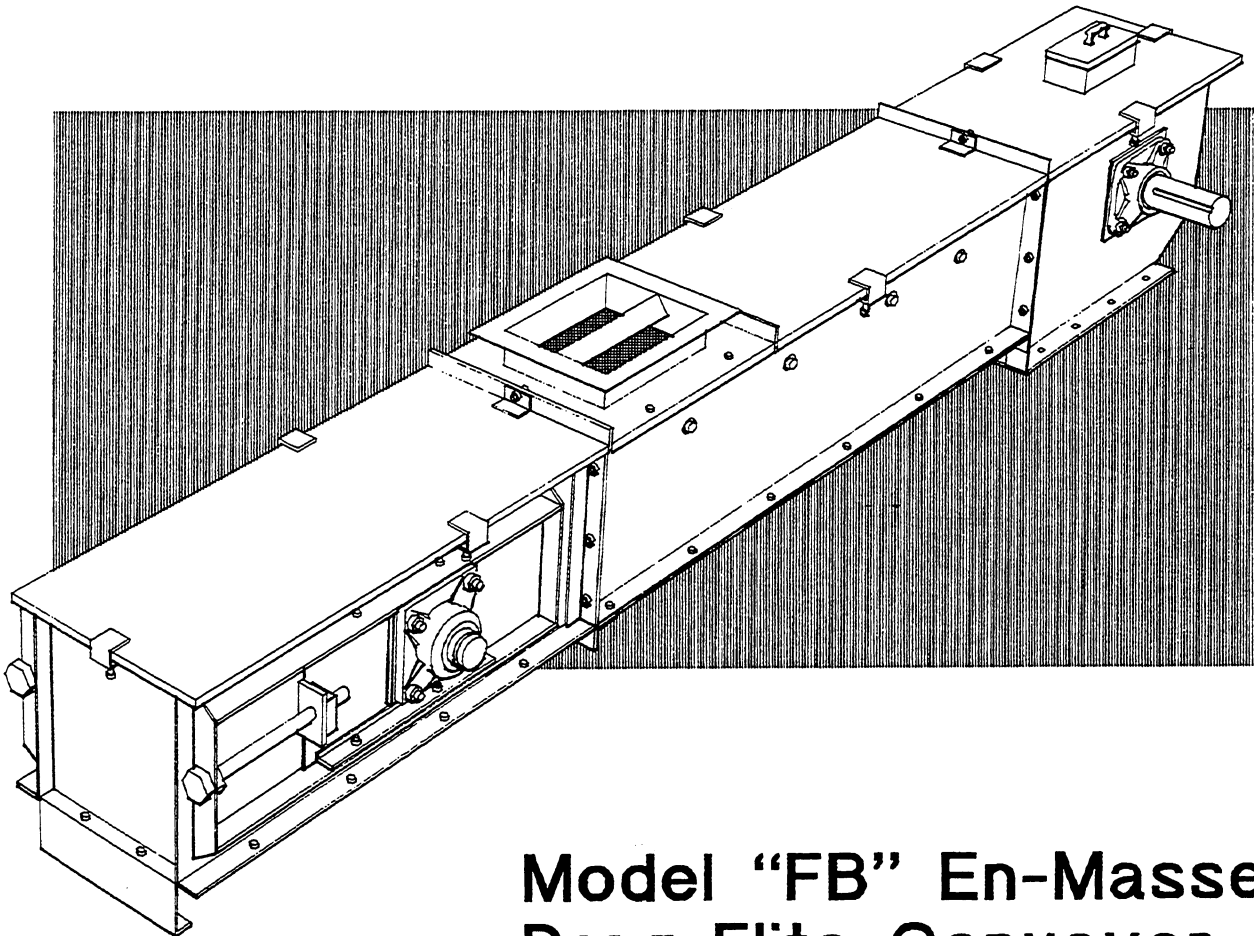
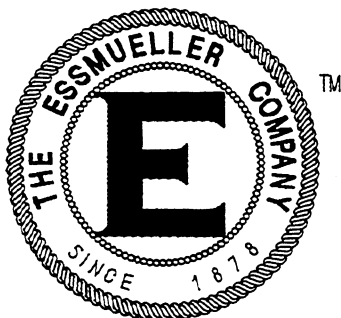


Installation and Maintenance Manual



**Model "FB" En-Masse
Drag-Flite Conveyor
&
Model "HF" High-Flite
Incline Conveyor**



Introduction

Your "Essmueller" conveyor is a piece of quality equipment. It has been designed to provide years of trouble-free service. Durability and performance are the results of the engineering skill, craftsmanship and top quality materials that go into "Essmueller" products. This manual contains instructions for the installation, operation, and maintenance of our *En-Masse* and High-Flite Conveyors. A separate section deals with safety and safety responsibility. With proper installation, a careful awareness for safety and periodic checks for maintenance, you can expect many years of satisfactory performance.

Safety Responsibility

It is the responsibility of the contractor, installer, owner, and user to supplement the materials and services furnished by The Essmueller Company with the necessary items to make the conveyor installation comply with the law. Electrical controls, machinery guards, railings and walkways are some of the necessary equipment for a safe workplace.

"Essmueller" *En-Masse* and High-Flite Conveyors are not normally designed to handle hazardous materials or operate in a hazardous environment. Hazardous materials can be those that are explosive, inflammable, or toxic. Special construction is normally necessary and The Essmueller Company should be consulted for all such installations.

Most accidents are the result of someone's carelessness or negligence. When installing the conveyor, the following minimum provisions should be followed in order to avoid an unsafe or hazardous condition.

1. "Essmueller" conveyors should not be operated until the conveyor is completely enclosed and power transmission guards are in place. If the conveyor is to be opened for inspection, cleaning or observation, the motor driving the conveyor is to be locked out electrically in such a manner that it cannot be restarted by anyone, however remote the area, unless the conveyor housing has been closed and all other guards are in place.
2. Feed openings shall be constructed in such a way that the conveyor is covered by a grating. If the nature of the material is such that a grating cannot be used, then the exposed section of the conveyor is to be guarded by a railing and there shall be warning signs posted. The entire conveyor is to be guarded by a railing if the conveyor must have an open housing as a condition of its use and application.
3. Do not use a rod or stick to poke material into the conveyor.
4. Do not walk on top of the conveyor, do not remove power transmission guards, do not place hands or feet in any of the conveyor openings, do not overload the conveyor or use it for anything but what it was designed to handle.
5. Always practice good housekeeping. Keep areas around the conveyor and the drive unit free and clear at all times.

SAFETY: Essmueller subscribes to the standards of the ANSI Safety Sign Standard program as administered by the Equipment Manufacturers Council (EMC) of the American Feed Industry Association (AFIA). Essmueller Equipment will be labelled in accordance with this program, on all removable covers, guards, inspection doors, end relief doors, inlets, discharges, and all head and tail sections.

If the owner or installer needs help in designing a safe installation and a safe working place, The Essmueller Company will be glad to assist in the selection of special devices, equipment, and signs. This includes "Lock-Out Tag-Out" procedures and enclosure of hazardous components.

Our end relief door with a limit switch can be used to shut off the conveyor power when the discharge of the conveyor is interrupted or the conveyor becomes plugged and overloaded. We can also furnish zero speed switches and/or slack chain detection devices (*En-Masse* Conveyors only) to shut off power in the event the conveyor is stalled due to the presence of foreign material in the conveyor or if for some reason the drive end of the conveyor is still running while the opposite end has stopped.

