Chain.
- Sprockets in both the Head and Tail sections should be secured and kept from rotating.
- Secure the Chain on both sides of the link to be repaired or replaced.

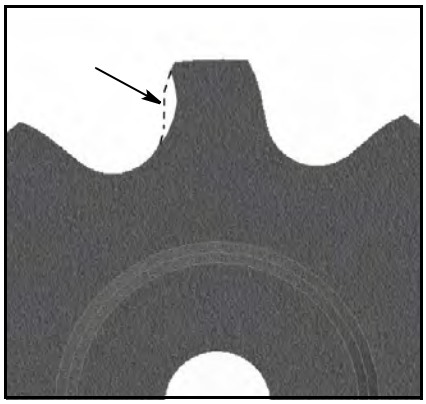
Replace the damaged links using procedures appropriate to the type of connector being used (solid or hollow.) When repairs are done, reconnect the Chain sections. Adjust to the proper tension using the take-ups.

To install a new Chain, see “**Drag Chain and Flights**” on pages 30-31.

Replacing a Broken or Worn Sprocket

Worn or damaged Sprockets will affect the performance of the Drag Conveyor and damage the Chain. Worn Sprockets can cause the Chain to "hang" on the Sprocket and/or vibrate. Wear can take place on either the side or the base of the Sprocket tooth (see Detail A, below.) To replace a Sprocket, follow these steps:

1. Loosen the set screws securing the Shaft to the Bearings.
2. Slide the Shaft to the side.
3. Remove the Keystock.
4. Remove the worn Sprocket from the Shaft and replace with new one.
5. Replace the Keystock.
6. Slide the Shaft back into position.
7. Tighten the set screws.
8. Ensure that the new Sprocket is correctly aligned. Check to make sure the take-up is set in equal increments on both sides.



Detail A.
Worn Sprocket Tooth

Item	Description
1	Sprocket
2	Bearing
3	Shaft
4	Set Screws

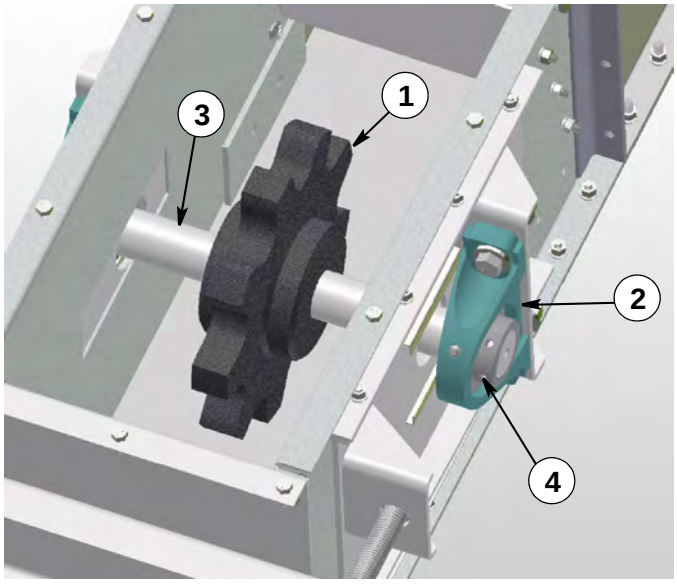


Figure 38.
Sprocket Replacement

Clearing A Blockage

If the Drag Conveyor becomes blocked or clogged, it will be necessary to clear the blockage.

IMPORTANT! ***This task is to be performed only by authorized maintenance personnel familiar with the safe clearing of Drag Conveyor blockages.***

After following appropriate lockout/tagout procedures, open inspection doors to determine the location and extent of the blockage. Use appropriate tools to remove grain, broken bucket(s), or other foreign objects causing the blockage.

WARNING! ***NEVER attempt to clear the blockage using any body part.***

Always follow appropriate lockout/tagout procedures and expect that the Conveyor may shift once the blockage is cleared.

Reducer Lubrication

IMPORTANT! SPEED REDUCER: Because the Reducer is shipped **without** oil, it is necessary to add the proper amount of oil before running. Use a high grade petroleum base, rust and oxidate inhibited (R&O) gear oil. Follow instructions on Reducer nameplate, warning tags, and in the installation manual.

Under average operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain Reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant.

IMPORTANT! ***Too much oil will cause over-heating and too little will result in gear failure. Check oil level regularly.***

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperature above 200°F, the oil should be changed every one to three months depending on severity of conditions.

DO NOT use lubrication of the EP (extreme pressure) type.

