TABLE OF CONTENTS

Standard Conditions of Sale	**3**
Warranty	**5**
NLE Product Safety Statement	**6**
Safety Alert and Warning Signals	**6**
Guarding "Open" Systems	**7**
Guarding All Danger Points	**8**
Safe Walkways Near Conveyors or Hopper Openings	**8**
Operation Training Requirements	**8**
Maintenance Safety	**9**
Safety Standards and Codes	**10**
Addresses For Obtaining Safety Codes	**10**
Safety Signs	**11**
Sign Off Sheet For Employees	**12**
Installation of Conveyor	
Receiving Your Conveyor	**13**
Unpacking Your Conveyor	**13**
General Installation	**14**
Electrical Installation	**14**
Conveyor Assembly For Magnetic, Drag, and Hinged Steel Belt Conveyors	**17**
Belt Installation and Tracking	**17**
Magnetic Conveyors	**17**
Drag Conveyors	**18**
Hinged Steel Belt Conveyors	**18**
Hinged Steel Belting – Description	**18**
Hinged Steel Belting – Installation and Tracking	**19**
Hinged Steel Belting – Tension	**21**
Hinged Steel Belting – Maintenance	**22**
Magnetic Conveyor Maintenance	**24**
Trouble Shooting	**25**
Preventative Maintenance Schedule	**26**
General Maintenance	
Bearing Lubrication	**27**
Motor Maintenance	**27**
Reducer Maintenance	**27**
Torque Limiters	**28**
Adjusting The First Time	**29**
Torque Limiter Setting	**30**
Readjusting the Torque Limiter	**30**
Ball Detent Overload Clutch	**30**
How the Ball Detent Operates	**31**
Torque Setting	**31**
Resetting	**31**
Shear Pin	**31**
Maintenance Advice	**32**

Support Identification and Assembly	**33**
Medium Duty Supports	**34**
Heavy Duty Supports	**35**
"View" of Conveyors – Aid to Replacement Parts	
Models 700 – Magnetic Conveyors	**36**
Models 711 – Drag Conveyors	**37**
Models 715, 721, 722, 724, 725, 726, 727, 751, 760	**38**
General Installation Tips	**39**

New London Engineering
Quality Conveyors Since 1948
STANDARD CONDITIONS OF SALE

The following standard conditions of sale are set forth to give both the Seller and the Buyer a clear understanding of the terms of the sale and to provide mutual protection in the transaction.
(Required reading for all accounts.)

TERMS AND CONDITIONS OF SALE BETWEEN SELLER (New London Engineering) AND BUYER

1) TERMS OF PAYMENT. Firms rated by Dun and Bradstreet with a "Composite Credit Appraisal" of "good" or "high" and having adequate financial strength will be placed on open account terms. Open Account terms are 1-% 10 days. 30 days Net on unit orders and 30 days Net on parts orders. Any unauthorized discount taken after 10 days will be re-invoiced. Firms not rated by Dun and Bradstreet will be shipped C.O.D. until Seller has been provided with appropriate credit references and information. If these meet above-mentioned financial requirements, the firms will be placed on open account terms. Orders are invoiced from the day of shipment. Terms begin from the date of the invoice. No exceptions. The buyer will be required to pay a late charge of one and one half percent (1 ½%) per month on any balance remaining open 30 days after the date on which payment is due the Seller. The Seller reserves the right to change terms, prices, and specifications without notice.
2) DOWN PAYMENTS. In the event of large dollar volume orders, long lead times, anticipated extended shipment time, or other causes, the Seller reserves the right to require a down payment and/or progress payments. Orders with this type of requirement will not be processed into fabrication until the down payment or first progress payment, as meets contract conditions, is received.
3) NEW ACCOUNTS. If Buyer is in doubt as to its rating with the mercantile agencies, please submit three credit references and the name of the Buyers bank. Provide all names, addresses, and phone numbers.
4) C.O.D. ORDERS. Please include a deposit of 50% with orders for units to be shipped C.O.D., shipment will then go forward C.O.D. against bill of lading for the balance. Parts orders for more than $500.00 will require a 50% deposit.
5) EXPORT ORDERS. Prices for export crating can be obtained by contacting the Sales Department for quotations and placing orders.
6) PRICE CHANGES. Seller may change the prices listed without notice in order to reflect Sellers prices at time of shipment and any increase in transportation, labor, or other costs. If a delivered price has been quoted, any charges at destination for spotting, switching, handling, storage, and other accessorial services and demurrage shall be borne by Buyer. Seller reserves the right to correct any obvious errors or mistakes in specifications or prices.
7) WHEN ORDERING. Please specify name of item; catalog part number, as well as Serial Number of the Conveyor and any other pertinent information, to insure prompt handling of the order.
8) MINIMUM BILLING. $50.00 Net, exclusive of transportation charges.
9) DELIVERIES. Any delivery schedule indicated is based on the Seller's present estimate of the time required to ship after receipt of Buyer's order and is contingent upon Buyer supplying all required technical information to the Seller when needed. In the event of any delay in Seller's performance do in whole or in part to any cause beyond Seller's reasonable control, Seller shall have such additional time for its performance as may be reasonably necessary under the circumstances. Deliveries are normally quoted A.R.O. (After Receipt of Order), which means when the written purchase order is received by the Seller; or A.R.O.A.D (After Receipt of Approval Drawings), which means signed approval drawings with no changes are received by the Seller. All orders are scheduled during a particular week. The Seller will not be required to ship on a particular day. Seller's responsibility ceases when delivery is made to the transportation company. Claims for loss or damage in transit must be handled by the Buyer with the carrier.
10) EXTRA MANUALS. Seller will furnish one combined safety, installation, operation, maintenance, and parts manual. Should extra manuals be required above the one manual supplied with each unit, a price of $10.00 will be charged for each extra manual.
11) SUSPENSION OF PERFORMANCE. If in Seller's judgement reasonable doubt exists as to Buyer's financial responsibility, or if Buyer is past due in payment of any amount owing Seller, Seller reserves the right, without liability and without prejudice to any other remedies, to suspend performance, decline to ship, or stop any material in transit, until Seller receives payment of all amounts owing to Seller, whether or not due, or adequate assurance of such payment.
12) SHIPMENT. Shipment may be by carrier or other means selected by Seller. Title to any goods priced at shipping shall pass to Buyer upon delivery at such shipping point. All units are shipped knocked-down. If shipment is delayed by Buyer, date of readiness for shipment shall be deemed to be date of shipment for payment purposes. If manufacture is delayed by Buyer, a payment shall be based on purchased price and percentage of completion, balance payable in accordance with the terms as stated. Equipment held for the Buyer shall be at risk and expense of the Buyer.
13) WARRANTIES. Seller warrants that material in and workmanship on the equipment manufactured by Seller will be free from defects at time of shipment. If during the first twelve months (or 2000 hours, whichever comes first) of operation after final shipment, the Buyer establishes to Seller's satisfaction that any part or parts manufactured by Seller were defective when they were shipped, the Seller will, at its expense, deliver (but not install) replacement parts. Buyer must contact Seller within the first nine months after sale to Buyer to allow any warranty coverage to be applied. Seller's liability under this warranty is limited to furnishing of such replacement parts and Seller will make no allowance for corrective work done unless Seller agrees hereto in writing. Buyer must check all hardware tightness and reducer oil level and vent plug at time of installation, and retighten any and all hardware loosened during shipping. Damage or deterioration due to failure to check these items, or due to extraordinary wear and tear (including, but not in limitation, use of said equipment to handle products of sizes, weights, and shapes at speeds or methods which differ from information originally provide by Buyer), chemical action, wear caused by the presence of abrasive material or by improper maintenance or lubrication, shall not constitute defect. Seller has made no representations, warranties, or guarantees, expressed or implied, not expressly set forth in the preceding paragraph. Seller shall not be liable hereunder for any consequential or indirect damages included but not in limitation to, damages which may arise from loss of anticipated profits or production, or from increased cost of operation or spoilage of material. The components used in the manufacture of said equipment, which were manufactured by others, will carry such manufacturer's customary warranty, which Seller will obtain for Buyer's benefit upon request. NOTE! To protect warranties on any defective conveyor components (i.e. gearbox, motor, etc.) call the Seller's home office for authorization before disassembling or replacing. Failure to do so will immediately void all warranties and guarantees.
14) SAFETY DIRECTIONS. Seller makes no warranty whatsoever that the equipment and installation of said equipment when placed in operation and use by Buyer will comply with pertinent national, state, and local health and safety laws, including but not in limitation, the Federal Occupational Safety and Health Act (OSHA) and the regulations, standard rules and orders issued pursuant to any such laws. Buyer shall be solely responsible for compliance therewith for any damages, penalties or fines arising from non-compliance; provided however, that Seller shall cooperate with Buyer in the design, manufacture or purchase of safety features or devices which Buyer deems to be necessary under OSHA or any other statute, ordinance or governmental regulation, the price at which any such further equipment or service shall be furnished by Seller and shall be at Seller's standard prices then in effect, or as agreed upon between Seller and Buyer. Unit applications, locations, the proximity of any and all persons to the equipment or any moving parts or materials, and customer specifications determine the type, quantity and/or placement of electrical, electrical safety or other safety controls required. Whether these controls are supplied by *New London Engineering* or another supplier, all OSHA safety and health standards, the National Electrical Code and local codes must be followed.

15) TOLERANCES AND VARIATIONS. All goods shall be subject to tolerances and variations consistent with usual trade practices regarding dimension, straightness, section, composition, and mechanical properties and normal variations in surface and internal conditions and quality and shall also be subject to deviations from tolerances and variations consistent with practical testing and inspection methods.

16) RETURNS. In the event a failure should occur in any of the parts of the machine during the warranty period the following procedure must be followed to return and receive replacement parts and/or receive permission for on-site repairs and/or repair charges. A minimum 25% handling charge will be made on all returned goods. *CONTACT NEW LONDON ENGINEERING IMMEDIATELY AS TO THE NATURE OF THE PROBLEM.* *A) PARTS:* *1) at this time, replacement parts will be sent prepaid. These parts will be invoiced for the normal selling price.*

2) In a few days, you will receive a Returned Goods Authorization (RGA) slip, which will be your authorization to return the problem parts to NLE prepaid. (The Returned Goods Authorization slip must accompany the problem parts or they will be refused).

3) When the problem parts are received in NLE's plant, our claims department and/or the manufacturer of the components will determine if the parts are covered under warranty. If the parts are determined to be defective NLE will issue the proper credit for them, If the parts are determined not to be covered by warranty, you will be required to pay the full invoice price.

B) REPAIRS OR REPAIR CHARGES (ON-SITE):

1) An estimate of the cost of repairs, in hours, material and dollars must be given in writing to Seller along with an accurate description of the problem.

2) The Seller reserves the right to grant permission for repairs, or to arrange to have NLE employees or agents repair the equipment on-site, or to request the return shipment of the unit(s).

3) The Seller will not accept any back-charges or accept any returned parts or units made or shipped, unauthorized by the Seller.

Seller Also Reserves The Right To Not Accept The Return Of Any Goods Which It Deems To Be Related To Good Safety Practices.

17) COPYRIGHT. No reproduction either in whole or in part may be made of the Seller's catalog, drawings, sketches, etc., without written permission from NLE's Sales department.

18) BACK ORDERS. Seller will attempt to ship all orders complete; however, in the event of back orders, the orders will be shipped with freight charges, collect or prepaid, at Sellers option only.

19) CLAIMS. Claims for shipping shortages, concealed or otherwise, will not be allowed by Seller, unless reported within 30 days after shipment of merchandise. Shipments travel at Buyer's risk and all damaged freight claims will be the responsibility of the Buyer.

20) PRODUCT CHANGE. Products of modular design with standardized components as represented in Seller's catalog have been one of the main features of its equipment over the years. However, Seller reserves the right to make changes without notice, in the interest of product improvement, delivery, or the application of new materials.

21) TOOLS, DIES, AND FIXTURES. Unless otherwise expressly provided herein, any tools, dies, or fixtures which may be developed for Seller in the production of the goods covered hereby shall be owned by Seller, as Seller may elect, even though you are charged in whole or in part for the cost of such tools, dies, and fixtures.

22) PATENT INFRINGEMENT. If any of the goods are to be furnished to Buyer's specifications, Buyer agrees to indemnify Seller and Seller's successors and assigns, against all liabilities and expenses resulting from any claim of infringement of any patent in connection with the production of such goods.
NOTE: Unless requested and agreed upon in writing by Buyer and Seller before the start of engineering and/or manufacturing (concept drawings or sequences put forth during original proposal or quote will constitute the start of engineering) the Seller will not be held to any secrecy or exclusivity clauses by the Buyer, and Seller shall retain all patent rights for any equipment designed or manufactured by the Seller.

23) SPECIAL DRAWINGS OR DATE REQUIREMENTS. If a customer should require one or more special drawings larger or different than the standard 8 ½" x 11" line drawing in our catalog, Seller will have the option to charge for the master drawing or copies as requested. Consult the Seller for prices on any special drawings or date requirements, or drawings required on magnetic media, such as 3 ½" disks. Sepias and/or other original drawings are not available.

24) CANCELLATION. An order may be cancelled or modified only by written agreement between the parties. Buyer insistence upon canceling or suspending fabrication or shipment, or Buyer's failure to furnish specifications when required, may be treated by Seller as a breach of contract by Buyer, and Seller may cancel any unshipped balance without prejudice to any other remedies Seller may have. Cancellation charges can be obtained from the Sales department.

25) TAXES. All applicable federal, state, or local sales use, occupational or excise taxes are the responsibility of the Buyer and shall be in addition to the price or prices stated unless otherwise specifically stated. Seller shall have the right to invoice separately any such tax as may be imposed at a later time. Applicable tax exemption certificates must accompany any order to which the same applies.

26) MODIFICATIONS OR ALTERATIONS TO EQUIPMENT. Modifications or alterations to the equipment without express written consent of the Seller-Manufacturer is forbidden. Failure to obtain consent in writing relieves the Seller-Manufacturer from any and all liability for said product.

27) EQUIPMENT OPERATION. Buyer agrees to require its employees to read and be familiar with the safety instructions and the operation and maintenance portion of the manual before operating this equipment. Buyer agrees to completely train and require its employees to use all safety devices and guards on the equipment and to use safe operating procedures. Buyer agrees to not remove or modify any such equipment, switch, device, guard, or wanting sign or allow it to fall into disrepair. If Buyer, or its employees, fails to strictly observe all these obligations, Buyer agrees to indemnify and save Seller harmless from any liability or obligation incurred by the Seller to persons injured directly or indirectly by the operation of the equipment.