"Essmueller" Model "FB" En-Masse Drag Conveyor and "HF" High-Flite Conveyor

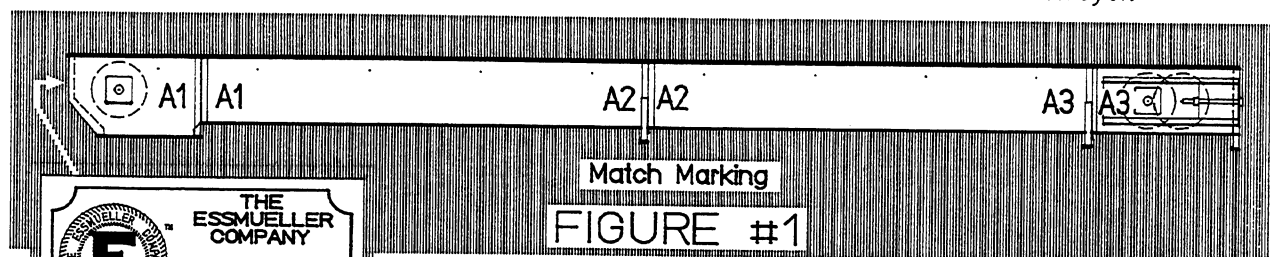
To insure maximum performance and trouble-free service from "Essmueller" equipment, install and maintain *En-Masse* and High-Flite conveyor(s) in accordance with the following instructions.

A. Shipment

1. Tail Section will be shipped completely assembled.
2. Head Section will be shipped completely assembled with bearings and sprocket.
3. Trough will be assembled and shipped in 10'-0" long Intermediate Sections when possible. Most installations will require one or more special length section(s).
4. The Chain is assembled in standard 10'-0" lengths each with connecting pins and "T" head cotters. It is usually necessary to furnish one partial length of chain less than ten feet long.
5. Flights and Flight Fasteners are boxed separately.
6. Assembly Bolts will be boxed and identified.
7. Inlets are assembled on trough sections at the factory except when they are to be located in the field.
8. Discharge gates, when required, are fitted to the trough sections at the factory and then removed for shipment. Hand wheels and chain wheels, when furnished, will also be removed and placed in the parts crate for shipment.
9. Drive components and guards for motorized gates will be completely assembled on gates.
10. When air-operated gates are ordered with air cylinders, solenoid valve, and limit switches, these items will be shipped assembled on the gates.
11. The conveyor drive, when furnished by Essmueller, will be shipped as loose components unless factory assembly is specified. The drive is shipped dry. It must be filled in the field with a lubricant recommended by the manufacturer.

B. Field Assembly

1. Refer to Assembly Drawings furnished by The Essmueller Company. These were drawn especially for your application and approved by a purchaser's representative prior to production of the equipment. DO NOT attempt to install the conveyor without these assembly drawings. Essmueller will send new copies if originals are lost.
2. Start the assembly by locating the head section. Attach the discharge flange to the mating flange of the chute or equipment which is to receive material from the conveyor.

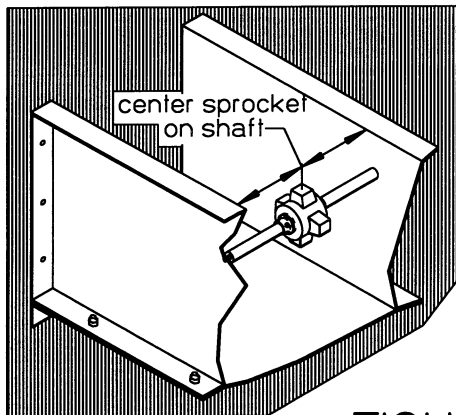


3. Locate the intermediate trough sections in the position shown on the assembly drawing. Refer to match marking on the drawing and on the trough sections. See Fig. #1 for an example.
4. When joining conveyor sections, apply caulking compound at each flange joint. Align bottoms of each section to insure they are flush and joints are smooth. Then, tighten flange bolts and remove excess caulking.

When making inquiries and in correspondence, refer to the Serial No. and Model No. located on the conveyor name plate

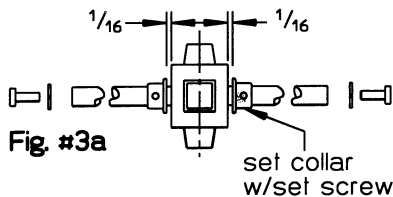
Note: Improperly aligned trough sections will result in excessive noise, and possible damage to flights.

5. The conveyor should be supported at or near the flanged trough joints. Supports should not be spaced more than twenty feet apart. (Standard spacing for support feet is one set per intermediate section.) Support feet, when purchased, are shipped loose, two for every 10' section. A channel support is also shipped loose for the tail section. (Fig. #2)
6. In conveyors equipped with Style "A" Return Idler Sprocket Assemblies, the plastic sprocket fits loosely between two set collars (Fig. #3). A gap of approximately $\frac{1}{16}$ " is allowed on both sides of the sprocket. This minimizes heat buildup. DO NOT tighten set collars tightly against the sprocket hubs. Not applicable to Hi-Flite conveyors.



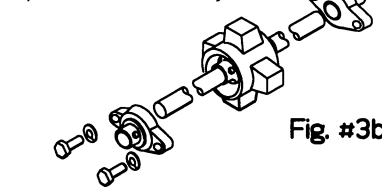
See Fig. #7a
For High-Flite
Trough

FIGURE #3



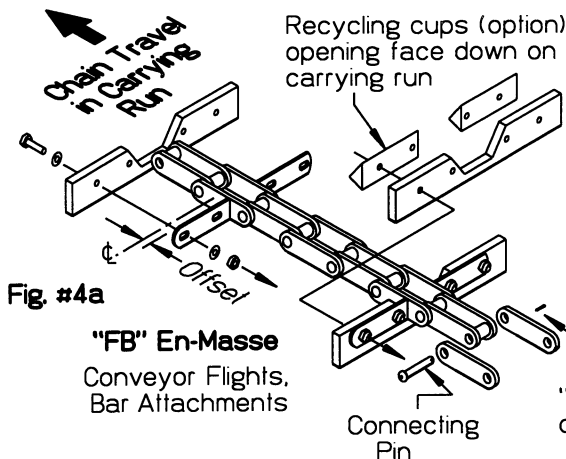
Style "A" Idler
Sprocket rotates on
fixed shaft.

Optional Assembly:

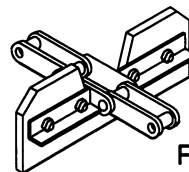


Style "B" Idler
Sprocket fixed to rotating
shaft with external bearings.

