Installation, Operation, Maintenance Manual

NBS®90SP

Narrow Belt Sorter

Contents

Purpose

It is the intent of MHS Conveyor, through this manual, to provide information that acts as a guide in the installation, operation and maintenance of MHS Conveyor NBS sorter NBS 90SP.

This manual describes basic installation practices, assembly arrangements, preventive maintenance and assists in replacement parts identification.

This service manual is intended for use by personnel who are knowledgeable of installation and safe working practices on conveyor systems.

Not all applications and conditions can be covered; therefore, this manual is to be used ONLY as a guide.

If additional copies of this manual are needed or if you have any question concerning the conveyor please contact your Business Partner or MHS Conveyor Customer Support at 231-798-4547 or Fax 231-798-4146.

Equipment Warranty

MHS Conveyor warrants that the material and workmanship entering into its equipment is merchantable and will be furnished in accordance with the specifications stated.

MHS Conveyor agrees to furnish the purchaser without charge any part proved defective within 2 years from date of shipment or before the equipment has forty-one hundred (4100) hours of running use, whichever period is shorter, provided the purchaser gives nrmanco immediate notice in writing and examination proves the claim that such materials or parts were defective when furnished. For drive components specific to XenoROL® (i.e. Xeno belts, slave Xeno belts, drive spools, standard and speed-up, and spacers), this warranty shall be extended to five years or ten thousand (10,000) hours of running use, whichever period is shorter, provided the conveyors are applied, installed and maintained in accordance with MHS Conveyor published standards. Other than the above, there are no warranties which extend beyond the description on the face hereof. Consequential damages of any sort are wholly excluded.

The liability of MHS Conveyor will be limited to the replacement cost of any defective part. All freight and installation costs relative to any warranted part will be at the expense of the purchaser. Any liability of MHS Conveyor under the warranties specified above is conditioned upon the equipment being installed, handled, operated, and maintained in accordance with the written instructions provided or approved in writing by MHS Conveyor.

The warranties specified above do not cover, and MHS Conveyor makes no warranties which extend to, damage to the equipment due to deterioration or wear occasioned by chemicals, abrasion, corrosion or erosion; Purchaser's misapplication, abuse, alteration, operation or maintenance; abnormal conditions of temperature or dirt; or operation of the equipment above rated capacities or in an otherwise improper manner.

All equipment and components not manufactured by MHS Conveyor carry only such warranty as given by the manufacturer thereof, which warranty MHS Conveyor will assign or otherwise make available to Purchaser without recourse to MHS Conveyor, provided that such warranty is assignable or may be made available.

IMPORTANT

For service on motors, reduction units, electrical components, controls, air or hydraulic cylinders, contact the local authorized sales and service representative of respective manufacturer. If none is available in your locality, contact the MHS Conveyor representative. MHS Conveyor will not be responsible for units that have been tampered with or disassembled by anyone other than the authorized representative of the respective manufacturer.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXTENDING BEYOND THOSE SET FORTH IN THIS STATEMENT OF WARRANTY.

Rev 04/08/2009

Warnings & Safety Instructions

Failure to follow the instructions, warnings, cautions (throughout this booklet) and warning labels (on the conveyor) may result in injury to personnel or damage to the equipment.

Your MHS Conveyor NBS Narrow Belt Sorter is powered by a motor and can be stopped only by turning off electrical power to the motor. As with all powered machinery, the drive and driven sprockets, chains, and pneumatically actuated devices present a danger. We have installed or provided guards to prevent inadvertent contact with these components along with warning labels to identify the hazards. **After maintenance, REPLACE guards immediately. Keep ALL warning labels clean and clear of any obstructions.**

Be sure to read and heed all Warnings. Warnings and Cautions are included throughout this manual and are defined as follows:

Warning ---- A notice which, if not followed, could result in serious injury to personnel.

Caution ---- A notice which, if not followed, could result in damage to equipment.

A thorough understanding and compliance with these Warnings and Cautions will greatly reduce the possibility of personnel injury or equipment damage.

Never remove, deface or paint over any labels. Any damaged label will be replaced by MHS Conveyor Inc. at no cost by contacting the Distributor Services Department.

WARNING
Do not perform maintenance on the conveyor until the start-up controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

Make sure personnel are clear of all conveyor equipment before restarting the system.