28) RESALE, TRANSFER, OR LEASE OF EQUIPMENT TO OTHERS. Buyer agrees to the continuing obligation to notify Seller of the resale, transfer, or lease of the equipment to third parties, stating the name and address of the new owner or transferee and the location of the equipment.

29) REPORTING PERSONAL INJURIES OR PROPERTY DAMAGE. The Buyer or user agrees to notify Seller within 30 days of any accident or occurrence involving Seller's machinery or equipment resulting in personal injury or property damage, and shall cooperate fully with Seller in investigation and determining the cause of such accident or occurrence. In the event that the Buyer or user fails to give notice to Seller and so cooperate, the Buyer or user agrees to indemnify and save Seller harmless from all loss or damage arising from such accident or occurrence.

30) ASSIGNABILITY. Any contract for sale and purchase of machinery and equipment cannot be assigned except with the written consent of Seller.

31) SUCCESSOR OWNERS AND USERS. The terms and conditions hereof are binding on successor owners and users, who take by purchase, assignment, lease, or otherwise, the right to own, use or operate the equipment sold to the original buyer, and said terms and conditions shall transfer with the equipment itself as an integral obligation of any successor to the original buyer. The successor owner and user obligations and liabilities stated herein shall also apply if the original buyer was a dealer and purchased the equipment from Seller for purposes of resale and transfer to third parties.

32) INSTALLATION AND ERECTION. Installation and erection of the equipment or supervision thereof by Seller, if specified or requested by Buyer, shall be governed by Seller's Standard Conditions of Erection and Installation and/or other specifications contained in the written order.

33) ENTIRE AGREEMENT. These Terms and Conditions of Sale constitute the entire agreement between the parties concerning any machinery or equipment sold and purchased. It shall not be modified or cancelled except by mutual agreement in writing and signed by all parties.

34) APPLICABLE LAW. The laws of the State of Wisconsin shall govern and control the right, duties, remedies, and obligations of Seller, Buyer, successors, users, and owners and Wisconsin law shall be used to interpret and construe all of the terms and conditions hereof.

GENERAL: Seller shall not in any event be liable for indirect special consequential or liquidated damages or penalties.

WARRANTIES

Seller warrants that material in and workmanship on the equipment manufactured by Seller will be free from defects at time of shipment. If during the first twelve months (or 2000 hours, whichever comes first) of operation after final shipment, the Buyer establishes to Seller's satisfaction that any part or parts manufactured by Seller were defective when they were shipped, the Seller will, at its expense, deliver (but not install) replacement parts. Buyer must contact Seller within the first twelve months after sale to Buyer to allow any warranty coverage to be applied. Seller's liability under this warranty is limited to furnishing of such replacement parts and Seller will make no allowance for corrective work done unless Seller agrees hereto in writing. Buyer must check all hardware tightness and reducer oil level and vent plug at time of installation, and retighten any and all hardware loosened during shipping. Damage or deterioration due to failure to check these items, or due to extraordinary wear and tear (including, but not in limitation, use of said equipment to handle products of sizes, weights, and shapes at speeds or methods which differ from information originally provide by Buyer), chemical action, wear caused by the presence of abrasive material or by improper maintenance or lubrication, shall not constitute defect. **Seller has made no representations, warranties, or guarantees, expressed or implied, not expressly set forth in the preceding paragraph.** Seller shall not be liable hereunder for any consequential or indirect damages included but not in limitation to, damages which may arise from loss of anticipated profits or production, or from increased cost of operation or spoilage of material. The components used in the manufacture of said equipment, which were manufactured by others, will carry such manufacturer's customary warranty, which Seller will obtain for Buyer's benefit upon request.

NOTE! To protect warranties on any defective conveyor components (i.e. gearbox, motor, etc.) call the Seller's home office for authorization before disassembling or replacing. Failure to do so will immediately void all warranties and guarantees.

To obtain an RGA (Returned Goods Authorization), contact the Customer Service department at New London Engineering.

NEW LONDON ENGINEERING
PRODUCT SAFETY STATEMENT

To: All of our customers, their operators, staff, and vendors

NLE works hard for safety, but needs to remind you of the increasing OSHA-mandated responsibilities of owners to TRAIN their operators in safe operation and maintenance practices. This manual cannot be considered to be complete as an aid in this training. Please consult your nearest OSHA office for training guidance including Lock-out/Tag-out procedures.

NLE requires and expects the customer/owner to comply with all applicable safety code standards and good construction and operation practices.

New London Engineering strives to make its products SAFE. Often, however**, NLE's** customers resell conveyors, or reuse them in completely different applications. NLE cannot control any unknown new uses or modifications, or assure their suitability or their compliance with applicable safety codes and practices. **NLE** offers its assistance to any customer in achieving the safe and productive reuse of good equipment. Some numbers of pertinent safety codes, standards, and regulations are printed later in this section (Pgs.8-9), along with their mailing addresses. The customer is referred to these and all applicable safety codes and practices for final guidance.

NLE will continue its best efforts to design, build, and market safe products, and will continue to advocate and urge their safe application, installation, and operation.

NLE requests your written or faxed suggestions as to how its product could be improved in its safety, convenience of use, function, maintenance, or repair. Please date and sign your suggestion, and send it to:

New London Engineering
Attn: Product Safety and Planning
1700 Division Street
New London, WI 54961

Phone: (920) 982-4030 / (800) 437-1994
Fax: (920) 982-6800
E-mail: Leslie @ nleco.com

SAFETY ALERT AND WARNING SIGNALS

Three Safety **SIGNAL** words shown below are used similarly throughout industry, for your quick understanding of the level of particular risks:

CAUTION: Indicates a potentially hazardous situation, if not avoided, may result in *minor or moderate injury*. It may also be used to alert against unsafe practices.

WARNING: Indicates a potentially hazardous situation, if not avoided, could result in *death or serious injury*, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

DANGER: Indicates an imminent situation, if not avoided, will result in *death or serious injury*. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

This manual must be read completely by each person involved with the conveyor. The customer must further train each operator in all areas of safe operation and maintenance. All machines have inherent hazards, such as moving parts, sharp edges, and electrical power. **Personnel must be trained** in identifying and avoiding all their hazards. The very last page in this section serves as a sign-off sheet to show everyone's name after they have read and understood at least this part of their safety training. Use other sign off sheets for the remainder of your safety-training program. **All warnings and safety regulations must be read, understood, and obeyed.**

Only authorized and trained personnel are to be allowed near this machine. All safety features are to be kept intact and operational. Contact NLE at any time for improving safety levels through the use of additional optional equipment. Plan now to create a safe and productive workplace.

This machine must not be altered in any manner, or operated with any missing guards or any damaged, missing, or malfunctioning parts. If any modification is deemed necessary to accomplish the user's requirements, write or fax a description including a sketch or drawing to NLE describing the anticipated changes or new uses. Include the machine identification (Serial Number, Model Number), condition, and any previous modifications.

WARRANTY IS VOIDED BY ANY CHANGES, WHICH ADVERSELY AFFECT SAFETY, OR ADD SIGNIFICANT UNAUTHORIZED LOADS OF ANY KIND TO THE NLE EQUIPMENT.

Remember that **NLE** may be able to help the customer or user discuss and avoid unintentionally creating hazardous situations. Careful attention by the customer on-site must be used for safe transfer of product from one machine to the next, and providing accessible space for proper operation, inspection, and cleaning. Some other safety factors to keep in mind are slippery spillage of material, safe personnel traffic lane requirements around the machines, noise levels, dust pollution, dangerous automatic startup, and handling of hot or toxic materials.

The user is warned to consider each and every machine involved with this one from NLE, because of the hazards of interfacing one machine to the next. Machines can interfere with the moving product and with each other in unexpected ways, causing damage to themselves, and possible injury to nearby workers. Never pretend there is only one machine involved in a safety decision; this is seldom the case.

GUARDING "OPEN" SYSTEMS

The customer is warned and instructed that any open system requires the use of certain barriers, grates, guard rails, or other guarding to prevent a person from falling or reaching into or coming into contact with the moving parts or materials.

NLE requires and assumes that no one will step on, step across, or step over the conveyor or hopper opening at any time. This is obviously dangerous because these items were not designed as walking surfaces or to handle extra loads; and movement of material or conveyor belts could occur unexpectedly. Forbid personnel from climbing onto or over parts of the conveyor or hopper; it was not designed for this. Instead, install crossovers, ladders, and guards, which comply with OSHA regulations. No person may ever ride the conveyor. **Owners**

shall affix warning signs on the conveyor reading Do Not Ride or Walk on the Conveyor! Signs with this message from **NLE** are listed at the end of this safety section (Pg 10) .

Extreme care is required in any conveyor used as a "pick line" to prevent employees from ever becoming entangled with passing material or moving parts of the conveyor. Always use pull rope switches there.

WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

GUARDING ALL DANGER POINTS

An important concept that OSHA uses is guarding the **POINT OF OPERATION**. This is **any point where the machine can injure an employee**. OSHA requires these potential danger points to be guarded without any remaining opening large enough for an employee to hurt themselves if they stuck any part of their body into that hole.

Guards less than a finger's distance from **danger** must have no hole large enough for any finger to fit through. Guards less than an arm's distance form danger must have no hole large enough for any arm to fit through. Keep these OSHA regulations in mind when you look at guarding your machines, especially where they fit together.
Danger Points can be said to be "GUARDED BY LOCATION", if they are far enough from any person's reach that no foreseeable operator or curious passerby could be injured. This usually means that they are more than eight feet from the walking or working surface nearby. Consult OSHA regulations for clarification.

SAFE WALKWAYS NEAR CONVEYORS OR HOPPER OPENINGS

Walkways near machines should be marked with yellow sidelines to keep workers away from any hazardous moving parts. Whenever conveyors or machines are mounted overhead, above aisles or other passageways, a minimum clearance of 7' 0" measured vertically from the floor or walking surface to the lowest part of the conveyor or its guards shall be provided. **At least 8' 0" is required below the lowest moving parts of any unguarded pinch points**. Provide safe walkways for every employee. Alternate passageways or crossovers may be required for proper access to emergency exits.

Overhead conveyors shall be guarded by spill guards, catch nets, bottom pans, guard rails or the equivalent, to avoid the possibility of the material falling off the conveyor for any reason.

WARNING: *FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.*

OPERATION TRAINING REQUIREMENTS

The customer/owner must develop a **TRAINING PROGRAM** for all the employees, including instruction in **safe** machinery operation and in emergency procedures. Only trained employees shall be allowed to operate and maintain conveyors or other machines, or to perform work in their immediate vicinity. Untrained employees must never be allowed to do this. **Different training is always required for maintenance**. It must cover safety concerns for maintenance on powered equipment, verification of competence and use of proper tools and procedures. A concern for the safety of others is required.

All employees shall know proper **LOCKOUT/TAGOUT procedures** and lock and tag supply locations. This is very important. **A written program for your particular location is required**. Besides preventing accidents, a lockout/tagout program can help avoid costly fines…and OSHA is rigorously enforcing lockout/tagout laws.

Train maintenance personnel in the location of lockout tags and padlocks too. A yellow visible board for these must be easily accessible, in accordance with OSHA section 1910.147. **Before restarting any conveyor, all personnel near it must be warned that it is going to start up.** Conveyors interlocked to automatically restart require warning horns before restarting. All controls, power disconnects, and safety switches shall be **well-labeled**, easy to spot, and never blocked from easy access. <u>All personnel shall be trained to identify these switches correctly</u>.
A conveyor shall only carry the amount and type of material or product that it is capable of handling safely. Training in avoiding overloads is required. Emergency procedures must be known. Under no circumstances shall the safety characteristics of the conveyor be altered. Unsafe work or maintenance habits must not be permitted. Safe work is serious business.

Regular routine inspections shall be enforced to insure that all safety features actually work and have not been removed or defeated. All guards and stickers must be in place. Remember that all the employees must be kept safe and this can't happen with missing or broken safety devices.

MAINTENANCE SAFETY

Preventative maintenance programs are very cost effective, ensuring that all conveyor components are maintained for long life and safety. Record keeping and setting up a calendar of maintenance for each machine can be combined into a comprehensive program that reduces accidents and breakdowns. Maintenance safety training is required for anyone ever expected to perform any maintenance. This helps prevent accidents, lost time and downtime.

Even simple maintenance such as lubrication and adjustments shall not be performed by untrained people, but only by your qualified and trained maintenance personnel. They need to know what to check and how to service the conveyor, and how to do this in a safe manner. Access covers have been designed to require tools to remove; this prevents untrained operators with no tools from getting into dangerous areas of the machine.

There must be a safe amount of room for maintenance. In-floor pits must allow easy removal of covers and shafts, and be well lighted. Access to conveyor sections above head height must be steady work surfaces. Ready access to switches is important.

Cleanliness has been seen to be very important both around the operator positions and inside the machines. Spilled materials can cause operator tripping or slipping hazards. Material carryback or buildup inside the conveyor can quickly damage costly components and adversely affect conveyor operation. Keep material buildup to a minimum. Inspect regularly inside the unit.

<u>All access covers and safety guards must be securely in place before restarting machinery, even temporarily</u>. All guards must be in good repair, with all warning stickers visible and legible. *Replacement stickers are available at no charge from NLE*. A copy of these stickers is located near the end of this section.

If there ever needs to be re-leveling of large conveyors, only qualified personnel, with adequate equipment should proceed.
Whenever practical, **DO NOT lubricate the machine while it is powered**. Only trained personnel who are aware of the hazards of moving parts shall ever be allowed to do any lubricating. Optional automatic

lubrication systems can be purchased from NLE for some of these tasks. Do not avoid lubricating just for safety reasons. Always keep your machine correctly lubricated, but it must be done safely!

SAFETY STANDARDS AND CODES

NLE requires and expects the customer/owner to comply with all applicable safety code standards and good construction and operation practices. Following these paragraphs is a list of standards that may apply to your machine. This list is included for your convenience, does not necessarily contain all codes and standards, and is to be updated by you periodically.
NLE recommends that you all make a sincere effort to keep yourselves informed on safety topics and have the latest versions of all regulations on hand. Safety standards are constantly evolving, and it requires vigilance to remain fully informed and protected.