Does not apply to High-Flite Conveyors



"FB" En-Masse
Conveyor Flights,
Bar Attachments



"HF" High-Flite
Conveyor Flight w/
Angle Attachment

Fig. #4b

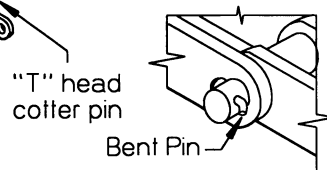


Fig. #4c

FIGURE #4

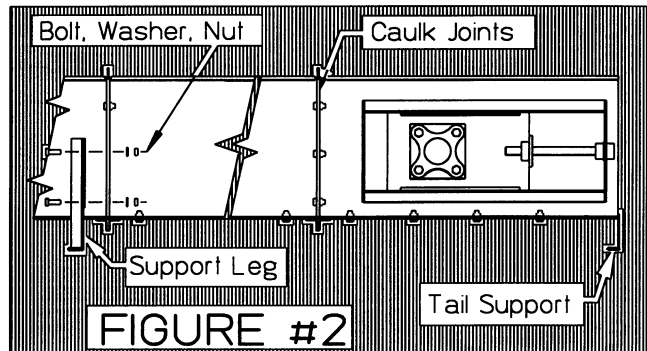


FIGURE #2

7. Check all sprockets and bearings to be certain set screws are tight on shaft. Check both the head and tail sprockets to see that they are centered in the trough. Every effort has been made at the factory to insure that all bolts, set screws, and sprockets have been properly installed and tightened. However, some loosening may occur during shipment.
8. When installing chain, notice that attachments are welded offset on sidebars. This places flights in the center of chain links when bolted on. Flights are bolted as shown in Fig. #4. The notch in U.H.M.W. flights must be facing "up" on the bottom strand of chain.

Each section of chain requires two connecting pins. The chain connecting pins are sized for a drive fit into the chain link sidebars. Before installing, pins should be lubricated with S.A.E. 30 motor oil. When driving the connecting pins in or out of the chain link, it is necessary that a heavy back-up bar be placed against both sidebars of the link on the side opposite the driving force.

After connecting pins are in place, insert "T" pins into holes in the ends of the connecting pins and drive firmly into place. The small end of "T" head cotter pins should be *bent over* to prevent them from working out.

9. Proper chain tension is extremely critical to the life and operation of the conveyor. Adjust screw take-ups as far as they will go toward the flanged (trough) end of take-up tail or take-up head. Take-up shaft must be perpendicular (90°) to conveyor centerline. Check by measuring from shaft to connecting flange on each side of conveyor (Fig. #4a). Adjust take-ups until both sides are equal. Adjust screw take-ups away from the center of the conveyor, using an equal number of turns to each adjustment bolt. This should remove most slack from the chain. Re-measure to check that take-ups are equally spaced on each side. If screw take-ups do not have sufficient travel to remove slack, return them to the position nearest the flanged (trough) end of take-up head or take-up tail. Remove necessary number of chain links from take-up section and retension chain. A certain amount of chain sag between each idler sprocket is normal. DO NOT tighten chain too tight, as this will result in excessive wear and vibration, particularly on conveyors with bend sections.
10. Check headshaft alignment to be sure it is perpendicular to the conveyor centerline. Measure from the shaft to the connecting flange. If adjustment is required, loosen the bearing mounting bolts. This allows a slight degree of movement ($\approx 1/32''$) so that both sides may be made equal.

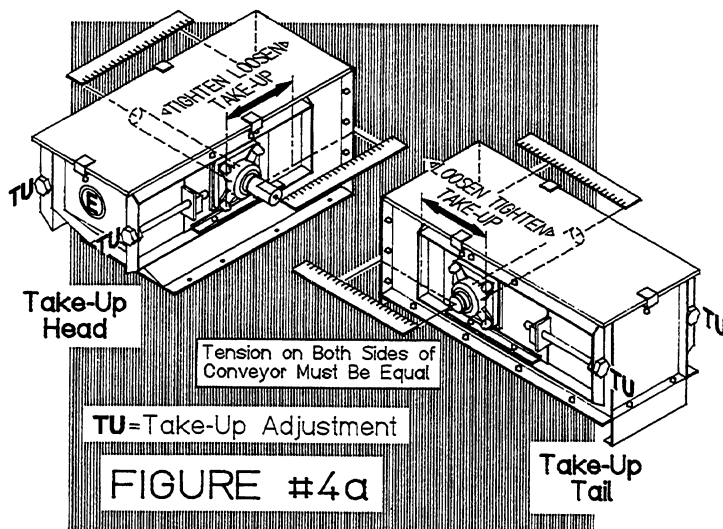
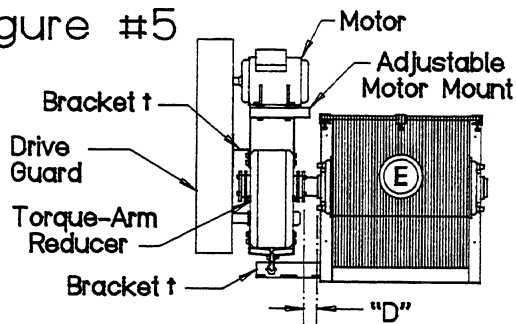


Figure #5



Typical Torque-Arm Reducer Installation
† by others

Min. Clearance "D" For Bolt Access
("Dodge Reliance" TXT-series)

REDUCER	"D"	REDUCER	"D"
TXT-115	1 1/4	TXT-615	1 13/16
TXT-215	1 1/4	TXT-715	2 1/16
TXT-315	1 1/2	TXT-815	2 1/16
TXT-415	1 3/4	TXT-915	2 7/16
TXT-515	1 13/16	TXT-1015	2 7/16

11a. MOTOREDUCER WITH ROLLER CHAIN DRIVE:

Mount reducer assembly to drive support. If equipped with slide base or rails, reducer should be as close to the headshaft as possible. Reducer output should be parallel and level with conveyor headshaft. Disassemble the oil-tight chain casing and install the shaft seals onto the headshaft and reducer shaft. Install the roller chain drive sprockets in line with each other.

Check alignment by laying a straight edge along the sprocket plates just above the hubs. Adjust sprockets if necessary so straight edge is flat the full length along both sprocket plates. Install roller chain over sprocket and connect ends by using coupler links. Adjust chain tension to provide a maximum of 1 1/2" sag on bottom run when top run is stretched tight. Sag should be checked midway between sprockets.

Install top half of chain casing. Install motor and high speed coupling in accordance with coupling installation instructions. Fill reducer, high speed coupling and oil-tight chain case with proper lubrication. See pre-start check list and Fig. #11.

11b. SHAFT MOUNT REDUCER WITH V-BELT DRIVE:

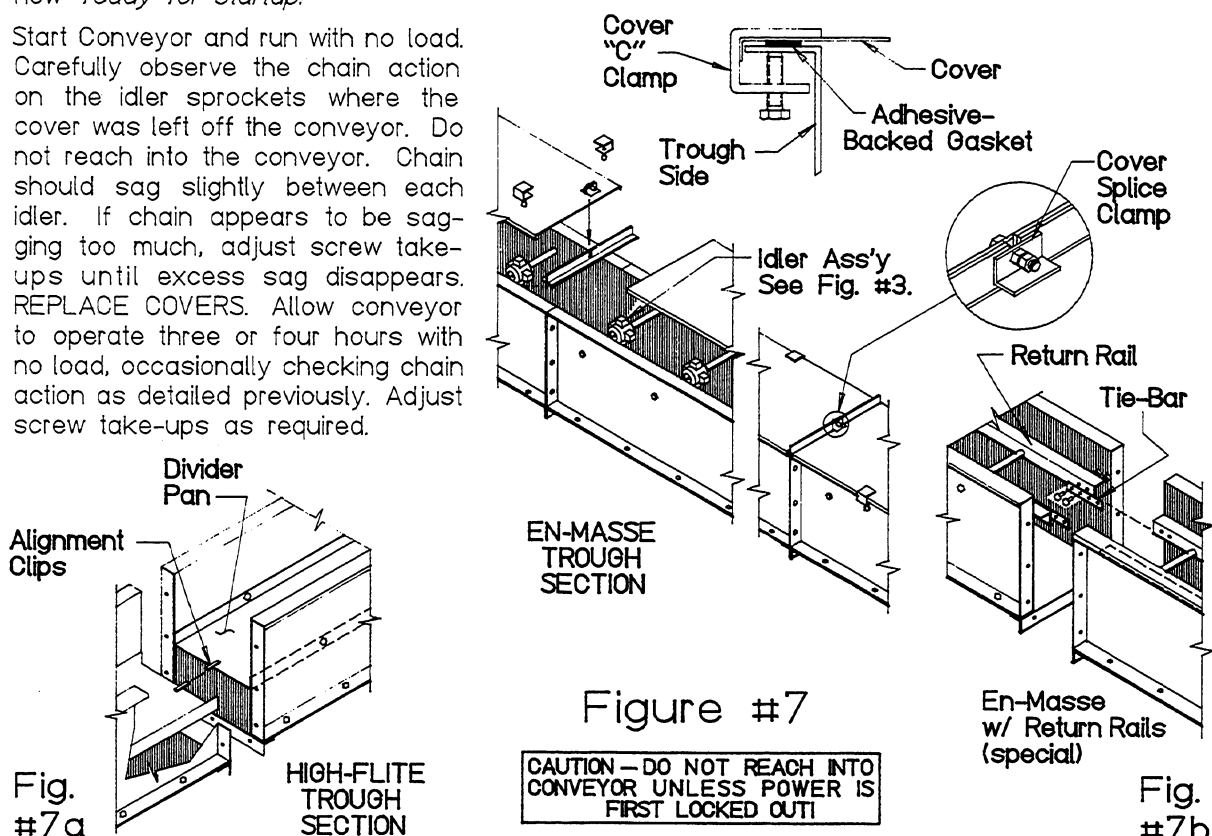
Mount reducer assembly to headshaft and tighten set screws (or bolts for tapered bushings). Field fabricate and mount torque arm mounting bracket to conveyor (Fig. #5). Torque arm should be located at approximately a 90° angle to a line through the reducer hollow shaft and reducer tie rod attachments. Fill reducer with proper lubrication (see pre-start check list). Bolt motor mount to reducer and tighten securely. Mount motor to motor mount. Mount rear half of V-Belt guard and field fabricate attachment brackets. Mount V-Belt sheaves and belts. Tighten V-Belts using adjusting screws on motor mounts. Install front half of V-Belt guard. See top Page 12.

C. Pre-Start Checklist:

1. Fill gear reducer, if furnished by Essmueller, with proper lubricant (as prescribed in reducer documentation which is shipped with the equipment).
2. Fill high-speed coupling, if furnished by Essmueller, with proper lubricant.
3. Fill chain casing with lubricant per the chart Figure #11.
4. Check all conveyor chain connecting pins to insure they are driven into the side bars correctly, and that the "T"-Head cotters have been bent over.
5. Check that chain and flights are properly installed. See Fig. #4.
6. Check that interior trough joints are flush and smooth.
7. Check that all flange bolts, drive mounting bolts, anchor bolts, etc. are tight.
8. Check to be sure all tools, etc. have been removed from inside the conveyor.
9. Check to be sure all guards, inspection doors, etc. are properly in place.
10. Check to be sure all set screws in head sprocket, tail sprocket, and idler keeper set collars are tight. (Idler set collars not used on High-Flite conveyors.)
11. Check to see that chain detection device arms are properly located and device is wired and operational (Fig. #9). Upper edge should be angled downward 10°-15° from horizontal. Not applicable to High-Flite conveyors.

D. Start-Up:

1. Carefully jog conveyor. Make sure motor is turning the right way! Run the conveyor through one complete cycle and observe closely for proper operation. Be prepared to STOP the conveyor drive if any unusual noise, stoppage, or obvious irregularity occurs. Lockout power to the drive and check for bent flights. Check the conveyor chain tension at the first intermediate section behind the head. If chain is loose, adjust screw take-ups. If everything is satisfactory, install trough covers (Fig. #7), except the one in front of the first inlet and the one just before the head section. Use three pairs of "C" clamps to hold down each section of cover (and three single clamps for head and tail sections). The conveyor is now *ready for startup!*
2. Start Conveyor and run with no load. Carefully observe the chain action on the idler sprockets where the cover was left off the conveyor. Do not reach into the conveyor. Chain should sag slightly between each idler. If chain appears to be sagging too much, adjust screw take-ups until excess sag disappears. REPLACE COVERS. Allow conveyor to operate three or four hours with no load, occasionally checking chain action as detailed previously. Adjust screw take-ups as required.



3. The conveyor may now be operated under load. Immediately upon placing conveyor in operation under load, check chain action and adjust take-ups if necessary as stated in Para. 2, above. Observe the flow of material in the trough. Be sure that it is clearing the underside of the idler shafts. If the material touches the shafts, the feed must be restricted. Check chain action frequently during the first week of operation and adjust take-ups as necessary. Replace covers each time the conveyor is put back into operation.
4. When conveyor is first started under load, the carried material may be slightly sluggish near the edges of the trough. This may be due to scale on the steel troughing, creating additional friction. The carried material will polish the inside of the troughs quickly and eliminate the excess friction. Thus, the material will soon move *en masse* freely.

E. Maintenance:

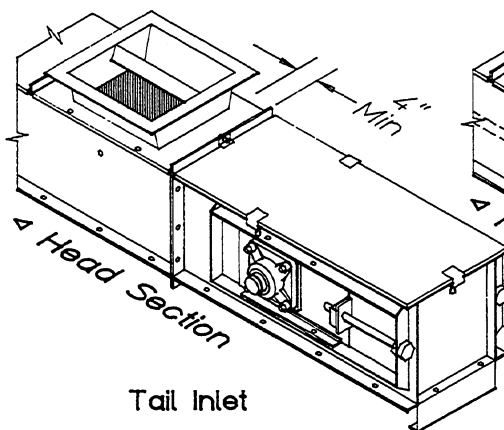
1. Head and tail shaft bearings should be checked approximately every 250 hours of operation and lubricated as required. Style "B" idler bearings, if used, should also be checked and lubricated.
2. Gear reducer oil level should be checked every 150 hours of operation (more often if leakage is observed). Oil should be changed in accordance with manufacturer's recommendations (consult manual shipped with the equipment).
3. Check oil level in chain casing (if so equipped) every 150 hours of operation. Also check and adjust drive chain tension at this time.
4. Check conveyor chain frequently for sag while under load (see para. D2 & D3), and adjust as necessary. The user should establish a schedule for checking chain tension in accordance with his application and usage. "Essmueller" suggests, after initial chain break-in, checking at least once a day until adjustment pattern has been established.
5. Check internal conveyor sprockets for proper location every 250 hours of operation. Check and tighten set screws if required. Check tooth profile for excessive wear. Worn teeth may cause chain failure. High-Flite conveyors do not have idler sprockets.

