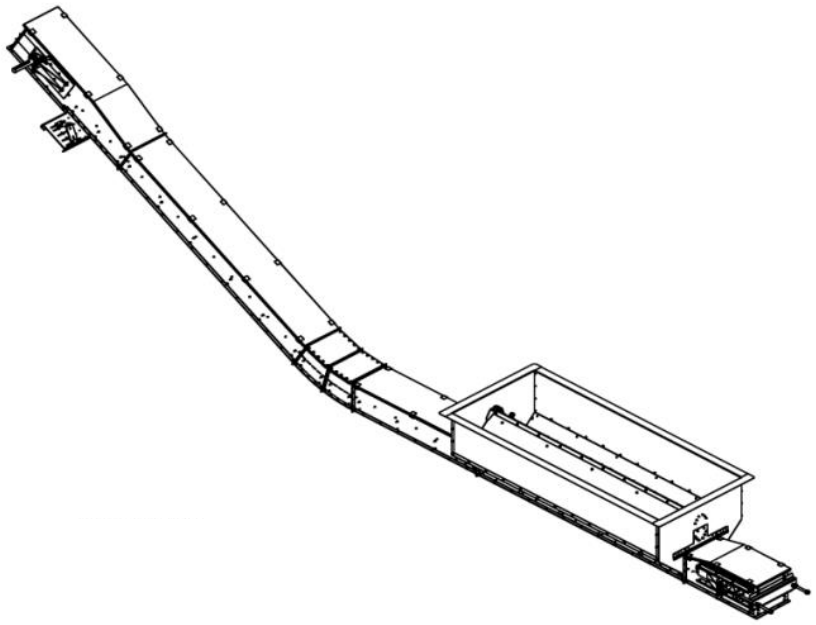


HY-FLIGHT CONVEYOR
Assembly and Owner's Manual

Sukup Manufacturing Co.
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Phone: 641-892-4222 **Fax: 641-892-4629**
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DATE	REVISIONS	PAGES
03/18/2020 –	Updated dimensions for distance between tail to center of inlet	15
	Added notice on grain damage & reduced capacity as angle of inlet increases	15 & 25
	Added reference to Manual L25025 for installing conveyor for bin unloading	20
	Added part numbers for drive-over hopper grating	65
07/03/2019 –	Updated warranty	4
	Updated torque values table	11
	Updated drawing & instructions for cutout in return pan of incline section under standard inlet	25
	Added notice & updated drawings showing torque arm rod attachment	32
	Added note on tensioning chain under load	38
	Updated sprocket replacement instructions	41
	Updated Dodge speed reducer installation instructions	46-53
	Updated Dodge Imperial & ISAF bearing lubrication instructions	55
	Updated head bearing guards table	57
	Added kit numbers for leg extensions	65

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Introduction

This conveyor was carefully designed to give years of dependable service and was manufactured with the finest materials available. This manual includes information relating to safety, installation, maintenance and troubleshooting, and should be thoroughly read prior to installation of conveyor. Due to the wide variety of factors possible, this manual cannot cover all aspects of installation. Instructions provided are to be used as general guidelines only. Qualified contractors should be used for site design, layout and construction of conveyor. Reliability, safety and good service life of conveyor depend to a very large extent on care taken in installing and preparing this equipment for its intended use.

Receiving and Inspection

Carefully inspect shipment for damage as soon as it is received. Verify that quantities of parts and packages received correspond to quantities shown on packing slip. Report any damage or shortage to delivering carrier as soon as possible. Sukup Manufacturing's responsibility for damage to equipment ended with acceptance by delivering carrier. Refer to bill of lading. Save all paperwork and documentation furnished with conveyor components.

Equipment Information

Record conveyor information in space provided below and keep it on file. This information will help identify your equipment should you need to contact your dealer with any questions.

Model number _____

Serial number _____

Inlet to outlet length _____

RPM _____

Grain type(s) _____

Horsepower _____

Dealer _____

Date purchased _____

Serial number plate is located on head assembly.

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E-mail: Info@sukup.com Visit us at: www.sukup.com

GRAIN HANDLING & MATERIAL HANDLING LIMITED WARRANTY

SUKUP MANUFACTURING CO. (Sukup) warrants to original retail purchaser that within time limits set forth, new equipment shall be free from defects in material and workmanship. A part will not be considered defective if it substantially fulfills performance specifications, such as cosmetic (appearance) issues that will not affect life of product. Should any part prove defective within the warranty period, the part will be replaced without charge F.O.B. Sukup Manufacturing Co., Sheffield, Iowa USA or Distribution Centers - Arcola, Illinois; Aurora, Nebraska; Defiance, Ohio; Jonesboro, Arkansas; Cameron, Missouri; Watertown, South Dakota. To obtain warranty, a copy of original invoice is required, see reverse side.

THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. Sukup neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part, and will not be liable for incidental or consequential damages. THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS LIMITED WARRANTY.

Sukup reserves the right to change specifications, add improvements or discontinue manufacture of any of its equipment without notice or obligation to purchasers of its equipment. This warranty gives you specific legal rights. You may also have other rights which vary according to state or province.

WARRANTY EXCLUSIONS - Labor, transportation, or any cost related to a service call is not provided by Sukup. This Limited Warranty does not apply to damage resulting from misuse, neglect, normal wear, accident or improper installation or maintenance. ITEMS NOT MANUFACTURED BY SUKUP (e.g. tires, belts, motors) ARE COVERED UNDER WARRANTIES OF THEIR RESPECTIVE MANUFACTURERS AND ARE EXCLUDED FROM COVERAGE UNDER THE SUKUP WARRANTY. Since the stirring down augers are so critical to the successful operation of the stirring machine, Sukup Manufacturing Co. will not warranty any machines unless they are equipped with Sukup down augers. SUKUP MANUFACTURING CO. MAKES NO WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO DOWN AUGERS LONGER THAN 20', INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Upon taking delivery of product, purchaser (dealer and/or end user) assumes responsibility for proper storage of all materials. Proper storage includes dry, temperature and humidity controlled facilities, which eliminate the potential of moisture, including condensation, from causing white rust and/or corrosion of any sort. Warranty does not extend to defects, damage or cosmetic (appearance) issues caused by improper storage, handling or erection.

BASIC WARRANTY - All Sukup manufactured products are warranted for one year from date of purchase. Part(s) must be returned to Sukup within 30 days in event of failure.

EXTENDED STIRRING MACHINE WARRANTY - Sukup warrants stirring machines for two years from date of purchase.

EXTENDED STIRRING AUGER WARRANTY - Sukup warrants stirring down augers for two years from date of purchase. Must return top 18" of down auger to obtain credit.

EXTENDED FAN WARRANTY - Sukup warrants fans for two years from date of purchase.

EXTENDED HEATER CIRCUIT BOARD WARRANTY - Sukup warrants heater circuit boards for three years from date of purchase.

EXTENDED MATERIAL HANDLING WARRANTY - Sukup warrants Material Handling, excluding structural support systems, for two years from date of purchase.

REPLACEMENT PARTS WARRANTY PERIOD - Sukup warrants replacement parts (e.g. belts, sensors, rotating contacts, gearmotors, switches) purchased from Sukup for one (1) full drying season following purchase.

ELECTRIC MOTOR WARRANTY - The manufacturers of electric motors warranty their motors through authorized service centers for a 2 year period from motor date code. Contact motor manufacturer for nearest location. If motor warranty is refused by a service center based upon date of manufacture, use the following procedure: Have motor repair shop fill out warranty report form as if they were providing warranty service. State on report reason for refusal. Send report, motor nameplate, and proof of purchase date (invoice from Sukup and invoice for your customer) to Sukup. If electric motor warranty is not satisfactorily handled by motor service center, contact Sukup for assistance. Sukup will attempt to obtain warranty from motor manufacturer, any credit obtained will be passed on. Warranty may also be obtained by returning motor to Sukup Manufacturing Co. or Distribution Centers with prior authorization. **NOTE**: Sukup will not be responsible for unauthorized motor replacement or repair. Labor for removal of motor from fan not included.

WARRANTY CERTIFICATION - Warranty registration card should be mailed within one month of product delivery to certify warranty coverage.

UNAPPROVED PARTS OR MODIFICATION - All obligations of Sukup under this warranty are terminated if unapproved parts such as stirring augers longer than 20' are used, or if equipment is modified or altered in any way not approved by Sukup.

12/7/18

Read manual before installing or using product. Failure to follow instructions and safety precautions in manual can result in death or serious injury. Keep manual in a safe location for future reference.

On safety decals, this symbol and the signal words Danger, Warning, Caution and Notice draw your attention to important instructions regarding safety. They indicate potential hazards and levels of intensity.

DANGER RED - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

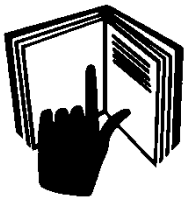
WARNING ORANGE - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION YELLOW - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE BLUE - **NOTICE** alerts you to practices unrelated to personal injury, such as messages related to property damage.

IMPORTANT: To prevent serious injury or death to you or your family, it is essential that safety decals are clearly visible, in good condition, and applied to the appropriate equipment.

FOLLOW MANUAL & SAFETY DECAL MESSAGES



Carefully read this manual and all safety decals on your equipment. Safety decals must be kept in good condition. Replace missing or damaged safety decals by contacting Sukup Manufacturing Co. via mail at PO Box 677, Sheffield, Iowa USA, 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com.

It is the responsibility of the owner/operator to know what specific requirements, precautions, and work hazards exist. It is also the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of hazards and safety precautions that need to be taken to avoid personal injury or death. Always keep children away from bins and vehicles with flowing grain.

Make no unauthorized modifications to machine. Modifications may endanger function and/or safety of unit. Keep unit in good working condition. Keep shields in place. Replace worn or missing shields free of charge by contacting Sukup Manufacturing Co.

GRAIN BIN SAFETY

Owners/operators are responsible for developing site-specific confined space entry procedures. OSHA's confined space entry procedures (29CFR 1910.146) can be found at www.osha.gov.

If you must enter bin for repair or maintenance:

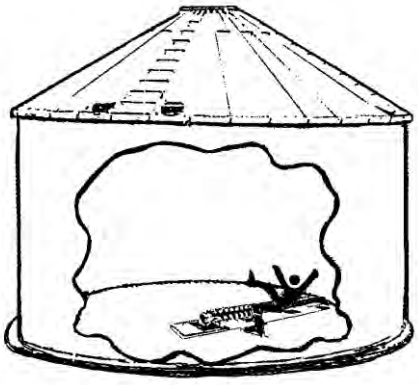
- Use a safety harness, safety line and respirator
- Station another person outside of bin
- Avoid the center of the bin
- Wear appropriate personal protective equipment
- Keep clear of all augers and moving parts

DANGER: Never enter bin unless all power is locked out and another person is present.



Rotating augers can kill or dismember!

NEVER enter bin when augers are running!
When bin is nearly empty, sweep auger will travel at an increasingly fast speed. Keep away from sweep and sump augers to avoid entanglement.



Failure to follow precautions above will result in death or serious injury.

DANGER: Flowing grain may trap and suffocate. If you enter a bin of flowing grain you can be completely submerged in grain in about 8 seconds.

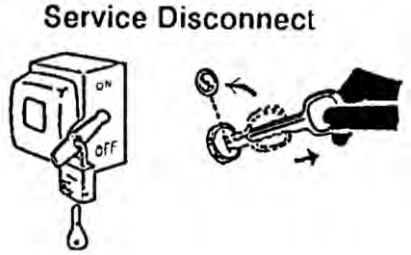


Failure to heed this warning will result in death or serious injury.

To avoid electric shock or electrocution, all equipment must be properly wired and grounded according to electrical codes. Have unit wired by qualified electrician.



Have an electrician install a main power disconnect switch capable of being locked only in OFF position. Mark disconnect clearly as to equipment it operates. Always lock out main power disconnect switch whenever equipment is not in use.



WARNING: When servicing equipment, never enter bin unless all power is locked out and another person is present. Always LOCK OUT all power and always check with voltage meter before servicing.

Failure to do so could result in death or serious injury.

Owners/operators are responsible for developing site-specific Lockout/Tagout procedures based on equipment at their work site. See OSHA's typical minimal lockout procedures (29CFR 1910.147 App A) at www.osha.gov.

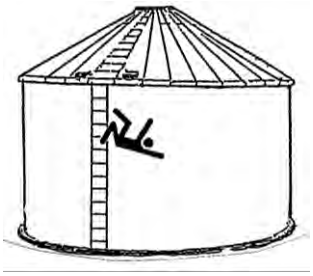
WARNING: KEEP CLEAR OF ALL MOVING PARTS.
Keep people (ESPECIALLY YOUTH) away from equipment, particularly during operation.

Keep away from all moving parts. Keep all shields in place. **SHUT OFF AND LOCK OUT** all power before servicing.



Failure to follow precautions above could result in death or serious injury.

WARNING: Metal is slippery when wet. To avoid falls, never carry items if climbing on bin. Maintain secure hand and foothold if climbing on bin. Failure to do so could result in death or serious injury.



CAUTION: Metal edges are sharp. To avoid injury, wear protective clothing and handle equipment and parts with care.

Failure to do so may result in minor or moderate injury.

PERSONAL PROTECTIVE EQUIPMENT



Refer to OSHA 1910.132 (Personal Prot. Equip.)

Owners/Operators are responsible for developing site-specific personal protective equipment standards. OSHA's personal protective equipment standards (29CFR 1910.132) can be found at www.osha.gov.

EMERGENCIES – KNOW WHAT TO DO

Have emergency numbers and written directions to work site readily available in case of emergency. An area for emergency phone numbers to be recorded is provided below and at end of this manual.

Ambulance • Fire • Police: 9-1-1

Bin rescue team: _____

Emergency medical squad: _____

Address of work site: _____

Directions to work site:_____

Do not enter a grain bin if grain has bridged or stopped flowing normally. Grain can collapse without warning and can trap, bury and cause suffocation. See Fig. 1.

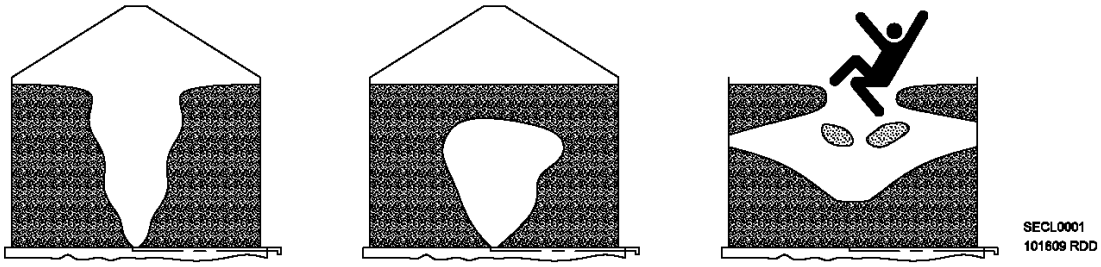


Fig. 1 – Obstructed-flow, bridged grain, collapsed bridge of grain in bin

Basic safety rules

1. Be certain that all covers, grates and guards are in place and securely fastened.
2. Never step or walk on conveyor covers, grates or guards.
3. Lock out all power before removing covers, grates or guards. Before working on any part of conveyor, secure all chains and belts to prevent movement.
4. Do not modify or redesign conveyor without first obtaining written approval from Sukup Manufacturing Co. Unauthorized modifications to components may impair function and/or safety and affect machine life.



FOLLOW A PROPER LOCKOUT PROCEDURE

This suggested procedure must be performed **EVERY TIME** conveyor is to be worked on. Following these steps will assist in preventing accidents.

Each worker must have his/her own lock and the only key to that lock.

Make sure conveyor is not operating before turning off power.

Notify all affected employees that conveyor will be locked out for service.

Authorized employee shall refer to the facility procedure referencing the power source for the conveyor.

Shut down conveyor in a normal manner.

All energy sources that could activate conveyor must be deactivated.

Each person who will be working on conveyor must put a lock on each energy source that could provide any power to conveyor.

Confirm that power has been deactivated by trying to re-start conveyor.

Turn all controls for conveyor to “Off” position.

NO ONE is to return power to conveyor until all work on it has been completed and all locks have been removed.

Facility management needs to proactively train employees to ensure use of proper lockout procedures while working on conveyor. Management also needs to inspect unit for any covers or guards not in their proper place. It is everyone’s responsibility to report any missing grates, guards, equipment failures or failures of others to lock out.

SAFETY QUESTIONS OR CONCERNS

Please contact Sukup Manufacturing Co. with any specific safety concerns about conveyor or its use.

Hy-Flight Conveyor Safety Decals

It is essential that safety decals below be mounted on Hy-Flight Conveyor to warn and remind of potential hazards. Decals are factory-mounted, but may need to be replaced if damaged or worn. Order replacement safety decals or shields free of charge by contacting Sukup Manufacturing Co. by mail at PO Box 677, Sheffield, Iowa USA 50475-0677; by phone at 641-892-4222; or by e-mail at info@sukup.com. Please specify decal identification number. See Fig. 2 for locations of decals.

1. **Decal L0113 – WARNING:** Falling from heights may cause serious injury or death.



2. **Decal L01132 – WARNING:** Do NOT walk or stand on covers or guards!



3. **Decal L0114 - WARNING:** Exposed buckets or flights may cause serious injury or death.



4. **Decal L0271 – DANGER:** Shield missing, do not operate!



5. **Decal L0281 - WARNING:** To avoid serious injury or death:



6. **Decal L0284 - WARNING:** Keep away from all moving parts



Hy-Flight Conveyor Safety Decal Placement

Check that all safety decals are in place as shown in Fig. 2 and are legible when conveyor is installed.

If decal replacement is necessary, use locations below. Make sure location for decal is free from grease, oil and dirt. Remove backing from decal and place in proper position.

IMPORTANT: If suggested location is not clearly visible, place safety decal in a more suitable area. Never cover up an existing safety decal.

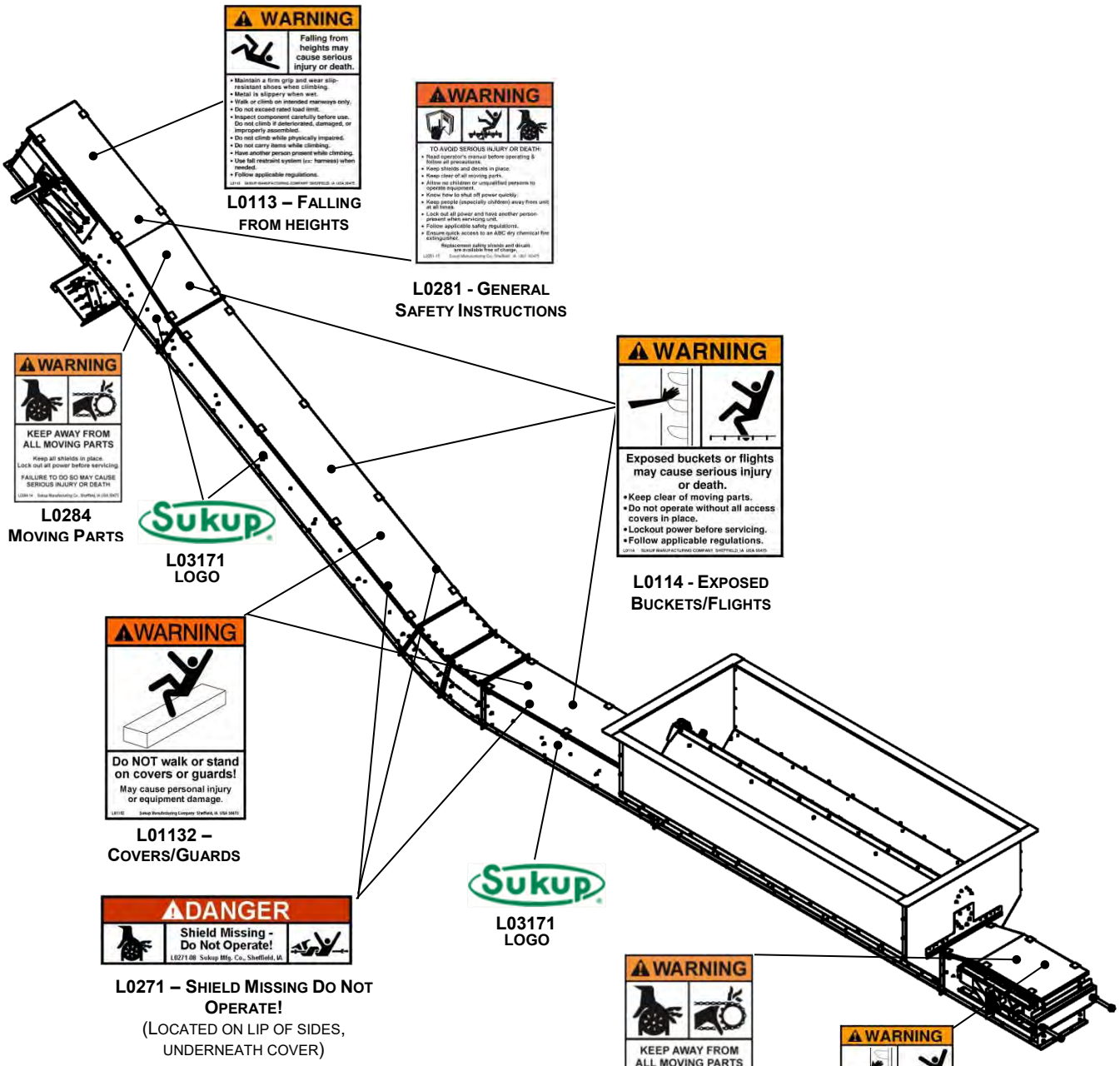


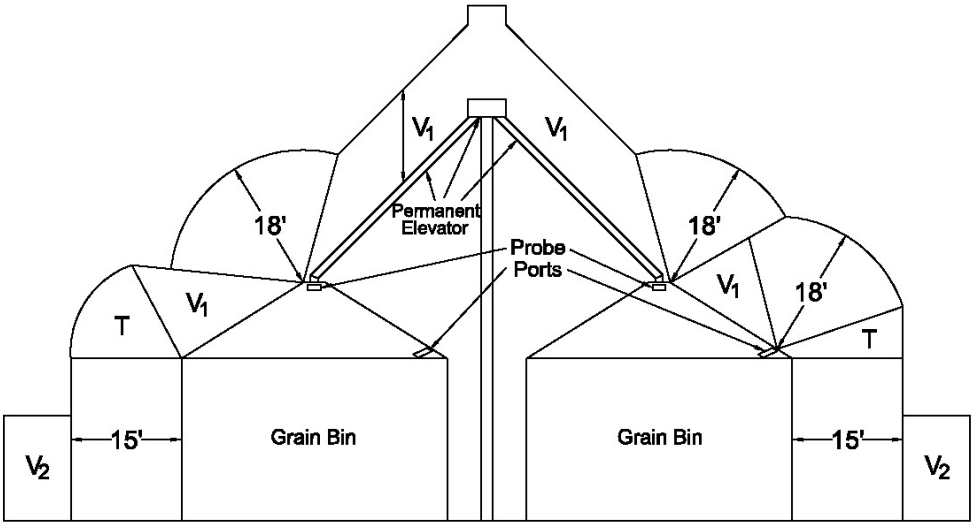
Fig. 2 – Hy-Flight Conveyor decal placement

Electrical Wire Clearances

Your local electric utility may be able to provide assistance in planning a safe environment for working around grain bins. State codes may vary regarding specific clearances for electrical lines around grain bins. Be certain your local electric utility is in accordance with your state's regulations. **To prevent overhead safety issues, bury electrical lines.**

The American National Standards Institute (ANSI) provides clearance envelopes for Grain Bins filled by permanently installed augers, conveyors or elevators in (ANSI) C2 2007 "National Electrical Safety Code," Rule 234, page 120.

NOTE: An electric utility company may refuse to provide electrical service to any grain bin built near an existing electric line that does not provide clearance required by ANSI and the National Electrical Safety Code.