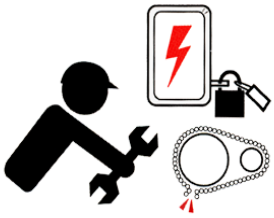
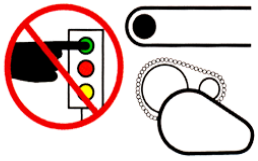
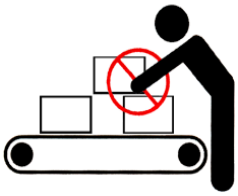
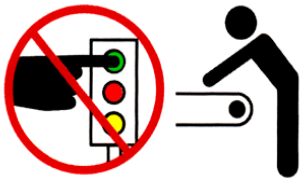
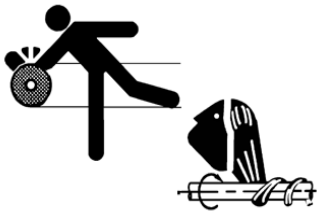
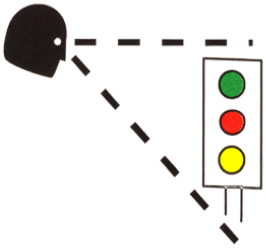
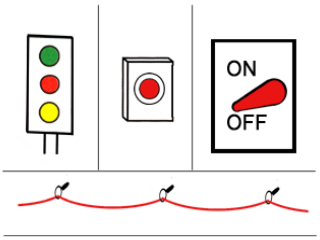
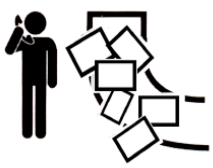
It is very important to instruct personnel in proper conveyor use including the location and function of all controls. It is important to establish work procedures and access areas which do not require any part of a person to be under the conveyor. It should be required that long hair is covered by caps or hair nets and the wearing of loose clothing or jewelry when working at or near the conveyor be prohibited.

Maintain enough clearance on each side of the unit for safe adjustment and maintenance of components. Provide crossovers at sufficient intervals to eliminate the temptation to climb over or under any conveyor. Prohibit riding or walking on conveyor by anyone.

WARNING
Before servicing or performing any work in the motor control panel, disconnect and lockout the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.

Warning examples on conveyor frames.

Package Conveyors

 Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time	 Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out and Blocked	 Operate Equipment Only With All Approved Covers and Guards in Place
 Do Not Load a Stopped Conveyor or Overload a Running Conveyor	 Ensure That All Personnel Are Clear of Equipment Before Starting	 Allow Only Authorized Personnel To Operate or Maintain Material Handling Equipment
 Do Not Modify or Misuse Conveyor Controls	 Keep Clothing, Body Parts and Hair Away from Conveyors	 Remove Trash, Paperwork and Other Debris Only When Power is Locked Out
 Ensure That ALL Controls and Pull Cords are Visible and Accessible	 Know the Location and Function of All Stop and Start Controls	 Report All Unsafe Conditions

POST IN PROMINENT AREA

Definition of Terms

KEY WORD	ABBREVATION	DESCRIPTION
AIRBAG		Inflatable lifting device used in NBS30
BEARING	"**BRG**"	Low friction rotating or sliding device
BELT	"**BLT**"	Flexible load carrying surface or O-ring
BETWEEN-FRAME	"**BF**"	The distance between conveyor side frames
BRACKET	"**BRKT**"	Attachment between a main and another part
CHANNEL	"**CH**"	Structural side member of conveyor equipment
CONNECTOR	"**CONN**"	Adapts and holds two other parts together
CROSSMEMBER	"**XM**"	Holds channels apart in NBS bed sections
DIVERTER		NBS30 module
DRIVE	"**DR**"	Power unit at the discharge end of NBS sorter
ELEVATION	"**EL**"	Top-of belt height above base surface
ENCODER		Electrical distaqnce counter used to track package locatic
ENDPULLEY	**"E-PULL"**	6" diameter roller at charge end of NBS sorter
EXTRUSION		Aluminum base that holds UHMW belt strips
FEET PER MINUTE	"**FPM**"	Speed sorter belts are traveling
FILTER / REGULATOR		Combination air pressure regulator / air filter
FLOOR STAND	"**FS**"	Name for conveyor bed support
FLOW CONTROL		Needle valve used to control airflow
FOOTPAD		Part used to distribute load from a jackscrew
GEARMOTOR	**"GEARMTR"**	One piece gear-reducer motor assembly
GUARD RAIL	"**GR**"	Angle or channel used to keep product on NBS
GUARD	"**GRD**"	Any part used to protect area for safety reasons
IDLER		Un-driven pulley used as a tensioning device
ITEM NUMBER	"**IT #**"	MHS Conveyor- part identification number
JOB NUMBER	**"C010_ _ _ _ _"**	Original factory tracking order number
KEY		Square locking device used on rotating shafts
KIT		Group of several parts with a single item number
LACED	"**LCD**"	The condition of a correctly installed lacing
LACING		Type or method of joining belts together (splice)
LIFT FRAME		The lifting structure of a NBS90 transfer
LIFT TABLE		Assembly that guides the NBS30 wheels upward
LOCKNUT		Self-locking fastener that resists vibration
LOCTITE		A thread-locking adhesive that resists vibration
LOOSE PARTS	"**LP**"	Individual parts that must be installed in the field
MULTI-BELT	"**MBLT**"	Another name that describes NBS equipment
MODULE	"**MOD**"	A self contained mechanical assembly
MOUNT	"**MNT"**	Part used to hold another, similar to a bracket
MOUNTING	"**MTG**"	Location and fasteners to attach a mount
MOTOR	"**MTR**"	Rotational power source usually using electricity
MUFFLER		Device used to reduce the noise of exhausted air
NATIONAL PIPE THREAD	"**NPT**"	Standard identifier for USA tapered pipe sizes
PHOTOEYE	"**PE**"	Optical sensing device used for product control
PLATE	"**PL**"	Flat piece of metal usually bolted on for strength