Conveyor Inlets:

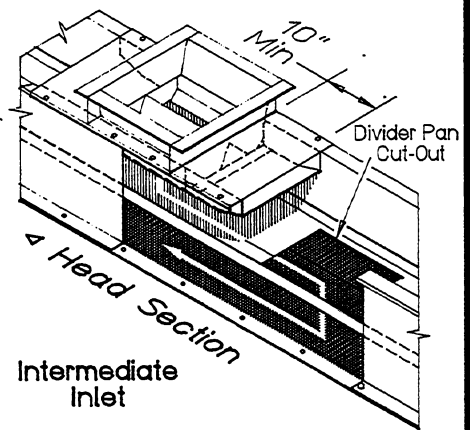
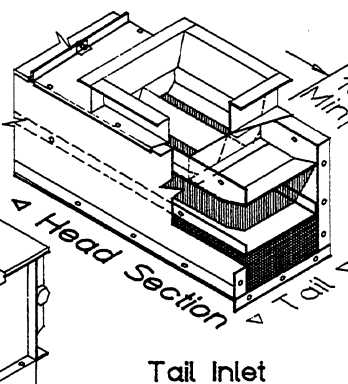
When field mounting inlets, several general rules apply:

1. They should never be placed closer than 4" to the tail section flange for *En-Masse* conveyors, 10" for High-Flite Conveyors (Fig. #8).
2. If possible, avoid locating inlets on or above bend sections. If it is necessary to do so, consult Essmueller.
3. The standard inlet for *En-Masse* conveyors is the Direct Inlet, which allows full, or choke loading. By-Pass and metering inlets are available. A special, self-metering inlet is required for High-Flite conveyors at the tail, and for intermediate inlets.

EN-MASSÉ "DIRECT" INLET



HIGH-FLITE "SELF-METERING" INLET



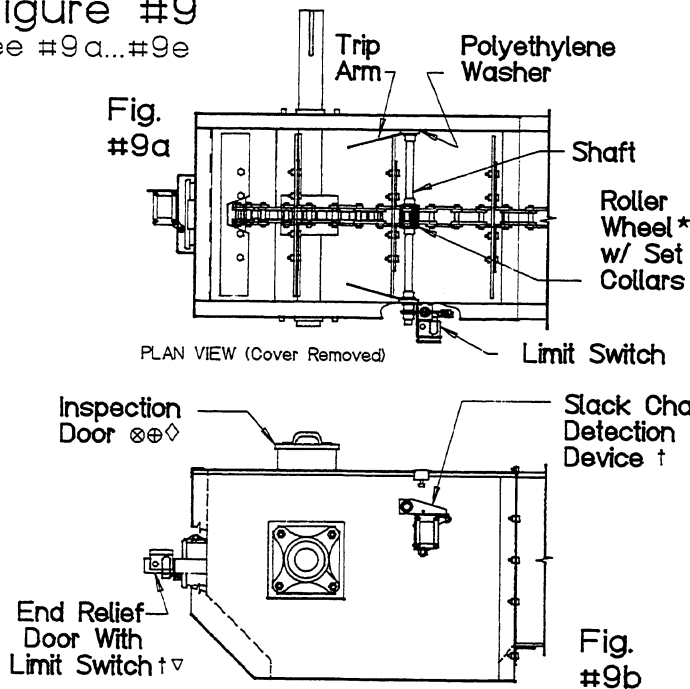
Standard inlet allows full "flood" or "choke" loading of trough. Locate at tail or intermediate section.

Figure #8

Self-metering inlet limits volume of material admitted into carrying-run of conveyor. Non-metering inlets will damage the conveyor. Intermediate inlets have flow-thru cut-out in divider pan as shown (beyond 10").

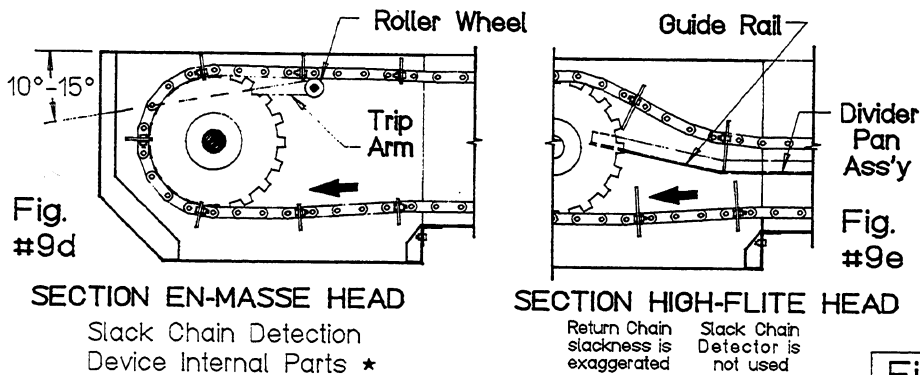
Figure #9

See #9a...#9e



STANDARD HEAD SECTION

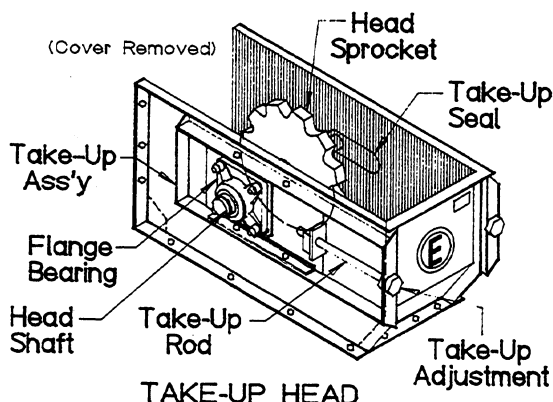
Options similar for Take-Up Head Section



NOTES:

- ⊗ Opening protected w/ grating
- ⊕ Can be furnished for intermediate section or tail
- † Totally Enclosed Std. Explosion Proof Opt.
- * En-Masse Conveyors only
- ◇ Limit switches can be furnished for inspection doors
- ▽ Proximity type sensors available

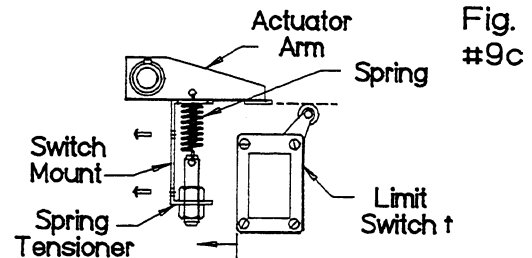
Figure #10



Used w/ Contoured Tail Section for Maximum Carry-Away of Material

Safety Options

End relief door with limit switch can be used to shut off power to the conveyor when the discharge is interrupted or the conveyor becomes plugged and overloaded. Essmueller can also furnish zero speed switches and/or slack chain detection devices to shut off power in the event the conveyor is stalled due to the presence of foreign material in the conveyor or if for some reason the drive end of the conveyor is still running while the opposite end has stopped.