V_1 = Vertical clearance above a building required by Rule 234C (Table 234-1)

V_2 = Vertical clearance above land required by Rule 232

T = Transition clearance

Fig. 3 – Electrical wire clearances

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2[b]	5 5.1 5.2	8 8.2
SAE Grade and Head Markings	NO MARK	2	5	8

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft	N.m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under pre-determined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher-grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nut to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"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.*

[b] *Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.*

Fig. 4 & Table 1 – Torque values

Component Identification

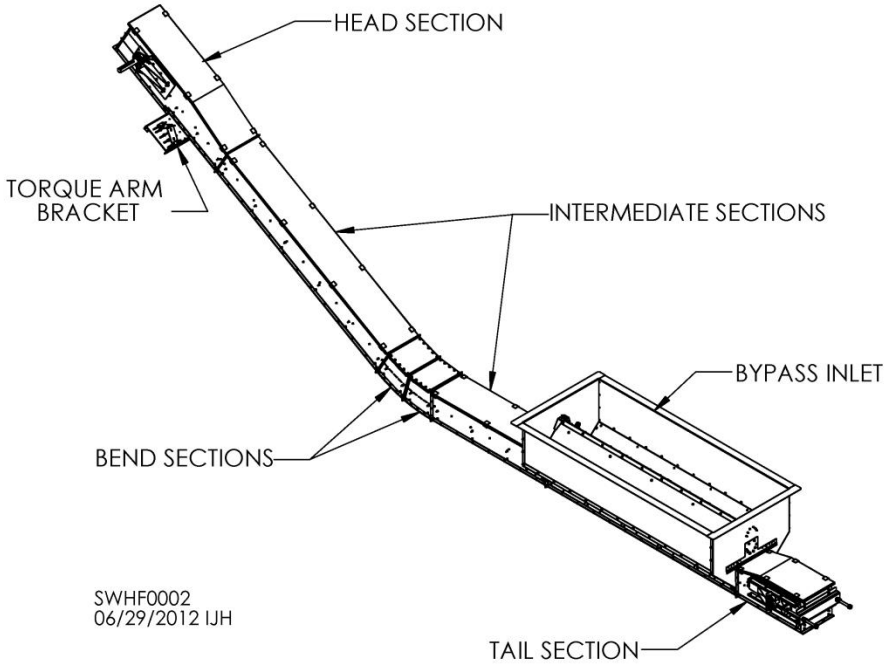


Fig. 5 – Hy-Flight Conveyor with bend sections

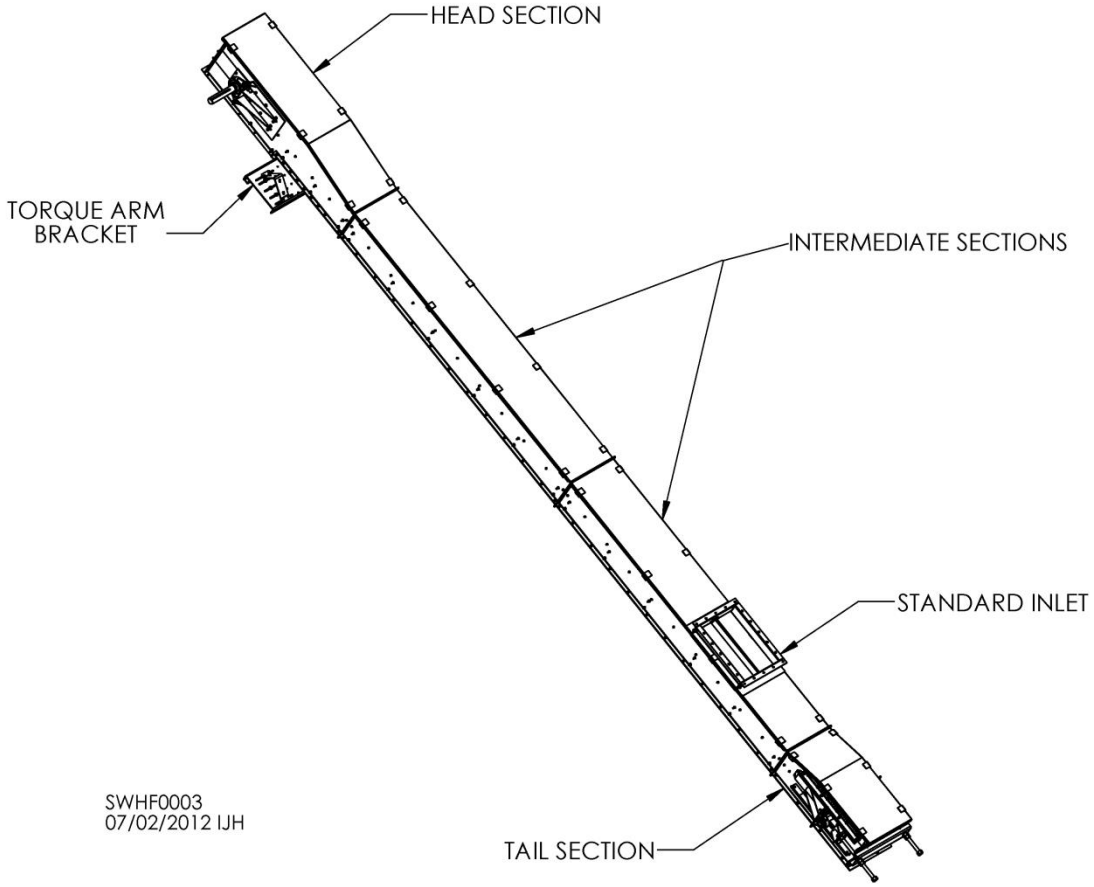


Fig. 6 – Straight Hy-Flight Conveyor

Dimensions

See Figs. 7 and 8 and Tables 2 and 3 for dimensions of Hy-Flight sections, in inches. Dimensions OAL, V1, C1, IOL1, E and G depend on application of conveyor. Dimension B is inner height of conveyor.

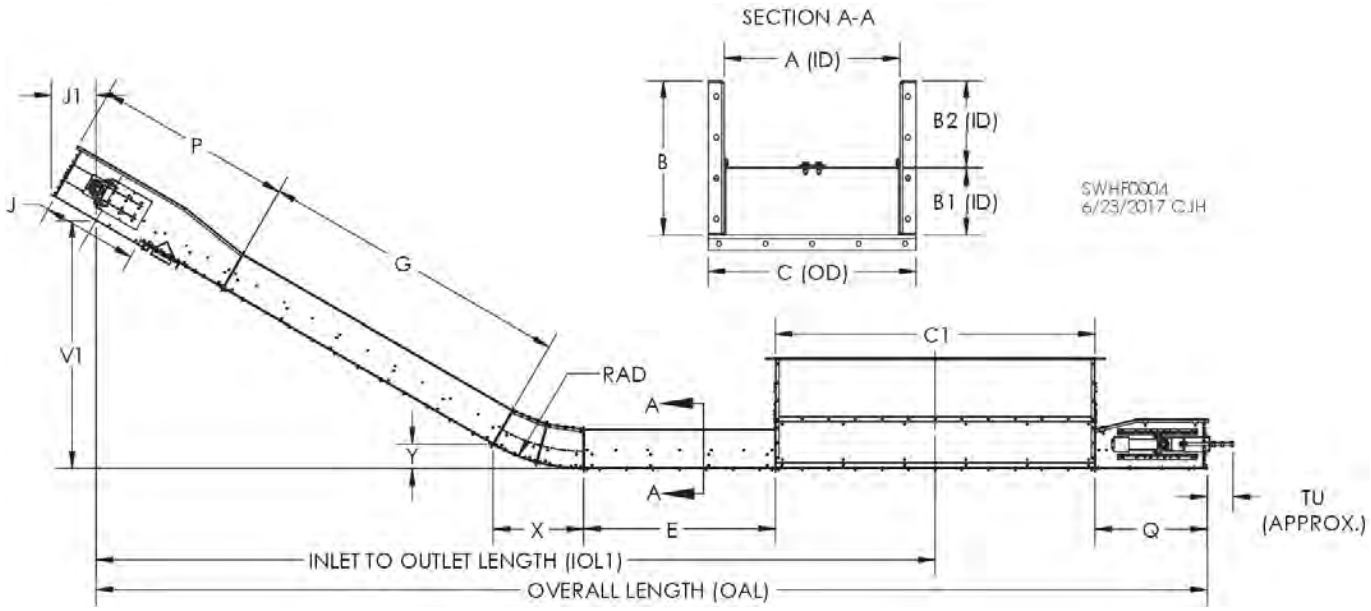


Fig. 7 – Dimensions of Hy-Flight Conveyor with bend sections

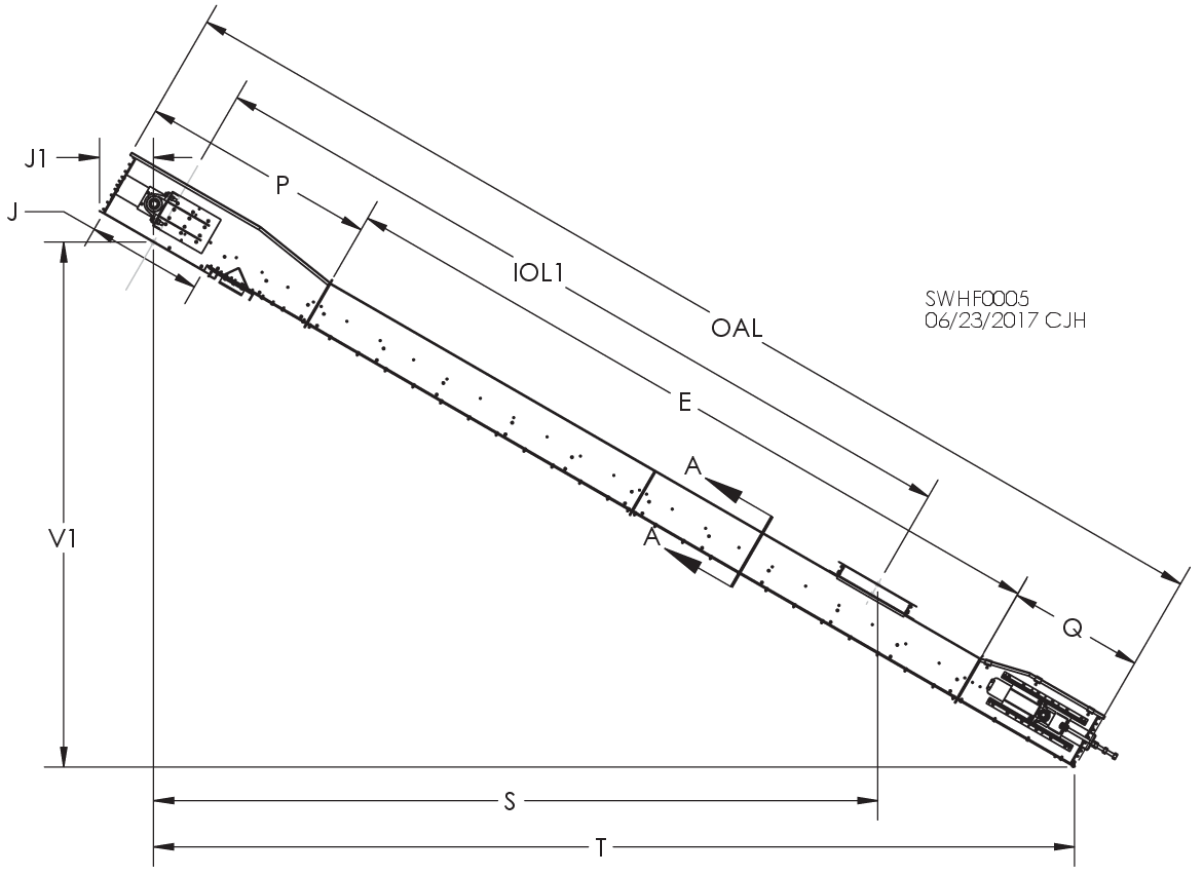


Fig. 8 – Dimensions of straight Hy-Flight Conveyor

Hy-Flight Dimensions

MODEL	RAD	A	B	B1	B2	C	J	P	Q	TU
HF1213	68	12-1/2	14-1/2	6-1/4	8-1/8	15-1/2	36	73-1/2	42-1/4	10-1/2
HF1613	68	16-1/2	14-1/2	6-1/4	8-1/8	19-1/2	36	73-1/2	42-1/4	10-1/2
HF1617	68	16-1/2	18-1/2	8-1/4	10-1/8	19-1/2	36	73-1/2	42-1/4	10-1/2
HF2117	68	21	18-1/2	8-1/4	10-1/8	24	36	73-1/2	42-1/4	10-1/2
HF2121	68	21	22-1/2	10-1/4	12-1/8	24	36	73-1/2	42-1/4	10-1/2
HF2721	84	27	22-1/2	10-1/4	12-1/8	30	36	73-1/2	42-1/4	10-1/2
HF3321	84	33	22-1/2	10-1/4	12-1/8	36	36	73-1/2	42-1/4	10-1/2
HF3325	84	33	26-1/2	12-1/4	14-1/8	36	36	73-1/2	73-1/2	3-7/8
HF3330	84	33	31-1/2	14-3/4	16-3/4	36	38	76	73-1/2	3-7/8

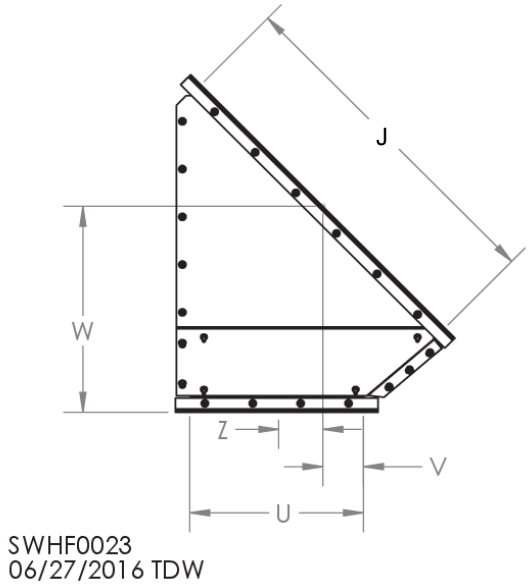
Table 2 – Dimensions, in inches, by Hy-Flight model

See Table 3 for dimensions of discharge at angles between 10° and 45°.

	J1			X			Y		
DEGREES	**HF1213-HF1617**	**HF2117-HF3325**	**HF3330**	**HF1213-HF2121**	**HF2721-HF3325**	**HF3330**	**HF1213-HF2121**	**HF2721-HF3325**	**HF3330**
10	16-1/4	19-3/16	20-3/16	11-13/16	14-9/16	14-5/8	1	1-1/4	1-5/16
15	15-15/16	18-7/8	19-3/16	17-9/16	21-3/4	21-3/4	2-5/16	2-7/8	2-7/8
20	15-1/2	18-5/16	19-1/4	23-1/4	28-3/4	29	4-1/8	5-1/16	5-3/16
25	14-15/16	17-11/16	18-9/16	28-3/4	35-1/2	36-11/16	6-3/8	7-7/8	8
30	14-5/16	16-7/8	17-3/4	34	42	42-7/16	9-1/8	11-1/4	11-7/16
35	13-1/2	16	16-3/16	39	48-3/16	48-11/16	12-5/16	15-3/16	15-7/17
40	12-5/8	14-15/16	15-11/16	43-3/4	54	54-5/8	15-15/16	19-5/8	20
45	11-11/16	13-13/16	14-1/2	48-1/16	59-3/8	60-1/8	19-15/16	24-5/8	25-1/16

Table 3 – Dimensions, in inches, by degree of discharge angle for Hy-Flight models

See Fig. 9 and Table 4 for dimensions of Sukup 45° discharge transition.



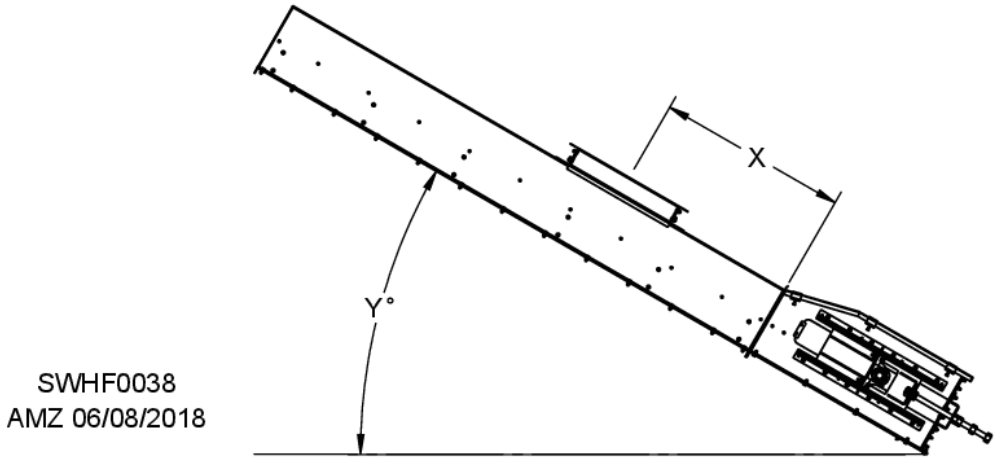
MODEL	J	U	V	W	Z
HF1213	36	12	-2	28-5/8	8
HF1613	36	16	2-1/4	24-5/8	5-3/4
HF1617	36	16	2-1/4	24-5/8	5-3/4
HF2117	36	18	4-1/4	22-3/4	4-3/4
HF2121	36	18	4-1/4	22-3/4	4-3/4
HF2721	36	18	4-1/4	21-9/16	4-3/4
HF3321	36	20	6-1/4	21-9/16	3-3/4
HF3325	36	20	6-1/4	21-9/16	3-3/4
HF3330	38	20	6-1/4	22-5/8	3-3/4

Fig. 9 and Table 4 – Dimensions, in inches, of Sukup 45° discharge transition

Dimensions

See Fig. 10 and Table 5 for distance from center of standard inlet to tail section, depending on angle of conveyor.

NOTICE: As angle of conveyor increases, a greater percentage of product will enter tail section and be damaged between sprocket and chain, and BPH conveyed decreases. To minimize damage and loss of capacity, place inlet on a horizontal section and use a bend section to elevate.



	ANGLE (Y)									
MODEL	**0°**	**5°**	**10°**	**15°**	**20°**	**25°**	**30°**	**35°**	**40°**	**45°**
HF1213	36	37.06	38.14	39.25	40.41	41.65	43.00	44.49	46.17	48.13
HF1613	36	37.06	38.14	39.25	40.41	41.65	43.00	44.49	46.17	48.13
HF1617	36	37.24	38.49	39.78	41.14	42.59	44.16	45.89	47.85	50.13
HF2117	36	37.24	38.49	39.78	41.14	42.59	44.16	45.89	47.85	50.13
HF2121	36	37.41	38.84	40.32	41.87	43.52	45.31	47.29	49.53	52.13
HF2721	36	37.41	38.84	40.32	41.87	43.52	45.31	47.29	49.53	52.13
HF3321	36	37.41	38.84	40.32	41.87	43.52	45.31	47.29	49.53	52.13
HF3325	36	37.59	39.20	40.86	42.60	44.45	46.46	48.69	51.21	54.13
HF3330	36	37.82	39.66	41.56	43.55	45.68	47.98	50.53	53.41	56.75

Fig. 10 & Table 5 – Distance (X) from tail to center of inlet, in inches

Bypass Hopper, Inlet Dimensions

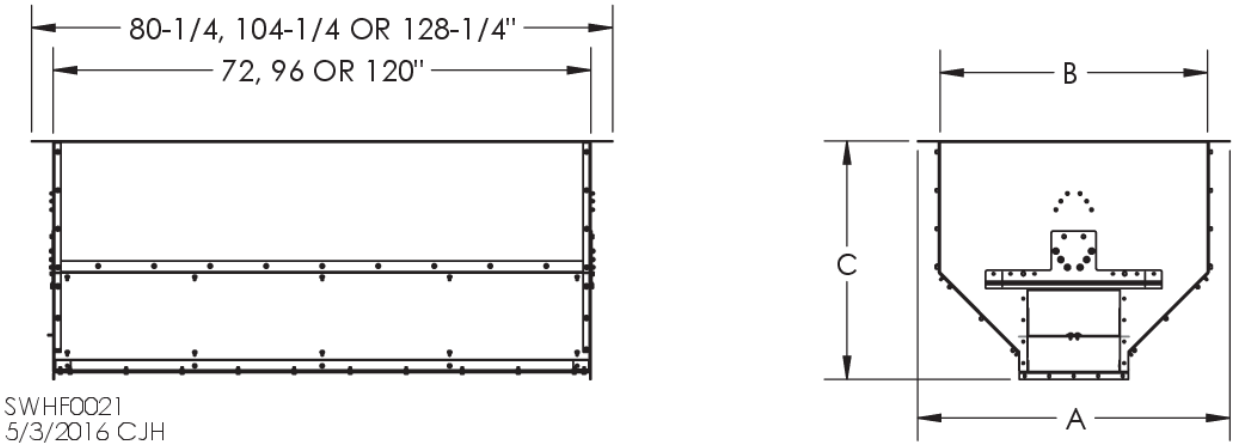


Fig. 11 – Bypass hopper with drive-over grating

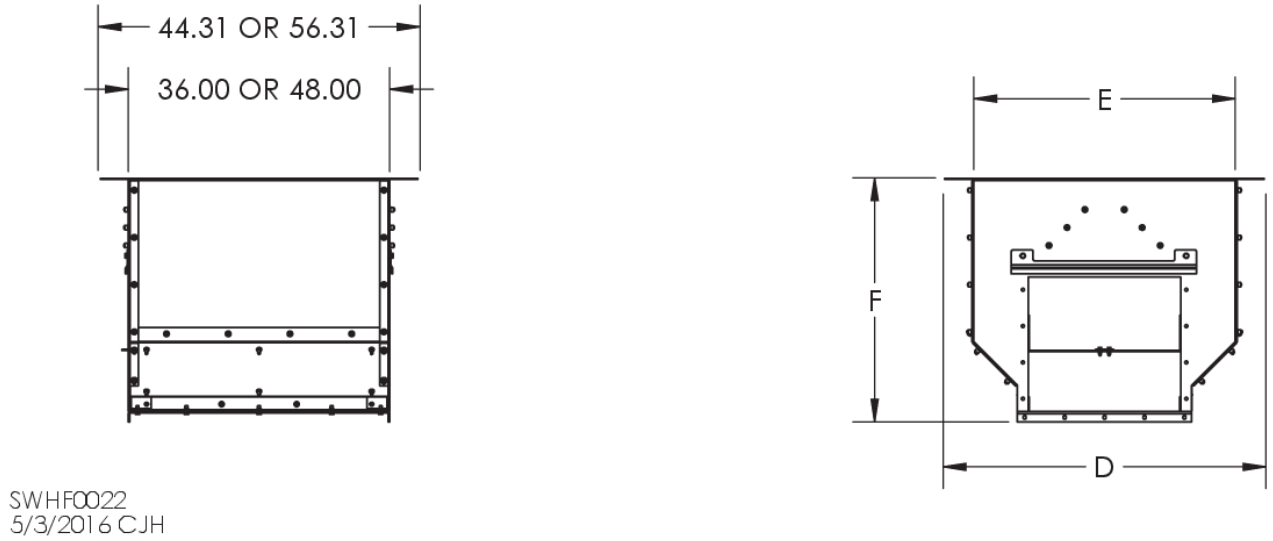


Fig. 12 – Bypass inlet

	BYPASS HOPPER W/ DRIVE-OVER GRATING			BYPASS INLET		
MODEL	**A**	**B**	**C**	**D**	**E**	**F**
HF1213	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	27-1/2
HF1613	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	27-1/2
HF1617	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	33-1/2
HF2117	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	33-1/2
HF2121	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	37-1/2
HF2721	55-3/4	47-1/2	42-7/16	44-1/2	35-3/4	41-1/2
HF3321	67-3/4	59-1/2	54-1/2	56-1/2	47-3/4	44-1/2
HF3325	67-3/4	59-1/2	54-1/2	56-1/2	47-3/4	46-1/2
HF3330	69-1/4	61-1/4	60-1/4	61-1/4	53-1/4	51-1/2

Table 6 – Bypass drive-over hopper, inlet dimensions, in inches

Low Profile Bypass Hopper Dimensions

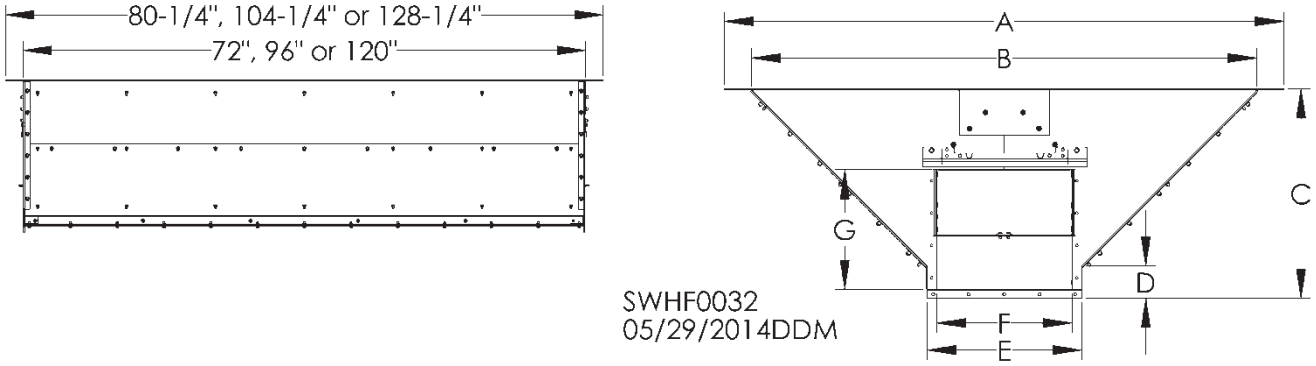


Fig. 13 & Table 7 – Low profile bypass hopper dimensions, in inches

	LOW PROFILE BYPASS HOPPER DIMENSIONS						
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**
HF1213	61	53-1/8	24-1/16	5-1/16	15-1/2	12-1/2	14-1/2
HF1613	69	61	26-1/16	5-1/16	19-1/2	16-1/2	14-1/2
HF1617	77-5/8	70	30-5/16	5-1/16	19-1/2	16-1/2	18-1/2
HF2117	86-11/16	78-5/16	32-1/2	5-1/16	24	21	18-1/2
HF2121	94-1/2	86-5/16	36-7/16	5-1/16	24	21	22-1/2
HF2721	106-5/8	98-9/16	39-9/16	5-1/16	30	27	22-1/2
HF3321	118-9/16	110-3/8	42-5/16	5-3/16	36	33	22-1/2
HF3325	126-9/16	118-3/8	46-3/8	5-3/16	36	33	26-1/2
HF3330	136-9/16	128-7/16	51-5/16	5-3/16	36	33	31-1/2

Drive-Over Bypass Hopper Pit

	STANDARD BYPASS HOPPER					LOW-PROFILE BYPASS HOPPER				
MODEL	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**
HF1213	56-1/4	50-1/4	42-5/8	46	3-3/8	61-1/4	53-3/8	24-3/8	**Dimensions depend on height of grating**	
HF1613	56-1/4	50-1/4	42-5/8	46	3-3/8	69-1/4	61-1/4	26-3/8		
HF1617	56-1/4	50-1/4	42-5/8	46	3-3/8	77-7/8	70-1/4	30-5/8		
HF2117	56-1/4	50-1/4	42-5/8	46	3-3/8	87	78-5/8	32-3/4		
HF2121	56-1/4	50-1/4	42-5/8	46	3-3/8	94-3/4	86-5/8	36-3/4		
HF2721	56-1/4	50-1/4	42-5/8	46	3-3/8	106-7/8	99	39-7/8		
HF3321	68-1/4	62-1/4	54-5/8	58	3-3/8	118-13/16	110-13/16	42-5/8		
HF3325	68-1/4	62-1/4	54-5/8	58	3-3/8	126-13/16	118-13/16	46-11/16		
HF3330	68-1/4	62-1/4	60-3/8	63-3/4	3-3/8	136-13/16	128-7/8	51-5/8		

Table 8 -- Drive-over bypass pit dimensions, in inches

NOTE: Grating must overlap angle iron by at least 1” for standard drive-over hopper pit. Grating overlap for pit with wide hopper is determined by size of drive-over grate and must comply with standards of the American Association of State Highway and Transportation Officials.