KEY WORD	ABBREVATION	DESCRIPTION
PROGRAMMABLE		Self-contained programmable control unit that
LOGIC CONTROLLER	**“PLC”**	Can control several input and output devices
O-RING		Polyurethane cord belts of differing lengths
PULLEY		Roller described by diameter and body length
REDUCER	**“RED”**	A C-face motor mount right-angle worm gearbox
REFLECTOR		Target used to reflect a light back to a photo eye
REGULATOR	**“REG”**	Air device that reduces pressure to usable level
RETAINER		Part used to mechanically lock a part in place
ROLLER		Described by axle size and BF dimension
ROLLER CHAIN	**“RC”**	Roller link chain used for power transmission
SCANNER		A device that recognizes products by bar codes
SCHEMATIC		Line drawing of a electrical or pneumatic circuit
SCREW		A threaded fastener also called a bolt
SEAL		Sealing device on a rotating shaft or cylinder rod
SMART DISTRIBUTED		The name for a proprietary software / hardware
SYSTEM	**“SDS”**	Network control system marketed by Honeywell Inc.
SHAFT		Round steel rod described by diameter and length
SHEAVE		A grooved disc that guides a V-belt or O-ring
SHIM		Thin piece of metal, used to fill up a space
SKATEWHEEL	**“SW”**	2” diameter X 5/8” wide X ¼” axle hole roller
SMILEY	**“J”**	(See standhead)
SOCKET	**“SOC”**	Hex shaped hole in an Allen screw
SOLENOID	**“SOL”**	An electrically operated multi-position air valve
SPACER		Thick washer or tube that a fastener passes thru
SPLICE		Area where similar materials are joined together
SPRING	**“SPR”**	Coiled wire device used for un-powered return
SPROCKET	**“SPKT”**	Wheel with shaped teeth that engage roller chain
SPUR		Transition bed between a diverter and exit lane
STANDHEAD		Pivoting bracket that attaches support to the bed
STARTER		Electrical relay that energizes the drive motor
TAG		Number that identifies unit in system lay-out
TAKEUP		Assembly used to remove slack from a belt / belts
TEE		A part with three connections locations
TENSIONER		A pneumatic, spring, or static take-up device
THREADED FULL LENGTH	**“TFL”**	Adjusting bolt used in take-up/tracking applications
TRANSFER	**“TRNS”**	NBS90 and NBS-SP module
ULTRA HIGH		Industry standard term for the hard milky white
MOLECULAR WEIGHT	**“UHMW”**	polyethylene used in wear strip applications
VALVE		An air shut-off or switching device
VENT		Small hole in gearbox to allow hot air expansion
WEARSTRIP		Low-friction material used to reduce rubbing wear
WELDMENT	**“WLDMT”**	Any part that requires welding in its manufacture
VFD		Variable Frequency Drive for motor speed control

NBS SP Application

NBS SP SELECTION GUIDELINES

Use NBS SP When:

- Higher speed sortation then NBS is required
- Product may be same size and weight, or mixed
- Product weight: 1-20 lbs, 1000 lbs. total load
- Product size: 4" X 4" Min. -- 13" X 24" Max.
- Ambient temperature is +35° to 100°F

APPLICATION NOTES

1. Matching conveyor rates before and after NBS sortation are vital to proper application decisions.
2. The transfer exit lanes from NBS SP can be gravity roller (used as a deceleration area), chutes or powered conveyor run at a speed which allows the lane to receive products as fast as they are transferred.
3. The maximum divert rate for a NBS SP single-direction is 120 CPM. The bidirectional rate is 120 CPM. (Contact the Customer Support group for application consideration above these rates)
4. Induction to NBS-SP sortation must be able to singulate individual products with a minimum gap of 6"+ conveyor width at 250 FPM 10"+ conveyor with at 300 FPM.
5. Justify all products along the exit lane side of the NBS SP sortation for single direction transfers.
6. When NBS-SP over-all-length is over 50' and up to 100' in length, an addition auxiliary air take-up is required.
7. The maximum length of a NBS SP sortation conveyor, including two air take-up units, is 100'.
8. The gearmotors used for NBS SP drives are all VFD (variable frequency drive) rated.