SAFETY CODE TOPICS	CODE SECTION NUMBERS
Backstops, Brakes (are they required?)	**OSHA 1910.27d, 2, 5**
Drive Guards	OSHA 1910.219m; 1910217c2b
Electrical Codes and Regulations	**NEC; OSHA 1910.300**
Emergency Stop Switches	ANSI B20.1 paragraph 5-11.2c
Guards and Covers	**ANSI B20.1 paragraph 5.09.1.1**
Inlet Grates, Covers for Openings	OSHA 1910.272j
Interfacing Adjacent Machines	**ANSI B20.1 paragraph 5-11.2c**
Ladders	OSHA 1910.24b
Lockout/Tagout	**OSHA 1910.147**
Platforms	OSHA 1910.23c3;1910.23e;1910.24b
Point of Operation Guarding	**OSHA 1910.212a3; 1910.217c2b**
Refrain From Altering Any Safety Characteristics	ANSI B20.1 paragraphs 5-12.7
Shafting and Coupling Guards	**OSHA 1910.219;10910.219c4;1910.219j**

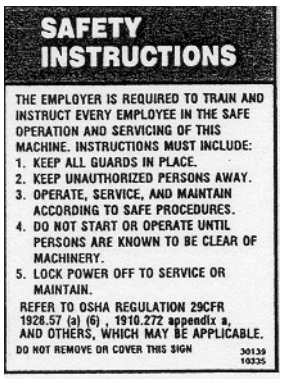
ADDRESSES FOR OBTAINING SAFETY CODES

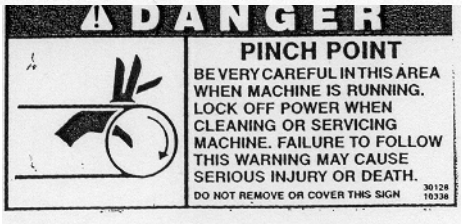
ANSI	**American National Standards Institute** **1430 Broadway** **New York, NY 10018**
OSHA	Office of Mechanical Engineering / Safety Standards, Room M 3621 OSHA Department of Labor, 200 Constitution N.W. Washington, D.C. 20210
ASME	**American Society of Mechanical Engineers** **347 East 47th Street** **New York, NY 10017**
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
ASAE	**American Society of Agricultural Engineers** **2950 Niles Road** **St. Joseph, MI 49085**
NEC	National Fire Protection Association 470 Atlantic Avenue

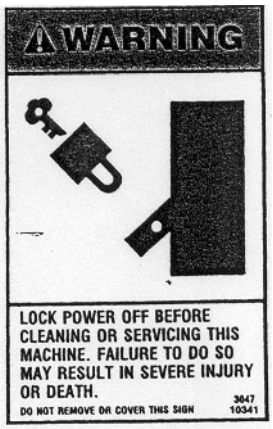
Boston, MA 02

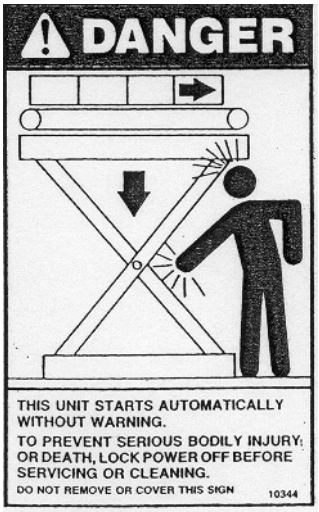
UL	**Underwriters L** **207 East Chica** **Chicago, IL 6**

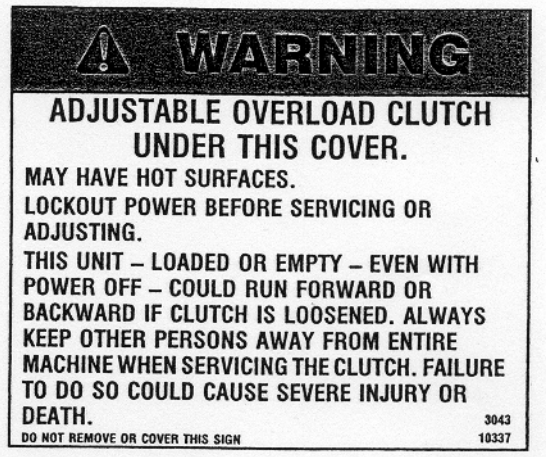
SAFETY SIGNS











SIGN OFF SHEET FOR ALL EMPLOYEES

The owner or employer responsible for the safe operation of this machine shall instruct all persons who may come into contact with it how to do so in a safe manner. This training shall include LOCKOUT/TAGOUT procedures, safe operation and maintenance, and good housekeeping.

HAVE EACH PERSON READ THIS MANUAL. Check their knowledge and then have them sign below, indicating that they understand all of the safety regulations pertinent to your machine. If there is a language barrier or other restriction to their understanding, this manual should be read to them and further questions asked. **Have them sign below only after they have demonstrated their understanding and use of the safety practices in this manual.**

Remember that this manual is only part of an adequate training program. It must be coupled with specific instructions for this particular application and with full information of national and local safety regulations that may apply.

I certify that I have read this manual, acquired all applicable safety and operating knowledge for this machine:

NAME (PRINT)	DATE	INITIALS

RECEIVING YOUR CONVEYOR

UNLOADING: Make sure that unloading personnel are qualified and properly equipped for your particular unloading situation. Don't attempt to use a fork lift truck if you really require a crane! Twisted frames are difficult to repair. Use the correct rigging slings and lifting equipment to avoid any frame twisting. Use lifting sling and chain spreaders to avoid compressing or bending portions of the conveyor.

- **Immediately** upon arrival of your shipment, inspect the outside carton or skid for damage. Open the box and inspect for missing items. If your shipment is flawed, stop unloading and request immediate inspection by the carrier. Take exception on the delivery receipt by including damage description words; for example, "2 cartons gouged" or "corners crushed". Takes photos and keep any original containers on hand for carrier inspection, or **it becomes very difficult to get your damages reimbursed**.

- Start a document file for each short or damaged shipment, and don't delay in filing a claim against the carrier once the amount of damage or loss is known. The time limit is less than nine months for domestic truck shipments. Claim forms are available from the delivering carrier.

- Plan to have enough room to temporarily store all of the pieces out of the weather. If the conveyor will not be installed immediately take all necessary precautions to protect your investment. Lubricate unpainted parts (like shafts), cover the conveyor, and protect it from being bumped, and store copies of the instruction manual where you can find them later.

- Check your shipment to verify that all operating components have arrived safely and that all parts have been shipped. NLE recommends that this be done right away to avoid delay when assembly of the conveyor is done.

UNPACKING YOUR CONVEYOR

- Your conveyor will most likely have been shipped and protected in a long cardboard box or on a wooden skid. The conveyor sections and supports can be found loose in the box or strapped to the conveyor. The drive components are generally mounted to the drive section.

  - ***For missing components that are not shown as being backordered on the packing list, notify NLE immediately. Give the following information:***
    Name of Dealer or Representative
    Serial Number
    Description of Items Missing

- Identify all the loose parts and sections from the drawings located in the IDENTIFY YOUR CONVEYOR section of this manual. You may also cross-reference your packing slip and/or approval drawings.

- Supports are shrink wrapped and packed in the long box, strapped to the skid, or already attached to the conveyor sections. In most cases, the smile brackets (support mounting brackets) are already attached to the frame. To mount supports, refer to the SUPPORT IDENTIFICATION AND ASSEMBLY section of this manual.

- Units short enough to be shipped in one piece have their belts installed but they are not tensioned or tracked. Please refer to the BELT INSTALLATION AND TRACKING section of this manual.

- Options, such as Discharge Chutes or Infeed Hoppers, are either mounted to the conveyor or shipped on a separate skid or box. In most cases, these parts bolt to the conveyor and will have the mounting hardware located in a cloth bag that will either be taped to the part or labeled for it.

- In the event, you find a part that you feel you do not need or is not correct for your conveyor, please contact our Customer Service Department @ (800) 437-1994, for assistance.

GENERAL INSTALLATION

All installers MUST read this manual before proceeding. The customer's sign-off sheet is located on the back page of the Safety Section and should be used to enforce training and familiarization with this installation. Call your New London Engineering Representative or experienced millwrights if questions arise.

INSTALLATION REQUIREMENTS:

- ✓ Use experienced and trained riggers, millwrights, installers, and licensed electricians. This is the only approach approved by New London Engineering and is entirely for your safety.

- ✓ Supports should be securely added as soon as each section is put into place. Use as many installers as required for safety. Check machine leveling and adjust it frequently during the installation. Belt tracking later depends heavily on the levelness of the conveyor.

- ✓ Support anchors and customer-supplied supports must be adequate for all foreseeable loads, including any offset drive weight at the drive section. If possible, lateral bracing from building columns or adjacent machinery should be considered.

- ✓ Hardware tends to loosen during shipment, and should be tightened correctly. Tighten all bearings and sprocket set screws; they are especially important for dependable operation of your unit. As sections are assembled into place, check all hardware for tightness. *You are responsible for any damage caused by loose hardware that was not tightened at this time.* Recheck hardware regularly, to protect your investment and your workers.

- ✓ Check the access to operator positions. There must be room around the various parts of the conveyor both for its operation and for maintenance procedures. Add any guardrails or safety devices now, before the unit is ever put into service.

- ✓ Check that all warning stickers are visible and legible. Use these where they will do the most good. Additional stickers are available upon request from New London Engineering.

ELECTRICAL INSTALLATION

National Electrical Codes are laws for safety. They must be followed, under the guidance of your local electrician, inspector or licensed journeyman electrician. Here is how this helps you:

1) It allows good machine control, protecting operators from mechanical accidents when material jams.
2) It safeguards personnel form electrical shock injuries.
3) It safeguards the machine and its connecting wires from major short circuit current damage.
4) It also safeguards the machine from slight amounts of over-current that can slowly overheat motors and wires, causing fires.

WARNING: Failure to follow Electrical Code requirements could result in serious injury or death.

Many conveyors can be electrically reversed, but check that they are not able to jam with loaded material when doing so. Your controls must be clearly labeled which direction is which, for safety.

New London Engineering recommends that motor direction must be verified before attempting to run the conveyor itself. If you are unsure which direction is backwards and which is forwards, be sure to ask someone who knows. Disconnect the drive chain before wiring the motor. Check the rotation of the reducer shaft. Complete all connections and replace all guards.

Do not install this machine without a lockable electrical disconnect switch.

New London Engineering cannot know all of the uses and applications of its units, but recommends the installation of one or more emergency stop switches on each installation. These may be purchased through your New London Engineering Representative. The customer will have to determine the number and location of emergency stop switches. These can be palm button switches, pull rope switches or other approved types. Save your personnel; save your investment; use stop switches.

Variable Speed Controls can be included on any installation. Most of these are the DC-type, requiring DC motors. ALWAYS disconnect and lock out electrical power before working on these controls. It is very easy to accidentally short out the solid state components inside these controls. Read their directions carefully then call your New London Engineering Representative if troubleshooting questions remain.

Photo eyes, proximity sensors and limit switches can be used to control the magnetic starter of a conveyor. These options are simple to install and are available through your New London Engineering Representative. With them, a conveyor can start and stop as required to move your product in, as it is sensed in particular locations. Extreme care must be taken around any conveyor that can start up without warning. Warning lights or horns may be required. If your conveyor could ever start without warning, then regular training, guarding, and safety stickers may be required.

Complex control or interlocking of an equipment system so machines operate together or in timed sequences, is always best left to an expert. This interlocking is often accomplished using programmable controllers, which should be able to activate the warning horns before machines can automatically restart. Programmable controllers are available as options through your New London Representative.

All electrical options require additional operator and maintenance personnel training. The customer must do this as soon as possible. Operator confusion about how to control, stop, slow down, or otherwise operate the machine can result in a dangerous and costly accident. Maintenance confusion can result in ruined controls unless the directions are read and understood. Always keep copies of these directions in a clean location where they can easily be found and referred to.

Familiarize yourself with the four main areas of Electrical Safety:

1) Operator Physical Safety

The first area for safety, operator physical injury, requires the physical guarding of all moving parts of the equipment. This means that electrical disconnect switches should be padlocked in the off position before work on movable parts is begun. Learn Lockout/Tagout requirements and train all employees immediately. Always install emergency stop switches near open areas and operator areas, to minimize injuries from accidental contact with moving material or equipment parts. Eliminate accidents before they happen with thorough training.

2) Electrical Shock Hazards

The second area, electrical shock hazards, requires properly sized and protected wiring and electrical equipment. Code requirements for wiring, grounding and conduit must be followed. The entire installation must be inspected periodically to catch any deterioration in your exposure to these and other risks. Use first rate components and install them properly. Don't ever allow workers to abuse them.

3) Short Circuit Protection

The third area, short circuit protection, requires properly sized fuses or circuit breakers for each and every section of the electrical distribution system. The code requires different sized protection and wiring in different sections. This is the only way to protect the entire system adequately.

4) Slight Over-currents

The fourth area, slight over-currents, can actually cause a lot of damage because it cannot be stopped with just fuses or circuit breakers, which are only available in so many sizes. Instead you must use magnetic starters with accurately sized heaters. Heaters are sensitive enough to prevent damage from slight overloads and low-voltage situations. The newest types of starters use adjustable heaters. In either case, your electrician should size or adjust the heaters based on actual full load amperages located on the motor nameplate. This will protect your motor investment.

Magnetic Starters also prevent dangerous unexpected restarting after power outages, and allow remote control switches, emergency stop switches and low speed switches to be used. These are important reasons why magnetic starters are code-required.

Magnetic Starters, emergency stop switches, variable speed controls, and other electrical components are available from your New London Engineering Representative, and should be included in your final installation, as required by the National Electrical Code and by your particular situation.

CONVEYOR ASSEMBLY

MAGNETIC CONVEYORS, DRAG CONVEYORS, AND HINGED STEEL BELT CONVEYORS

Once you have checked your shipment, unpacked, and identified your conveyor sections and supports, you can begin the assembly of it.

- Before you begin to install:
  - Make sure their will be adequate room for maintenance and operation activities.
  - Make sure their will be adequate room to remove the drive shaft, for instance, and access to the drive area should be easy.
  - Crossovers may be required for operators normal traffic patterns.
  - Never allow employees to climb on or to walk over the conveyors.
  - Overhead conveyors need floor space for ladders during maintenance work.
  - Good lighting is important everywhere.

If the conveyor is less than 20' long, it will come as a complete unit, less the supports in most cases. If the conveyor is too wide or too long, it will be shipped in as few sections as possible. The belting will be shipped on a separate skid and needs to be installed after the conveyor is completely assembled.