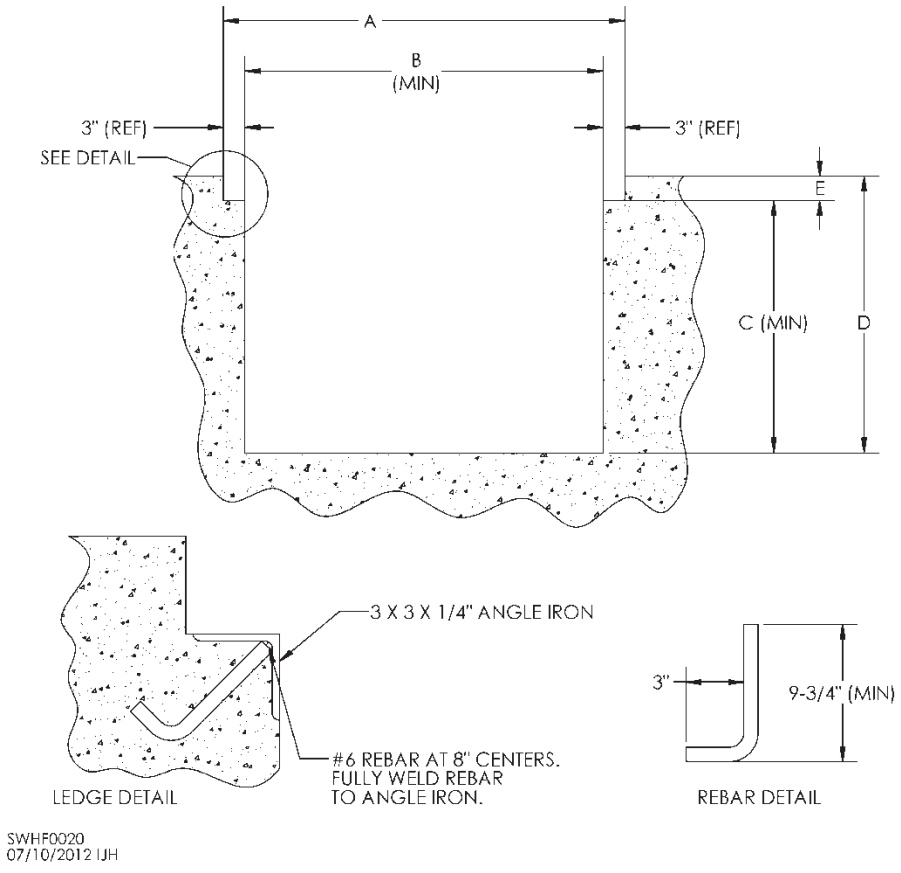


Fig. 14 – Dimensions of straight Hy-Flight Conveyor hopper pit

Bin Trench Dimensions

See Engineering Section of Material Handling Catalog for bin pad trench dimensions depending on conveyor height and, if applicable, floor support height.

Specifications

Table 9 shows capacities in bushels per hour and chain speeds in feet per minute.

CAPACITY (BPH)	HF1213	HF1613	HF1617	HF2117	HF2121	HF2721	HF3321	HF3325	HF3330
1500	69								
2000	92								
2500	115								
3000	138	104							
3500	161	121							
4000	184	139	105						
4500		156	118						
5000		173	131	103					
5500		191	144	113					
6000			157	123					
6500			171	134					
7000			184	144	116				
7500			197	154	124				
8000				164	132	103			
8500				175	141	109			
9000				185	149	115			
10000				205	165	128	105		
11000					182	141	115		
12000					198	154	126	105	
13000						167	136	114	
14000						180	147	123	
15000						192	157	131	109
16000							168	140	117
17000							178	149	124
18000							189	158	131
19000								167	138
20000								175	146
21,000									153
22,000									160
23,000									167
24,000									175
25,000									182

Table 9 – Capacities and chain speeds

Pre-Installation Information

Hy-Flight Conveyors are not meant to be self-supporting structures or parts of truss systems.

Conveyor must be supported every 10 feet (at every connection). Owner and contractor are responsible for providing adequate support for conveyor.

Do not weld supports to conveyor. Overhead clearance and maintenance accessibility should be considered.

Conveyor has not been designed to support other equipment such as cleaners, distributors, spouting, etc. Separate structures must be provided to support any accessory equipment.

Sukup Manufacturing Co. has supplied conveyor and certain optional accessories only, but does not assume responsibility for installation.

Installation recommendations in this manual are general guidelines only. Owner and/or installer are responsible for consulting a civil or structural engineer regarding installation, including but not limited to construction, supervision, foundation and bracing.

IMPORTANT: Retain a licensed engineer to plan installation and a qualified millwright or contractor to erect conveyor and accompanying equipment and structures.

Conveyor Location

Careful thought needs to be given to location of conveyor. Consider depths of pits, location of inlets and possible obstructions. If conveyor is used to feed a bucket elevator or another conveyor, clearance for drives, discharges, valves, etc., must be provided. Also, clearance must be provided for maintenance of equipment. If conveyor is in a pit, there must be enough room for removal of sprocket assembly.

Electrical Requirements

A qualified electrician should make all electrical connections. Check local codes before installation. A lockable external line disconnect switch that complies with local codes must be provided and located as close as possible to conveyor. When conveyor is connected with other machinery, electrical interlock priorities should be maintained so that if any other equipment fails, all preceding equipment would stop.

Refer to Page 10 for clearance requirements.

NOTE: Local authority having jurisdiction should be contacted prior to and during planning and installation.

NOTE: If a dual-drive system is used, additional equipment may be needed to balance load between motors. It is customer's responsibility to identify this situation and supply such equipment. Customers can contact Sukup Manufacturing Co. for load-balancing options if a dual-drive system is required.

Installing Conveyor as Bin Unload System

NOTE: If installing Hy-Flight Conveyor as a bin unloading system, see manual L25025.

General Instructions

There are many methods for constructing a Hy-Flight Conveyor. Factors to consider include general conditions at job site, hoisting equipment available, crew experience and personal preference. Sukup Manufacturing Co. recommends the following procedure:

1. Position sturdy items to serve as blocking (e.g., wood blocks, sawhorses). Blocking is used to support conveyor sections during assembly.
2. Pre-assemble any supporting structures.
3. Lay out conveyor sections in order in which they will be assembled, starting with head section and working back toward boot section.
4. If unit is shipped with unassembled intermediate sections, assemble them.
5. Connect sections together beginning at head, aligning sections as you go.
6. To facilitate chain installation, thread a cable or rope through lower trough area as unit is being built.
7. Do a final check of alignment and add chain assembly.
8. Perform initial chain tightening.
9. Install any drive assembly, transitions, etc.
10. Complete field wiring.
11. Install covers.
12. Check for loose fasteners and check operation of conveyor without material.

Head and Boot Sections

Normally, head and boot sections are shipped pre-assembled from factory.

Intermediate Section Assembly

If intermediate sections of conveyor were not pre-assembled at factory they should be assembled first. Bolt sides to bottoms, making sure sides are square and parallel before tightening fasteners. Attach liners (if provided) with countersunk head bolts. Install return pan with lip in up position.

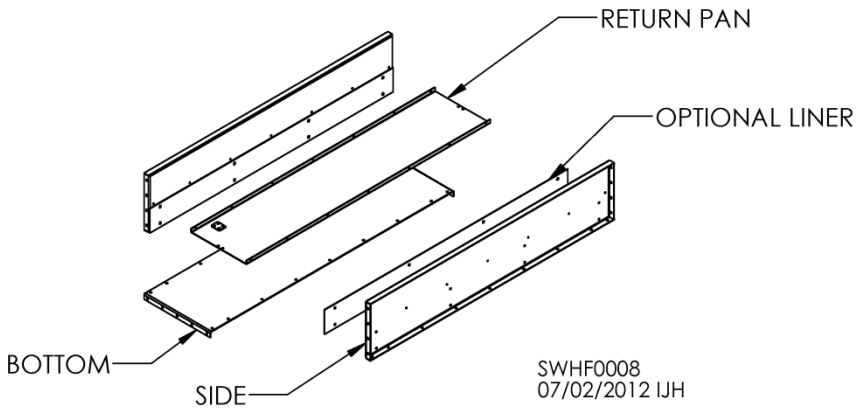


Fig. 15 – Intermediate section with optional liner

Head Section

Apply silicone caulk to flanges prior to assembly of intermediate and head sections. Loosely install bolts and nuts. Use a taut line to make sure conveyor is straight. Shim as required to align sections. Tighten connecting hardware, making sure that sides and bottom surfaces are aligned so paddles will not catch on surfaces as they move from one section to another.

Store covers in a safe place. They will not be attached until chain is installed.

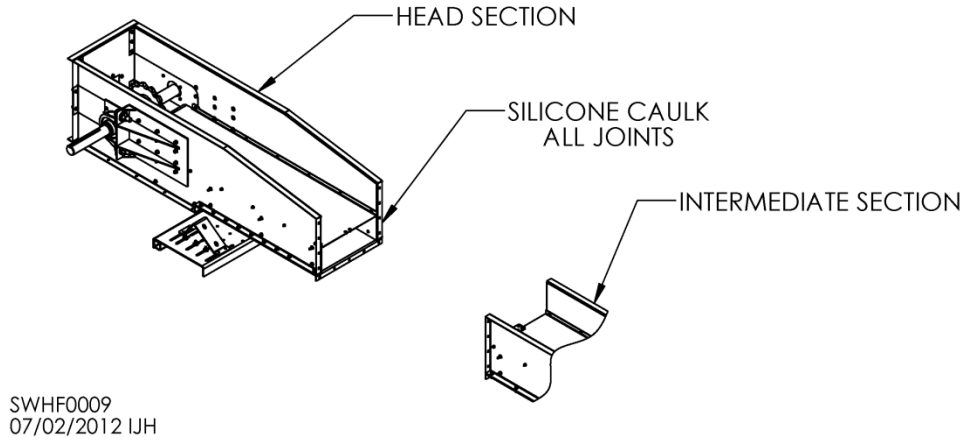


Fig. 16 – Connecting head section to intermediate section

Curve Sections

Curve sections are available in 10° or 15° curves. Position as required for application. See Fig. 17. Use silicone caulk to connect sections to one another and to intermediate sections. Leave off covers and store them in a safe place until chain is assembled inside conveyor.

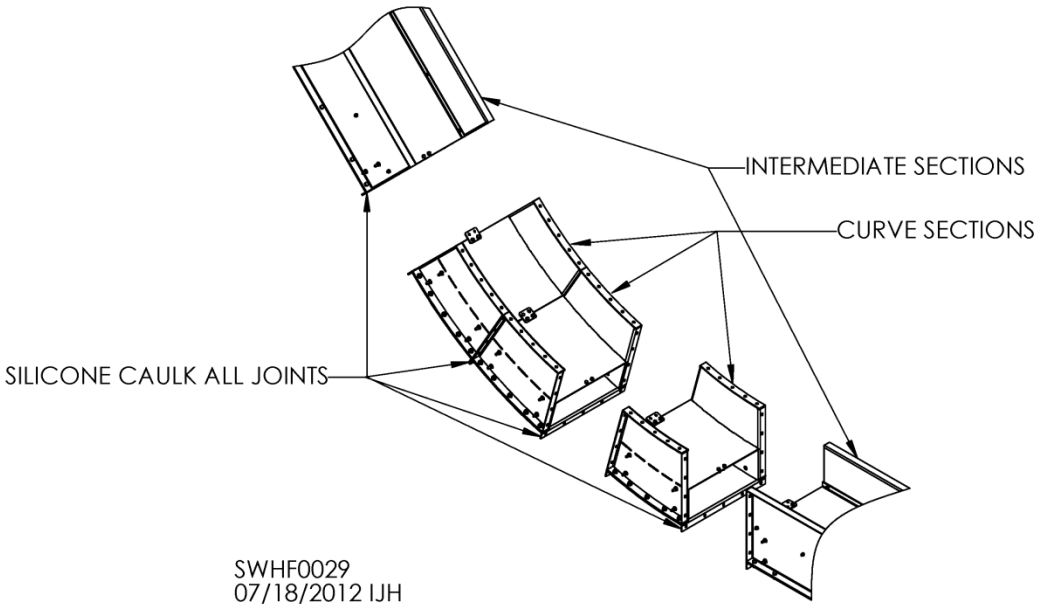


Fig. 17 – Connecting curve sections to intermediate section

Trough Installation

Connect Intermediate Sections

Intermediate sections are normally supplied in 9’ 9” standard lengths. Depending on application and individual specifications, however, shorter lengths may be specified. If intermediate discharges are used, location must be determined before proceeding with assembly. Refer to diagram supplied with applicable quote to determine section locations and arrangements. It may be necessary to use shorter sections to avoid having a discharge gate at a trough joint. As sections are fastened together, use silicone caulk at each vertical joint as shown in Fig. 18.

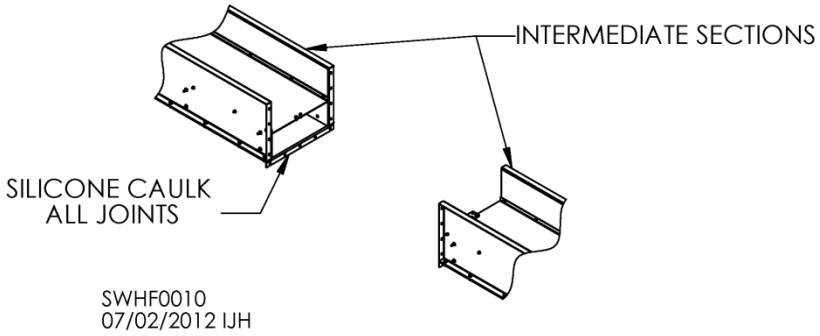


Fig. 18 – Connecting intermediate sections

As intermediate sections are being assembled, make sure that return pan on one section will fit inside “tongue” of next section. See Fig. 19. To avoid excessive paddle wear and noisy operation, return pan connection must be smooth.

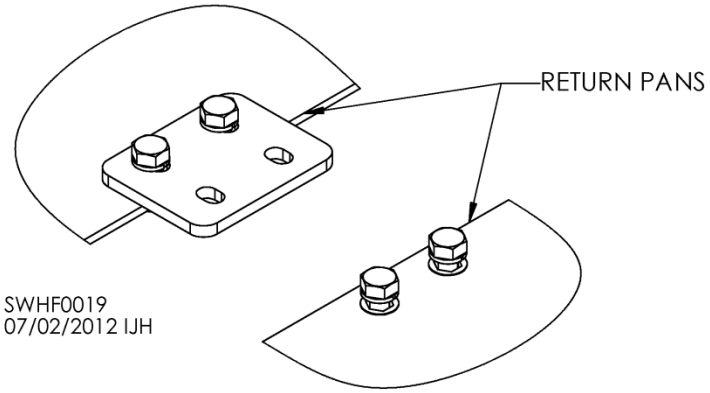


Fig. 19 – Fitting return pan

Carefully inspect each flange joint to ensure that inside bottom and side surfaces of trough are flush. This will prevent paddles from catching on any ledges. If trough is misaligned by as little as 1/32”, conveyor chain attachments could break or wear rapidly. It is important that completed conveyor be aligned. A taut line can be used to make sure conveyor is straight horizontally. Maximum run-out in any direction is 1/4".

As intermediate sections are being assembled together, thread a cable or rope through lower portion of trough sections. This will aid in insertion of chain.

Hy-Flight Inlets

Normally, bypass inlets are used for Hy-Flight Conveyors. See Page 26. These are specifically designed inlets that bypass upper chamber of intermediate section and direct grain to lower section. However, due to site design or space constraints, it is occasionally necessary to use a standard inlet that attaches to top of an intermediate section of conveyor. In this case, grain flows “backward” toward tail in upper chamber for a few feet. Grain is then dumped into lower section, where it moves toward discharge. For inlet on a horizontal section, return pan will be factory-cut to allow grain to drop into lower chamber. See Fig. 20.

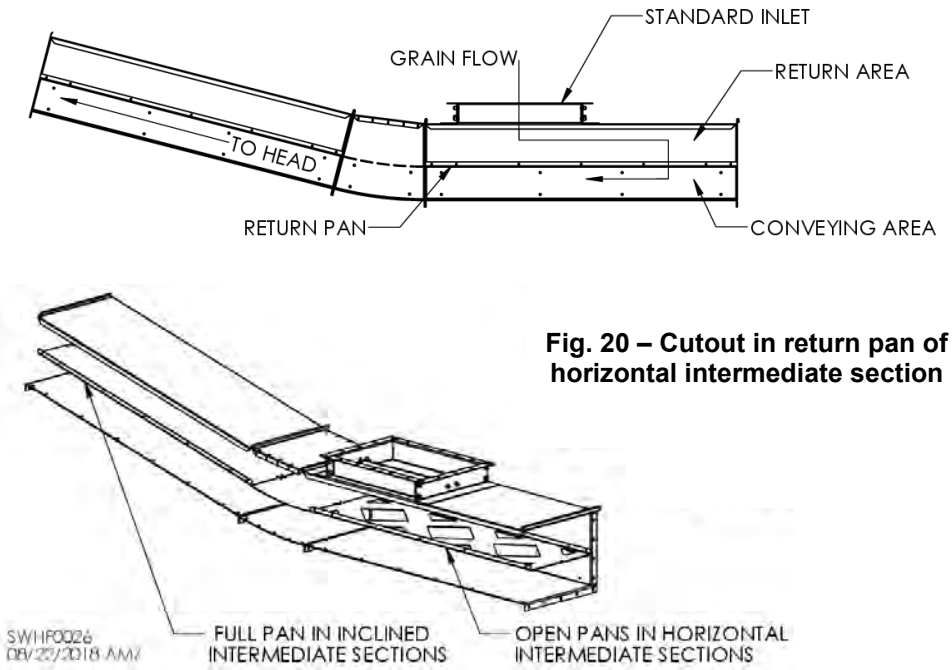


Fig. 20 – Cutout in return pan of horizontal intermediate section

If inlet will be on a straight conveyor that is inclined, cutout must be field-cut as shown in Fig. 21. Cutout needs to be at least 36” long, possibly longer for higher capacity units. Use an “X” cutout as shown in Fig. 21. **NOTE:** Make sure minimum width of “X” cutout is wider than paddle gap. If this is not done, paddle may catch in cutout and damage equipment. Deburr all rough edges of cutout.

IMPORTANT: See warning on Page 28 about cutting or grinding metal.

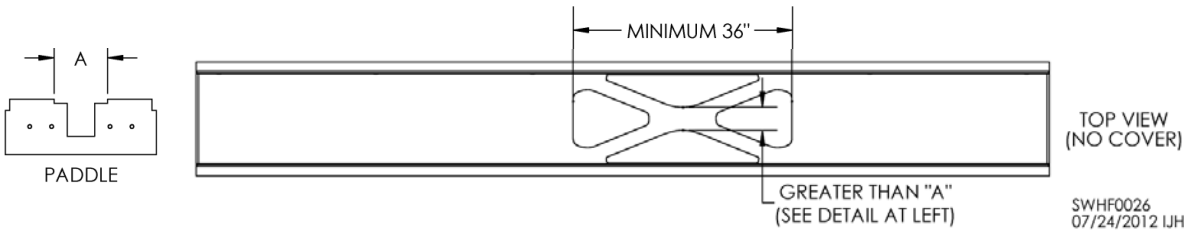


Fig. 21 – Field-cutting return pan

Upper end of cutout must be straight below a line from center of inlet as shown in Fig. 22, not perpendicular to inlet center. See Table 5 for dimensions.

NOTICE: As angle of conveyor increases, a greater percentage of product will enter tail section and be damaged between sprocket and chain, and BPH conveyed decreases. To minimize damage and loss of capacity, place inlet on a horizontal section and use a bend section to elevate.

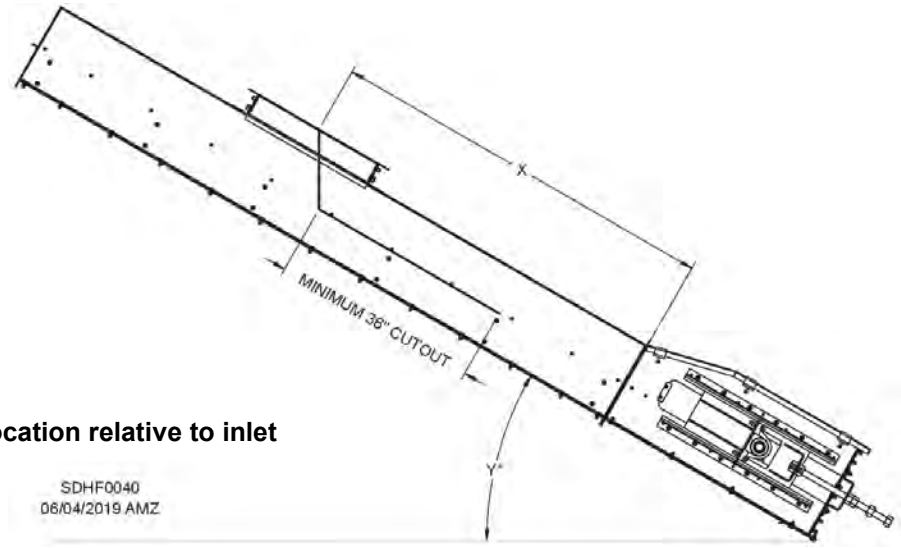


Fig. 22 – Cutout location relative to inlet

Cover of conveyor must be cut for standard inlet as shown in Fig. 23. Note placement of inlet flanges to prevent chain from catching. Use caulk around connection between inlet and cover.

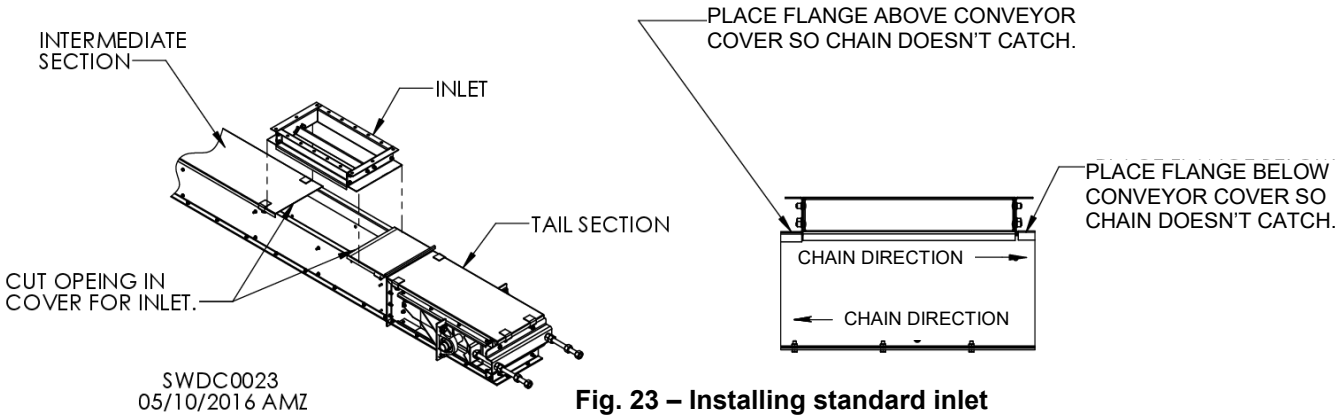
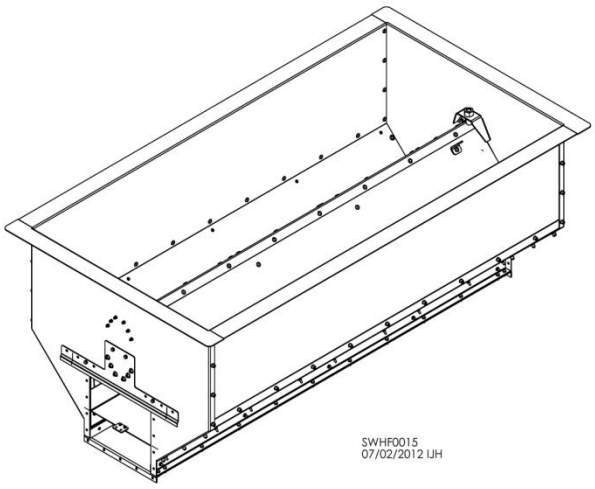


Fig. 23 – Installing standard inlet

Bypass Inlet

In a bypass inlet, material flows around chain and paddle assembly, directly into bottom of conveyor. See Figs. 24 & 25. Bypass inlets are pre-assembled at factory and will replace a 6', 8' or 10' section based on size that is ordered. See attachment instructions on next page.



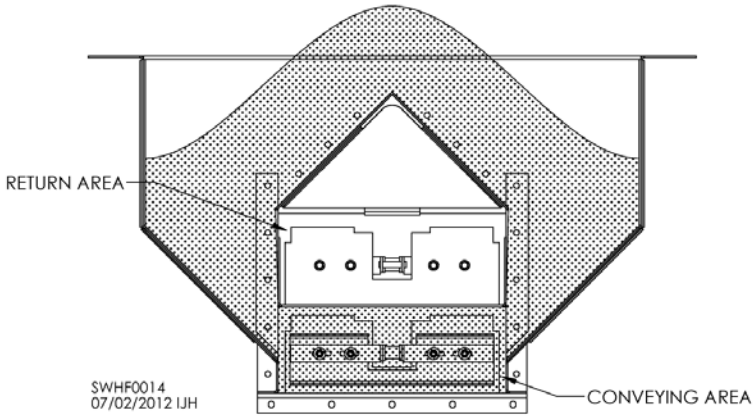


Fig. 24 & 25 – Views of bypass inlet

IMPORTANT: Ensure that device feeding bypass inlet is centered over hopper and there is enough clearance so grain will flow evenly down both sides of peak and to ends of hopper. See Details D (end view) and E (side view) of Fig. 26. Also ensure that bypass inlet section is horizontal. See Detail F of Fig. 26. Be sure to use at least a 1' intermediate section before a bend section as shown in Detail F. Failure to follow these instructions will reduce capacity of conveyor.