DETAIL OF LIMIT SWITCH ASSEMBLY SLACK CHAIN DETECTION DEVICE

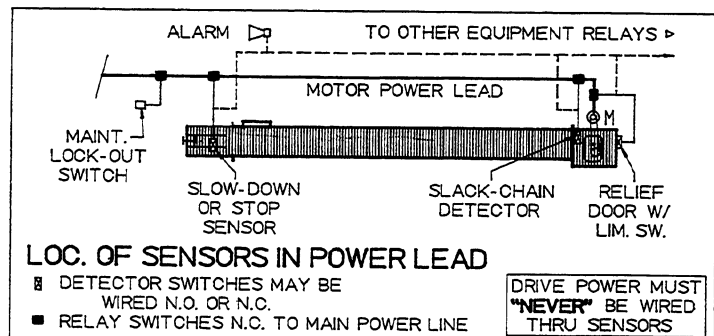
* Not available for High-Flite conveyors

Figure #11

Chain Casing Lubricant

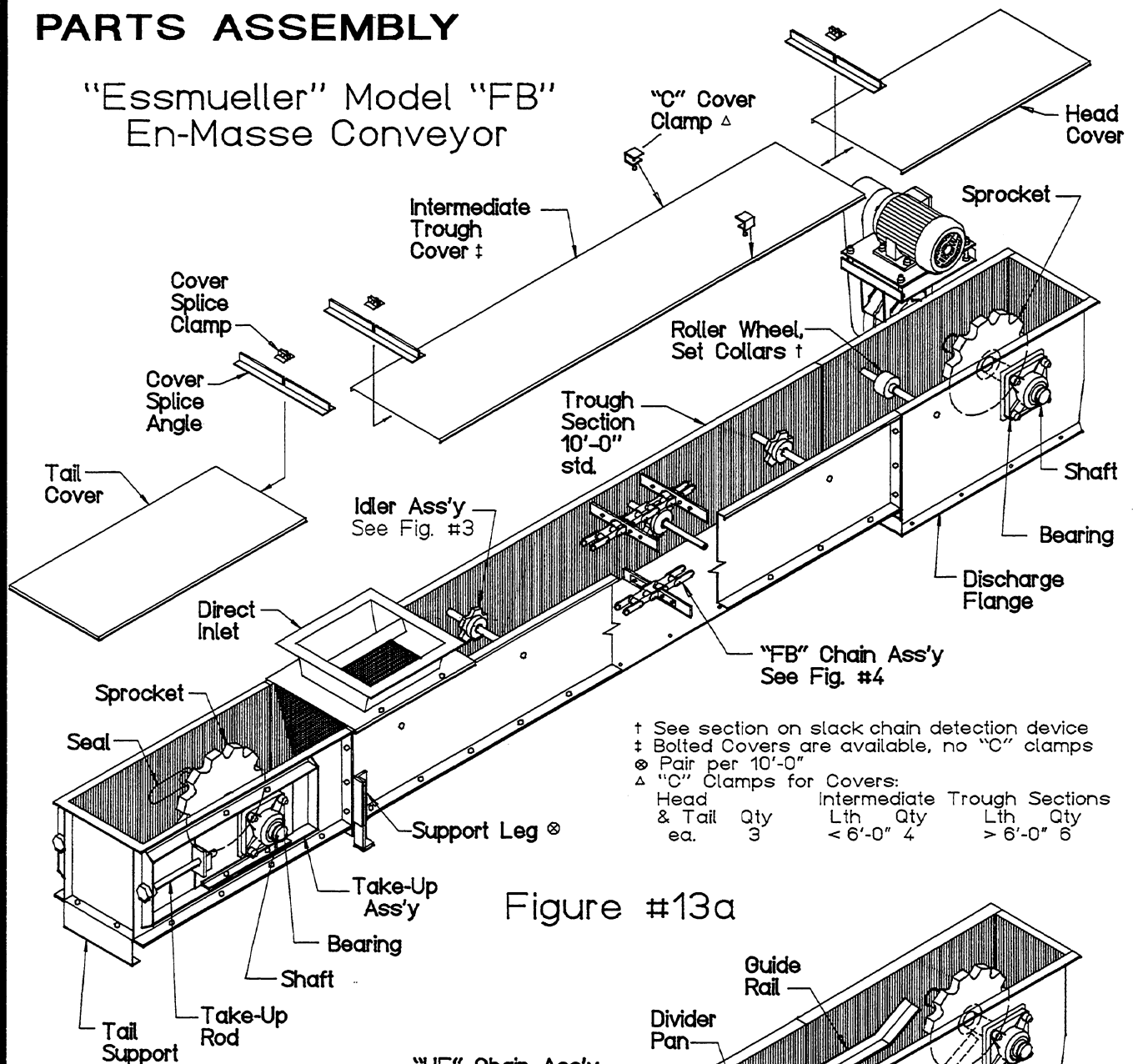
TEMPERATURE		RECOMMENDED
Fahrenheit	Celsius	LUBRICANT
20°F... 40°F	= -7°C...-4°C	SAE 20
40°F...100°F	= -4°C...38°C	SAE 30
100°F...120°F	= 38°C...49°C	SAE 40
120°F...140°F	= 49°C...60°C	SAE 50

Figure #12



PARTS ASSEMBLY

"Essmueller" Model "FB" En-Masse Conveyor



† See section on slack chain detection device
 ‡ Bolted Covers are available, no "C" clamps
 ⊗ Pair per 10'-0"

Δ "C" Clamps for Covers:

	Head & Tail ea.	Qty	Intermediate Lth	Qty	Trough Sections Lth	Qty
< 6'-0"		3		4		
> 6'-0"					6	