- Installation
  - Start with the assembly of the Frame first:
    - If the conveyor is made of a Bolted Construction:
      - Bolt the sections together using the splice plates that are provided. Splice plates are generally shipped on the end of the conveyor sections or in a cloth bag.
    - If the conveyor is made of a Welded Construction:
      - You may be required to weld the sections together in the field. In most cases, the support brackets and knee brace brackets are already welded to the conveyor.
  - Tighten all hardware firmly.
  - When you are ready to attach the supports, refer to the SUPPORT INDENTIFICATION AND ASSEMBLY section of this manual.
  - If you are unsure of which section's go together, refer to either the final "Approval Drawing" or the drawings located in the "Identify Your Conveyor" section of this manual.

- Once the frame and supports are attached, check the conveyor to confirm that it is level and square.
  - Next, install the belt. Refer to the following pages for Belt Installation and Tracking.

BELT INSTALLATION/TRACKING

MAGNETIC CONVEYORS

- The Magnetic conveyors are shipped with the belts already installed in them.
  - Checked to verify that they are running straight and in the center of the frame.
    - The rollers will be free to spin as they roll along. Machines that are out of alignment can obviously cause belts to drift to one side.
  - Check frame levelness and straightness to guarantee that the conveyor belting is running straight and true.
    - It is much better to shim supports today than to replace belting later.
  - The sprockets must be checked for sideways shifting and repositioned securely if the belt is off center.

- This requires splitting the belting pitches at the Drive shaft or the Infeed shaft to get to the sprocket set screws.

When the belt is does not track well, the wear will show up on the internal tracks, chain, or sprockets, and can have one or more causes. When belting shifts too far to one side, the rod ends can touch the frame or track, and become quickly and severely damaged. Look for damage anytime the deck is removed.

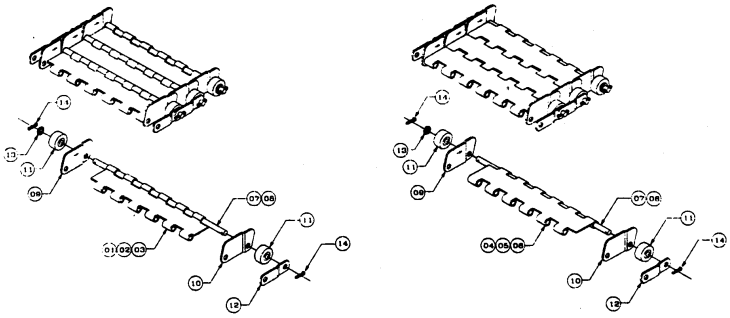
DRAG CONVEYORS

Drag Conveyors follow the same pattern as the Hinged Steel Belt Conveyors below. The only noticeable difference is that the chain is in the middle of the belt and the flights are centered on the chain. The replacement belting is much easier to handle than the Hinged Steel Belt and a winch is not needed to pull the belt through. The conveyor generally will have one sprocket on the drive end and on the infeed end. It is centered and the chain of the belt wraps around them. On conveyors that are wider than 18", you may see dual drive and infeed sprockets, but the same theory works.

HINGED STEEL BELT CONVEYORS

- **First, we will describe the basic parts of your *Hinged Steel Belting* and show the different types of belt available.**
  - Take a good look at your belting. Uninstalled belting has been assembled into 10' sections for ease in shipping and handling.
  - Refer to the following drawing when identifying your belt components:

***"Conventional"* Style** ***"Flat Top"* Style**



1) **Plain Plate (Apron)**
   - *Standard aprons, with plain steel surfaces*, are used for most other materials.
2) **Pimpled Plate (Apron)**
   - *Pimpled aprons* are used when surface films of oil cause small light pieces of material to stick to the belting and to be carried back down into the conveyor instead of discharging properly.
3) **Perforated Plate (Apron)**
   - *Perforated aprons* are useful for draining any cutting or quenching fluids from material.
4) **Flat Top Plain Plate (Apron)**
5) **Flat Top Pimpled Plate (Apron)**
6) **Flat Top Perforated Plate (Apron)**
   - The flat horizontal plates you see linked together are called aprons, or hinge plates.
   - These plates are available in a Pimpled/Perforated option, also.
   - Aprons are available in either a *"conventional"* style or the new *"flat top"* style.
   - The "Flat Top" aprons have a smooth top surface because their connecting loops are rolled under the flat portion.
   - The older style, "Conventional", standard aprons have connecting loops centered at the flat portion, causing the loops to stick up slightly above the flat areas.

- This can help carry some small materials uphill with fewer cleats, but could damage your larger material at the lower curve area.

7) Axle - No Outside Sidebars

8) Axle - with Outside Sidebars

- They are linked and supported by rods, or axles, which extend outward on each side of the sidewings, rollers, and washers. The only difference between #7 and #8 is the length. If the belt has Outside Sidebars on it, the length of the axle will be longer.
- The rods hold everything together by the use of cotter pins at each end.
- Rollers are always in between the sidewings and the washers.
- If you have a wide or highly loaded unit, your belt may include the optional outside sidebars instead of washers for increased belt pull strength.
- Washers are also shown as loose parts.

9) Left Sidewings

10) Right Sidewings

- Sidewings are always located right next to the aprons, and overlap to contain your material as it is being carried.
- All sidewings overlap the ones just ahead of them.
- All sidewings are marked on their visible inboard surface.
- Look for an arrow and "RH" (Right Hand) or "LH" (Left Hand) to indicate their correct orientation.
- The arrows point in the direction of belt travel.

11) Rollers

- Flanged Rollers are optional

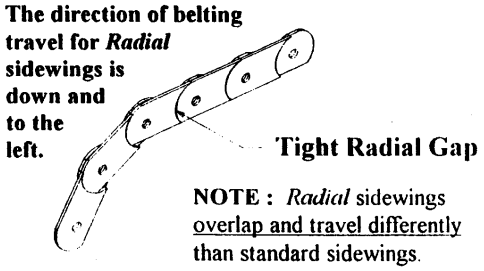
12) Outside Sidebars

13) Machinery Bushings

14) Cotter Pins

15) Left Radial Sidewings

16) Right Radial Sidewings



- Sidewings are available in two different styles: standard or radial. The difference is in the linkage of the sidewings.
- The s*tandard* style has a gap that forms when they are put together. The Radial style has virtually no gap, when they are put together.
- The *radial* style sidewings is very useful in handling small screw, nails, or bits of material that would otherwise jam at the moving joints between each adjacent sidewing. Notice the curve bend line and how closely it fits up to the next sidewing ahead of it.

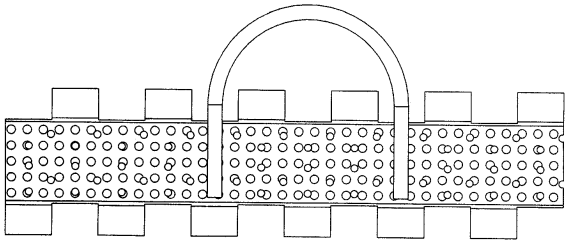
Your belt should now be able to be identified by its apron style (conventional or flat top) and its apron type (plain, pimpled, perforated, or pimpled and perforated). You should also note the width of the aprons. Are they 8" wide? Are they 12" wide? Are the sidewings standard or are they the radial style? Does your belt have optional outside sidebars outside the rollers? Lastly, does your belt have cleats? How far apart are they? What size are the cleats? These details are necessary when talking to the factory about replacement parts. You should also be able to tell your New London Engineering Representative the Serial Number of your conveyor.

HINGED STEEL BELT – BELT INSTALLATION AND TRACKING

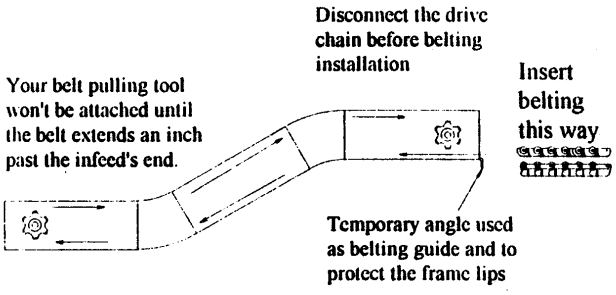
- **To install the belt, follow these steps:**
  1. First, tighten all belt sprockets set screws.
  2. Make yourself a belt pulling tool to help pull the belt through the frame.
     - One or two extra pitches of belt are always supplied, so remove one pitch to construct a belt-pulling tool, to pull the belting up any incline without damaging it.

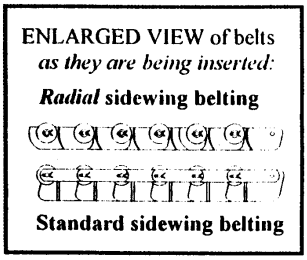
- Use an apron from the end of a belt section without a rod.
- Weld a piece of at least 5/16" rod very securely, as shown below.
- You won't need to attach this tool until the belting gets down to the *infeed* end of the conveyor.

WELDS MUST BE SECURE



3. Remove Chain Guard and disconnect the drive chain at this time.
   - A support such as a piece of angle iron may be temporarily clamped at the drive section to prevent incoming belt from snagging on the frames bottom lips during installation. This angle should be ¼" narrower than the frame, and should be vice gripped on top of the lower frame lips, aiming into the machine. Belting should be able to run over the vice grip as long as the take up is fully retracted. Retract the take up completely at this time and clamp it down.
4. Remove the infeed cover.
   - It requires at least two persons to lift and move belting safely. Arrange to have a second person available to assist.
5. Installed one section of belt at a time.
   - Most belts are installed at the Drive section because there is more room there to join the belt. Retract the take up completely at this time and clamp it down.
   - Lay the first section of belting upside down with the correct end first. **The belt MUST have its orientation correct, to prevent voiding the machine's warranty**
   - Feed the belt upside-down, as illustrated below, into the conveyor's return tracks under the sprockets at the Drive section. Inserting the belt this way makes it easier to work around the internal frame spreaders when pulling the belting back up the inclined portion of a conveyor. (The arrows on the sidewing point in the direction of belt travel.)
   - Remember, once a section is connected to the conveyor its total weight increases rapidly.



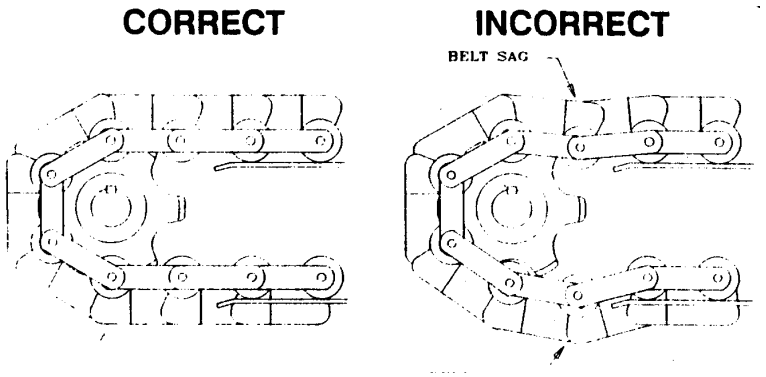


- You must always use *safety cables* to prevent the belt from sliding out of control down the inclined tracks of the conveyor. If that happens, it could **kill or injure a worker** caught in the wrong lace. All pull cables and cranks or winches should be safely checked before proceeding.
- Carefully lift the first section of belt over the temporary belt-support angle, under the sprockets and onto the return tracks. The rollers must mesh with the sprocket teeth as the belt is installed, causing the drive sprockets to rotate.
- Carefully lift and insert more of this first section of belt until only a short portion remains down on the floor or work platform.
- Secure the belting from slipping out of the Drive sections, while you connect the next section of belting to it.
  - It is easier to connect belt when it is laying on a flat surface, but some installers do it in the air near the drive section.

6. Move the correct end of the next belt section close to the end on the floor. Remove the rod, and reinsert it to assemble the two sections, as described previously, so that all parts correctly overlap, and the cotter pin is secure.
   - Move more belting into the conveyor.
   - When the belt's leading end approaches the infeed sprocket, very carefully guide the sprocket teeth into the belt, being very careful to protect your fingers!
     - New London Engineering reminds you that the *belting is awkward to manhandle and can move unexpectedly*. Belting can roll downhill suddenly. Therefore, **all workers must keep their hands and feet safely protected**. **They must never stand inside the machine, or place themselves in danger from shifting or moving belting or falling tools.**
7. Now advance the belt about 1 inch out of the infeed end of the conveyor (not around the infeed sprocket). Remove the rod and connect the belt-pulling tool with the belt's first **rod**. Flex the belting to lead the tool and belting around the infeed sprocket.
   - Attach your pulling winch or rope or cable to the tool and begin to pull begin up the incline.
8. Disassemble the unused last pitches of the belt until you arrive at the *shortest belt length* that can still be joined together around the drive sprocket. The belt will "stretch" soon after it is put into service, and take up adjustments will soon be required. On large machines, one or more pitches of belting will actually have to be removed later as the remaining take up adjustment is used up.
9. Now connect the ends of the belt together, swinging sidewings into place, just before the rod is pushed through them. Make sure that they and any sidebars overlap correctly. Complete the connection with the **cotter pins**.

HINGED STEEL BELT – BELT TENSION

- Adjust the take up, using the take-up bolts, and tighten the bearings bolts. Use the slack at the infeed section as your guide, as shown below. A correctly tensioned belt does not sag at the top or bottom of the infeed sprocket. Check this often during the first days of service.
- Conveyors with long horizontal sections can have their belting slack show up at the return run of the lower curve, instead of the infeed sprocket. This slack can sometimes be detected by locking off the power, then pressing down just after the infeed sprocket, to pull the available slack around to that point. Adjust out any discovered slack from your lower curve, so that it doesn't bind up there and jam the conveyor. A little slack isn't a problem. A lot of slack can be expensive.



To disassemble the belt, follow these steps: This must occur at the drive section, where there are 1 ¾" frame holes near the drive shaft bearings. Lock off power, remove the guard and drive chain. Loosen the bearings and take up bolts, and retract the take up until these holes are usable, and rotate the driveshaft a little until one of the rods is centered at the hole. The cotter pin at the drive guard end of one rod is removed. That rod is then tapped or pulled out of the belting through the hole. Use a drift pin, to keep from mushrooming the rod end. Unlink the sidewings and the aprons from each other. Now any belting parts can be removed or exchanged for new ones, as required, or the entire belt can be pulled from the machine. Be very careful to prevent the belt from falling or moving suddenly as it is being worked on.