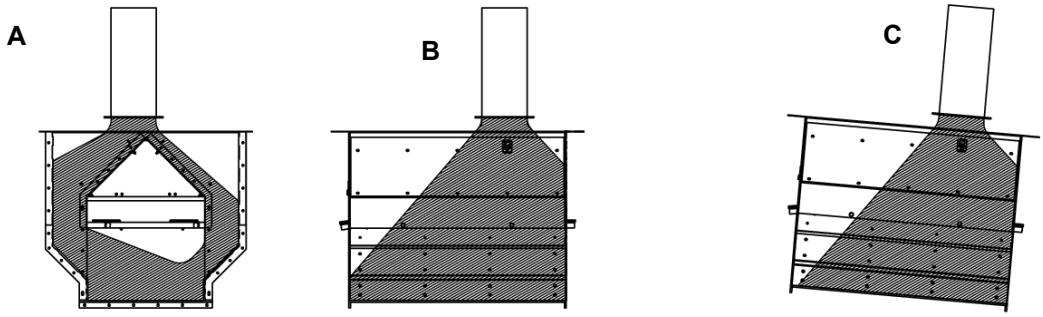
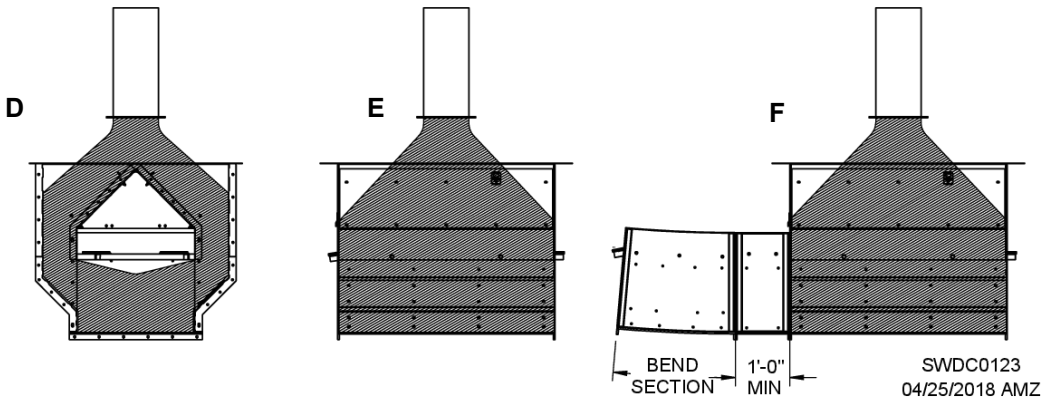


Fig. 26 – Incorrect (above) and correct (below) installation of bypass hopper



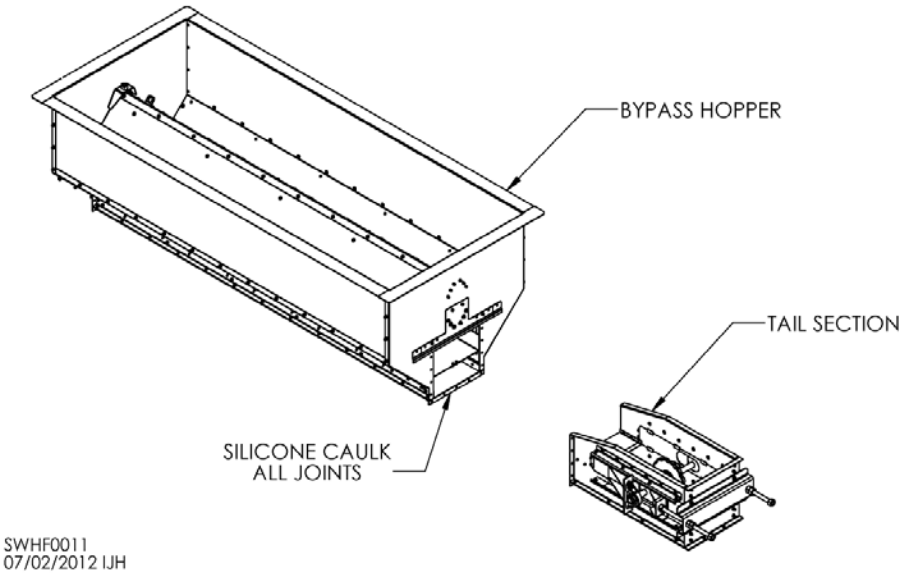


Fig. 27 – Connecting bypass hopper to tail section

Finish trough installation by connecting last intermediate or bypass section to tail. Install bypass inlet horizontally or capacity will be reduced. Apply silicone caulk before bolting trough sections to inlet. **NOTE:** Trough section covers have a flange at each end, normally one facing upward and the other downward. However, cover that goes on trough section immediately downstream of inlet has two upward flanges. Be sure to place a body section that has such a cover in this location. Make sure to slide cover flange under seal on inlet before attaching cover to trough section.

Intermediate Gate Assemblies

Two styles of gate – in-line and right angle – can be ordered with a Hy-Flight Conveyor or retrofitted at a later date. Installation procedure is similar in either case. Right-angle gate should be used with reversible conveyors when possible. On conveyors that are 13” tall, gate has a 30” opening. On conveyors 17” to 30” tall, opening is 38”.

Cut out an “X” in bottom plate of trough as shown in Fig. 28. Deburr all rough edges of cutout areas. **IMPORTANT:** Do not install gate at a trough joint.

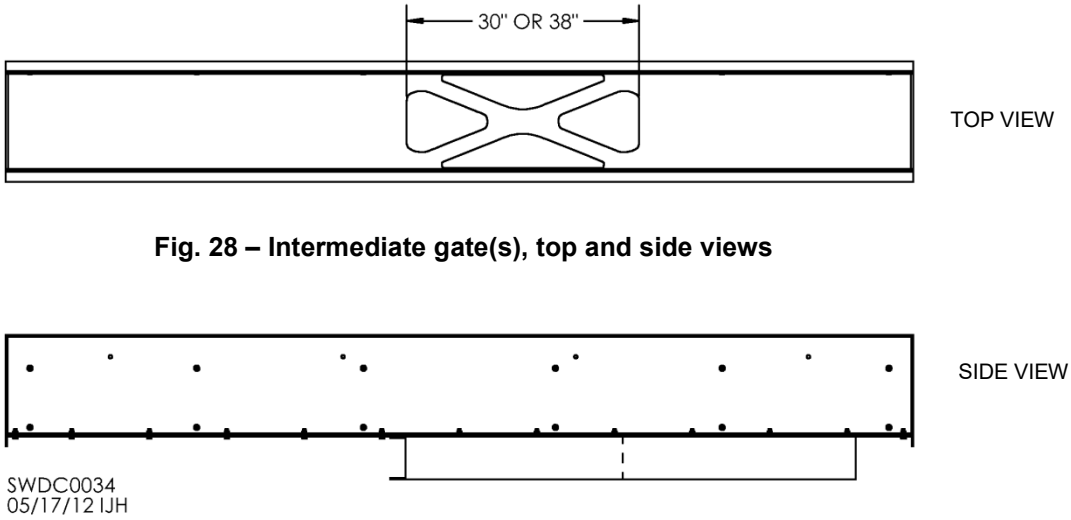


Fig. 28 – Intermediate gate(s), top and side views

WARNING: Follow all federal, state, local and corporate procedures when welding, grinding or cutting. Flame or sparks igniting dust could cause explosion resulting in death or serious injury.

Position gate under cutout area. Drill mounting holes through edges of bottom plates, through trough side panel. Fasten gate(s) to conveyor trough.

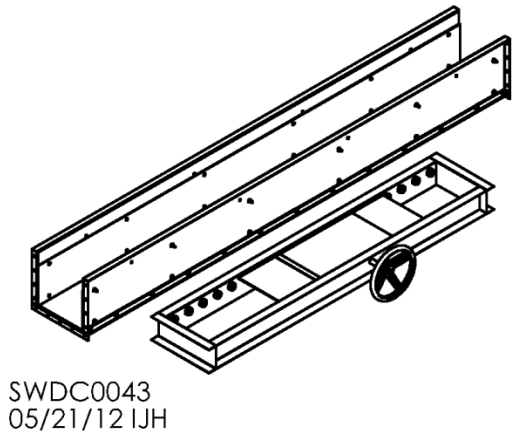


Fig. 29 – Standard inline discharge rack and pinion gate

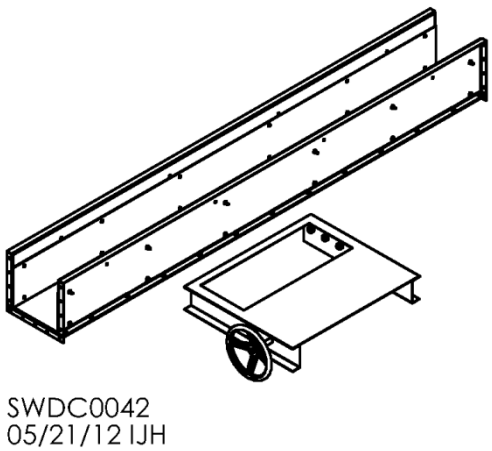


Fig. 30– Optional right-angle rack and pinion gate

Chain Installation

Hy-Flight Conveyor chain should be installed after all components of conveyor have been joined. Start by adjusting take-ups to loosest position. Insert chain into trough section in bottom of conveyor. Faces of paddles should contact grain (UHMW paddle side should face toward discharge end). Wrap chain around sprockets.

NOTE: Be sure to install chain in proper direction to avoid damage to chain and sprockets.

See instructions below to connect sections of chain.

NOTICE: Chain can become twisted if improperly handled. DO NOT turn over a length of chain by twisting one end. This may cause permanent twist in chain.

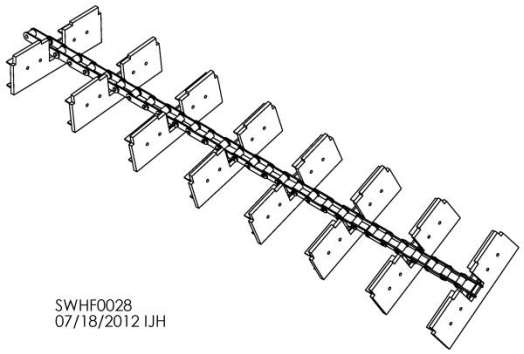


Fig. 31 – Avoid twisting chain

Connecting Sections of Conveyor Chain

Five types of chain are used in Sukup conveyors. Chain is shipped in approximately 10' lengths. Depending on size of chain, either cotter pins or T-head cotter pins are used in ends of pins that are used to connect chain sections. **IMPORTANT:** Make sure that ends of regular cotter pins are bent backward in relation to grain movement as shown in Fig. 32, or that ends of T-head cotter pins do not face direction grain moves, as shown in Fig. 33.

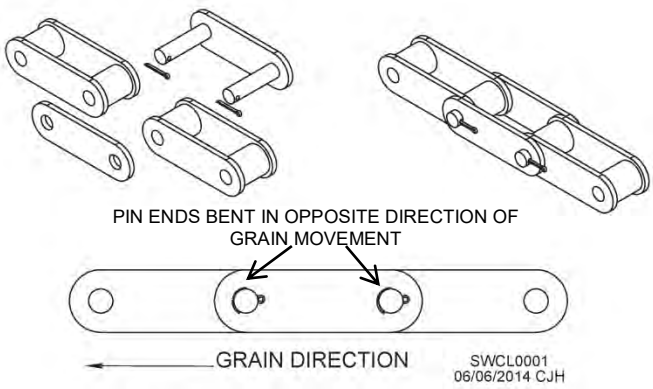


Fig. 32 – Connecting 81X, 81XHH chain

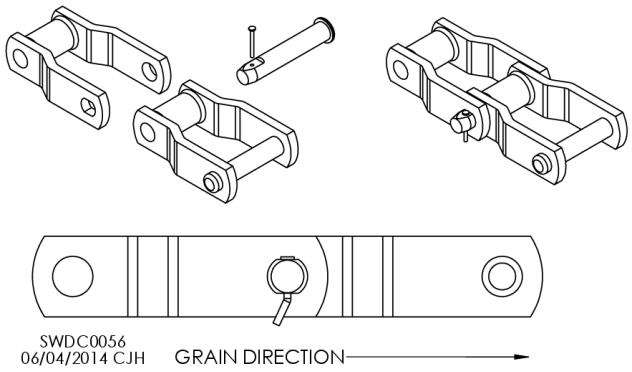


Fig. 33 – Connecting WH124, WH124HD, WH132 chain

NOTE: Link pin will only go through one side of WH124, WH124XHD or WH132 chain. Use a hammer to drive link pin completely through links once they are aligned. Insert T-head pin and bend it at least 20° but no more than 45°. Do not over-bend T-head pin or it will break.

NOTICE: Failure to properly install chain can result in catastrophic failure of conveyor.

NOTES:

- Chain will stretch after initial use and will likely need to be shortened by removal of links.
- Up to 3% of 81X chain or 5% of WH chain can be removed before chain needs to be replaced.

EXAMPLE: After 6 feet of 81X chain or 10 feet of WH chain has been removed from a 100-foot conveyor (with total of 200 feet of chain), chain must be replaced.

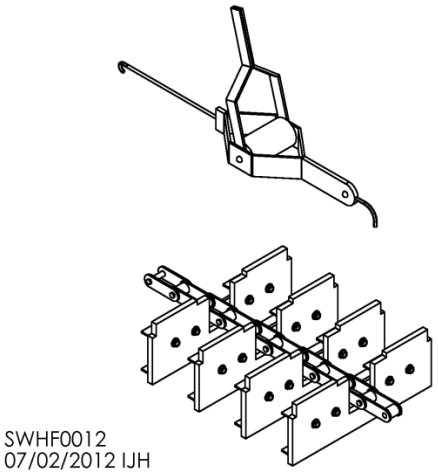


Fig. 34 – Tensioning chain

Eliminate chain slack by using a take-up device similar to one shown in Fig. 34. Remove any extra links and re-join chain. Extra chain should be saved for possible future use. Once chain has been installed and connected in conveyor, tighten chain by adjusting take-ups on tail section. Take-ups should be adjusted in small increments to ensure tail sprocket is kept square.

On conveyors with a 45° incline, paddles will touch return pan about 5’ to 6’ behind head sprocket when sufficiently tightened. Making sure chain is properly tensioned will improve longevity of conveyor. If chain is too tight, premature chain and sprocket wear will result. Chain that is too loose can damage conveyor or result in catastrophic failure if sagging paddles wrap around sprocket. After chain is tight, ensure head and tail shafts are square to sides of trough. If shafts are not square, loosen the tighter of the two take-ups until shafts are square.

After chain has been tensioned it should be completely cycled through conveyor at least once. Make sure chain and paddles are not catching on flanges or rubbing on sides of trough due to improper tail and/or head sprocket alignment. Make any adjustments if necessary. Once all sections of conveyor have been tightened and properly aligned, top covers can be installed as shown in Fig. 36 using bolts or clips depending on design. Ensure that all fasteners are tight, joints are aligned and that no tools have been left behind. Run conveyor for two hours without material. Re-adjust chain tension.

DANGER: Install covers and guards prior to running conveyor. Entanglement in conveyor will cause death or serious injury.

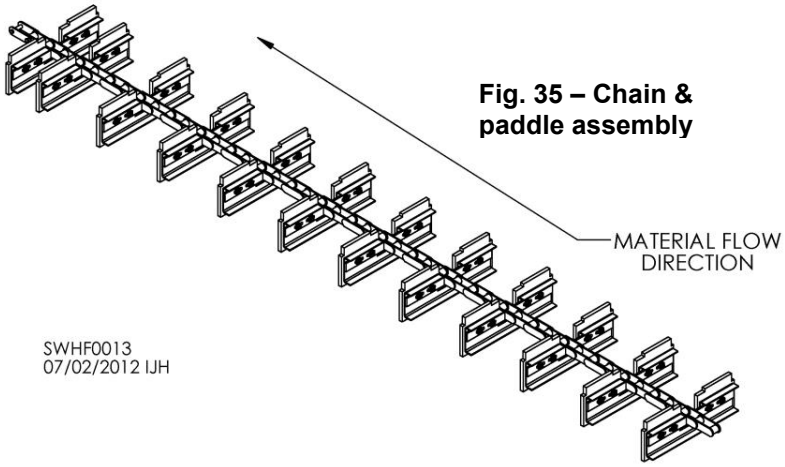


Fig. 35 – Chain & paddle assembly

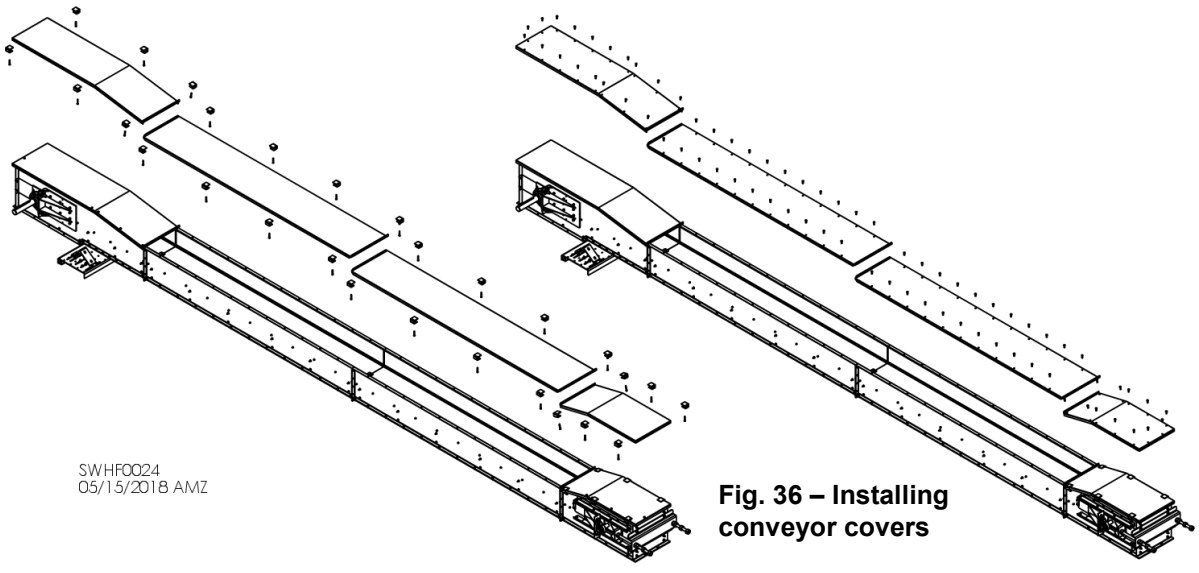


Fig. 36 – Installing conveyor covers

Drive-Over Hopper Grating

Drive-over grating is installed in three, four or five sections, depending on size of drive-over hopper. See Figs. 37, 38 and 39.

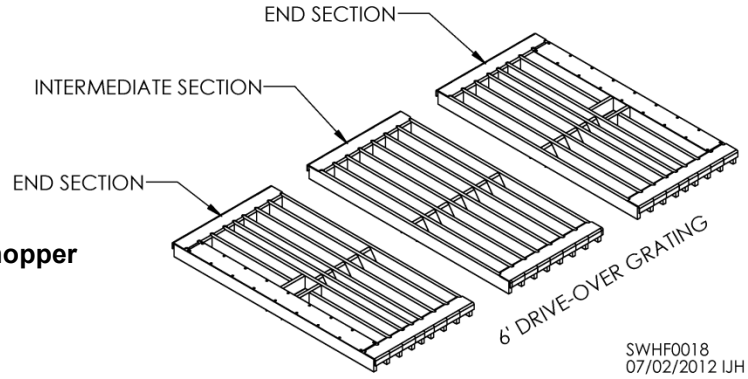


Fig. 37 – Grating for 6' hopper

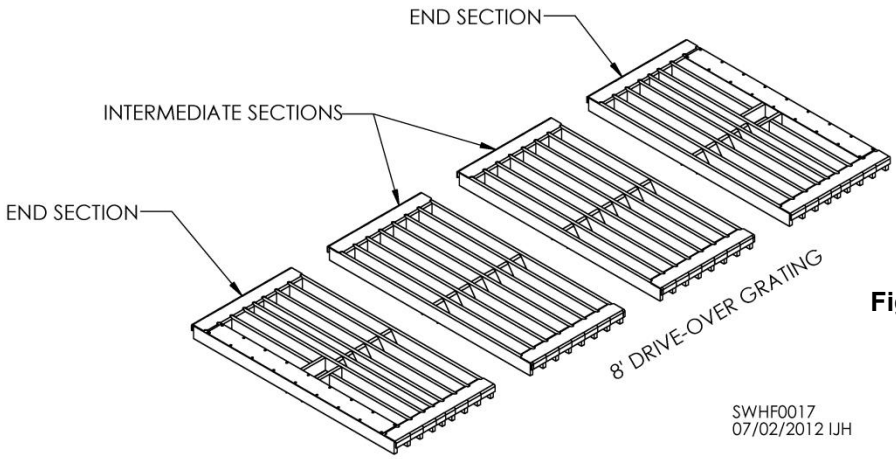


Fig. 38 – Grating for 8' hopper

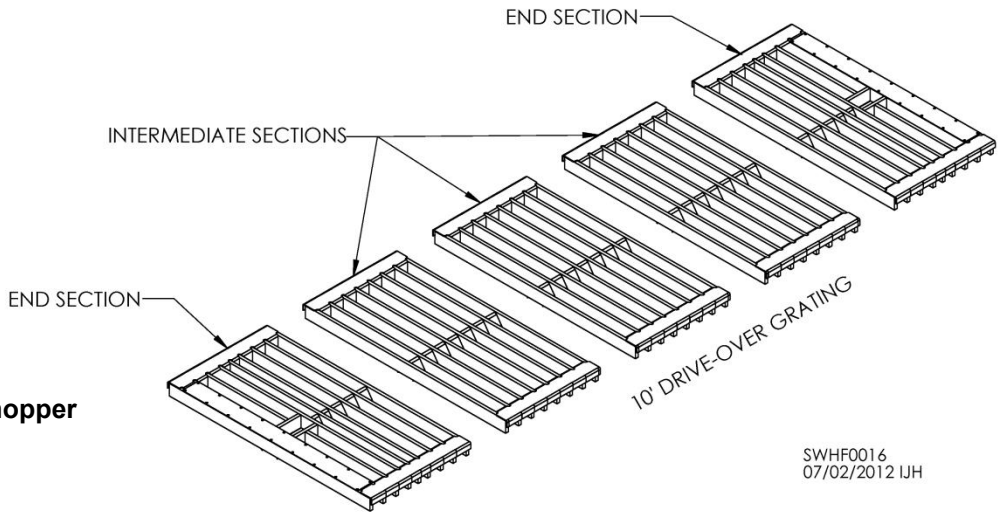


Fig. 39 – Grating for 10' hopper

Drive Assembly

Instructions for installation of Dodge drive reducer will be located in box with reducer and are copied on Pages 46-53 of this manual. Drive is typically mounted in position “B”.

Torque arm bracket is pre-assembled to head section. Fasten torque arm anchor bracket to reducer housing and fasten pivot to torque arm bracket. Rotate torque arm turnbuckle as needed to keep reducer fairly level. See Figs. 40 and 41. Use lock nut on turnbuckle to prevent movement by vibration.

Torque Arm Rod Installation

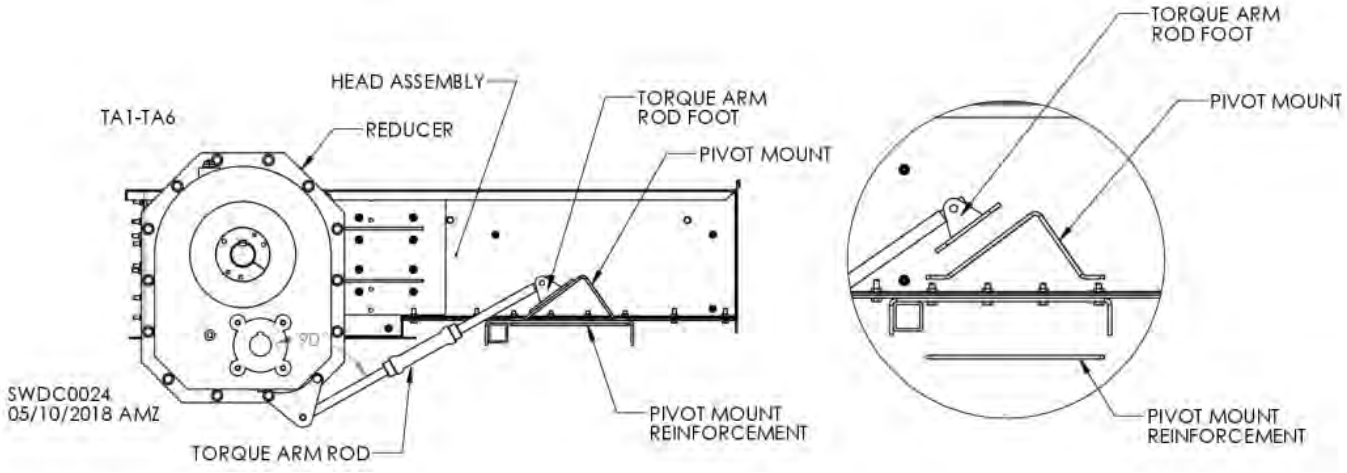


Fig. 40 – Torque arm rod attachment for TA1-TA6 reducers

Install torque arm rod assembly as shown in Fig. 40 or 41, following manufacturer’s recommendations. Mount torque arm to reducer so angle formed by torque arm and an imaginary line running upward from end of torque arm through reducer output shaft is close to 90 degrees. This mounting position is usually in lower right-hand portion of reducer for most right-hand drive models.

NOTICE: Angle must not vary by more than 20 degrees from 90 degrees or torque arm may fail.