Figure #13a

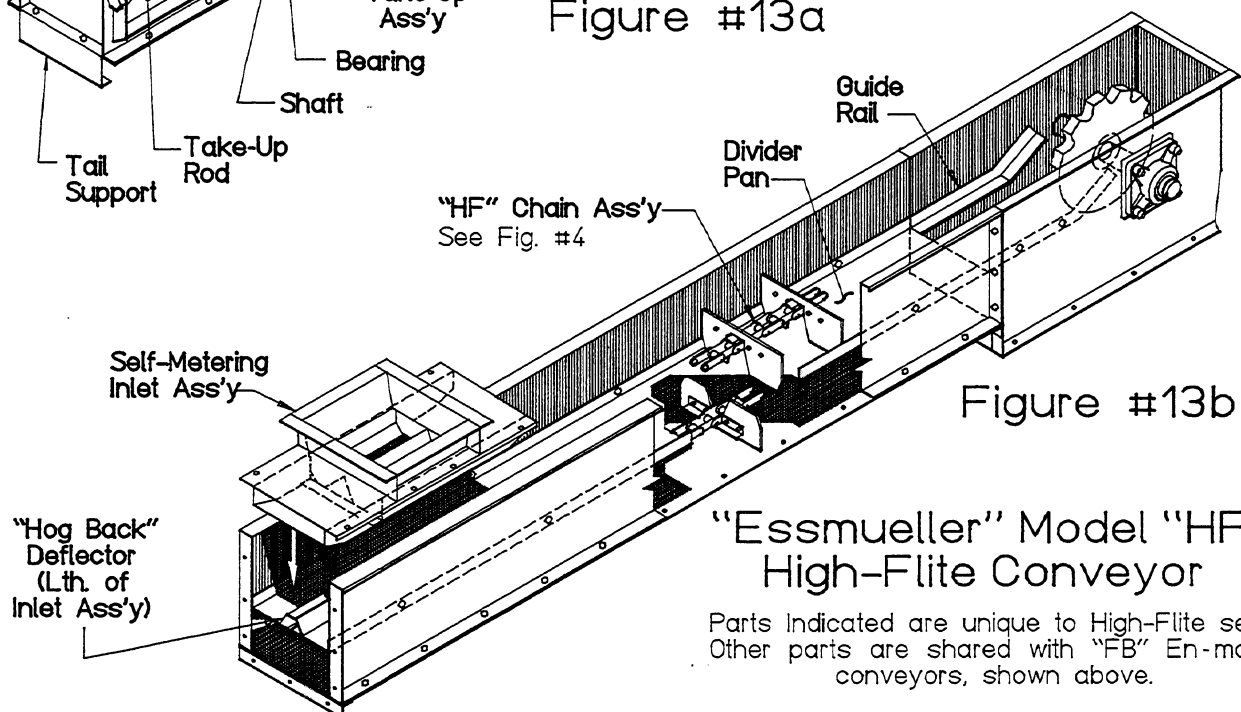


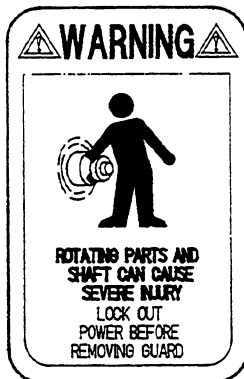
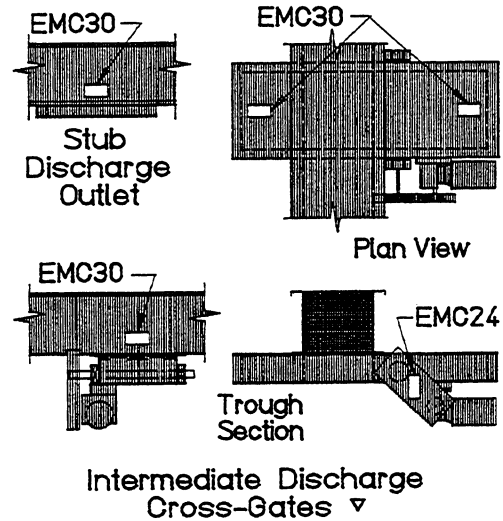
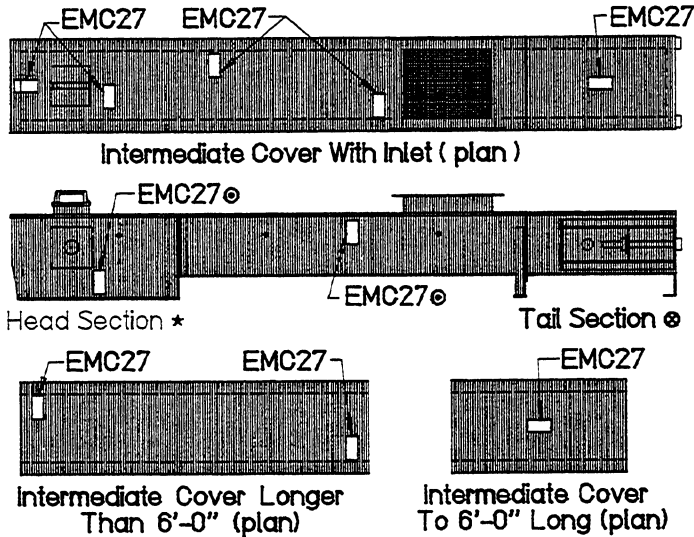
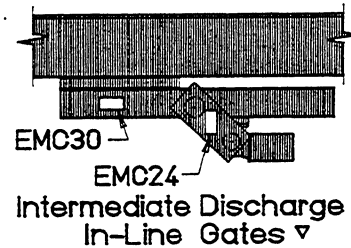
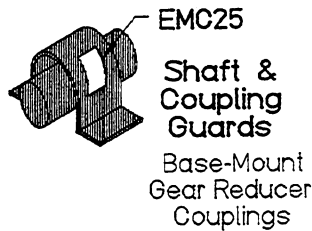
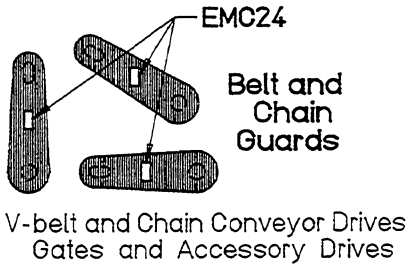
Figure #13b

"Essmueller" Model "HF" High-Flite Conveyor

Parts Indicated are unique to High-Flite series. Other parts are shared with "FB" En-masse conveyors, shown above.

WARNING LABELS FOR FLAT-BOTTOM CONVEYORS

Safety Signs conform to guidelines of Equipment Manufacturers
Council of the American Feed Industry Association (AFIA).



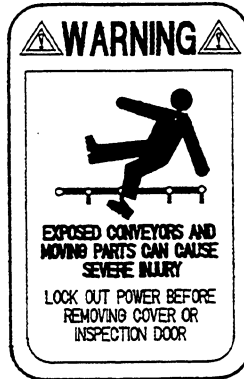
EMC25

EMC25. On guard near fastener or top. Larger guards or sectional guards may require more than one sign—locate each end and on top or on each piece. Applies to "Scoop-mount" gear reducer couplings.



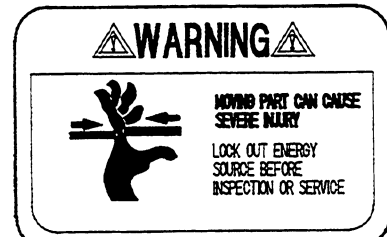
EMC24

EMC24 On guard face near fastener or top. Guards larger than 3' or in more than one section —on each end and on top or on each piece. Applies: gear reducers, gate drive reducers.



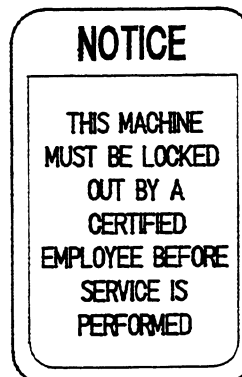
EMC27

EMC27 Hinged access doors, incl. relief lids. Adjacent to door if possible, else on door. On conveyor discharge. Trough: on both sides of conveyor (ctr. ea. sect.). Removable access panels, lids, covers: Center if less than 6'; diagonal end corners if longer.



EMC30

EMC30. Discharge and Slide Gate Sides: each side for best vision. All covers for best vision.



EMC402



EMC28

Refer to chart for sign replacement on repainted equipment.
Use largest sized decal that area will allow.

NOTES: Warning Sign Locations:
■ Flat-Bottom Conveyors: En-Masse and High-Flite Series
○ Each side of conveyor
▽ ELECTRIC, MANUAL and PNEUMATIC
* Fixed or Take-Up Head
⊗ Take-Up or Countour Tail

User's Worksheet

© 1994, THE ESSMUELLER COMPANY
FORM WF-FH294

This worksheet is provided for use by the user or operator. It may be used to record pertinent information about ESSMUELLER equipment in this order. The form is for your records. It may be helpful when you contact Essmuller with problems, repair, replacement, or future orders.