To reassemble the belt, follow these steps: Install the belting into the conveyor, if it had been removed, using the steps described above for installation of the belt. Position the ends correctly on the drive sprocket's teeth, so the missing rod will line up with the frame hole. Start with one outside sidebar, if provided, linking it to the adjacent one, and insert the rod just slightly through them. If outside sidebar is not provided, slide the roller through the washer and almost through the roller, prying gently to seat the roller on the sprocket. Now pivot the sidewings into alignment, and insert the rod just barely through them. As the rod approaches the far side, align all the parts and roller as your continue to move the rod.

HINGED STEEL BELT BELTING MAINTENANCE

- **The most common problem with belting is the loss of a cotter pin**, due to buildup of material on the roller tracks. *The loss of a cotter pin leads to the loss or bending back of a sidebar*. This will then damage other parts of the conveyor unless corrected quickly! Belt parts can wedge inside the conveyor where they can be very difficult to get to and remove.
  - Regular maintenance must include close inspection for damaged cotter pins, even though it is uncomfortable to watch passing pins attentively at the Drive section.
    - Mark one of the belting pitches, with paint, so that workers can be sure they have examined every pitch in the belt.
    - They must do this on both sides of the belt, with someone at the stop switch in case a bad cotter pin is spotted.
    - New cotter pins are inexpensive; unplanned shut-downs are not.

- **Material jams** inside the machine can cost you a lot of time just when you don't have it. Material jams can drag on the passing belting and overstress and wear the belting and also cause damage to the cotter pins.
  - To prevent material from accumulating on the roller tracks, you must prevent it from spilling over the tops of the sidewings, or from being carried around at the drive sprockets back down into the machine.
  - Regular periodic inspection of your conveyor pays off by reducing your risk of losing cotter pins and jamming your machine.

- **Roller and Rod lubrication** is usually done manually, with the machine locked off**. Care must always be taken around any moving belting.** ***It is always dangerous***, so have a trained person ready on a shut off switch nearby.
  - Occasionally, nearby equipment or lack of maintenance manpower force the use of an automatic lubrication system for the rollers. New London Engineering can provide this for retrofit in the field.
  - *Manual lubrication, however, is much more likely to result in spotting missing cotter pins, or other belt problems and is usually more practical as well.*

- **Belting installed properly will run centered in the frame**, as judged from the frame top lip or return track edges. The rollers will be free to spin as they roll along.
  - Out of alignment machines can obviously cause belts to drift to one side.
    - **Check the frame for levelness and straightness and *correct anything more than 3/32".*** It is much better to shim supports today than to replace belting later.
    - The sprockets must be checked for sideways shifting and repositioned *securely* if the belt is off center. This requires splitting the belting pitches at the Drive shaft or the Infeed shaft to get to the sprocket set screws.

- **If a belt is not tracked, it will result in wear showing up on the rod ends, sidewings, or sprockets, and can have one or more causes.**
  - When belting shifts too far to one side, the rod ends can touch the frame or track side, and will quickly damaged the frame.

- When inspecting your belt, also be sure the sidewings are not contacting the roller track top flange.

- **Watch the running machine for any stuck rollers**. Rollers may be seen at the drive section if you look carefully.
  - *With the conveyor locked off*, check sticky rollers and others by prying the belt up slightly from the track and seeing if the roller can easily turned.
  - Clean and lubricate, or replace stuck rollers, as required.
    - Refer to the belt drawings in the Installation section or "Exploded View" section, for belt assembly details.

- **Material loads that are not centered on the belt can eventually wear or stretch one side of the belt more than the other.**
  - This causes the remaining tight side to *lead the way*, which steers the belting over towards the worn or stretched side.
  - Rollers and track will wear more quickly from this *skidding* towards one side during rolling.
  - In severe cases, the drive sprocket teeth will wear faster, from the increase in the **effective pitch** of the chain, and from higher belt pull.

- **Belting that is too loose** will not completely sit in the infeed sprocket, causing wear to the top lips and bottom pan in that area. It might also buckle over and bind while returning down through the lower curve section.
  - Always keep your belt just tight enough to eliminate drooping belt right after it passes the top of the infeed sprocket, as previously illustrated.

- **Belt that is too tight** can also be a problem, causing increased vibration and more rapid wear to both the belting and conveyor sections and bearings.

- **A rare problem is loss of one of the drive shaft keys** for the belting sprockets in the drive section. If one of the two keys is lost, the other sprocket must pull both side of the belt. The keyless side will rotate on the shaft and effectively lag behind slightly, steering the belting rollers toward that side and possibly damaging belting or the frame sections.
  - Once a year, use a long *level* aligned with the belting barrels of the inclined section to see if this could be happening.
  - If the frame is level side to side, but one side of the belting seems to be lower, you may need to verify that both drive sprocket keys are installed and secure. Do this by splitting the belt at the drive section and checking the set screws on both sprockets, and carefully measuring how the sprockets are centered in the frame.

- **To sum up Belting Maintenance**:
  - Keep the conveyors clear of jammed, spilled, or carried back material.
  - Check both sides of the belting regularly for damaged or missing cotter pins.
  - Lubricate the belt as required to keep the belting components loose and free.
  - Correct any mistracking, misalignment, or out of level conditions. Keep a vigilant eye on your belt tension.
  - Never overload your conveyor.
  - Regularly check the motor and reducer.
  - Plan to be able to repair any of these problems or damaged parts at once because they can multiply.

MAGNETIC CONVEYOR MAINTENANCE

- **The most common problem with magnetic conveyors is loss of frame seal.** This leads to the acceptance of steel chips into the frame of the conveyor, where they adhere to the magnets. This will then damage other parts of the conveyor unless corrected quickly! Foreign matter can wedge inside the conveyor where they can be very difficult to get to and remove.
  - Regular maintenance must include close inspection for an intact frame seal. If a void in the seal of the frame is found the frame deck should be removed, and the housing cleaned properly. Internal jams inside the machine can cost you a lot of time just when you don't have it. This can drag on the passing belting and overstress and wear the belting. This can also damage the magnets as described above.
    - Clean out the frame and prevent material from entering it in the future.
    - Control where your material lands on the stainless steel deck.
    - Prevent it from spilling over the tops of the siderails, or from being carried around at the stainless steel deck.
    - Prevent it from spilling over the tops of the siderails, or from being carried around at the Drive end back down along the frame.
    - Regular periodic inspection of your conveyor pays off by reducing your risk of downtime due to jamming your machine or excess wear.

- Internal chain lubrication is usually done manually, with the machine running. Care must always be taken around any moving equipment. It is always dangerous, so have a trained person ready on a shut off switch nearby. Occasionally, nearby equipment or lack of maintenance manpower force the use of an automatic lubrication system for the rollers.
  - Manual lubrication, however, is much more likely to result in spotting a corrupted frame seal or frame damage or wear, or other conveyor problems and is usually more practical as well.

- Magnetic Conveyor Belting installed properly will run centered in the frame, as judged with the deck removed. The rollers will be free to spin as they roll along. Out of alignment machines can obviously cause belts to drift to one side.
  - Check frame levelness and straightness to guarantee that the conveyor belting is running straight and true. It is much better to shim supports today than to replace belting later.
  - The sprockets must be checked for sideways shifting and repositioned securely if the belt is off center. This requires splitting the belting pitches at the drive shaft or the Infeed shaft to get to the sprocket set screws.
  - Belt mis-tracking results in wear showing up on the internal tracks, chain, or sprockets, and can have one or more causes.
    - When belting shifts too far to one side, the rod ends can touch the frame or track sides, and become quickly and severely damaged.
    - Look for damage any time the deck is removed.

- Watch the running machine for any signs of trouble.
  - Product on the machine that appears to shudder or surge is a sign of damage to the internal magnetic chain.
  - Product that is not moving is a sign that the product is either overloading the conveyor or an internal jam is present.
  - Clean, check and lubricate the internals, replace and reseal the deck, and proceed with caution at startup.

- Material loads that are not centered, can eventually wear or stretch one side of the belt more than the other. This causes the remaining tight side to lead the way, which steers the belting over towards the worn or stretched side.
  - Rollers and track will wear more quickly from the skidding towards one side during rolling.

- In severe cases, the drive sprocket teeth will wear faster, from the increase in the effective pitch of the chain, and from higher belt pull.

TROUBLESHOOTING CHART
For Magnetic, Drag, and Hinged Steel Belt Conveyors

PROBLEM	PROBABLE CAUSES	POSSIBLE SOLUTIONS
Material is being carried back into the conveyor and building up.	Material or belting is too sticky. Not enough room at discharge.	Clean off belting regularly. Try various belt scrapers, brushes. Try some "Pimpled" aprons. Alter discharge area for clean discharge. Raise discharge end.
Sidebars are coming off.	Cotter pins are being damaged.	Check all pins; clean out material.
Torque Limiter slips.	Conveyor is overloaded. Material has jammed somewhere. Sidebar has come loose. Lubrication of chain is needed. Friction facings have worn.	Reduce loading of material. Clear out jammed material. Replace sidebar and cotter pin. Lubricate chain properly. Evenly tighten bolts.
Motor Stops.	See first three causes above. Voltage is low by more than 5%. Fusing or heaters are undersized. Motor is too hot. Loose motor connections. Motor is undersized for loads. Reducer or motor is defective.	See first three solutions above. Increase voltage, wire size, or the motor size and horsepower. Consult an electrician. Clean off and cool motor. Tighten connections carefully. Consult NLE for upsizing advice. Test and replace as required.
Belt movement is pulsating or jerky.	An obstruction exists. Belting is too slack. Belting is much too tight.	Find and remove obstruction. Adjust the take up.
Belt parts are worn or stretched.	Abrasive material is at belt edges. Lubrication is insufficient. Belt loads are too high. Loading is higher on one side.	Center material on the belting. Increase oiling. Check for jamming; high loads. Center the loading side-to-side.
Belting tracks towards one side.	Conveyor is not level. Belt is stretched or worn on the opposite side. Sprockets or shafts have shifted towards one side.	Level conveyor accurately. Check belting lengths side-to-side; repair or replace. Reposition sprockets and shafts.
Material or products are being Carried back through the Conveyor, or spilling onto the Floor.	Speed is too slow, or areas for Leakage exist at transition Points, or overflow at discharge is occurring.	Change the conveyor speed, or add discharge transition guides or chutes or change the overlap of the equipment.

If the above situations do not reference your problems, please consult your Dealer or NLE.

PREVENTATIVE MAINTENANCE SCHEDULE

GENERAL INSPECTIONS AND MAINTNENCE:	FREQUENCY
Inspect Conveyor for damages.	At Delivery
Inspect Shipment for missing pieces.	At Delivery
(You have 30 Days to report missing components)	
Locate, read, and protect your instruction manual.	At Delivery
Check conveyor levelness and true-ness.	At Installation
Clean around operator areas, infeed, and discharge.	Daily
Check inside the frame for material build-up.	Weekly
Clean off motor and reducer.	Monthly
Lubricate Hinged Steel Belting and check for wear	Monthly or As Required
Check and adjust belting take up tension.	Monthly
Check frame for corrosion, cleanliness, damage.	Monthly
Check drive chain tension and torque limiter.	BI-Monthly
Retighten setscrews and drive mounts.	Semi-Annually
Check electrical amperages and connections.	Annually
Check internal chain guides for wear (Model 700; Magnetic).	Annually
Check chain, sprockets, and magnetic caps for wear.	Annually
LUBRICATION MAINTENANCE:	**FREQUENCY**
Oil Chain (Model 711; Drag)	As Required
Oil the Hinged Steel Belt Rollers, Apron Barrel and Surface.	As Required
Lubricate the main drive chain.	Monthly
Carefully lube the bearings.	Quarterly
Check reducers lube level.	Quarterly
BELT TRACKING MAINTENANCE:	**FREQUENCY**
Track the belting at both ends of the conveyor.	Monthly
Check Hinged Steel Belt Rollers/Sprockets for center and wear.	BI-Monthly
Check the shaft and sprocket alignment.	BI-Monthly
SAFETY REQUIREMENTS:	**FREQUENCY**
Make extra copies of this manual.	Immediately
Train new employees in all safety areas.	At Hiring
Check that all safety guards are in place.	Weekly
Check that all warning stickers are readable.	Monthly
Conduct regular Operation and Safety Training.	BI-Monthly
Update all safety regulations and literature.	Annually

BEARING LUBRICATION

Many conveyors come equipped with **permanently lubricated** bearings, which have no grease zerks. These include 2 and 3-Bolt Flange Bearings with shaft sizes through 1-7/16". This prevents injecting improper or contaminated grease, and leaves the seals tighter due to elimination of grease purging. **Lubricate other bearings regularly** with approved lubricants from the list below. **Avoid over lubrication**, especially when shafts are not turning, as this can blow out the seals and lead to contamination and failure of the bearing. Exercise extreme caution around all moving equipment when working close to them, for lubrication.

Acceptable Lubricants: **Standard Oil Co of Indiana – Stanolith #57**
Sinclair Oil Co – Litholene
Socony Mobil Co. – Armvac #781
Keystone Lubrication Co. - #84H Light
Texas Oil Co. – Multi-Fak #2

(Suppliers for these lubricants can be found in your Yellow Pages under "Oil-Lubricating".)

Proper intervals of bearing lubrication depend on the speed, temperature, and working conditions involved. In normal applications of 16 hours a day or less, a three-month interval is adequate (in clean conditions). Lock off equipment before attempting to wipe or touch movable equipment of any kind. Clean off grease zerk fittings before lubrication and wipe excess lube from the shaft seals so you can observe the amount of newly expelled grease. Remember to tighten the bearing set screws BI-annually while doing the greasing.

MOTOR MAINTENANCE

At regular intervals check that the motor electrical connections are tight and not corroded. Blow clean any open frame motors, and clean off any dust or debris so proper amounts of heat may be radiated. If motors consistently become covered with debris, construct a guard above them, which does not hinder heat radiation.

Lubricate any motors with grease fittings every two years unless conditions are extremely dirty or damp. Lubricate any motors with sleeve bearings with 10 – 15 drops of SAE #20 non-detergent or motor oil every year (more often if dirty or damp).

New motors are more efficient, but run at higher temperatures than you may be used to. Do not become alarmed unless the ambient temperatures at your drive section are >104^F. At these high temperatures, normal motors may overheat at full loads, and special high-temperature motors may be required.

REDUCER MAINTENANCE

Most conveyors come equipped with New London Engineering's standard Gear Reducer made by Grove Gear. This is a trouble free reducer with normal applications and maintenance. To keep it that way, make sure you know how to check it over, then do it regularly, as shown below.