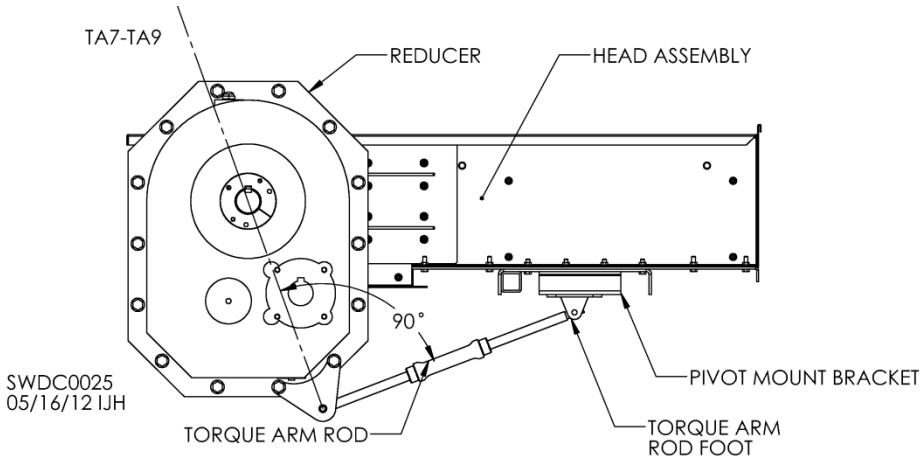


Fig. 41 – Torque arm rod attachment for TA7-TA9 reducers

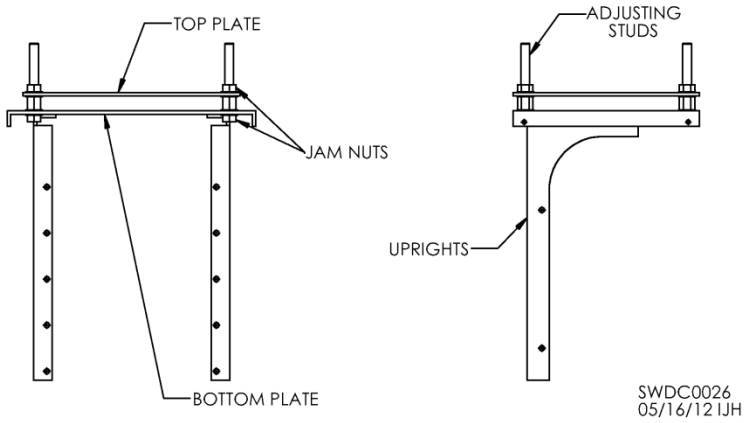


Fig. 42 – Fastening motor mount to reducer

Attach front and back motor mount supports (uprights) to reducer. Fasten four (4) long jack screws, one at each corner of bottom plate, using four (4) jam nuts as shown in Fig. 42. Securely tighten nuts. They will not require any further adjustment. Add one larger jam/spacer nut to each stud and thread to about middle of stud. Slide top motor mounting plate over studs to rest on jam/spacer nuts. Thread remaining jam nuts onto studs to secure top motor mounting plate. Do not fully tighten these nuts yet.

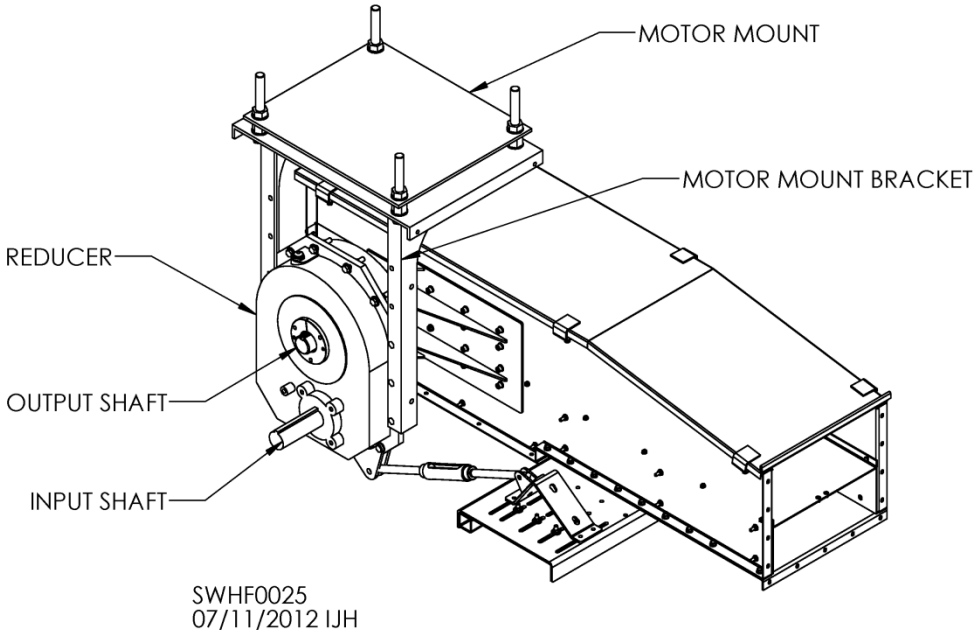


Fig. 43 – Motor mount attached to reducer

Fasten motor to mount. Refer to drawings and table on next page for proper mounting position for motor. Fasteners used will depend on size and position of motor. DO NOT tighten motor mount screws yet. Fasten belt guard mounting brackets to motor mount. Loosely fasten belt guard, WITH COVER REMOVED, to guard mounting bracket. See Dodge belt guard installation instructions on Page 53. Shift guard so elongated hole for reducer input shaft is vertically aligned and full range of adjustment is available. Tighten guard mounting fasteners.

Motor Mount Heights

NOTE: Motor mount should be in lowest possible position (M1, M2 or M3) that will not cause interference with other components, for example, belt shield. Job-specific drawings for proper mounting are available upon request.

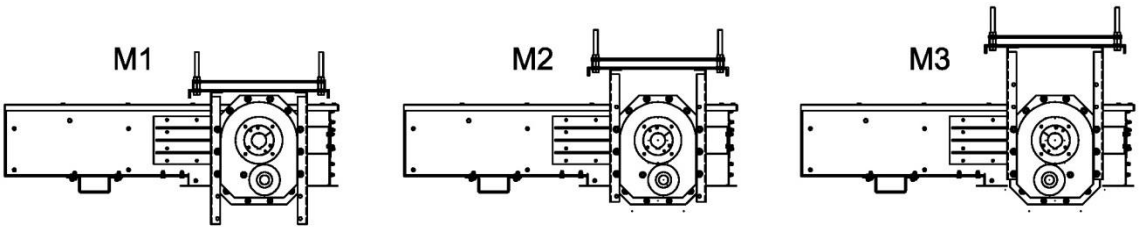


Fig. 44 & Table 10 -- Motor mount heights

MODEL		MODEL		MODEL		MODEL		MODEL	
HF1213, HF1613		HF1617, HF2117		HF2121, HF2721, HF3321		HF3325		HF3330	
Reducer	MM Height	Reducer	MM Height	Reducer	MM Height	Reducer	MM Height	Reducer	MM Height
TA1	M3	TA1		TA1		TA1		TA1	
TA2	M3	TA2		TA2		TA2		TA2	
TA3	M3	TA3	M3	TA3		TA3		TA3	
TA4	M3	TA4	M3	TA4	M3	TA4		TA4	
TA5	M2	TA5	M2	TA5	M3	TA5	M3	TA5	
TA6	M2	TA6	M2	TA6	M3	TA6	M3	TA6	M3
TA7	M2	TA7	M2	TA7	M2	TA7	M3	TA7	M3
TA8	M2	TA8	M2	TA8	M2	TA8	M3	TA8	M3
TA9	M1	TA9	M2	TA9	M2	TA9	M2	TA9	M2
TA10		TA10	M1	TA10	M1	TA10	M2	TA10	M2
TA12		TA12		TA12	M1	TA12	M2	TA12	M2

Assemble drive and driven pulleys (sheaves) on motor and reducer input shafts. Align pulley faces and tighten taper-lock bushing setscrews. Fit belts over pulleys. See Page 36 for belt tightening instructions. Use long screws in motor mount to take up slack in belt. Make sure guard does not rub on either shaft, then install belt guard cover. Tighten all fasteners.

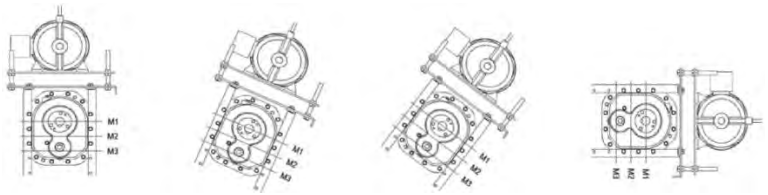
NOTICE: Speed reducer is shipped without oil. Oil must be added before conveyor is started. Check manufacturer's instructions for oil recommendations. See instructions on next page.

NOTICE: Running chain backward can damage conveyor. Always check motor rotation before installing drive belts to avoid running chain in wrong direction.

Filling Reducer with Oil

Use a quality, high-grade petroleum-based rust and oxidation inhibiting (R & O) gear oil. Under most conditions, SAE 90 weight is recommended. For more information on oil, see Dodge Torque Arm II Speed Reducer pages, which begin on Page 46. Follow instructions on reducer nameplate, on warning tags and in installation manual with reducer.

NOTE: Reducer used on Hy-Flight conveyor is mounted in position B. Amount of oil depends on angle of operation of reducer. See Fig. 45 and Table 11 for oil quantity recommended for each angle of operation. As angle of operation increases (based on angle of conveyor), so does amount of oil required.



	OPERATION ANGLE			
REDUCER	**0-14 degrees**	**15-30 degrees**	**31-50 degrees**	**51-90 degrees**
TA0107L	0.5	0.6	0.6	0.7
TA1107H	0.7	0.9	1	1.3
TA2115H	1.1	1.4	1.6	2.1
TA3203H	1.5	1.9	2.2	2.8
TA4207H	2.5	3.1	3.6	4.4
TA5215H	4.7	5.6	6.4	7.4
TA6307H	5.5	6.6	7.5	8.8
TA7315H	10.8	10.8	10.8	8.4
TA8407H	11.7	11.7	11.7	7.7
TA9415H	16.8	16.8	16.8	17
TA10507H	27.6	31	33	38
TA12608H	41.5	44.6	48	53

Fig. 45 and Table 11 – Approximate volume of oil, in quarts, based on angle of operation in Position B (90-degree tilt = Position A)

Before filling reducer with oil, install magnetic drain plug in hole closest to bottom of reducer, making sure reducer is in position in which it will be operated. Remove tape that covers filter/ventilation plug for shipment and install plug in topmost hole. The lower of the two remaining plugs on sides of reducer is the minimum oil level plug.

Oil should be changed after an initial operation of about two weeks. After initial break-in period, lubricant should be drained, magnetic drain plug cleaned, and gear case flushed and refilled every 2,500 hours of operation. Change oil every one to three months when operating in conditions of extreme dirt and temperature

NOTICE: Too much oil will cause overheating, and too little will result in gear failure. Check oil level regularly.

Pulley & Belt Installation

Mount pulleys (sheaves) on motor and reducer shafts as closely as possible to inner belt guard. Align pulleys by using a straight edge across faces of pulleys. Secure pulleys using tapered lock bushings. Make sure drive keys are properly installed. Check pulley alignment again after securing to shafts.

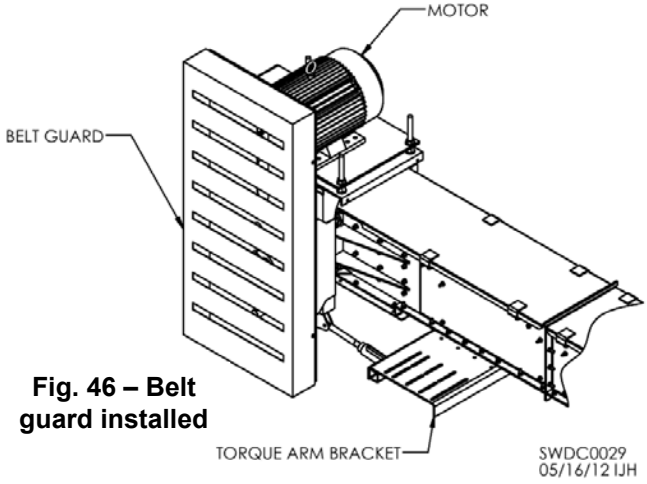


Fig. 46 – Belt guard installed

Install belts onto pulleys and set belt tension. When tightening belts, loosen electric motor mount from motor mount bracket. Adjust tension on belts by turning nuts on motor mount rods. Uniformly adjust nuts so that threaded rods are equidistant, electric motor stays perpendicular with belts, and motor mount doesn't bind with bracket. See belt adjustment instructions on next page. Make sure guard does not rub on either shaft, then reinstall belt guard cover. Tighten all fasteners.

Adjusting V-Belt Tension

Place belt(s) in pulley grooves and tighten by adjusting motor mount. Follow these steps to tension belt.

1. Measure span length. See Fig. 47.
2. At center of span, apply enough force to deflect belt 1/64” for every 1” of belt span. If span is 32”, deflection amount should be 32/64”, or 1/2”.
3. Use Table 12 to determine amount of force to apply to gauge proper deflection per belt.

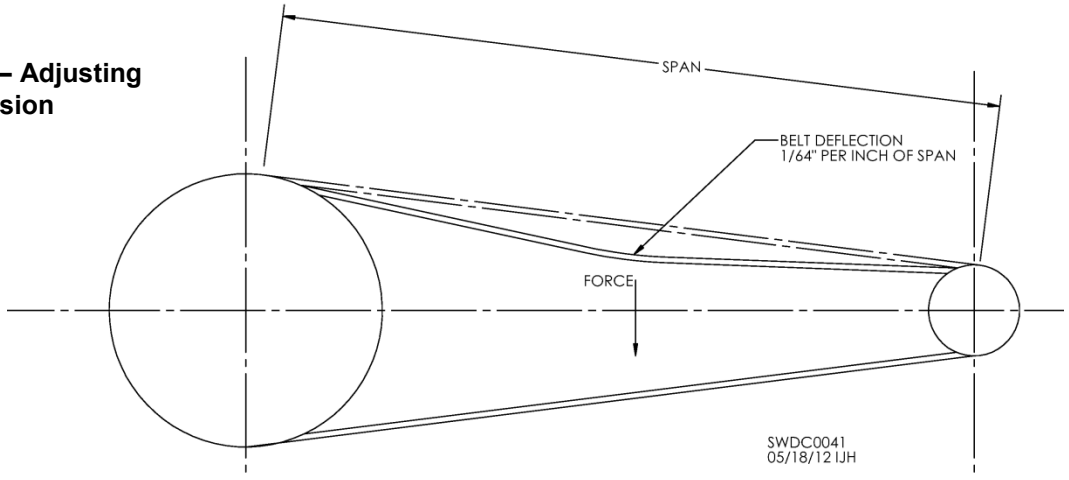
Belt Cross Section	Smallest Pulley Diameter Range	RPM Range	Belt Deflection Setting			
			Deflection = 1/64 of belt span			
			Uncogged Single V-Belts & Uncogged Banded V-Belts		Cogged V-Belts & Cogged Banded V-Belts	
			Used Belt	New Belt	Used Belt	New Belt
A, AX	3.0 – 3.6”	1,000 – 2,500	3.6	5.4	4.0	6.0
		2,501 – 4,000	2.8	4.1	3.3	4.9
	3.8 – 4.8”	1,000 – 2,500	4.4	6.6	4.9	7.3
		2,501 – 4,000	3.7	5.7	4.3	6.4
	5.0 – 7.0”	1,000 – 2,500	5.3	7.8	5.7	9.2
		2,501 – 4,000	4.6	6.8	5.1	7.6
B, BX	3.4 – 4.2”	860 – 2,500	---	---	4.8	7.2
		2,501 – 4,000	---	---	4.1	6.2
	4.4 – 5.6”	860 – 2,500	5.2	7.9	7.1	10.5
		2,501 – 4,000	4.5	6.6	7.1	9.1
	5.8 – 8.6”	860 – 2,500	6.2	9.4	8.4	12.4
		2,501 – 4,000	6.0	6.8	7.3	10.7
5V, 5VX	4.4 – 6.7”	500 – 1,749	---	---	10	15.2
		1,750 – 3,000	---	---	8.9	13.2
		3001 – 4000	---	---	5.6	8.5
	7.1 – 10.9”	500 – 1,740	12.6	18.9	14.8	22.1
		1,741 – 3,000	11.2	16.5	13.7	20.1
	11.8 – 16.0”	500 – 1,740	15.5	23.4	17.1	25.5
		1,741 – 3,000	14.5	21.8	16.8	25

Table 12 – Belt deflection settings for Bestorq belts

Sukup products use belts made by Bestorq. Sukup recommends using a Bestorq tension meter to measure belt deflection. Go to www.bestorq.com or call (402) 423-3077 for more information.

After adjusting tension to desired level by adjusting motor mount, remove any foreign material from inside of belt guard. Check that all fasteners are tightly secured. Close and latch belt guard.

Fig. 47 – Adjusting belt tension



IMPORTANT: Check and adjust belt tension after first five (5) and 24 hours of operation, then during regular maintenance (at least twice yearly).

Plug Relief Door Installation

Remove overflow cover plate from end of head section. Use existing hardware from cover plate to attach inside and outside frames of plug relief door, as well as door hinge, to end of head section. See Fig. 48. Bolts should be inserted from inside conveyor to outside.

Apply sealant around relief door.

Fasten interlock switch to frame as shown in Fig. 48.

Ensure switch keeps sufficient tension against plug relief door lid when lid is closed.

A NEMA 4 limit switch is shown in Fig. 48. A NEMA 9 limit switch should be used in extremely dirty/dusty settings and/or in enclosed environments.

Before connecting wires, remove plug from bottom of limit switch and remove cover plate from outside of limit switch. Wire according to diagram in Fig. 49, making sure to follow applicable electrical codes. Replace cover plate on outside of limit switch.

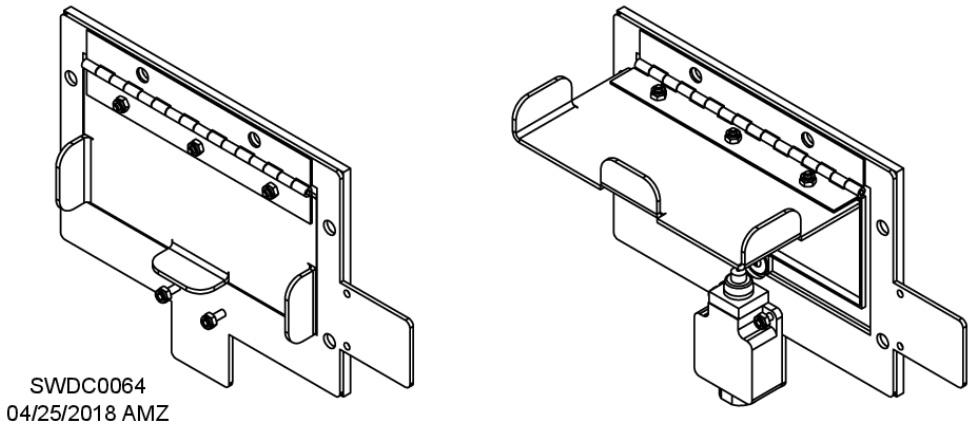


Fig. 48 – Installing plug relief door and limit switch

Limit Switch Wiring

Fig. 49 shows wiring diagram for limit switch.

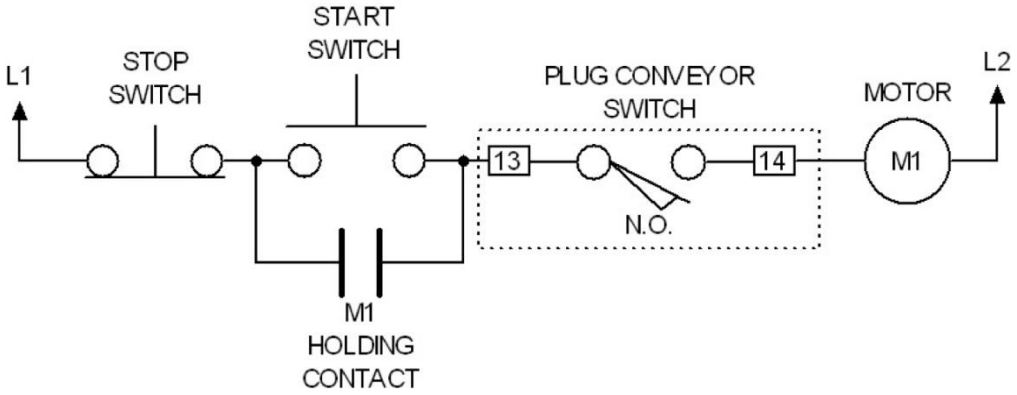


Fig. 49 – Limit switch wiring diagram

Final Check

Before operating conveyor, check all areas for SAFETY and machine damage that could have happened during construction. Follow step-by-step procedure below for initial start-up and operation, paying close attention to caution statements.

1. Disconnect and LOCK OUT all electrical power.
2. Check entire conveyor for loose bolts, construction tools, construction debris and/or any other material not related to conveying material, and remove before start-up.
3. Check for proper chain and paddle direction. Check chain tension and adjust if necessary.
4. Check to see that all appropriate decals are present on conveyor.
5. Check to make sure conveyor has been properly aligned.
6. Check all setscrews in drive pulleys, head and tail sprockets, shaft bearings and gear reducer.
7. Check lubrication of gear reducer. **NOTE:** Reducer is shipped without oil. See Pages 49-52.
8. Operate conveyor empty for a period of time, keeping personnel away from moving parts.
9. Disconnect and lock out all electrical power.
10. Make any needed adjustments.
11. Check all discharge gates to ensure they open and close properly.
12. Make sure all covers and guards are re-installed following any adjustments.

Conveyor Operation

Since conveyor has been previously operated without material, it may now be tested under load. It is suggested that flow systems be checked next. Allow only a small amount of grain to enter conveyor. Check that material can flow through system connections, valves, distributors, etc. Once all flow paths have been checked, conveyor may be loaded to capacity.

NOTE: A final tensioning of chain must be done while conveyor is loaded. Avoid tightening one take-up screw more than the other by noting degrees of turn and frequently switching between the two screws. This method should be used every time tension is adjusted.

INSPECT CONVEYOR AFTER FIRST 8 TO 10 HOURS OF OPERATION. This should include:

Inspect motor drive for loose pulleys, sprockets, belts, chains, paddles, etc.
Check for oil leakage or overheating of gear reducer.
Check head and tail sprocket hub bolts and setscrews.
Check chain for tension.

Maintenance

WARNING: Lock out power before performing any maintenance or service inspections. Contact with moving chain and/or paddles could cause death or serious injury.

Regularly scheduled maintenance can greatly increase life of equipment and reduce downtime. A good maintenance program includes general cleaning and upkeep and regular lubrication and inspection. Remember to check conveyor immediately if any unusual noise or vibration is observed. Following is a list of things to check regularly.

1. Inspect conveyor for loose bolts, missing or damaged flights, overall chain condition, and electrical connections, etc. Any bent or broken flights should be straightened or replaced.
2. Check chain for tightness after 10, 30 and 100 hours of operation, and every 200 hours thereafter. Remove links as needed if chain cannot be adjusted to proper tightness.
3. Bearings are greased at factory and do not need to be greased prior to start-up. Grease all bearings every 800 to 1000 hours after start-up. While unit is running, use only enough grease until you can see fresh grease at seals. If you cannot lubricate bearings while unit is running, do it immediately upon shutdown, while bearing is still warm. Do not grease a cold bearing.
4. Be certain to maintain reducer as specified by manufacturer. Follow manufacturer's instructions for regular oil level inspection and oil changes.
5. Check belt drive tension after first five (5) and 24 hours of operation, then at least twice yearly. See Page 36 for proper tensioning of belt. Check pulleys for alignment and to see they are securely tightened.
6. Oil motor every 1,000 hours or once yearly if equipped with oil holes, or grease unit if zerks are present.
7. Check all safety decals and replace all that are missing or deteriorated.
8. Check and retighten all fasteners.

Extended Shutdowns

If conveyor will be shut down for more than one month, follow these steps:

1. Remove all foreign material from conveyor and check that surface coatings are in good condition.
2. Lubricate and protect all bearings and drives according to manufacturer's instructions.
3. Rotate gear reducer occasionally during shutdown according to manufacturer's instructions.
4. Coat all exposed metal surfaces with rust-inhibiting oil according to manufacturer's instructions.
5. Before start-up, follow installation and operation instructions in this manual.

Chain & Sprocket Inspection

Chain

Check periodically for these potential chain and/or sprocket problems. Remedy by realigning or replacing chain, depending on severity of problem, or by replacing sprocket.

1. Chain stretching – 81X chain has stretched 3% (e.g., from 120’ to 123.6’) or WH chain has stretched 5% (e.g., from 120’ to 126’). Replace chain.
2. Stiff joints – Chain rollers can get packed with debris, leading to failure of rivets. Clean or replace chain.
3. Sidebar wear – Chain is sliding in trough. Realign chain.
4. Sidebar wear – Inside of links wearing from sprocket teeth. Realign chain.
5. Bushing wear – Bushings are worn or gouged – not polished -- where sprocket tooth touches. Check sprocket and replace if necessary.
6. Attachment wear – Attachments are gouged or bent from hanging up in conveyor. Realign or replace chain.
7. Rivet wear – Heads or tails of rivets worn from rubbing sides of trough. Realign or replace chain.
8. Roller wear – Inner diameters of rollers are worn from chain slack and wobble. Realign or replace chain.

Sprockets

1. Worn teeth – Worn teeth will over-stress chain, causing it to snap in and out of sprocket and possibly hang up when exiting. Replace sprocket. See next page.
2. Build-up in pockets – Material packed into pockets of sprocket will cause chain to stretch. Remove material.
3. Teeth scrubbed on sides – Indicates misalignment of sprockets or shaft. Chain could also be worn to point where it won’t track properly. Realign or replace chain.
4. Chain rides high on teeth – Chain is elongated and close to needing replacement.
5. Chain bow too tight – Indicates material packed in pockets or flanges too large. Remove material and/or replace chain.
6. Noise – Chain should make a clicking sound (metal on metal) against sprocket. If chain snaps against sprocket, check for issues 1 through 5.

Replacing Sprocket

Remove cover of tail section.

Remove connector link from chain and remove chain from sprocket.

Remove belt shield, belt(s), pulley and speed reducer.

Loosen setscrews and bolts on shaft bearings.

Loosen setscrews on sprocket and remove sprocket from shaft.

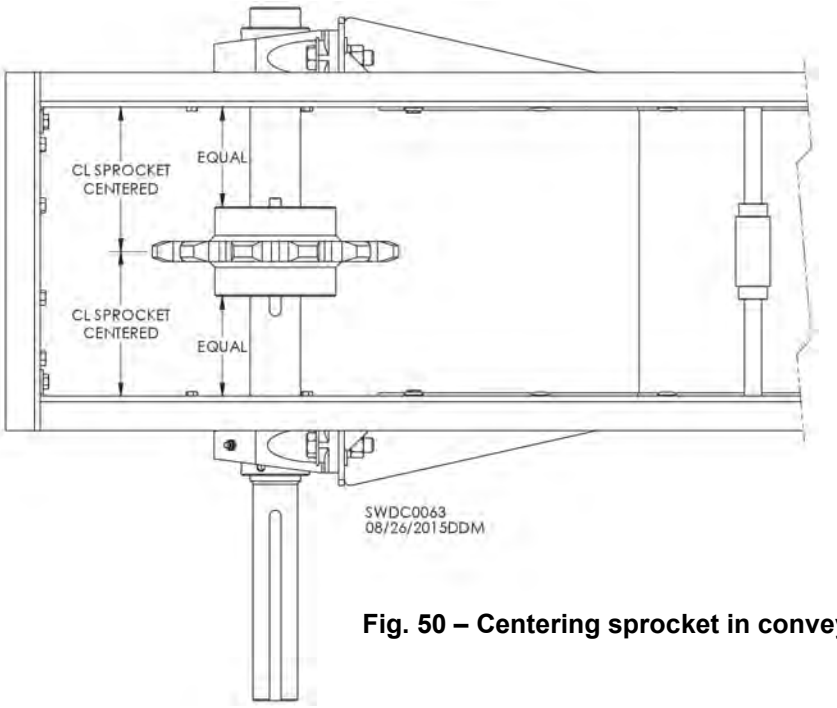


Fig. 50 – Centering sprocket in conveyor

Ensure key is in shaft slot and slide new sprocket over it. Reposition shaft in bearings and tighten bearings. Ensure sprocket is centered on shaft as shown in Fig. 50.