DO NOT use oils containing slippery additives such as graphite or molybdenum in the Reducer. These additives will destroy sprag action.

Motor Lubrication

If the motor is equipped with an Alemite fitting, clean the fitting tip and apply grease gun. Use one or two full strokes on motors in NEMA 215 frame and smaller. Use two or three strokes on NEMA 254 thru NEMA 365 frame. Use three or four strokes on NEMA 404 frames and larger. On motors having drain plugs, remove the grease drain plug and operate the motor for 20 minutes before replacing the drain plug.

On motors equipped with a slotted head grease screw, remove the screw and apply a grease tube to the hole. Insert two or three inches of grease string into each hole on motors in NEMA 215 frame and smaller. Insert three to five inches on larger motors. On motors having grease drain plugs, remove the plugs and operate the motor for 20 minutes before replacing the drain plug.

CAUTION! ***Keep grease clean. Lubricate motors at standstill. Remove and replace drain plugs at standstill. DO NOT mix petroleum grease and silicone grease in motor bearings.***

Operating Temperature

Abnormal bearing temperatures may indicate faulty lubrication. Normal temperatures may range from “cool-to-warm-to-touch” up to “too-hot-to-touch-for-more-than-a-few-seconds”, depending on bearing size and speed and the surrounding conditions. Unusual high temperature accompanied by excessive leakage or grease indicates too much grease. High temperature with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Normal temperature and a slight showing of grease at the seals indicates proper lubrication.

Mounted Bearing Lubrication Instructions

Grease Lubrication

All bearings come lubricated from the factory with No. 2 Lithium Grease. For re-lubrication select a grease that is compatible with a No. 2 Lithium Grease. Re-lubricate in accordance with table below.

Initial Startup

During initial startup slowly add No. 2 Lithium grease to the bearing while the equipment is running at the normal operating speed. The bearing is full when there is a small amount of leakage coming through the seals.

Extended Shutdown

If equipment will be idle for some time, before shutting down, add grease to the bearing until grease purges from the seals. Shut equipment down and wipe seals with a cloth to remove the purged grease. This will ensure protection of the bearing, particularly when exposed to severe environmental conditions. After idle period, add fresh grease to the bearing before staring.

Lubrication Intervals

The following table is a general guide for normal operating conditions. When establishing a re-lubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

BEARING RE-LUBRICATING INTERVALS

Bearing Size (inches)	Months	Weeks
1 7/16	3	12
1 15/16	3	12
2 3/16	3	12
2 7/16	3	12
2 15/16	3	12
3 7/16	2.5	10
3 15/16	2	8
4 7/16	2	8
4 15/16	1.5	6
5 7/16	1.5	6
6	1	4
6 1/2	1	4
7	1	4

Kinds of Grease

Many ordinary cup greases will disintegrate at speeds far below those at which the bearings will operature successfully if proper grease is used. The bearings have been lubricated at the factory with No. 2 consistency lithium base grease which is suitable for normal operating conditions. Re-lubricate with lithium base grease or a grease which is compatable with original lubricant and suitable for ball bearing service. In unusual or doubtful cases the recommendation of a reputable grease manufacturer should be secured.

Speed Reducer Oil Recommendations for Average Operating Conditions

Output RPM	Ambient Temp.				Gear Oil	
	Min.		Max.		ISO Grade	AGMA Grade
	°F	°C	°F	°C		
41-125	50	*10*	125	*51.7*	220	5
11-40	50	*10*	125	*51.7*	320	6
41-125	15	*-9.4*	60	*15.6*	150	4
11-40	15	*-9.4*	60	*15.6*	220	5

NOTES:
1. For Reducers operating in ambient temperatures between -22°F (-30°C) to 20°F (-6.6°C) use a synthetic hydrocarbon lubricant, 100 ISO grade AGMA 3 grade (for example Mobil SHC627.)
2. For Reducers operating outside the above table, review the manufacturer's recommendations.

IMPORTANT! Keep breather holes clear at all times to prevent pressure build-up in the Reducer.

Motor

Ball-bearing Motors: No lubrication needs to be added before startup. Bearings have been factory-lubricated.