Try to keep the reducer sprocket installed as close to the reducer as possible to reduce any overhung loads. Keep the reducer clean so it can dissipate excess heat better. All mounting bolts should be tightened securely. Check the lube level regularly. Change the lubricant every six months or 2500 hours, whichever comes first. **Gearmotors** require no lubrication change under most conditions. These gearmotors are used most often on the Model 250 "Thin-Line" Conveyors.

MANUFACTURER'S RECOMMENDED LUBRICANTS

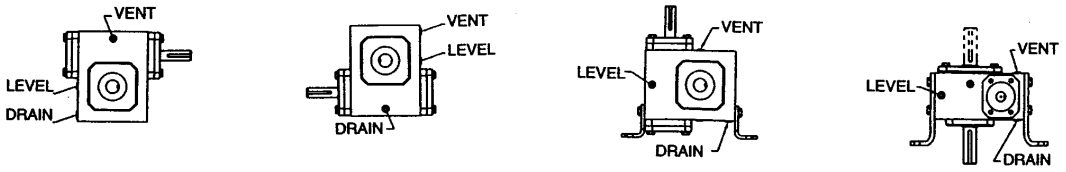
MANUFACTURER	AGMA COMPOUND #7 (15 – 60^F Ambient Temp)	AGMA COMPOUND #8 (50-125^F Ambient Temp)
Amoco Oil Co	Worm Gear Oil	Cylinder Oil #680
Cheveron USA, Inc	Cylinder Oil #460X	Cylinder Oil #680X
Exxon Co., USA	Cylesstic TK-460	Cylesstic TK-680
Gulf Oil Co.	Senate 460	Senate 680D
Mobil Oil Corp.	600W Super	Extra Hecla Super
Shell Oil Co.	Valvata Oil J460	Valvata Oil J680
Sun Oil Co.	Gear Oil 7C	Gear Oil 8C
Texaco	Honor Cylinder Oil	650T Cylinder Oil
Union Oil Co., of CA	Steaval A	Worm Gear Lube 140

Inspect your reducer **vent plug** often to make sure it is clear and operating. It is the upper plug on the reducer. The next lower plug is the **level plug**, and the lowest plug is the **drain plug**. ***The oil level should be kept at the bottom of the threaded hole of the level plug.*** However, if the conveyor and reducer are inclined above horizontal, extra oil may be required for optimum reducer life. Synthetic Oil, if used, should not be intermixed with regular oil.

Input and Output Seals can be purchased through your local New London Engineering Representatives.

STANDARD SPEED REDUCER MOUNTING POSITIONS AND VENT PLUG LOCATIONS

Before putting unit into operation, substitute the vent plug for the solid pipe plug at the position desired. Arrows indicate the recommended vent plug locations:



On Unit sizes 1262 (226) and larger all applications with vertical input and output shafts should be referred to the factory. Special provisions for bearing lubrication may be required.

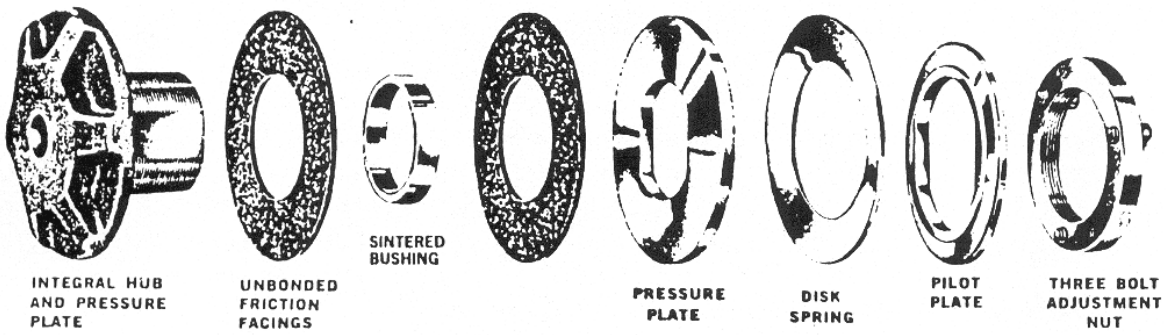
TORQUE LIMITERS

Slip Clutch/Friction Torque Limiters are standard with all New London Engineering Hinged Steel Belt Conveyors. If your system is equipped with any other type of Slip Clutch/Friction Torque Limiter, please reference the manufacturers manual. Slip Clutch/Friction Torque Limiters, use two friction facings, and *spring pressure* to cause the drive shaft to rotate. The reducer rotates a sprocket held between the friction facings. The drive shaft rotates only when there is enough spring pressure. If slippage occurs under normal conditions, the spring pressure can be increased slightly by turning three bolts. Abnormal slippage results from jams of material or broken belting. This slippage protects the resulting load surges from destroying shafts, belting or endangering workers.

The torque settings will vary with changes in temperature, sprocket surface rusting, moisture or presence of lubricants. As the friction facings slowly wear, slight adjustments may be required.

When properly adjusted, a torque limiter will slip less than one limiter revolution during conveyor start up, under full load. Any significantly higher load should cause immediate slippage of the limiter, even though the motor keeps running. The limiter is designed to withstand the slippage for up to a half-hour without failure, although the life of the friction facings is limited to perhaps only ten of these severe slippage events. Parts are easily replaceable and available through your New London Engineering Representative.

The parts for the Torque Limiter are shown below. The **hub** is a casting that is attached to the conveyor drive shaft with a key and set screw. The **sintered bushing** is hard enough to withstand the rotation of the large driving sprocket, which is not shown. This sprocket and the two **friction facings** ride on the bushing. The spring is a **disk spring**, not a coil spring. It pushes on a metal **pressure plate** instead of contacting the spring directly. The outer part, which will be easiest to see when installed on the drive shaft, is the **adjustment nut**, with its three adjusting bolts.
The sprocket (not shown) has a large bore, to ride on the bushing. The bushing's width must match the standard size of drive chain and sprocket being used. #60 chain, for instance, uses a wider bushing than does #40 chain. Notice the washer-like spring. This is compressed by threading on the large nut and then carefully tightening the nut's three bolts. The spring must never be completely flattened because this could prevent the slippage that protects your equipment. Some units use two springs to handle higher loads without flattening.



ADJUSTING THE TORQUE LIMITER THE FIRST TIME

The Torque Limiter is not adjusted at the factory because your material operating loads are not exactly known. You must safely adjust your limiter so that it can move the empty conveyor belting *during the first periods of break-in*, and you must adjust it again later when the conveyor is run with material load on it. The initial load setting should be looser, so it will slip when the belting requires tracking or other initial adjustment or attention. *A tighter setting of your torque limiter later will prevent material loads from damaging the equipment*, but will *minimize* slippage during normal operation.

An observation or adjustment of the torque limiter is dangerous because the drive guard must be temporarily removed. Only qualified maintenance workers are permitted to do these tasks, and they must be very careful and vigilant. Two persons are required so that one may instantly shut off the conveyor, if required for any safety reason.

If the torque limiter slips during initial operation of the conveyor, there could be a serious belt- tracking problem. Lock out and tag out the conveyor to prevent the belting from moving unexpectedly while people are sticking their hands into the conveyor. ***Remember*** *to remove this restraint before restarting the machine.* Check to see if the belting is too loose, refer to the drawing in the belt tracking section that showed a sagging belt at the infeed sprocket. Adjust the loose belt as covered on the belt installation section. If this is not the problem, check for jamming or interference. Correct the problem and carefully restart the conveyor. If the belt seems correctly tensioned and the limiter still slips remove the main driving chain and attempt to move the belting through the machine manually, in a safe manner. The belting should move without definite snags being felt. Investigate any snags caused by loose hardware, mis-aligned conveyor sections or track, or by loose

sprockets and mis-tracked belting. Look for any jamming. Because of the tight clearances in these machines it is possible that the top lips of the frame are touching the passing sidewings. There should be about 1/16" clearance.

TORQUE LIMITER SETTING

If the belt can be moved through the conveyor manually, reattach the drive chain, and adjust the limiter by tightening the 3 Bolt Adjustment Nut, finger tight. Then alternately tighten the 3 bolts (capscrews) no more than ½ turn at a time until their heads bottom. They must be tightened evenly for even force on the pressure plate. To test for proper adjustment, make a temporary magic marker mark on the driving sprocket and the friction facings and the pressure plate before restarting the conveyor. Carefully start the conveyor while observing this mark. There should be between ¼ and ¾ of a revolution of slippage during startup. Readjust if necessary. Replace the drive guard as soon as possible.

READJUSTING THE TORQUE LIMITER

If the torque limiter slips during later standard loaded operation of the conveyor, when it had previously not been slipping, there could be a serious material jamming or belt-tracking problem. *Lock out and tag out* the conveyor, and first check to see if the material on the conveyor could pull the conveyor belt backwards while you are working on the conveyor. If so, restrain the belting securely before proceeding. Prevent the belting from moving unexpectedly while people are sticking their hands into it. ***Remember to remove this restraint before restarting the machine.***

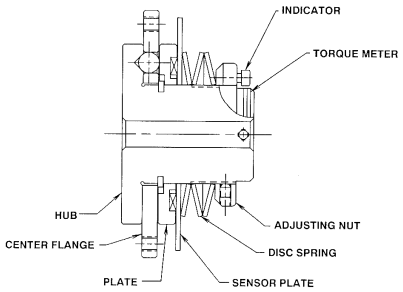
Once the belt is restrained, examine the conveyor for jamming or interference of moving parts. Carefully remove any obstruction or perform the required maintenance. Look for jamming of any kind. Don't try to move an unbalanced load of material up an incline manually with the drive chain removed; instead, unload the material before this test. Locate the problem and fix it. Replace any covers or guards, remove any belt restraints, then cautiously restart the conveyor. If slippage continues, check once more for any problems before readjusting the torque limiter.

If you are sure that the torque limiter is just a little loose, adjust it in the following way: Lock and tag off the power again. Check that the spring is not completely flattened yet, adjust the torque limiter by tightening the 3 Bolt Adjustment Nut, finger tight. Then alternately tighten the 3 bolts (capscrews) no more than ½ turn at a time until their heads bottom. They must be tightened evenly for even force on the pressure plate. After each adjustment, carefully and safely test the operation of the machine. To test for proper adjustment, make a temporary magic marker mark on the driving sprocket and the friction facings and the pressure plate before restarting the conveyor. Carefully start the conveyor while observing this mark. There should be between ¼ and ¾ of a revolution of slippage during startup. Readjust if necessary. Replace the drive guard as soon as possible.

Keep the torque limiter clean and dry, and properly adjusted. Never over tighten it. Replacement parts are available through your New London Engineering Representative.

BALL DETENT OVERLOAD CLUTCH

The Ball Detent Torq/Pro is a Mechanical Overload Protection Device, as is the Torque Limiter. A Ball Detent is used when more precision is needed. Morse TORQ/PRO™ Ball Detent overload clutches are designed to protect from overload situations and the resultant potential damage and downtime. The non-symmetrical arrangement of the ball and detent allows



for one position engagement only but enables Torq/Pro to be run in either direction. Once the overload is removed, resetting is as simple as jogging a driving member to re-engage the ball in its detent. Even when repeated tripping occurs, the torque can be adjusted and maintained within +/- 10%. Standard on all units, the sensor plate engages the proximity switch during overload to disconnect the drive and prevent machine damage. By tightening or loosening the adjusting nut, the desired torque can easily be set or adjusted. When used with a proximity switch, the overload is detected immediately and can sound an alarm or disconnect the drive.

HOW THE BALL DETENT OPERATES:

Torque is transmitted by a **ball and detent**, which is arranged in an irregular position to insure single position engagement. During normal machine operation, torque is transmitted from the **center flange** through the ball to the detent in the **hub**. When an overload occurs, the ball is released and rolls between the **plate** and hub. When Torq/Pro is tripped, the **plate** will move slightly in the direction of the load, causing the **sensor plate** to move out and engage the proximity switch. Tightening the adjusting nut can make torque adjustment. The **indicator** and **torque meter** will show the tripping torque that has been set.

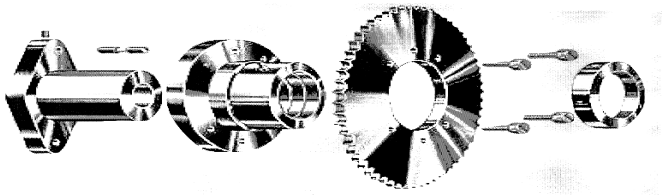
TORQUE SETTING:

Tightening or loosening the adjustment nut adjusts torque setting. Make sure that the setscrew in the nut is loosened to prevent hub thread damage. Note: There is a brass lock plug under setscrew.) Refer to catalog torque to determine approximate rotation of adjustment nut to obtain desired torque. It is suggested that the nut is first tightened to a value less than desired (60 Degrees) and final adjustment on the shaft after making a test run. Adjust to final torque by gradually tightening adjustment nut. After setting torque, tighten setscrew to prevent loosening. (Note: Do not tighten the adjustment nut beyond maximum limit of scale because the TP unit may not trip even under overloading conditions.)

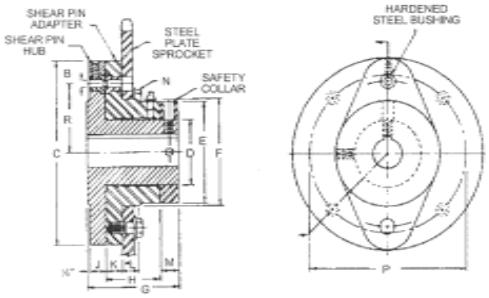
RESETTING:

When Ball Detent trips, stop the drive and remove the source of the overload. Reset by either rotating at 50 rpm or less or by jogging the motor. When resetting, an audible sound will be heard as the ball snaps into the detent. For further information on the Ball Detent Overload Protection Device, see individual manual provided by Emerson Power Transmission or visit their website at www.emerson-ept.com.

SHEAR PIN HUB ASSEMBLY



Shear Pin sprockets provide simple, dependable protection against expensive machinery damage caused by overloads or jamming. A single pin, necked to shear when the safe load is exceeded, transmits torque. The **Shear Pin Hub** is the outermost piece of the Shear Pin Assembly and the **Shear Pin Adapter** follows behind it. The **Shear Pin** (Hardened Steel Bushing) goes through these two pieces and locks in place. When an overload occurs, the pin shears, disconnecting the drive immediately. The **Steel Plate Sprocket** is connected to the Shear Pin Adapter, followed by the **Safety Collar**. The Steel Plate Sprocket and Safety Collar are attached to the Shear Pin Adapter by four screws. For further information on the Shear Pin Overload Protection Device, see individual manual provided by Martin Sprocket or visit their website at www.martinsprocket.com.