Remove sprocket setscrews. Clean setscrews and sprocket with a fast-drying degreaser. Follow directions on container. After dry, apply Loctite 263 to each setscrew, then reinsert and tighten according to Table 13 after double-checking that sprocket is centered.

Remove bearing setscrews. Clean and reinstall as instructed above.

Reinstall chain and reset tension by turning adjustment screws.

Reinstall speed reducer, pulley and belt. Tighten belt. See Page 36. Reinstall belt shield.

Reattach cover of section.

Table 13 – Torque values based on setscrew & hex wrench size

		TORQUE SPEC.	
SETSCREW SIZE	**HEX WRENCH SIZE**	**INCH-LBS.**	**FT.-LBS.**
1/4”	1/8”	77	6.4
5/16”	5/32”	156	13
3/8”	3/16”	273	22.8
7/16”	7/32”	428	35.7
1/2"	1/4"	615	51.3
5/8”	5/16”	1,315	109.6
3/4”	3/8”	2,150	179.2
7/8”	1/2"	5,130	427.5
1”	9/16”	7,010	584.2

Troubleshooting

Problem	Cause	Remedy
Low capacity	Obstruction	Check for foreign objects at conveyor inlets, bin or chutes feeding conveyor.
	Improper head shaft speed	Ensure pulleys are properly installed. Check speed reducer for proper reduction ratio. Check Sukup literature for proper speeds.
	Wet, sticky material	Remove clumps on flights or in trough. Use other equipment if problem persists.
	Insufficient tension at drive belt.	Belts may be slipping, causing conveyor to run at less than normal speed. Tighten belts.
	Damaged flights	Check for and remove any foreign object in trough, head or tail. Replace broken flights with new ones and/or straighten metal attachments.
	Material depth in conveyor too shallow	Check how conveyor is being loaded. Increase amount going to conveyor.
	Steep incline	Make sure conveyor is not operating at a significant incline.
	Loose chain	Re-check tension and adjust if needed.
Uneven paddle (flight) wear	Conveyor misalignment	Check conveyor alignment and adjust if needed.
	Sprocket slipped	Check setscrews on sprockets. Center and square the sprocket.

Troubleshooting, continued

Problem	Cause	Remedy
Noisy operation	Loose paddles	Check all bolts on chain and check for missing or bent attachments.
	Loose chain	Check for proper tension.
	Misalignment	Re-align sections.
	Foreign object	Check and remove any foreign object in inlet.
	Bent shafts	Check and replace bent shafts in head and/or tail.
	Sprockets are not centered	Center and square sprockets in head and/or tail.
	Bad bearing	Replace bearing.
	Chain installed backwards or upside down	Check for proper installation.
	Drive components	Check oil level.
Material damage too high	Material is being pushed back into tail and being ground by sprocket.	Ensure inlet is not too close to tail, lengthen opening and/or slow down conveyor.
	Bottoms are not aligned, causing a shearing action on material.	Align bottoms or grind a long bevel on high side.
	Material level too low and bouncing chain is chopping material.	Slow down conveyor.

Troubleshooting – Electrical

Problem	Cause	Remedy
Low capacity	Low voltage in power source	Check voltage at motor input. Voltage in power lines may be low. Consult power company.
Speed too slow	One fuse blown on three-phase circuit	Check fuses.
High amperage	Defective motor	Check motor for short or open-circuit condition. Repair or replace motor.

Troubleshooting – Speed Reducer

Problem	Cause	Remedy
Overheating	Under-sized reducer	Check rated capacity of drive.
	Insufficient oil	Check oil level and adjust. Check for leakage.
	Wrong grade of oil	Flush and refill with proper grade of oil. See Pages 49-52 for recommendations.
	Inadequate cooling	Check rated capacity of drive and add cooling fan if required.
	Excessive speed	Check output speed against nameplate rating.
Noise and vibration	Improper installation	Check and tighten all mounting bolts. Inspect for any broken or cracked parts.
	Bearing failure	Replace worn bearings. Check for excessive loads.

Troubleshooting – V-Belt Drive

Problem	Cause	Remedy
Belts slip (shiny pulley grooves)	Not enough tension	Increase tension.
	Overloaded drive	Redesign drive.
Drive squeals	Improper tension	Increase tension.
	Not enough arc of contact	Increase center distance.
Belt turned over	Broken cord caused by prying on pulley	Replace set of belts correctly.
	Misalignment of pulley & shaft	Realign drive.
	Worn pulley grooves	Replace pulleys.
	Excessive belt vibration	Check drive design. Check equipment for solid mounting.
Mismatched belts	New belts installed with old belts	Replace all belts.
	Pulley shafts not parallel (gives appearance of mismatched belts)	Align drive.
Belt breaks	Belt pried over pulleys	Replace set of belts correctly.
	Foreign objects in drive	Replace belt guard.
Belt wears rapidly	Pulley grooves worn	Replace pulleys.
	Pulley diameter too small	Redesign drive. Check for split along pitch line and/or cracking along bottom of belt.
	Belt slips	Increase tension.
	Pulleys misaligned.	Align pulleys.

NOTE: Information on this and following pages is from DodgeTorque-Arm II Speed Reducers manual MN1601, dated 09/18. It can be found at http://www.baldor.com/mvc/DownloadCenter/Files/MN1601. For speed reducer warranty information, go to http://www.baldor.com/brands/baldor-dodge/product-support/standard-warranty-information.

Instruction Manual
Dodge® Torque-Arm™ II Speed Reducers
Ratios 5, 9, 15, 25, and 40:1

TA0107L	**TA3203H**	**TA6307H**	**TA9415H**
TA1107H	**TA4207H**	**TA7315H**	**TA10507H**
TA2115H	**TA5215H**	**TA8407H**	**TA12608H**

These instructions must be read thoroughly before installation or operation. This instruction manual was accurate at the time of printing. Please see **baldor.com** for updated instruction manuals.

Note! The manufacturer of these products, Baldor Electric Company, became ABB Motors and Mechanical Inc. on March 1, 2018. Nameplates, Declaration of Conformity and other collateral material may contain the company name of Baldor Electric Company and the brand names of Baldor-Dodge and Baldor-Reliance until such time as all materials have been updated to reflect our new corporate identity.

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

WARNING: All products over 25 kg (55 lbs) are noted on the shipping package. Proper lifting practices are required for these products.

WARNING: Torque-Arm II product exceeding 13.5 kg (30 lbs) should be lifted using lift-assist equipment rated for the weight of the product. Weight values for all Torque-Arm II products are listing in the Gearing Engineering Catalog. Lifting brackets provided on the Torque-Arm II should be used when connecting to the lift-assist equipment.

WARNING: Depending on operating conditions, sound levels for Torque-Arm II products may exceed 70 dB. Protective measures such as hearing protection may be needed when in close proximity to a Torque-Arm II.

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

INSTALLATION

1. Use lifting bracket to lift reducer.
2. Determine the running positions of the reducer. (See Figure 1). Note that the reducer is supplied with 6 plugs; 4 around the sides for horizontal installations and 1 on each face for vertical installations. These plugs must be arranged relative to the running positions as follows:

Horizontal Installations–Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filter/ventilation plug in shipment and install plug in topmost hole. Of the 2 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

Vertical Installations–Install the filter/ventilation plug in the hole provided in the upper face of the reducer housing as installed. If space is restricted on the upper face, install the vent in the highest hole on the side of the reducer per Figure 1. Install a plug in the hole in the bottom face of the reducer. Do not use this hole for the magnetic drain plug. Of the remaining holes on the sides of the reducer, use the plug in the upper housing half for the minimum oil level plug.

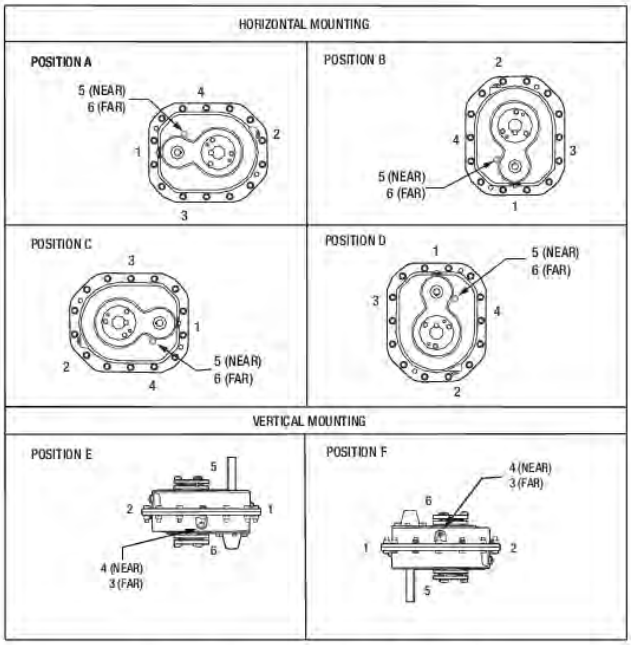


Figure 1 - Mounting Positions

Table 1 - Output Speeds

Output Speeds Above 15 RPM

Mounting Position	Vent and Plug Locations					
	1	2	3	4	5	6
Position A	Level	Plug	Drain	Vent	Plug	Plug
Position B	Drain	Vent	Level	Plug	Plug	Plug
Position C	Plug	Level	Vent	Drain	Plug	Plug
Position D	Vent	Drain	Level	Plug	Plug	Plug
Position E	Level	Plug	Plug	Drain	Vent	Plug
Position F	Plug	Drain	Level	Plug	Plug	Vent

Output Speeds Above 15 RPM and Below*

Mounting Position	Vent and Plug Locations					
	1	2	3	4	5	6
Position A	Plug	Level	Drain	Vent	Plug	Plug
Position B	Drain	Vent	Plug	Level	Plug	Plug
Position C	Level	Plug	Vent	Drain	Plug	Plug
Position D	Vent	Drain	Level	Plug	Plug	Plug
Position E	Level	Plug	Plug	Drain	Vent	Plug
Position F	Plug	Drain	Level	Plug	Plug	Vent

* Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Mechanical Power Transmission Support in Greenville, SC.

The running position of the reducer in a horizontal application is not limited to the four positions shown in Figure 1. However, if running position is over 20° in position "B" & "D" or 5° in position "A" & "C", either way from sketches, the oil level plug cannot be used safely to check the oil level, unless during the checking, the torque arm is disconnected and the reducer is swung to within 5° for position "A" & "C" or 20° for position "B" & "D" of the positions shown in Figure 1. Because of the many possible positions of the reducer, it may be necessary or desirable to make special adaptations using the lubrication filling holes furnished along with other standard pipe fittings, stand pipes and oil level gauges as required.

If mounting the Torque-Arm II reducer on an inclined angle, consult Mechanical Power Transmission Support for proper oil level.

3. Mount reducer on driven shaft as follows:

   For Taper Bushed Reducer: Mount reducer on driven shaft per instruction in Torque-Arm II Bushing Installation section of this manual.
4. Install sheave on input shaft as close to reducer as practical (Figure 2).
5. If not using a Dodge Torque-Arm II motor mount, install motor and V-belt drive so belt will approximately be at right angles to the center line between driven and input shaft (Figure 3). This will permit tightening the V-belt with the torque arm.
6. Install torque arm and adapter plates reusing the reducer bolts. The adapter plates will fit in any position around the input end reducer.
7. Install torque arm fulcrum on a flat and rigid support so that the torque arm will be approximately at right angles to the center line through the driven shaft and the torque arm anchor screw (Figure 4). Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

   CAUTION: Unit is shipped without oil. Add proper amount of recommended lubricant before operating. Failure to observe this precaution could result in damage to or destruction of the equipment.
8. Fill gear reducer with recommended lubricant (Table 3).

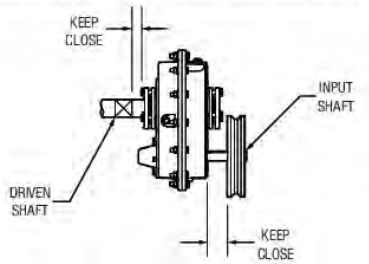


Figure 2 - Reducer and Sheave Installation

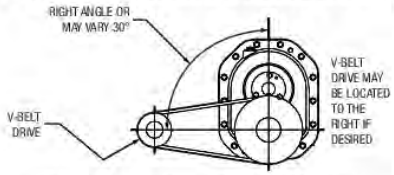


Figure 3 - Angle of V-Drive

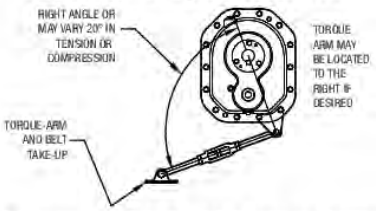


Figure 4 - Angle of Torque-Arm

TORQUE-ARM II BUSHING INSTALLATION

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

The Dodge Torque-Arm II reducer is designed to fit both standard and short length driven shafts. The Standard Taper Bushings series is designed where shaft length is not a concern. The Short Shaft Bushing series is to be used where the driven shaft does not extend through the reducer.

Standard Taper Bushings:

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of two tapered bushings, bushing screws and washers, two bushing backup plates and retaining rings, and necessary shaft key or keys. The driven shaft must extend through the full length of the reducer. If the driven shaft does not extend through the reducer do not use the standard tapered bushings; instead use the short shaft bushings as described in the Short Shaft Bushings section that follows. The minimum shaft length, as measured from the end of the shaft to the outer edge of the bushing flange (Figure 6), is given in Table 2.
2. Install one bushing backup plate on the end of the hub and secure with the supplied retaining ring. Repeat procedure for other side.
3. Place one bushing, flange end first, onto the driven shaft and position per dimension "A", as shown in Table 2. This will allow the bolts to be threaded into the bushing for future bushing and reducer removal.
4. Insert the output key in the shaft and bushing. For easy of installation, rotate the driven shaft so that the shaft keyseat is at the top position.

PLEASE NOTE – In most cases the keys that are supplied with the bushing kit are NOT square keys, and the orientation of the key is important. Install the key so that it fits snugly in the width of the keyseat. The keys are marked with a part number and some keys are also etched with "THIS SIDE UP" – these markings should be showing on the top of the key when it is installed in the shaft keyseat, see Figure 5 below.

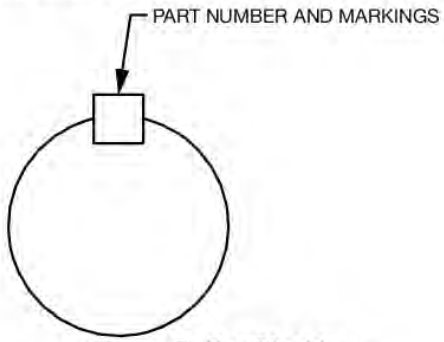


Figure 5- Key Marking

5. Mount the reducer on the driven shaft and align the shaft key with the reducer hub keyway. Maintain the recommended minimum distance "A" from the shaft bearing.
6. Insert the screws, with washers installed, in the unthreaded holes in the bushing flange and align with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing screws. Tighten the screws lightly. If the reducer must be positioned closer than dimension "A", place the screws with washers installed, in the unthreaded holes in the bushing before positioning reducer making sure to maintain at least 1/8" between the screw heads and the bearing.
7. Place the second tapered bushing in position on the shaft and align the bushing keyway with the shaft key. Align the unthreaded holes in the bushing with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing holes. Insert bushing screws, with washers installed in the unthreaded holes in the bushing. Tighten screws lightly.
8. Alternately and evenly tighten the screws in the bushing nearest the equipment to the recommended torque given in Table 2. Repeat procedure on outer bushing.

Short Shaft Bushings:

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of one long tapered bushing, one short tapered bushing, one tapered bushing wedge, bushing screws and washers, two bushing backup plates and retaining rings, and necessary shaft key or keys. The driven shaft does not need to extend through the reducer for the short shaft bushing to operate properly. The minimum shaft length, as measured from the end of the shaft to the outer edge of the bushing flange (Figure 5), is given in Table 1.

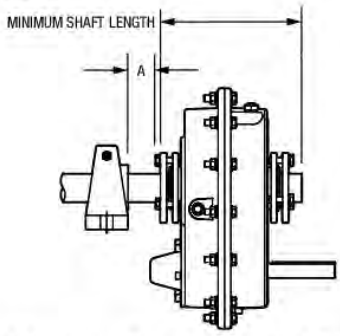


Figure 6 – Minimum Recommended Dimensions

Table 2 – Minimum Mounting Dimensions and Bolt Torques

Minimum Required Shaft Length		
Reducer Size	**Standard Taper Bushing (inch)**	**Short Shaft Bushing (inch)**
TA0107L	6.83	4.32
TA0107L	6.83	4.32
TA1107H	6.95	4.43
TA2115H	7.80	4.80
TA3203H	8.55	5.46
TA4207H	8.94	5.66
TA5215H	10.33	6.35
TA6307H	10.82	6.72
TA7315H	11.87	7.62
TA8407H	12.82	8.10
TA9415H	13.74	8.56
TA10507H	15.46	9.67
TA12608H	18.32	11.60

Bushing Screw Information and Minimum Clearance for Removal			
Reducer Size	**Fastener Size**	**Torque in lb-ft**	**A (inch)**
TA0107L	5/16-18	20-17	1.08
TA1107H	5/16-18	20-17	1.20
TA2115H	3/8-16	20-17	1.20
TA3203H	3/8-16	20-17	1.20
TA4207H	3/8-16	26-23	1.48
TA5215H	1/2-13	77-67	1.81
TA6307H	1/2-13	77-67	1.81
TA7315H	1/2-13	77-67	2.06
TA8407H	1/2-13	77-67	2.06
TA9415H	5/8-11	86-75	2.39
TA10507H	5/8-11	86-75	2.39
TA12608H	5/8-11	86-75	2.39

2. The long bushing is designed to be installed from the side of the reducer opposite the driven equipment as shown in Figure 6. The long bushing when properly installed is designed to capture the end of the customer shaft that does not extend through the reducer. Normally the reducer would be mounted such that the input shaft extends from the side of the reducer opposite the driven equipment however the reducer design allows installation of the reducer to be mounted in the opposite direction.
3. Install the tapered bushing wedge into the hollow bore of the reducer from the same side as the long bushing will be installed. When installing the tapered bushing wedge into the reducer hub, install the flange end first so that the thin taper is pointing outwards towards the long bushing as shown in Figure 7. The wedge is properly installed when it snaps into place in the reducer hub.

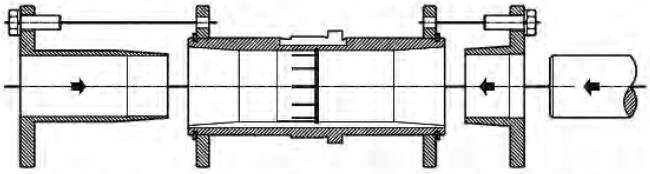


Figure 7 – Short Shaft Bushing and Output Hub Assembly

4. Align the tapered bushing wedge keyway with the reducer hub keyway. The keyway in the wedge is slightly wider than the keyway in the reducer hub allowing for easier installation.
5. Install one bushing backup plate on the end of the hub and secure with the supplied retaining ring. Repeat procedure for other side.
6. Install the short bushing; flange first, on the driven shaft and position per dimension "A", as shown in Table 3. This will allow the bolts to be threaded into the bushing for future bushing and reducer removal.
7. Insert the output key in the shaft and bushing. For easy of installation, rotate the driven shaft so that the shaft keyseat is at the top position.

PLEASE NOTE – In most cases the keys that are supplied with the bushing kit are NOT square keys, and the orientation of the key is important. Install the key so that it fits snugly in the width of the keyseat. The keys are marked with a part number and some keys are also etched with "THIS SIDE UP" – these markings should be showing on the top of the key when it is installed in the shaft keyseat, see Figure 8 below.

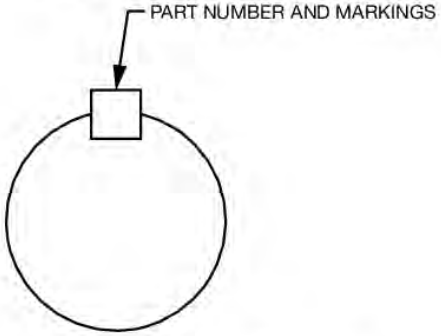


Figure 8- Key Marking

8. Mount the reducer on the driven shaft and align the shaft key with the reducer hub keyway. Maintain the recommended minimum distance "A" from the shaft bearing.
9. Insert the screws, with washers installed, in the unthreaded holes in the bushing flange and align with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing screws. Tighten the screws lightly. If the reducer must be positioned closer than dimension "A", place the screws with washers installed, in the unthreaded holes in the bushing before positioning reducer making sure to maintain at least 1/8" between the screw heads and the bearing.
10. Place the long bushing in position on the shaft and align the bushing keyway with the shaft key. Use care to locate the long bushing with the tapered bushing wedge installed earlier. Align the unthreaded holes in the bushing with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing holes. Insert bushing screws, with washers installed in the unthreaded holes in the bushing. Tighten screws lightly.
11. Alternately and evenly tighten the screws in the bushing nearest the equipment to the recommended torque given in Table 1. Repeat procedure on outer bushing.

Bushing Removal for Standard Taper or Short Shaft Bushings:

1. Remove bushing screws.
2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws make sure screw threads and threaded holes in the bushing flanges are clean. If the reducer was positioned closer than the recommended minimum distance "A" as shown in Table 2, loosen the inboard bushing screws until they are clear of the bushing flange by 1/8". Locate two (2) wedges at 180 degrees between the bushing flange and the bushing backup plate. Drive the wedges alternately and evenly until the bushing is free on the shaft.
3. Remove the outside bushing, the reducer, and then the inboard bushing.

LUBRICATION

NOTE: Because reducer is shipped without oil, it is necessary to add the proper amount of oil before operating reducer. Use a high-grade petroleum base rust and oxidation inhibited (R&O) gear oil (Tables 3 and 4). Follow instructions on reducer warning tags, and in the installation manual.

For average industrial 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.

CAUTION: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly. Failure to observe this precaution could result in bodily injury.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above 200°F, the oil should be changed every 1 to 3 months, depending on severity of conditions.

Table 3–Oil Volumes

Approximate Reducer Size		Volume of Oil to Fill Reducer to Oil Level Plug ① ④											
		② Position A		② Position B		② Position C		② Position D		② Position E		② Position F	
		③ Quart	Liter	③ Quart	Liter	③ Quart	Liter	③ Quart	Liter	③ Quart	Liter	③ Quart	Liter
TA0107L	Single	0.7	0.6	0.5	0.5	0.7	0.6	1.4	1.3	1.3	1.2	1.5	1.4
	Double	0.7	0.6	0.5	0.5	0.6	0.6	1.3	1.3	1.2	1.2	1.4	1.3
TA1107H	Single	1.3	1.3	0.7	0.7	0.7	0.6	1.7	1.6	1.5	1.4	1.9	1.8
	Double	1.3	1.3	0.7	0.7	0.6	0.6	1.7	1.6	1.5	1.4	1.9	1.8
TA2115H	Single	2.1	2.0	1.2	1.2	1.1	1.0	2.7	2.5	2.3	2.2	3.1	2.8
	Double	2.1	2.0	1.1	1.1	1.0	1.0	2.6	2.5	2.4	2.3	3.0	2.9
TA3203H	Single	2.8	2.7	1.6	1.6	1.8	1.7	4.1	3.9	3.3	3.1	4.4	4.2
	Double	2.8	2.7	1.5	1.4	1.7	1.6	4.0	3.8	3.4	3.3	4.2	4.0
TA4207H	Single	4.4	4.2	2.6	2.5	2.9	2.8	7.4	7.0	6.3	6.0	7.8	7.3
	Double	4.4	4.2	2.5	2.4	2.8	2.6	7.3	6.9	6.4	6.0	7.5	7.1
TA5215H	Single	7.4	7.0	4.9	4.7	5.8	5.5	13.2	12.5	11.6	11.0	13.1	12.4
	Double	7.4	7.0	4.7	4.4	5.5	5.2	12.9	12.2	11.4	10.8	12.6	11.9
TA6307H	Single	8.8	8.4	5.8	5.5	6.6	6.2	16.1	15.3	13.2	12.5	16.1	15.3
	Double	8.8	8.4	5.5	5.2	6.2	5.9	15.8	15.0	13.9	13.1	15.3	14.5
TA7315H	Single	8.4	8.0	11.8	11.1	13.9	13.2	22.5	21.3	22.1	20.9	25.1	23.7
	Double	8.4	8.0	10.8	10.3	13.2	12.5	22.0	20.9	22.4	21.2	23.1	21.8
TA8407H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	7.7	7.3	11.7	11.1	13.7	12.9	25.1	23.8	24.0	22.7	25.8	24.4
TA9415H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	17.0	16.1	16.8	15.9	18.1	17.1	33.2	31.4	33.2	31.4	38.6	36.5
TA10507H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	38.0	36.0	27.6	26.1	25.8	24.4	53.5	50.6	53.8	50.9	56.1	53.0
TA12608H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	53.0	50.2	41.5	39.3	37.1	35.1	70.7	66.9	72.2	68.3	80.4	76.1

① Oil quantity is approximate. Service with lubricant until oil runs out of oil level hole.
② Refer to Figure 1 for mounting positions.
③ US measure: 1 quart = 32 fluid ounces = .94646 liters.
④ Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Mechanical Power Transmission Support, Greenville, SC
⑤ Reducers with a 5:1 ratio are single-reduction. All other ratios are double-reduction

Table 4 – Oil Recommendations

Output RPM	ISO Grades For Ambient Temperatures of 50° F to 125° F * (10° C to 51° C)											
	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	320	320	320	220	220	220	220	220	220	220	220	220
201 – 300	320	320	320	220	220	220	220	220	220	220	220	220
151 – 200	320	320	320	220	220	220	220	220	220	220	220	220
126 – 150	320	320	320	220	220	220	220	220	220	220	220	220
101 – 125	320	320	320	320	220	220	220	220	220	220	220	220
81 – 100	320	320	320	320	320	220	220	220	220	220	220	220
41 – 80	320	320	320	320	320	220	220	220	220	220	220	220
11 – 40	320	320	320	320	320	320	320	320	320	320	220	220
1 – 10	320	320	320	320	320	320	320	320	320	320	320	320
Output RPM	ISO Grades For Ambient Temperatures of 15° F to 60° F * (-9.4° C to 15° C)											
	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	220	220	220	150	150	150	150	150	150	150	150	150
201 – 300	220	220	220	150	150	150	150	150	150	150	150	150
151 – 200	220	220	220	150	150	150	150	150	150	150	150	150
126 – 150	220	220	220	150	150	150	150	150	150	150	150	150
101 – 125	220	220	220	220	150	150	150	150	150	150	150	150
81 – 100	220	220	220	220	220	150	150	150	150	150	150	150
41 – 80	220	220	220	220	220	150	150	150	150	150	150	150
11 – 40	220	220	220	220	220	220	220	220	220	220	150	150
1 – 10	220	220	220	220	220	220	220	220	220	220	220	220

NOTES:

1. Assumes auxiliary cooling where recommended in the catalog.
2. Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature.
3. Extreme pressure (EP) lubricants are not necessary for average operating conditions. When properly selected for specific applications, TORQUE-ARM II backstops are suitable for use with EP lubricants.
4. Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturer's representative for his recommendations.
5. For reducers operating in ambient temperatures between -22°F (-30°C) and 20°F (–6.6°C) use a synthetic hydrocarbon lubricant, 100 ISO grade or AGMA 3 grade (for example, Mobil SHC627). Above 125°F (51°C), consult Mechanical Power Transmission Support, Greenville, SC for lubrication recommendation.
6. Mobil SHC630 Series oil is recommended for high ambient temperatures.