MOTOR RE-LUBRICATING INTERVALS

Hours of Service per Year	HP Range	Suggested Re-Lube Interval
5,000	1–7 1/2	5 years
	10–40	3 years
	50–150	1 years
Continuous normal application		2 years
Seasonal service motor is idle for 6 months of more		1 year (Beginning of season)
Continuous high ambients; dirty or moist locations; high vibrations; or where shaft end is hot (pumps/fans)	1–40	6 months
	50–150	3 months

Use high quality ball bearing grease. Use consistency of grease suitable for class of insulation stamped on nameplate as follow:

MOTOR BEARING GREASE

Insulation Class	Consistency	Type	Size
A and B	#2	Lithium Base	215T and smaller
A and B	Medium	Polyurea	254 and larger
F and H	Medium	Polyurea	All

Troubleshooting

Checklist of possible problem areas:

- Check overflow panel switch
- Check discharge chute for blockage (use mesh observation panel)
- Check motor overload

Problem	Cause	Solution
Low capacity	Not feeding enough material	Check to insure you are getting the required material to the conveyor.
	Baffle plates in conveyor bypass hopper adjusted too low	Raise baffle plates.
	Wrong head RPM	Check enclosed specification for your conveyor.
	Chain too loose	Take-up chain to proper tension.
	Conveyor on an incline	Double flights on conveyor and speed up conveyor.
Conveyor stops or does not start	Chain Slack Detector or End Relief Door Sensor tripped	Verify switches are properly adjusted and connected, and that there is not a material blockage or excessive slack in the chain.
Drag conveyor being overloaded	Feeding too fast	Check incoming material capacity and slow down to match drag.
	Baffle plates in conveyor by-pass hopper adjusted too high.	Lower baffle plates.
	Head sprocket running too slow	Check sprocket speed. Check packing list to be sure correct sheaves are properly installed. Check speed reducer for correct reduction ratio.
Chain runs to one side	Out of alignment	String conveyor and realign.
	Bearings on head uneven	Shim lower side until flights center.
	Bearing worn	Defective bearing head or tail; needs replaced.
	Tail sprocket out of line	Move take-up rods to center.
Bent flight attachments	Obstruction in conveyor	Repair or remove.
	Loose side liner	Check and repair or replace.
	Catching on side or bottom	Check alignment of trough and make smooth at all joints.
	Inner pan guides plates bent backwards on curved conveyor	Trough sections installed backwards. Turn around and repair guide plates.
Noise at flanges	Trough out of alignment	Check alignment of bottom plates, sides, return rails and top cover.
Premature wear on chain and sprockets	Chain installed improperly	Install new chain as required and ensure proper installation.

Problem	Cause	Solution
Flight damage	Catching on sides or bottom	Check alignment.
	Obstruction in conveyor	Repair or remove.
Over-heating	Load exceeds drive capacity	Check rate capacity of drive. Replace with drive of sufficient capacity or reduce load.
	Insufficient oil. Too much oil in the drive causes churning and excessive heat is generated by the friction of the churning oil	Check oil level. Adjust to level indicated.
	Wrong grade of oil	Flush and refill to indicated oil level with grade specified on drive nameplate.
Noise and Vibration	Improper installation	Check mounting bolts and tighten. Check clevis support for rigidity and strengthen if necessary.
	Wear, evident by dullness of balls and raceways. Wear of bearings is caused by abrasives in oil	Replace worn bearings. Clean and flush drive and replace oil.
	Spalling or flaking-out of metal in raceways usually indicates over-loading. Bearing cage failure usually indicates over-loading.	Replace worn bearings. Check and remedy bearing clearances, loading of drive and overhung loads.
	Overloading causes pitting of tooth face	Determine if load exceeds nameplate rating. If overloaded, reduce load or replace with reducer of sufficient capacity.
	A low oil level reduces the muffling effect of the oil	Check oil level. Fill to level indicated.
	Excessive shock loads or improper connection with other machinery	Inspect drive for broken parts, loose bolts, nuts, and screws. Check all keys for proper size and fit.
	Excessively high speeds	Check recommended speed range. Reduce speed or install drive with sufficient speed range.
Excessive shaft end play	Bearing exposure to an abrasive cause wear in balls and raceways	Worn bearing balls and raceways have a dulled appearance. Replace worn bearings. Clean and flush drive and replace oil.
Excessive backlash	Worn gears and keys or loose screws cause backlash. Backlash increases with the number of gear sets; therefore backlash is normally greater in double reduction drives	Replace worn gears and keys. Tighten loose screws.
Oil leakage	Excessive oil	Check oil level and drain to indicated level.
	Clogged breather	Clean or replace breather. Clean breather hole with pipe cleaner and a suitable non-flammable solvent.

BROCK

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Safeguarding Your Grain® Since 1957

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Changes this issue:
There were trademark updates.
Certain graphics were updated.
The Safety Section was updated.