MAINTENANCE ADVICE

Maintenance eliminates costly downtime. It lets you increase the return on your investment, avoid dangerous accidents, and prevent having to turn away customers because your equipment breaks down when you least expect it. To avoid this costly downtime, regular maintenance and stocked replacement parts decreases your chances of being down.

Set up a periodic maintenance SCHEDULE and stick to it. Use the schedule that follows as a starting point, and include maintenance for all your equipment and any safety checks required locally. Provide adequate time for this regular maintenance to reduce yearly operating costs, lost down time, and risk of accidents. Install adequate lighting for safe operation, reliable inspections and efficient repairs.

Except as otherwise required, this conveyor must be stopped an its starting switches locked out and tagged out before making adjustments or doing maintenance work.

Trained and experienced personnel equipped with the proper tools should only do maintenance work. They should be well aware of the dangers of working near moving belting and parts, and *accept responsibility* for their safe performance of any maintenance work done while the conveyor is running. There should always be a person present at the off switch at these times. **Lockout and tag-out practices save lives. Use them whenever possible!**

Material load changes cause many repairs, due to motor overloading, equipment-damaging spillage, and increased operating stress on belting and other parts. Be very careful when increasing conveyor speeds or loading levels. **Never overload the unit, even temporarily, or use it beyond its rated capacity or speed**. If you are unaware of your capacity rating, please call your Dealer or New London Engineering.

Material carry-back or jamming is sometimes a problem. Oily light material or stringy shavings can be carried back down into the conveyor, causing hidden drag and eventual jamming. Use pimpled belt or an optional scraper or brush for these applications. Very thin material can also wedge between parts of the belt and restrict it from flexing freely. Contact your New London Engineering Representative with any questions.

Keep the conveyor area CLEAN. Do not allow buildup of material inside any part of the conveyor. This leads to shorter component lives and increased downtime. Friction, pressure and rust can destroy even hard steel if conditions are bad, due to material jams and moist, corrosive and abrasive material buildup. Rusting of the belt or buildup of material on it can damage the belt quickly. Without lubrication, rollers can seize and fail; belting can refuse to flex. Lubrication requirements increase dramatically with poor cleanliness. Both the roller and the apron barrel joints required periodic lubrication to keep them free from friction. Very carefully drip or spray oil on the sides of the rollers as they pass. With the unit locked off, clean the apron surfaces and apply oil with a sprayer, small mop or a long-spout oilcan. Rollers and apron barrels require clean 30 weight oil. Keep the apron surfaces from rusting with a light film of waste oil. Remember that disposing of oil later can become expensive, so avoid spillage and excess dripping.

Always comply with all of the applicable codes, regulations and standard practices for your area and in our safety section.

SUPPORT IDENTIFICATION AND ASSEMBLY

- For the most part, supports should be mounted to the conveyor sections prior to turning them upright and locating in position. This can be difficult in many situations, so please use the proper mechanical equipment necessary to avoid any injuries.

- Prior to assembly, use the following drawings and tables to determine what items you should have for the supports that are called out on the packing slip.
  - The packing slip will tell you if knee braces are required or not.
  - If you feel that a part is missing, contact New London Engineering as soon as possible and we will try to get the parts out as soon as possible. **Always refer to your packing slip to see what supports are being called out for your height specifications.**

- Supports consist of all or part of the following items:
  1) Upper Support
  2) Lower Support
  3) Spreader
  4) Smile Bracket*
  5) Knee Brace**
  6) Knee Brace Bracket**
  7) Mounting Hardware
  8) Cross Bracing

  *Smile Brackets are generally mounted to the conveyor prior to shipment. If you do not find them with the support items, look on the bottom of your conveyor. For longer conveyors, smile brackets are generally shipped with the other support items.

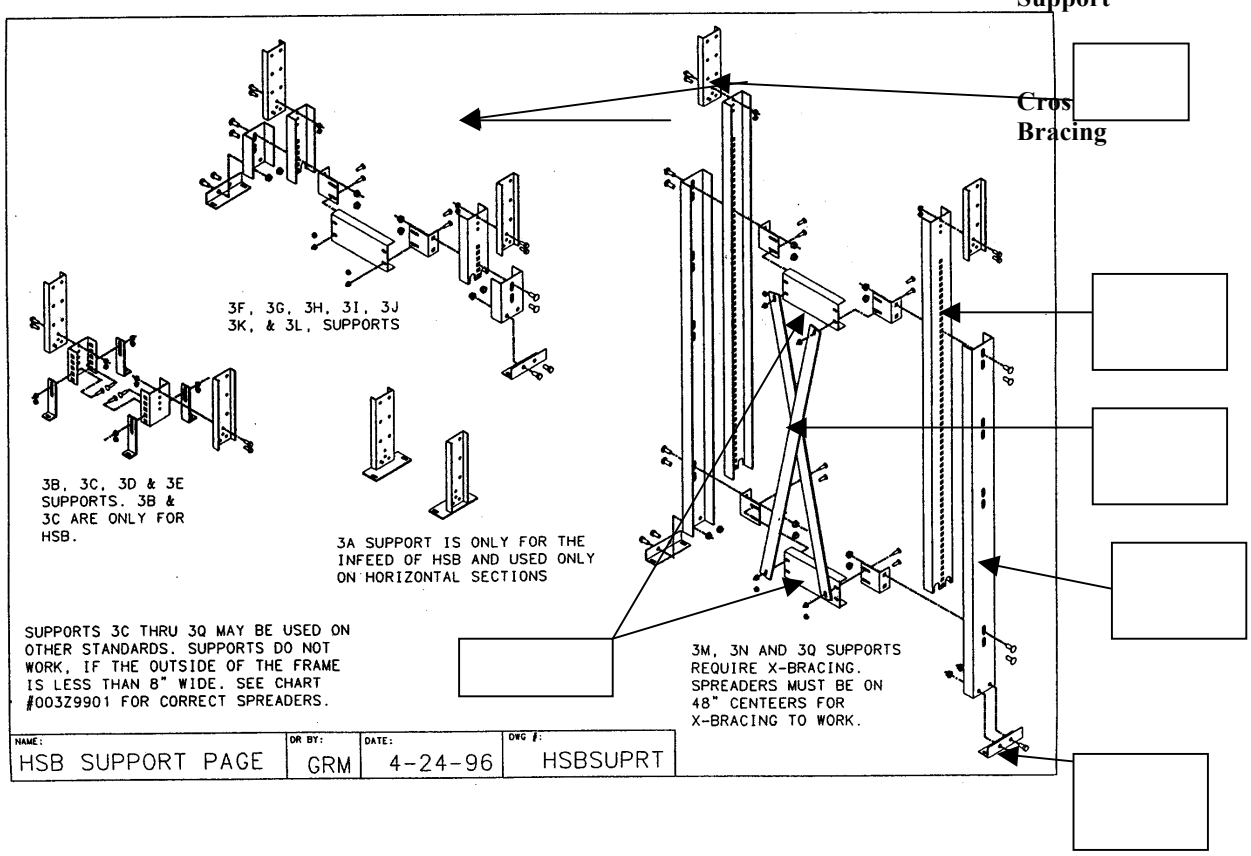
  **Knee Braces and Knee Brace Brackets are used when heights of the conveyor are over 36" Top of Belt, or if they are called out for a special reason. Refer to the packing slip if you are unsure of whether you should have these or not.

- Supports include other parts besides the upper and lower support pieces.
  - Notice the *support spreader* and also the optional diagonal *knee brace.*
  - Knee braces, if listed on your packing slip, attach to the frame bottom flanges using the knee brace bracket shown on the following pages.
    - This bracket uses holes that are approximately 20" to 24" from a frame joint.
    - The lower end of the knee brace is bolted to the upper or lower support, at approximately 45^ from the frame.
    - Some knee braces are adjustable in length, and comprised of two different pieces that overlap each other.
    - All the bolts should be securely tightened as you level the conveyor.
    - Knee braces are used on many conveyors more than 36" high.

- Level your conveyor both laterally and longitudinally, to prevent later problems with belt tracking**.**
  - **Long conveyors may require several different adjustments to eliminate all the dips.**
  - Uneven floors may even require different holes to be used on different supports.
  - Be sure to tighten support bolts and <u>anchor the conveyor to the floor</u>.
    - During anchoring, check that your conveyor is **straight**.
  - When you are done, your conveyor will be stable and located at the correct location with respect to the other equipment around it.

MEDIUM DUTY SUPPORTS

Support #	Min – Max Range	Part Length Lower	Part Length Upper	# of Spreaders	# of X-Braces
3A	0” – 3-7/8”	¼”	3-5/8”	0	0
3B	3-7/8” – 5-5/8”	3-13/16”	3-3/16”	0	0
3C	4 ¾” – 7 ½”	4 ¾”	4 ¼”	0	0
3D	7” – 10”	6”	5 ½”	0	0
3E	9 ½” – 13-5/8”	8-5/8”	7 ½”	0	0
3F	12 ¾” – 15”	6 ¾”	11”	1	0
3G	14 ½” – 18”	8 ¾”	12”	1	0
3H	16-5/8” – 22”	10 ¾”	14”	1	0
3I	20” – 29 ¼”	14”	18”	1	0
3J	24” – 36”	18”	21”	1	0
3K	30-1/8” – 49 ¼”	24”	28”	2	0
3L	42” – 73 ¼”	36”	40”	2	0
3M	66-1/8” – 121 ¼”	60”	64”	3	1
3N	110” – 150 ¼”	104”	64”	3	2
3Q	139” – 200 ¼”	104”	108”	4	3



HEAVY DUTY SUPPORTS

Support #	Min – Max Range	Part Length Lower	Part Length Upper	# of Spreaders
4A	11” – 12 ¼”	5 ¾”	9 ¼”	1
4B	11 ¾” – 13-11/16”	6 ½”	10”	1
4C	13-3/16” – 16-5/8”	7-15/16”	11-7/16”	1
4D	16-1/8” – 22 ½”	10-7/8”	14-3/8”	1
4E	21-3/4” – 31 ¼”	16 ½”	19”	1
4F	30 ¼” – 39 ¾”	25”	19”	1
4G	38 ¾” – 48 ¼”	33 ½”	19”	2
4H	47 ¼” – 56 ¾”	42”	19”	2
4I	55 ¾” – 65 ¼”	50 ½”	19”	2
4J	64 ¼” – 73 ¾”	59”	19”	3
4K	72 ¾” – 82 ¼”	67 ½”	19”	3
4L	81 ¼” – 90 ¾”	76”	19”	3

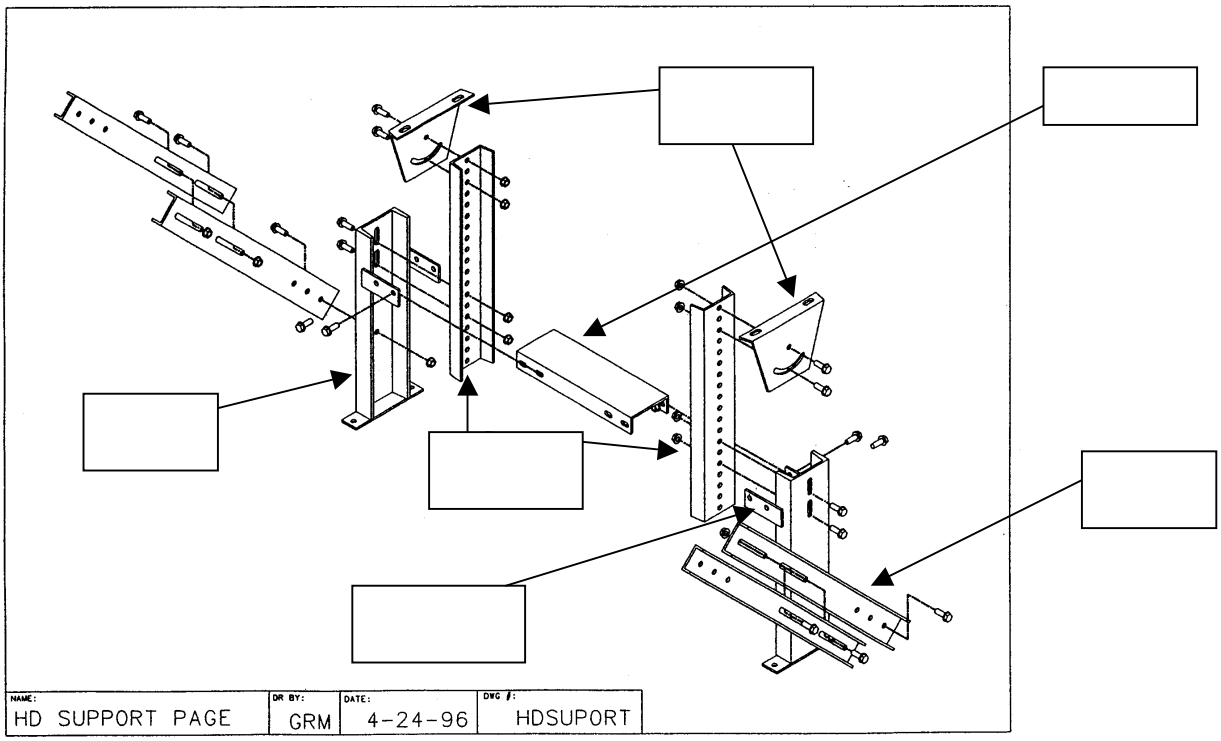
Lower Support

Upper Supports

Smile Brackets

Knee Spreader Braces

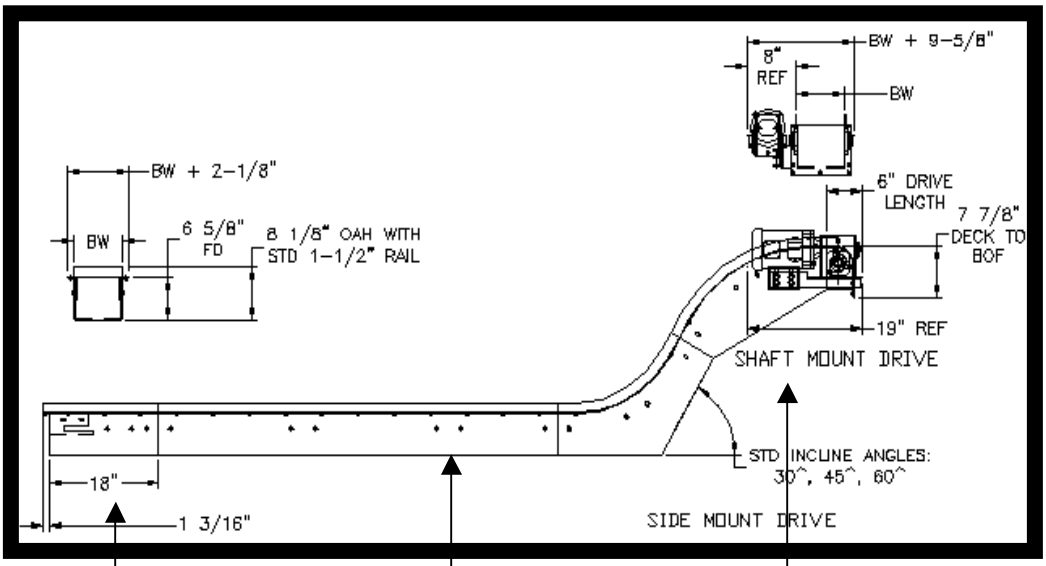
Connecting Plate

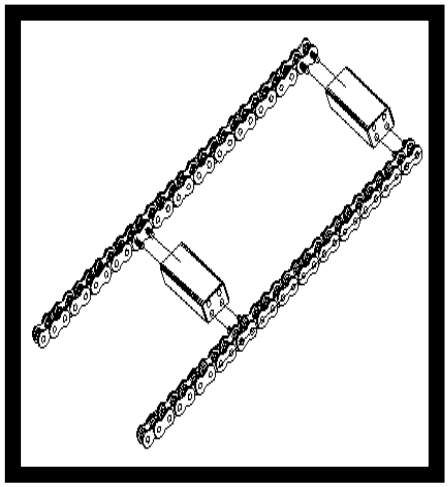


"MAGNETIC CONVEYOR VIEWS"