GUIDELINES FOR TORQUE-ARM II REDUCER LONG-TERM STORAGE

During periods of long storage, or when waiting for delivery or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

By taking special precautions, problems such as seal leakage and reducer failure due to lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

Preparation:

1. Drain oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with Table 5.
2. Seal the unit airtight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover all unpainted exterior parts with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co. or equivalent).
4. The instruction manuals and lubrication tags are paper and must be kept dry. Either remove these documents and store them inside, or cover the unit with a durable waterproof cover which can keep moisture away.
5. Protect reducer from dust, moisture, and other contaminants by storing the unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outdoors, cover the entire exterior with a rust preventative.

When placing the reducer into service:

1. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.
2. Clean the shaft extensions with petroleum solvents.
3. Assemble the vent plug into the proper hole.
4.

Follow the installation instructions provided in this manual.

Table 5 – Quantities of VCI #105 Oil

Reducer Size	Quantity (Ounces / Milliliter)
TA0107L	1 / 30
TA1107H	1 / 30
TA2115H	1 / 30
TA3203H	1 / 30
TA4207H	1 / 30
TA5215H	2 / 59
TA6307H	2 / 59
TA7315H	3 / 89
TA8407H	3 / 89
TA9415H	4 / 118
TA10507H	6 / 177
TA12608H	8 / 237

VCI #105 and #10 are interchangeable.
VCI #105 is more readily available.

OIL VISCOSITY EQUIVALENCY CHART

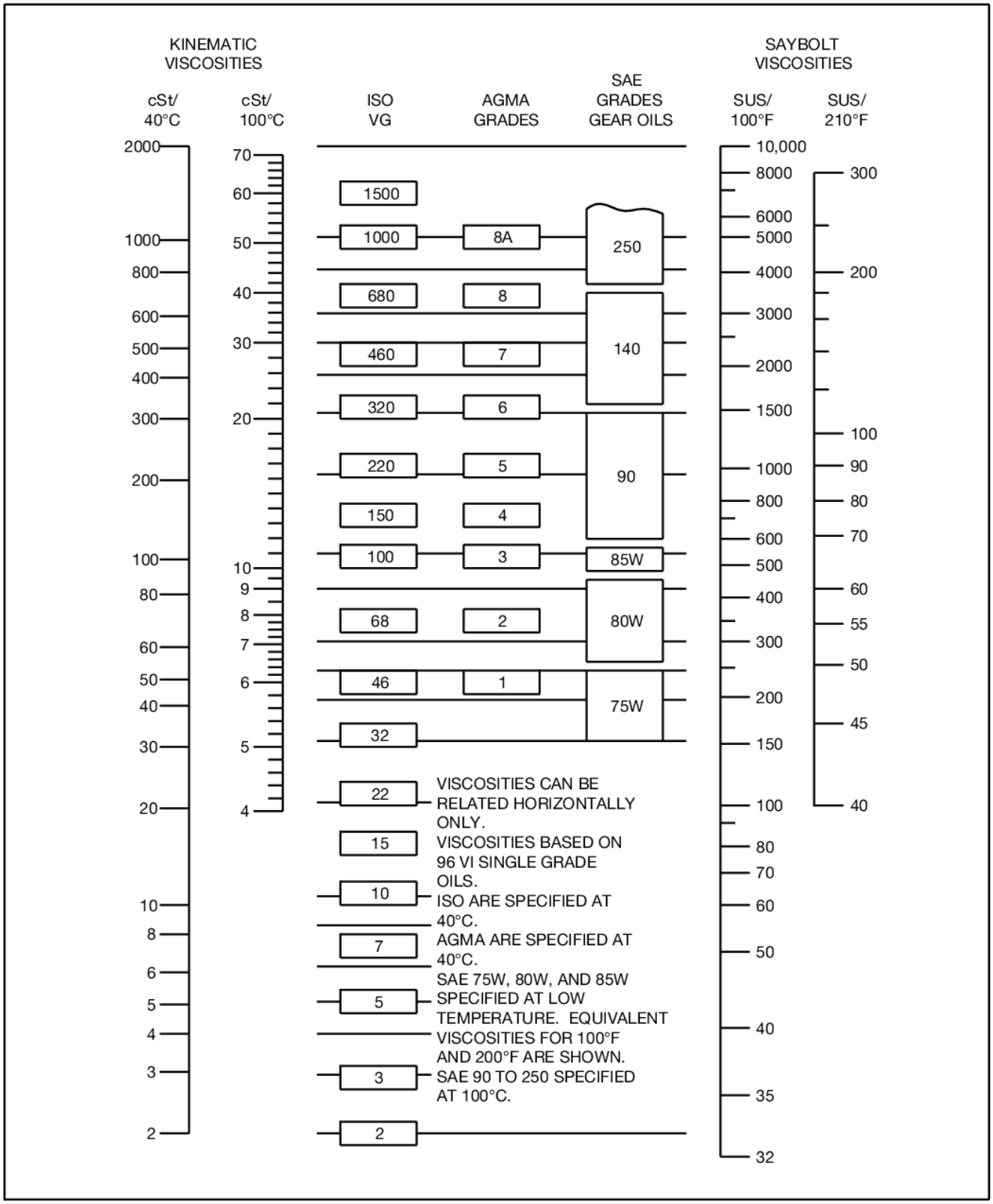


Figure 9 - OIL VISCOSITY EQUIVALENCY CHART

Below are belt guard installation instructions from Dodge speed reducers manual MN1601, dated 09/18.

TORQUE-ARM II BELT GUARD INSTALLATION

Two different belt guards are available for the Torque-Arm II speed reducer. One belt guard assembly is designed for mounting in position "B" and the other belt guard assembly is designed for mounting in position "C" as shown in Figure 14. It is important that the mounting position of the Torque-Arm II motor mount be determined prior to purchase of the belt guard as these two guards do not interchange and will be attached to the motor mount uprights.

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

WARNING: Ensure that all guards are properly installed before proceeding. Exercise extreme care to avoid contacting rotating parts. Failure to observe these precautions could result in bodily injury.

Vertical Installation (Position B):

1. Move belt guard and hardware from box and verify all parts are available. The belt guard assembly consists of one back cover, one front cover, two brackets, and necessary hardware.
2. Using the hardware provided, assemble the two brackets to the back cover as shown in Figure 16. Note that the brackets are mounted so that the angles of the brackets are mounted to the inside. Do not fully tighten these bolts.
3. Position back cover over the motor shaft and reducer input shaft. The long slot in the back cover fits over the motor shaft.
4. Align the back cover assembly to the Torque-Arm II motor mount and attach using four cap screws, washers, and nuts. Securely tighten the brackets to the motor mount and back cover.
5. Install motor and reducer sheaves. Install belts and adjust accordingly.
6. Position and install the front cover onto the back cover. **Note: The front cover is designed with an extended lip at the top of the cover and installs over the top of the back cover.**
7. Secure the front cover with four cap screws and washers.
8. Check machine for proper operation.

Horizontal Installation (Position C):

1. Remove belt guard and hardware from box and verify all parts are available. The belt guard assembly consists of one back cover, one front cover, two brackets, and necessary hardware.
2. Using the hardware provided, assemble the two brackets to the back cover as shown in Figure 17. Note that the brackets are mounted so that the angles of the brackets are mounted in the same direction. Do not fully tighten these bolts.
3. Position back cover over the motor shaft and reducer input shaft. The long slot in the back cover fits over the motor shaft.
4. Align the back cover assembly to the Torque-Arm II motor mount and attach using four cap screws, washers, and nuts. Securely tighten the brackets to the motor mount and back cover.
5. Install motor and reducer sheaves. Install belts and adjust accordingly.
6. Position and install the front cover onto the back cover. **Note: The front cover is designed with an extended lip at the top of the cover and installs over the top of the back cover. Close cover and secure with two cap screws and washers.**
1. Secure the front cover with four cap screws and washers.
2. Check machine for proper operation.

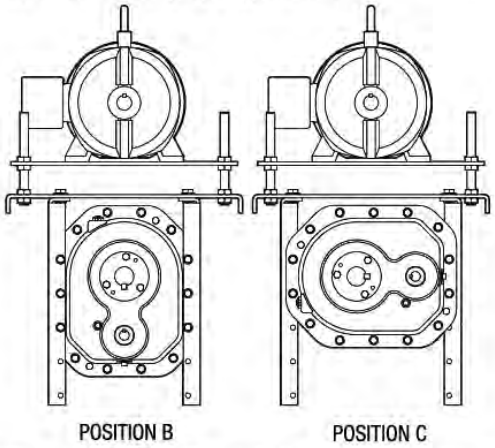


Figure 15 – Belt Guard Mounting Positions

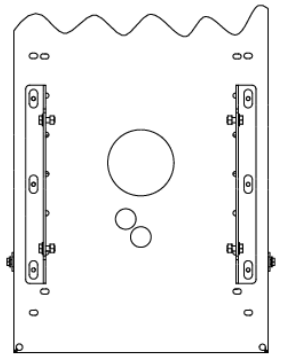


Figure 16 - Mounting Brackets in Position B

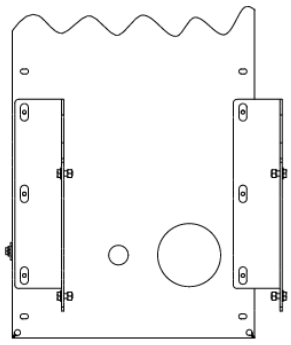


Figure 17 – Mounting Brackets in Position C

BEARING LUBRICATION

NOTE: Following are instructions from Dodge on lubrication of bearings used in Sukup conveyors.

DODGE S-2000 BEARING

LUBRICATION INSTRUCTIONS

OPERATION IN PRESENCE OF DUST, WATER OR CORROSION VAPORS

This bearing is factory lubricated with No. 2 consistency lithium complex base grease which is suitable for most applications. However, extra protection is necessary if bearing is subjected to excessive moisture, dust, or corrosive vapor. In these cases, bearing should contain as much grease as speed will permit (a full bearing with consequent slight leakage through the seal is the best protection against contaminant entry).

In extremely dirty environments, the bearing should be purged daily to flush out contaminants. For added protection, it is advisable to shroud the bearing from falling material.

HIGH SPEED OPERATION

At higher operation speeds, too much grease may cause overheating. In these cases, the amount of lubrication can only be determined by experience. If excess grease causes overheating, remove grease fittings and run for ten minutes. This will allow excess grease to escape. Then wipe off excess grease and replace grease fittings.

In higher speed applications, a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals. However, the proper volume and interval of lubrication can best be determined by experience.

AVERAGE OPERATIONS

The following table is a general guide for normal operating conditions. However, some situations may require a change in lubricating periods as dictated by experience. If the bearing is exposed to unusual operating conditions, consult a reputable grease manufacturer.

Lubrication Guide

Read Preceding Paragraphs Before Establishing Lubrication Schedule

Table 2 - Suggested Lubrication Period in Weeks

Hours run per day	1 to 250 rpm	251 to 500 rpm	501 to 750 rpm	751 to 1500 rpm	1001 to 2000 rpm	1501 to 2000 rpm	2001 to 2500 rpm	2501 to 3000 rpm
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	2	1
24	10	5	3	2	1	1	1	1

OPERATING TEMPERATURE

Abnormal bearing temperatures may indicate insufficient lubrication. If the housing is too hot to touch for more than a few seconds, check the temperature by applying a thermometer at the top of the pillow block with the thermometer tip surrounded by putty.

Because the thermometer reading will be approximately 10°F lower than the actual bearing temperature, add ten degrees to the reading and compare to the temperature rating of your grease. If the bearing temperature reading is consistent and operating within the recommended limits of your grease, the bearing is operating satisfactorily. The recommended maximum operating temperature for S-2000 Spherical Roller Bearings is 200 °F.

STORAGE OR SPECIAL SHUT DOWN

If equipment will be idle for some time, before shutting down, add grease to the bearing until grease purges from the seals. This will ensure protection of the bearing, particularly when exposed to severe environmental conditions. After storage or idle period, add fresh grease to the bearing before starting.

Table 3 - Set Screw Torque Table

Shaft Size	Socket Set Screw Size	Tightening Torque
1-3/8 – 1-3/4 in.	5/16 in.	165 Inch Pounds
1-15/16 – 2-7/16 in.	3/8 in.	290 Inch Pounds
2-11/16 – 3-7/16 in.	1/2 in.	620 Inch Pounds
3-15/16 – 4-15/16 in.	5/8 in.	1325 Inch Pounds

Table 4 - Recommended Shaft Tolerance Table

Normal Shaft Size	Low to Normal Equivalent Load and Catalog Speed*	
Up to 1-1/2 in.	+.000 in.	–.0005 in.
Over 1-1/2 to 2-1/2 in.	+.000 in.	–.001 in.
Over 2-1/2 to 4 in.	+.000 in.	–.001 in.
Over 4 to 5 in.	+.000 in	–.0015 in.

*Normal equivalent load .08C to .18C.

On severe applications and where dynamic balance and minimum runout are important, a snug to light press fit may be required to obtain optimum bearing performance. Consult Dodge Product Support.

DODGE IMPERIAL & ISAF BEARING

Grease Lubrication

DODGE IP and ISAF bearings are pre-packed with NLGI #2 Lithium Complex grease. For re-lubrication select a grease that is compatible with a #2 Lithium Complex grease. Re-lubricate in accordance with Table 3.

Storage or Special Shutdown

If exposed to wet or dusty conditions, or to corrosive vapors, extra protection is necessary. Add grease until it shows at the seals; rotate the bearing to distribute grease; cover the bearing.

Table 3 - Re-Lubrication Intervals (Months) Based on 12 hours per day, 150° F M

Shaft Size (inches)	RPM								
	250	500	750	1000	1250	1500	2000	2500	>3000
1-1/8 to 2	4	3	2	2	1	0.5	0.25	0.25	0.25
2-3/16 to 2-1/4	3.5	2.5	1.5	1	0.5	0.5	0.25	0.25	0.25
2-3/8 to 3	3	2	1.5	1	0.5	0.25	0.25	0.25	0.25
3-3/16 to 3-1/2	2.5	1.5	1	0.5	0.25	0.25	0.25	0.25	-
3-11/16 to 4-1/2	2	1.5	1	0.5	0.25	0.25	0.25	-	-
4-15/16 to 5-1/2	1.5	1	0.5	0.25	0.25	0.25	-	-	-
5-15/16 to 6	1	0.5	0.5	0.25	0.25	0.25	-	-	-
6-7/16 to 7	1	0.5	0.25	0.25	0.25	-	-	-	-

DODGE SC & SCM BEARING

Lubrication

High Speed Operation - In the higher speed ranges, too much grease will cause over-heating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience. If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting to permit excess grease to escape. The bearing has been greased at the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

Lubrication Guide

Use a No. 2 Lithium complex base grease or equivalent*

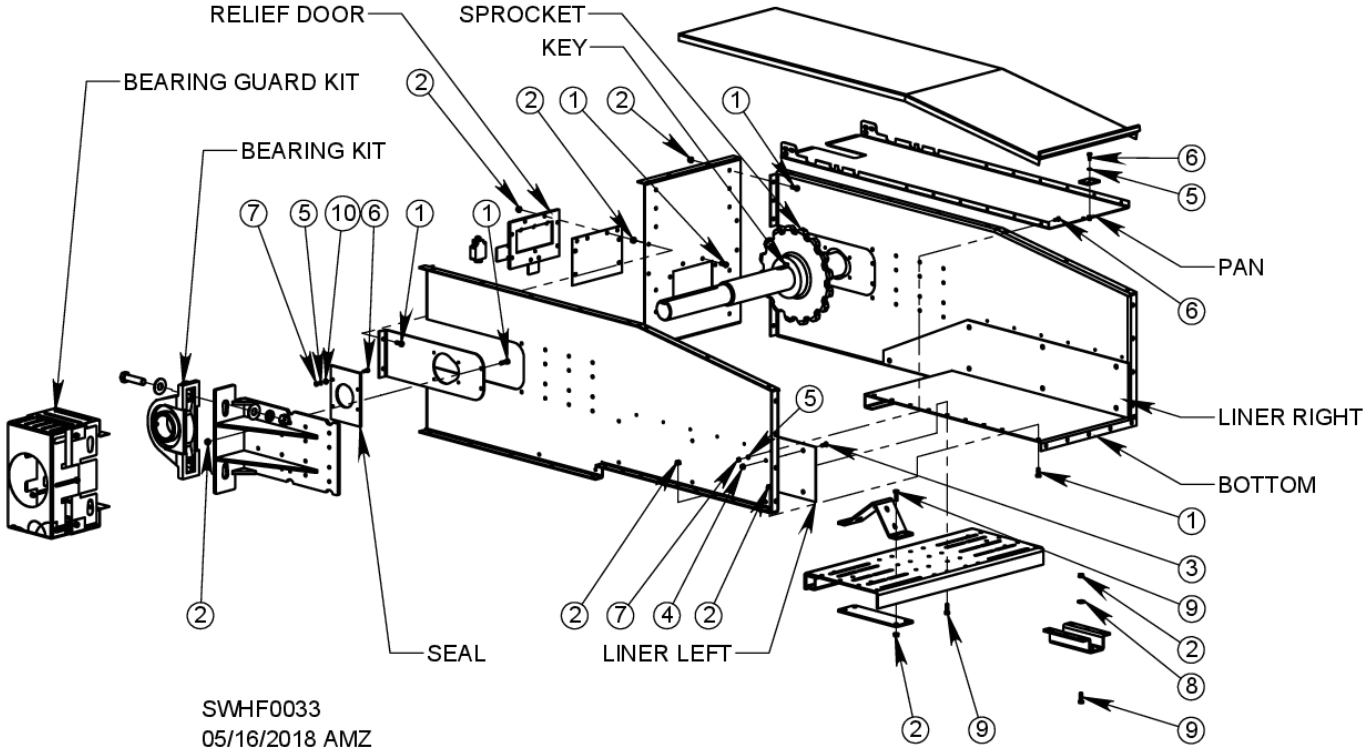
Hours Run per Day	Suggested Lubrication Period in Weeks							
	1 to 250 RPM	251 to 500 RPM	501 to 750 RPM	751 to 1000 RPM	1001 to 1500 RPM	1501 to 2000 RPM	2001 to 2500 RPM	2501 to 3000 RPM
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	1	1
24	10	5	3	2	1	1	1	1

*For EZ-Kleen series bearings, use an aluminum complex base grease.

Lubrication recommendations are intended for standard products applied in general operating conditions. For modified products, high temperature applications, and other anomalous applications contact product engineering at 864-284-5700.

PARTS ASSEMBLIES

HEAD SECTION



HARDWARE

ITEM #	DESCRIPTION	PART #
1	Screw, 3/8 -16 x 1”	J0606
2	Flange nut, 3/8” - 16	J1017
3	Screw, 5/16 – 18 x 3/4”	J0530
4	Nut, 5/16” - 18	J1110
5	Lock washer, 1/4”	J1195
6	Carriage bolt, 1/4 – 20 x 3/4"	J0505
7	Nut, 1/4" - 20	J0990
8	Flat washer, 3/8”	J1117
9	Screw, 3/8 – 16 x 1-1/4”	J0616
10	Flat washer, 1/4”	J1105

PANS

CONV. MODEL	BEARING BORE (IN INCHES)	
	1.9-3.9	4.4-6.5
1213	W81507	
1613	W81505	
1617	W81488	
2117	W81517	
2121	W81483	W81331
2721	W81551	W81587
3321	W81921	W81569
3325		W81566
3330		

HEAD SECTION PARTS LISTS

BOTTOMS

CONV. WIDTH	THICKNESS / FINISH			
	7GA GALV.	3/16" AR	1/4" AR	3/8" AR
12”	W81089	W81080	W81316	W80846
16”	W81085	W81081	W81319	W81765
21”	W81086	W81104	W81323	W81762
27”	W80994	W81548	W81591	W81744
33”	W80847	W81567	W81329	W80549

AR LINER LEFT SIDE

CONV. HEIGHT	BEARING BORE	GAUGE		
		10GA	3/16"	1/4"
13"	1.9 - 2.9”	W81114	W81649	W80843
17"	1.9 - 3.9”	W81122	W81142	W81759
21"	2.1 - 3.9”	W81485	W80515	W80844
21"	4.4 - 6.5”	W81571	W80750	W80845
25"	4.4 - 6.5”	W81578	W80552	W81740
30"	4.4 - 6.5”	W80801	W80745	W81731

AR LINER RIGHT SIDE

CONV. HEIGHT	BEARING BORE	GAUGE		
		10GA	3/16"	1/4"
13"	1.9 - 2.9”	W81110	W81650	W80840
17"	1.9 - 3.9”	W81118	W81143	W81760
21"	2.1 - 3.9”	W81484	W80514	W80841
21"	4.4 - 6.5”	W81570	W80749	W80842
25"	4.4 - 6.5”	W81577	W80551	W81741
30"	4.4 - 6.5”	W80800	W80744	W81732

HEAD BEARING KITS

BRNG. BORE	BEARING STYLE		
	SCM	S-2000	ISAF
1.9”	W89512		
2.1”	W89513	W89521	
2.4”	W89514	W89522	
2.9”	W89515	W89523	
3.4”	W89516	W89524	
3.9”		W89525	
4.4”		W89526	
4.9”		W89527	
5.4”			W89528
5.9”			W89529
6.5”			W89530

Kit includes 2 bearings plus fasteners

HEAD BEARING SEALS

BRNG. BORE	BEARING STYLE		
	SCM	S-2000	ISAF
1.9”	W70465		
2.1”	W70466	W70474	
2.4”	W70467	W70468	
2.9”	W70469	W70470	
3.4”	W70471	W70472	
3.9”		W70473	
4.4”		W70545	
4.9”		W70546	
5.4”			W70594
5.9”			W81748
6.5”			W81622

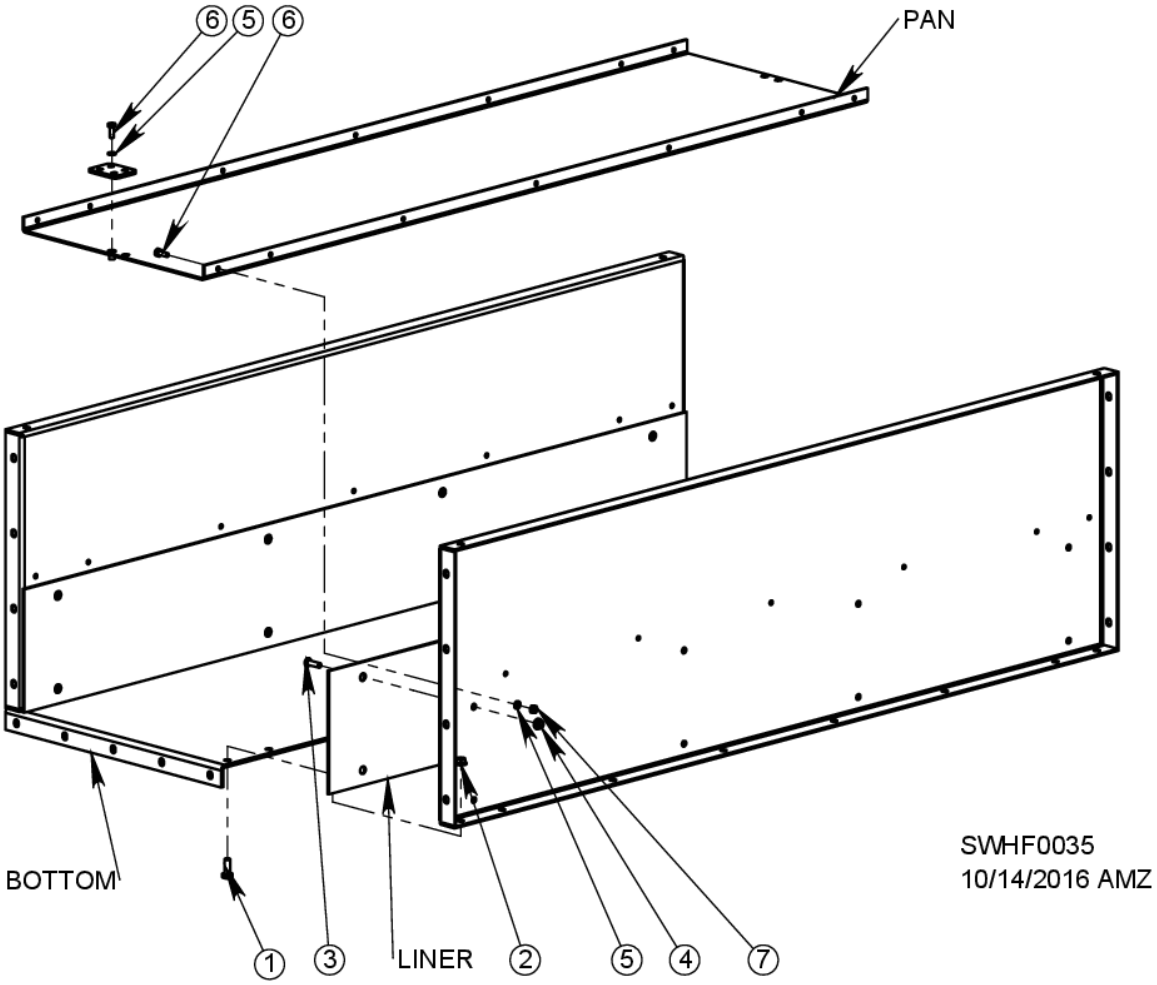
HEAD BEARING GUARDS

CONV. HEIGHT	BEARING BORE	KIT #
9"	1.9 - 2.9"	W650040
9”	3.4 - 3.9"	W650041
13”-17"	1.9 - 2.9"	W650042
13”-17”	3.4 - 3.9"	W650043
21"-30”	2.1 - 2.9"	W650044
21"-30”	3.4 – 3.9”	W650045
21"-30”	4.4 - 6.5"	W650046