MODEL/SERIES: (✓) or complete applicable spaces:

Serial Number Order Number Purchased From Date/Year Purchased Conveyor Model/Size Capacity

☐ BPH ☐ CFH ☐ TPH

TYPE CONVEYOR:

☐ En-Masse ☐ High-Flite
Flat-Bottom Incline
Horsepower Head Shaft

FPM _____
RPM _____
Tail Shaft

DRIVE
L-☐ R-☐
Head ☐
Tail ☐

ATTITUDE:

☐ Horizontal ☐ Straight-Incline ☐ C-horiz+Incline

CHAIN:

☐ 81X all stl ☐ C188 comb ☐ S188 all stl ☐ 9131 all stl w/roller

FLITES

☐ std. full spaced ☐ 1/2 spaced ☐ steel flites ☐ back-up flites

CONFIGURATION

- ☐ 1. Fixed Head + Take-up Tail (standard)
- ☐ 2. Take-up Head + Contoured tail
- ☐ 3. Reversing (1 Take-up Head + 1 Fixed Head, 2 End Discharges)
- ☐ 4. Reversing (1 Take-up Tail + 1 Fixed Tail, Intermed. Discharge(s) Only)

INLETS:

☐ direct ☐ metering ☐ by-pass ☐ control

LGTH(S) AND LOC FROM HEAD:

DISCHARGE OUTLETS:

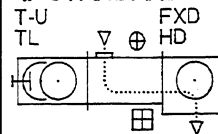
☐ stub discharge ☐ cross gate ☐ in-line gate ☐ manual gate ☐ TE elect gate ☐ EP elect gate ☐ pneum gate

LOC FROM HEAD:

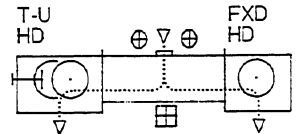
CONVEYOR CONFIGURATIONS

⊕-opt.int.inlets
⊞-opt.int.outlets

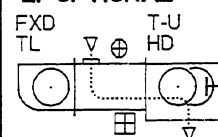
1. STANDARD



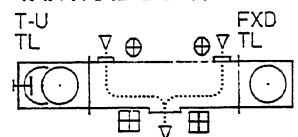
3. TWO END DSCHGS



2. OPTIONAL

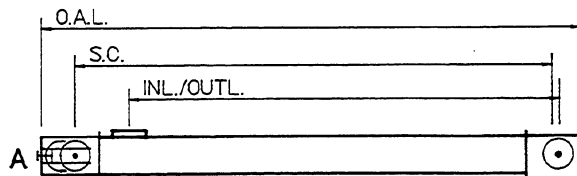


4. INTRMD DSCHG ONLY

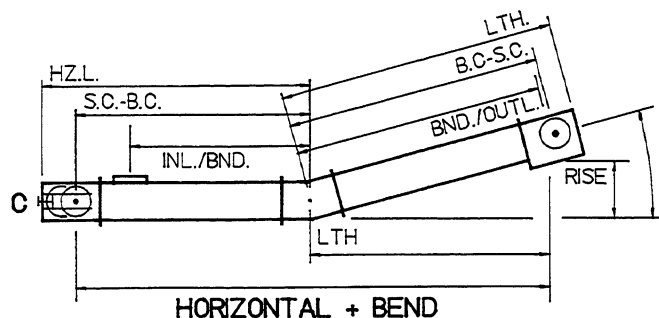


DRIVE SIDE:

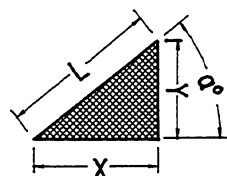
() L.H. (FAR)
() R.H. (NEAR)



HORIZONTAL
OR INCLINE < 5°



HORIZONTAL + BEND



CALCULATIONS FOR DIMENSIONS

$$L = \sqrt{X^2 + Y^2}$$

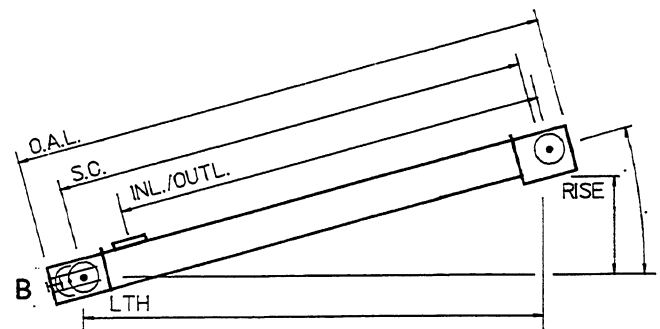
$$\alpha^\circ = \text{ARCTAN}(Y \div X)$$

$$X = L \times \text{COS}(\alpha^\circ)$$

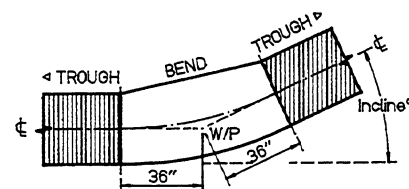
$$Y = L \times \text{SIN}(\alpha^\circ)$$

$$= X \times \text{TAN}(\alpha^\circ)$$

USE THESE SKETCHES to show numbers and locations of inlets, discharges, structures, and other information about your conveyor. Add notes and known dimensions. Show walls, hoppers, etc.

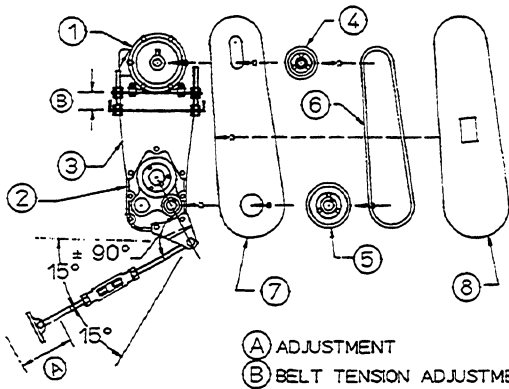


INCLINED



TYPICAL BEND SECTION LAYOUT
HOLD 36" CENTERS

DRIVE ASSEMBLY - TORQUE ARM REDUCERS



(1) MOTOR
HP: _____
FRAME: T- _____
1750 RPM _____
VAC: _____

(2) TORQUE-ARM
SIZE: TXT- _____
CLASS: _____
BUSHING: _____
SHAFT DIA: _____
OPTIONS: _____

(3) MOTOR-MOUNT
SIZE: _____

(4) DRIVER SHEAVE
GROOVE: _____
SIZE: _____
OD: _____
BUSHING: _____
DIA: _____

(5) DRIVEN SHEAVE
GROOVE: _____
SIZE: _____
OD: _____
BUSHING: _____
DIA: _____

(6) BELT(S) _____
QTY: _____
SIZE: _____
NO: _____

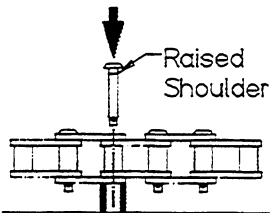
(7) INSIDE GUARD COVER *
(8) OUTER GUARD COVER *

* BRACKETS BY OTHERS

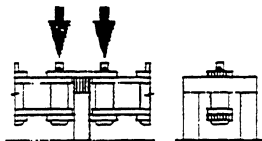
"Dodge Reliance" TXT-series components shown. Your assembly will vary with use of other mfr's products.

When fabricating Torque-Arm Bracket, for best results stay within the manufacturer's limits for offset angle and length, shown here. In most cases, the torque arm may be mounted as shown, or reversed, without affecting performance or service life.

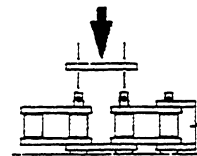
CHAIN ASSEMBLY



Assembly of engineering steel straight link chain with shouldered pins. See Fig. #4



Assembly of steel bushed rollerless or other engineering steel chains requiring connection with link pin assemblies.



Installation of connecting links of roller chain

Information courtesy American Chain Association (ACA)

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