FOR ASSISTANCE IN ORDERING REPLACEMENT PARTS

MODEL 700

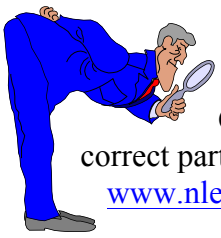




INFEED	INTERMEDIATE	DRIVE
← Deck →		
Sprockets **Bearings** **Take Up Springs** **UHMW Tracks**	**UHMW Tracks**	**Sprockets** **Shaft** **Bearings**

*Parts will vary with Model.

CHAIN COMPONENTS
Outer Carrying Chain with Extended Pins **Carrying Magnets**

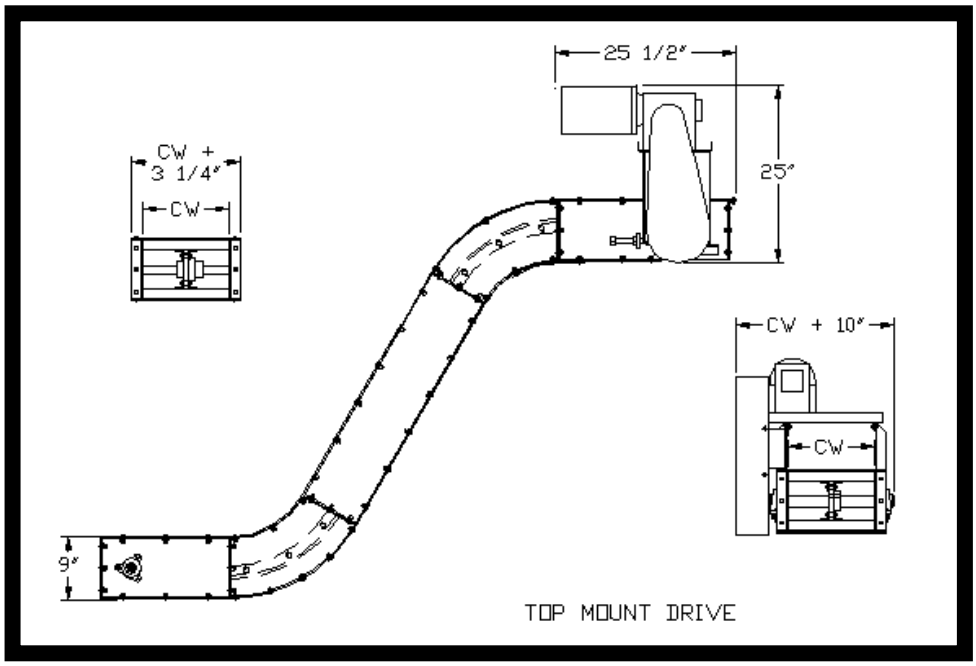


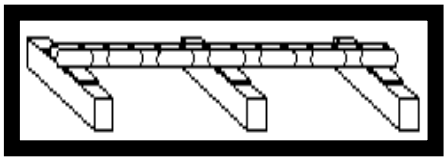
Motor, Reducer, Ratio Multiplier, Sprockets, Drive Chain, Torque Limiter, and Replacement Chain are all Replacement Components that are Unique to each conveyor. NLE cannot guarantee correct parts without a Serial Number off of conveyor. See our website for more detailed Drawings at www.nleco.com.

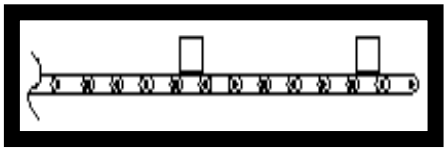
"DRAG CONVEYOR VIEWS"

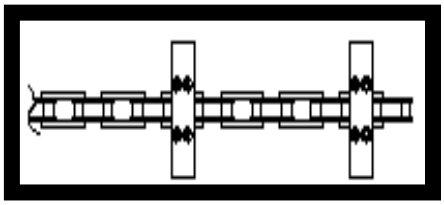
FOR ASSISTANCE IN ORDERING REPLACEMENT PARTS

MODEL 711









INFEED	INTERMEDIATE	DRIVE
← Bottom Pan / Top Cover →		
Infeed Shaft Infeed Bearings Sprocket		Drive Shaft Drive Bearings Sprocket
Lower Curve/ Upper Curve Hold down Wear strip		

*Parts will vary with Model.

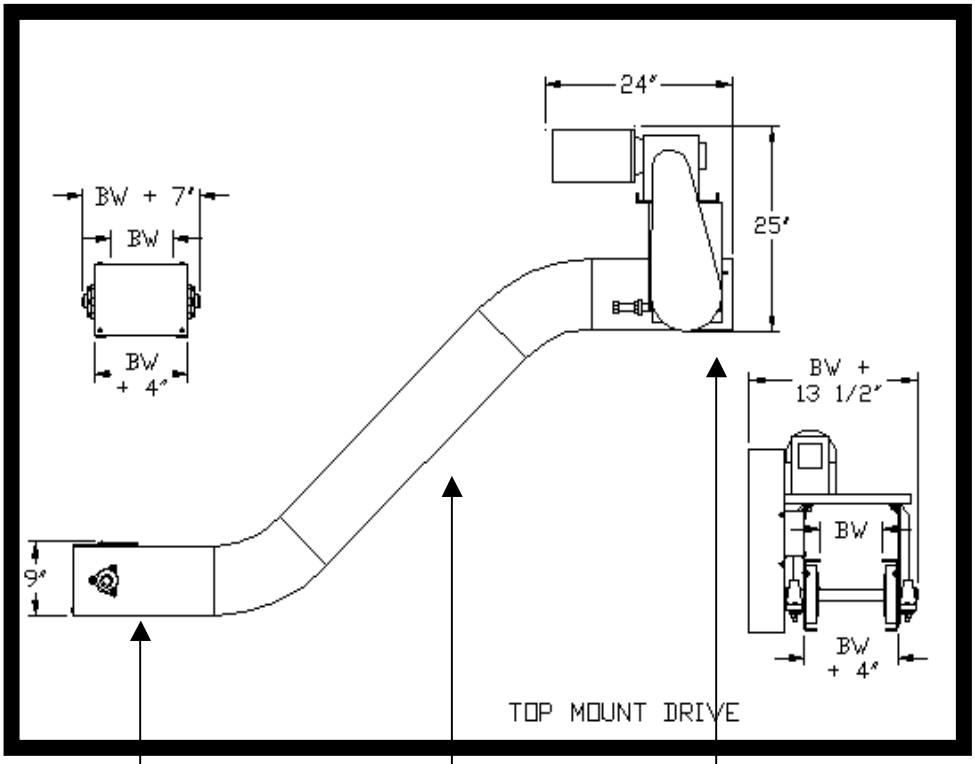
CHAIN COMPONENTS
Chain with Attachments UHMW Cleats

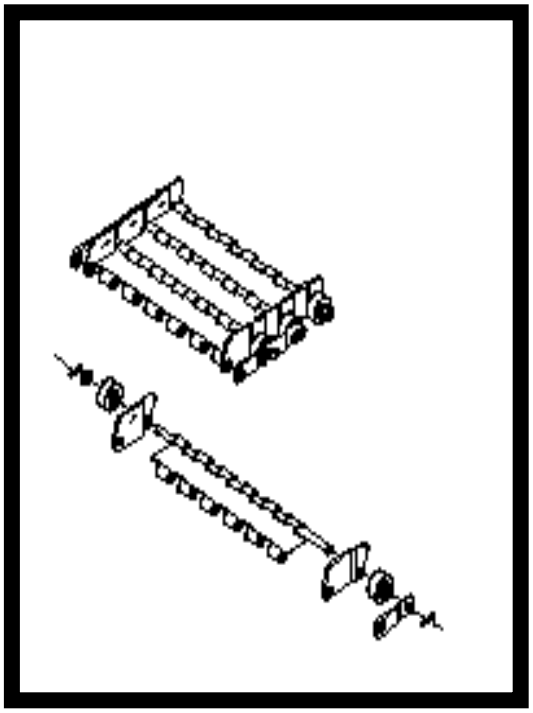
Motor, Reducer, Ratio Multiplier, Sprockets, Drive Chain, Torque Limiter, and Replacement Chain are all Replacement Components that are Unique to each conveyor. NLE cannot guarantee correct parts without a Serial Number off of conveyor. See our website for more detailed Drawings at www.nleco.com.

"HINGED STEEL BELT CONVEYOR VIEWS"

FOR ASSISTANCE IN ORDERING REPLACEMENT PARTS

MODELS 715, 721, 722, 724, 725, 726, 727, 750, 751, 760





INFEED	INTERMEDIATE	DRIVE
Infeed Sprockets **Infeed Shaft** **Infeed Bearings**		**Drive Sprockets** **Drive Shaft** **Drive Bearings**

*Parts will vary with Model.
*Frame Style and Depths will vary with Model (See below for examples)

BELTING COMPONENTS
(Start at middle and work outward)

Apron (Conventional/Flat Top)
Axle
Side wings (Standard or Radial)
Rollers (Standard or Flanged)
Outside Sidebars
Machinery Bushings
Cotter Pins

Motor, Reducer, Ratio Multiplier, Sprockets, Drive Chain, Torque Limiter, and Replacement Chain are all Replacement Components that are Unique to each conveyor. NLE cannot guarantee correct parts without a Serial Number off of conveyor. See our website for more detailed Drawings at www.nleco.com.

GENERAL INSTALLATION TIPS

Before proceeding, we recommend you read and understand your Owner's Manual. This summary does not replace or imply to replace the importance of reading and understanding the Owner's Manual in its entirety.

I. UPON ARRIVAL OF YOUR SHIPMENT

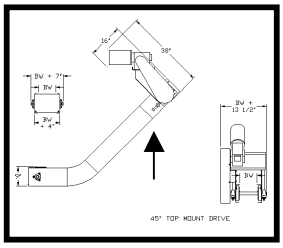
- Inspect your conveyor upon arrival for any damage or missing parts. It is your responsibility to file a claim with the carrier. *(Owners Manual Page: 13)*

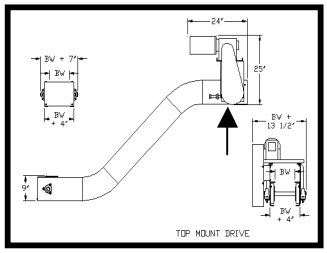
II. PRIOR TO INITIAL START UP, VERIFY THE FOLLOWING:

- Using your packing slip as a guide, identify all components of your conveyor (i.e. frame, supports, knee braces, belting, hardware) *(Owners Manual Page: 33-35)*
- Be sure to assemble your frame properly. Assemble your frame starting at the Infeed Section first, then add the intermediates, and end with the Drive Section last. Depending on the configuration of your conveyor, you may have curves at either the infeed or discharge or both. In most cases, the conveyor will come in one piece and you will only have to level and track belting. *(Owners Manual Page: 17)*
- Be sure your supports are attached to the frame in the proper locations. *(Owners Manual Page: 17)*

• Determine the number of supports called out on the Packing Slip. Attach one to the Infeed Section and one to the Drive Section. A good rule of thumb, is to place the other supports every 10' along the intermediate sections, unless noted on a drawing differently. *(Owners Manual Page: 33-35)*

Support Locations





The supports locations are generally located at the intermediate section and discharge section only, unless you have a conveyor that is horizontal. It is imperative to identify the support brackets on your conveyor, prior to attaching the supports. In most cases, the support brackets are welded to the conveyor frame during fabrication and assembly.

- Be sure conveyor is level and square. *(Owners Manual Page: 18)*
- Be sure to install the belt with the right side of the belt facing up. Belting is typically rolled with the top surface out. *(Owners Manual Page: 18)*
- Be sure that the Gearbox/Reducer has oil in it and the vent plug is installed. *(Owners Manual Page: 27)*
- Be sure all hardware and setscrews are tightened properly. *(Owners Manual Page: 18)*

III. INITIAL START UP (NO PRODUCT LOAD)

- We suggest you track and tension the belt with no load. Repeat this process after several hours of production and then monthly. *(Owners Manual Page: 19)*
- Be sure to adjust your torque limiter because material loads are not known and the factory **does not** adjust them. *(Owners Manual Page: 29)*
- Check that all sprockets and chain are aligned and tensioned. *(Owners Manual Page: 17-18)*
- Verify that all safety guards are in place and marked with safety warnings. *(Owners Manual Page: 6-12)*
- Verify that all Safety Codes and Standards are met. *(Owners Manual Page: 6-12)*

IV. AFTER INITIAL START UP

- Recheck the oil levels in your Gearbox/Reducer. *(Owners Manual Page: 27)*
- Recheck your belts tracking and tension. *(Owners Manual Page: 18)*
- Readjust your torque limiter, if required. *(Owners Manual Page: 29)*