	RELIEF DOOR	LIMIT SWITCH
STANDARD	W61158	J44872
EX-PROOF	W61159	J44875

BRNG. BORE	KEY WIDTH	CONVEYOR HEIGHT		
		13-17”	21-25”	30”
1.9	1/2"	W60554		
2.1				
2.4	5/8"	W61171		
2.9	3/4"	W60563	W60595	
3.4	7/8"	W60575	W60637	
3.9	1"	W60536	W60596	
4.4				
4.9	1-1/4"	W60593		
5.4				
5.9	1-1/2"	W61216		
6.5				

TROUGH SECTION



HARDWARE

ITEM #	DESCRIPTION	PART #
1	Screw, 3/8 -16 x 1”	J0606
2	Flange nut, 3/8” - 16	J1017
3	Screw, 5/16 – 18 x 3/4”	J0530
4	Nut, 5/16” - 18	J1110
5	Lock washer, 1/4”	J1195
6	Carriage bolt, 1/4 – 20 x 3/4"	J0505
7	Nut, 1/4" - 20	J0990

PANS

	LENGTH									
WIDTH	**1'**	**2'**	**3'**	**4'**	**5'**	**6'**	**7'**	**8'**	**9'**	**9' 9"**
12"	W80448	W80443	W80527	W80098	W80097	W80298	W80438	W80439	W80436	W80467
16"	W80223	W80220	W80238	W80100	W80265	W80224	W80222	W80264	W80221	W80338
21"	W80042	W80054	W80059	W80064	W80055	W80026	W80023	W80354	W80239	W80352
27"	W80119	W81344	W80321	W80301	W80311	W80045	W80419	W80099	W80121	W80310
33"	W80320	W81627	W81334	W80400	W80319	W80318	W80317	W80316	W80315	W80314

TROUGH SECTION PARTS LISTS

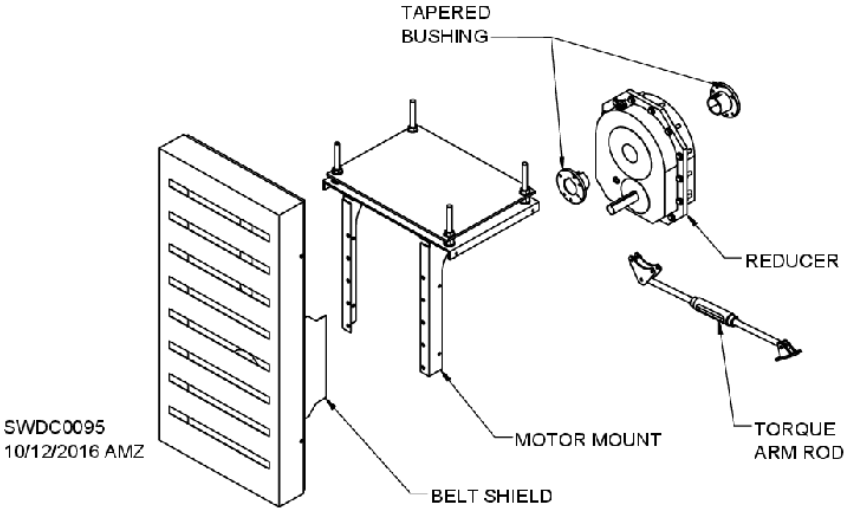
AR LINERS

		LENGTH									
HEIGHT	**GA**	**1'**	**2'**	**3'**	**4'**	**5'**	**6'**	**7'**	**8'**	**9'**	**9' 9"**
13"	10GA	W80051	W80447	W80446	W80445	W80263	W80053	W80050	W80262	W80049	W80052
	3/16"	W81647	W81767	W81670	W81751	W81835	W81769	W81669	W81843	W81648	W81646
	1/4"	W81844	W81845	W81846	W81847	W81848	W81849	W81850	W81851	W81852	W81853
17"	10GA	W80019	W80342	W80341	W80335	W80340	W80025	W80022	W80339	W80337	W80336
	3/16"	W80480	W80544	W80526	W81330	W80545	W80638	W81854	W81608	W80639	W80481
	1/4"	W81855	W81856	W81755	W81857	W81754	W81858	W81859	W81860	W81753	W81752
21"	10GA	W80007	W80344	W80322	W80350	W80351	W80044	W80347	W80016	W80014	W80353
	3/16"	W81313	W80516	W81657	W81861	W80524	W80669	W80530	W80531	W81776	W81402
	1/4"	W81862	W81863	W81864	W81865	W81866	W81867	W81868	W81869	W81870	W81871
25"	10GA	W81872	W81873	W81874	W81875	W81876	W81877	W81878	W81879	W81880	W81341
	3/16"	W80562	W81881	W81882	W81680	W81883	W80559	W80778	W81884	W80777	W80557
	1/4"	W81885	W81886	W81887	W81888	W81725	W81724	W81716	W81712	W81714	W81713
30"	10GA	W81826	W81889	W81890	W81891	W81892	W81893	W81278	W81894	W81895	W81896
	3/16"	W81897	W81898	W81899	W80830	W80581	W80831	W80832	W80580	W80833	W80579
	1/4"	W80834	W80835	W80836	W80837	W81704	W81685	W80838	W81705	W81684	W80839

AR BOTTOMS

		LENGTH									
WIDTH	**GA**	**1'**	**2'**	**3'**	**4'**	**5'**	**6'**	**7'**	**8'**	**9'**	**9' 9"**
12"	7GA	W70589	W71048	W70425	W71073	W70611	W70610	W70609	W70608	W70607	W70006
	3/16"	W70422	W70421	W70420	W70419	W70605	W70604	W70603	W70602	W70601	W70000
	1/4"	W70919	W71335	W70920	W71331	W70921	W70922	W70923	W70924	W70925	W70926
	3/8"	W71609	W71610	W71370	W71611	W71330	W71329	W71328	W71327	W71326	W71325
16"	7GA	W70634	W70633	W70417	W70571	W70631	W70630	W70629	W70628	W70627	W70026
	3/16"	W70639	W70638	W70059	W70437	W70625	W70624	W70623	W70622	W70621	W70020
	1/4"	W70929	W71607	W70930	W71287	W70931	W70175	W70174	W70932	W70933	W70173
	3/8"	W71605	W71606	W70988	W71608	W70976	W70977	W70978	W70979	W70980	W70981
21"	7GA	W70191	W70790	W70145	W70652	W70651	W70650	W70649	W70648	W70647	W70046
	3/16"	W70149	W70148	W70147	W70646	W70645	W70644	W70643	W70642	W70641	W70040
	1/4"	W70935	W71026	W70937	W70938	W70939	W70168	W70167	W70940	W70941	W70942
	3/8"	W71602	W71603	W71309	W71604	W71043	W71042	W71041	W71040	W71039	W71038
27"	7GA	W71167	W71166	W71600	W71601	W70071	W70070	W70069	W70068	W70067	W70066
	3/16"	W70159	W71599	W70667	W70660	W70065	W70664	W70663	W71030	W70661	W70060
	1/4"	W71006	W71186	W71083	W71598	W71055	W71054	W71053	W71002	W71052	W71000
	3/8"	W71594	W71595	W71596	W71597	W71295	W71294	W71293	W71292	W71291	W71289
33"	7GA	W71586	W71587	W71588	W71589	W71437	W71436	W71435	W71434	W71433	W71432
	3/16"	W70162	W71216	W71590	W71580	W70815	W70814	W70813	W70812	W70811	W70810
	1/4"	W71377	W71591	W71089	W71084	W71074	W71075	W70956	W71076	W71077	W70959
	3/8"	W80560	W71592	W71593	W71259	W71283	W80558	W81715	W80565	W81681	W80555

REDUCER PARTS



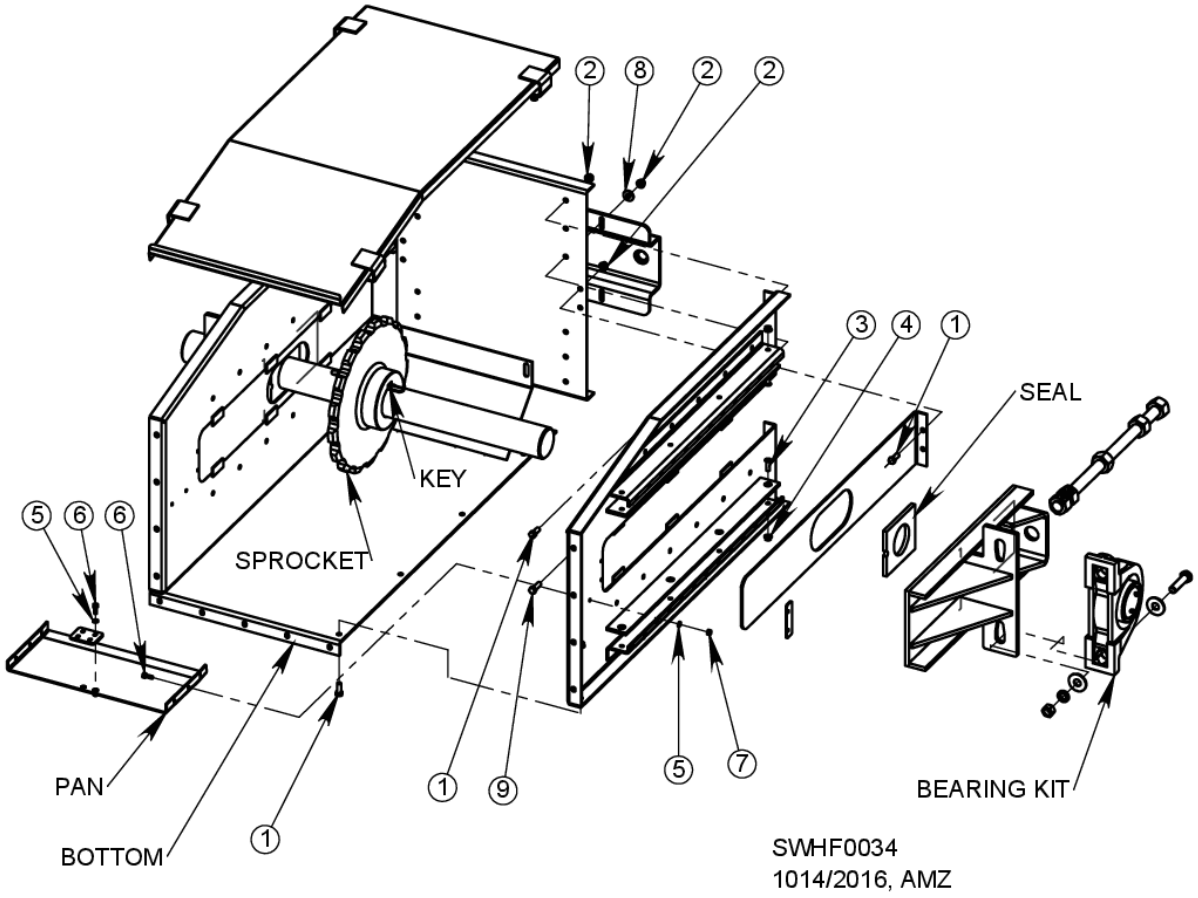
REDUCER	COMP. #	TORQUE ARM ROD	MOTOR MOUNT	BELT GUARD *	COOLING FAN	TAPERED BUSHINGS (IN INCHES)									
						1.4375	1.9375	2.1875	2.4375	2.9375	3.4375	3.9375	4.4375	4.9375	5.4375
TA1107H15	J9103	J9205	J9305	J9505		J9405									
TA1107H25	J9104														
TA2115H15	J9113	J9215	J9315	J9515			J9415								
TA2115H25	J9114														
TA3203H15	J9122	J9220	J9320	J9520			J9418	J9420							
TA3203H25	J9120														
TA4207H15	J9125	J9225	J9325	J9525				J9426	J9425						
TA4207H25	J9126														
TA5215H15	J9134	J9235	J9335	J9535					J9434	J9435					
TA5215H25	J9135														
TA6307H15	J9139	J9240	J9340	J9540					J9439	J9454	J9440				
TA6307H25	J9140														
TA7315H15	J9146	J9247	J9349	J9550	J9350						J9448	J9447			
TA7315H25	J9147														
TA8407H15	J9150	J9247	J9349	J9550	J9350							J9453	J9450		
TA8407H25	J9149														
TA9415H15	J9152	J9251	J9362	J9551	J9351								J9451	J9452	
TA9415H25	J9151														
TA10507H15	J9153	J9254	J9363	J9553	J9352									J9456	J9455
TA10507H25	J9154														

***Belt guard is for Position B**

SPROCKETS												
CONV. HEIGHT	CHAIN SIZE	TOOTH COUNT	BEARING BORE									
			1.9375	2.1875	2.4375	2.9375	3.4375	3.9375	4.4375	4.9375	5.4375	5.9375	6.5
13"	81X	13	J2155	J2163	J2164	J2166	J2172						
	81XHH	13	J2155	J2163	J2164	J2166	J2172						
17"	81X	16	J2149	J2143	J2144	J2146	J2148	J2178					
	81XHH	16	J2149	J2143	J2144	J2146	J2148	J2178					
	WH124	10		J2266	J22661			J2265					
21"	81XHH	19	J2190	J2192	J2218	J2191	J2193	J2194	J2200	J2247			
	WH124	12		J2216	J2243	J2228	J2281	J2246	J2214	J2219			
	WH124HD	12			J2280			J2279	J2283				
25"	81XHH	22					J2187						
	WH124	14	J2229	J2203	J2211	J2201	J2212	J2213	J2202	J2217			
	WH124HD	14									J2238	J2255	
	WH132	9				J2195							
30"	WH124	16			J2267	J22811	J2287	X	J2268	J2284	J2285		
	WH124HD	16			J2245		J2249				J2244		J2248
	WH132	10			J2256							J2254	

SPLIT SPROCKETS												
CONV. HEIGHT	CHAIN SIZE	TOOTH COUNT	BEARING BORE									
			1.9375	2.1875	2.4375	2.9375	3.4375	3.9375	4.4375	4.9375	5.4375	5.9375	6.5
13"	81X	13	J21551	J21631	J21641	J21661	J21721	J21722					
	81XHH	13	J21551	J21631	J21641	J21661	J21721	J21722					
17"	81X	16	J2260	J21431	J2259	J21461	J21481	J21781					
	81XHH	16	J2260	J21431	J2259	J21461	J21481	J21781					
	WH124	10		J2266	J22661			J2265					
21"	81XHH	19			J22181	J21911	J21931	J21941	J22001	J22471			
	WH124	12		J2216	J2243	J2228	J2281	J2246	J2214	J2219			
	WH124HD	12			J2280			J2279	J2283				
25"	81XHH	22											
	WH124	14	J2229	J2203	J2211	J2201	J2212	J2213	J2202	J2217			
	WH124HD	14		J22384	J2282	J22381	J22383	J2239	J22385	J22382	J2238	J2255	
	WH132	9											
30"	WH124	16			J2267	J22811	J2287		J2268	J2284	J2285		
	WH124HD	16			J2245		J2249				J2244		J2248
	WH132	10			J2256							J2254	

TAIL SECTION



HARDWARE

ITEM #	DESCRIPTION	PART #
1	Screw, 3/8 -16 x 1”	J0606
2	Flange nut, 3/8” - 16	J1017
3	Screw, 5/16 – 18 x 3/4”	J0530
4	Nut, 5/16” - 18	J1110
5	Lock washer, 1/4”	J1195
6	Carriage bolt, 1/4 – 20 x 3/4"	J0505
7	Nut, 1/4" - 20	J0990

BOTTOMS

CONV. WIDTH	THICKNESS / FINISH			
	7GA GALV.	3/16" AR	1/4" AR	3/8" AR
12"	W81088	W81092	W81317	W80848
16"	W81097	W81093	W81320	W81766
21"	W81096	W81094	W81324	W81763
27"	W80995	W81552	W81592	W80849
33” x 21”	W80850	W80383	W81340	W80851
33” x 25”	W80852	W80853	W81830	W81722
33” x 30”	W80852	W80853	W81830	W81722

Part numbers are for all conveyors of given width unless height is specified

PANS

CONV. WIDTH	PART #
12"	W80294
16"	W80242
21"	W81493
27"	W80133
33” x 21”	W80382
33” x 25”	W81719
33” x 30”	W81719

Part numbers are for all conveyors of given width unless height is specified

TAIL BEARING KITS

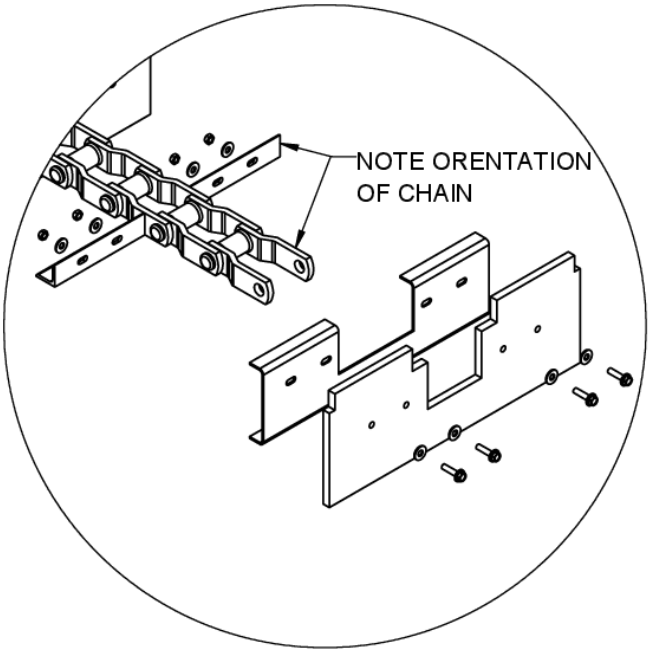
BRNG. BORE	STYLE	
	SCM	S-2000
1.4”	W89512	
1.9”	W89513	W89521
2.1”	W89514	W89522
2.4”	W89515	W89523
2.9”	W89516	W89524
3.4”		W89525
3.9”		W89526
4.4”		W89527

Kit includes 2 bearings plus fasteners

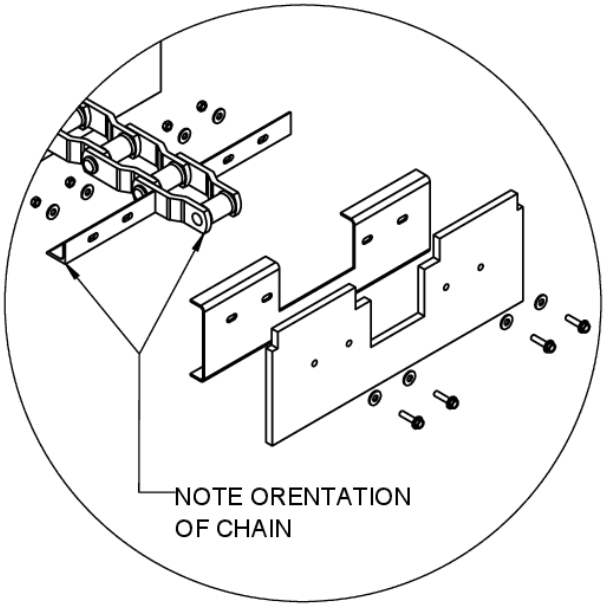
TAIL BEARING SEALS

CONV. HEIGHT	13” – 21”		25” – 30”	
BRNG. BORE	BEARING STYLE			
	SCM	S2000	SCM	S2000
1.4”	W60839			
1.9”	W60840	W71286	W70555	W70556
2.1”	W60841	W60843	W70557	W70558
2.4”	W60842	W60844	W70559	W70560
2.9”	W60846	W60848	W70561	W70562
3.4”		W60849		W70563
3.9”				W70564

REPLACEMENT CHAIN (10’ ROLL)



OLD STYLE CHAIN



NEW STYLE CHAIN

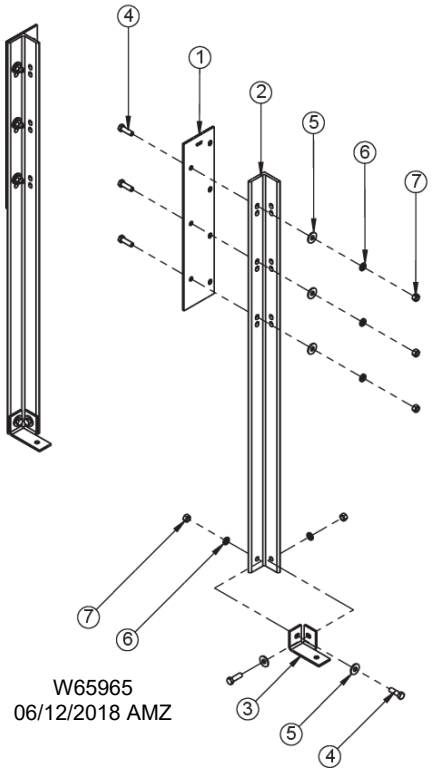
OLD STYLE

CONV. MODEL	CHAIN TYPE				
	81X	81XHH	WH124	WH124 DBL.	WH132
1213	W80296	W80479			
1613	W80257	W80312			
1617	W80358	W80384			
2117	W80408	W80166	W80792		
2121	W80287	W80299	W80599		
2721		W80376			
3321			W61047	W80381	
3325			W70767		
3330					W81747

NEW STYLE

CONV. MODEL	CHAIN TYPE		
	WH124	WH124 DBL.	WH132
2117	W82210		
2121	W80599		
2721			
3321	W82207	W82208	
3325	W82209		
3330	W82214		W82213

LEG EXTENSION KITS
(KIT W65965 FOR 17" CONVEYOR SHOWN)



CONVEYOR HEIGHT	KIT #
13"	W65969
17"	W65965
21"	W65967

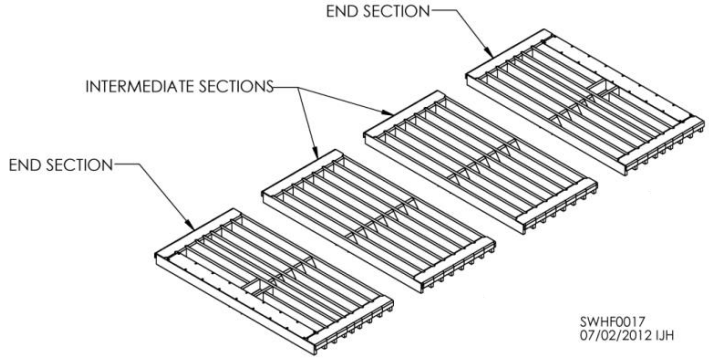
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	W61973	PLATE,SUPPORT,17",HI-F,LEG	2
2	W61974	ANGLE,LEG,24",CONV	2
3	W61975	FOOT,LEG,	2
4	J0616	SCREW, 3/8-16, 1.25, PLT, GR5, HHCS	10
5	J1117	WASHER,FLAT,3/8,PLT	10
6	J1205	WASHER, LOCK,3/8,PLT	10
7	J1020	NUT, HEX, 3/8-16,PLT	10

DRIVE-OVER HOPPER GRATING

Drawing and tables below identify drive-over hopper replacement grating kits and part numbers depending on nominal dimensions of hopper.

CONV. MODEL	KIT # DEPENDING ON HOPPER DIMS.					
	4' x 6'	4' x 8'	4' x 10'	5' x 6''	5' x 8'	5' x 10'
HF1213	W65263	W65266	W65269			
HF1613						
HF1617						
HF2117						
HF2121						
HF2721						
HF3321				W65264	W65265	W65267
HF3325						
HF3330						

SECTIONS PER KIT		
KIT #	END QTY.	INTERMED. QTY.
W65263	W80825	W80824
	2	1
W65266	W80476	W80824
	2	2
W65269	W80829	W80824
	2	3
W65264	W80823	W80822
	2	1
W65265	W80623	W80822
	2	2
W65267	W80828	W80822
	2	3



Contact Information

Owner's manuals are available from Sukup Manufacturing Co. and additional copies can be requested at address, phone number or e-mail address shown below. Please indicate manual number L2503 when requesting Hy-Flight Conveyor Assembly and Owner's Manual.

Sukup Dealer Information

Dealer name: _____

Address: _____

Cell phone: _____

Office phone: _____

Fax: _____

Emergencies – Know What To Do

Have emergency numbers and written directions to your location near your telephone in case of emergency. An area for emergency phone numbers to be recorded is provided below.

Ambulance • Fire • Police: 9-1-1

Bin rescue team: _____

Emergency medical squad: _____

Address of work site: _____

Directions to work site: _____

Sukup Manufacturing Co.

1555 255th Street, Box 677
Sheffield, Iowa, USA 50475-0677

Phone: 641-892-4222 **Fax: 641-892-4629**

Website: www.sukup.com **Email: info@sukup.com**