CAUTION
The use of a VFD or at least a "soft start" motor drive is recommended for NBS SP drive motor control. Ignoring this point may void the motor warranty.

GENERAL CONSIDERATIONS

ELEVATION (TOB)
The minimum elevation at the discharge end of an NBS SP sortation line is 23". The end drive unit is located at the discharge end and requires a space 23" high by 33" long.

Extra room alongside the drive should be provided to allow maintenance personnel access to either side of the drive assembly.

TRANSFER LOCATIONS

- The leading edge of the first transfer module must be a minimum of 28" from the charge end of the sorter.
- The trailing edge of the last divert module must be at least 42" from the discharge end.
- The center line of a transfer exit lane is centered on the center line of the transfer rollers in an NBS SP.
- Standard available coated transfer rollers widths are: 9", 12", 15", 18", & 21"
- One NBS SP transfer can transfer to up to four separate lanes of 1/2 the width of the roller length.
- Single direction transfer to two lanes is called a "Dual Transfer"

- Bi-directional transfer to two lanes each side is called a "Quad Transfer"

STANDARD AVAILABLE DRIVE SELECTIONS
.5, .75, 1, 1.5 HP @ the following speeds
120, 150, 180, 200, 220, 250, 300 FPM
Additionally: 2 HP @ 200, 220, 250, 300 FPM

SORTER NOMINAL WIDTHS & NUMBER OF BELTS
11.5NBS-SP with 3 Belts on 2-1/2" Centers
14NBS-SP with 4 Belts on 2-1/2" Centers

Receiving & Site Preparation

GENERAL

MHS Conveyor NBS Narrow Belt Sorters are shipped in subassemblies. These subassemblies are packaged to guard against damage in shipment, when handled properly.

Examination immediately following unloading will show if any damage was caused during shipment. If damage is evident, claims for recovery of expenses to repair damage or replace components must be made against the carrier immediately. While unloading, a check must be made against the Bill of Lading, or other packing lists provided, to confirm full receipt of listed items.

CAUTION
TAKE CARE DURING THE REMOVAL OF EQUIPMENT FROM THE CARRIER. Remove small items and boxes first. Pull and lift only on the skid, not on the frame, crossmember or any part of the equipment. Be sure the skid is free of other materials which may be on top of or against the side of the skid to be removed.

PREPARATION OF SITE

After the conveyor is received, move it to the installation site or designated dry storage area as soon as possible. Clean up all packing material immediately before parts get lost in it. Loose parts should remain in the shipping boxes until needed.

Prior to starting assembly of the conveyor, carefully check the installation path to be sure there are no obstructions that will cause interference. Check for access along the path needed to bring in bed sections and components closest to the point where they are needed. It is often necessary to give the area along the system path a general cleanup to improve installation efficiency, access and accuracy.

PARTS INVENTORY & IDENTIFICATION

Each subassembly is shipped completely assembled except the bed joint splice plate/nuts which are shipped with other loose parts. Identify and separate the sorter subassemblies by type or tag number, for inventory and ease of locating during installation.

An identification label is attached to the inside of one side channel or on a crossmember, close to one end of each conveyor bed. This label contains: job number, part number, order number, tag number (if specified), assembler's initials and date of manufacture. On supports, the tag is located on the bottom side of the foot. On special devices it is located on a convenient flat surface that is not offensive to the appearance of the equipment but is still accessible for viewing. These numbers can be cross-referenced against the packing list. The illustrations in this manual and the part number stickers will assist you with your inventory.

Identification Label

Loose parts are boxed and shipped separately. You should have all conveyor sections and supports for a particular conveyor prior to installation. It is cost-effective to identify and procure any missing parts before they are needed for assembly. Small items like nuts and bolts are weigh-counted and packaged by size and type.

CAUTION
Do not remove finishing nails from rail ends. They keep the UHMW guides from sliding down to the discharge end.

General Procedures

The following procedures are to be used as guidelines only. Specific installation methods will vary somewhat depending on available equipment on site and each installer's preferences based on past experience.

WARNING
The Installation Supervisor must be experienced with conveyor and qualified in the mechanics of the equipment and enforce safe working procedures for the protection of the crew, customer, and customer's property.

DIMENSIONAL REFERENCE POINTS

The path of each conveyor in the system is determined by establishing a reference point at each end. The center line of the conveyor is established and a chalk line is snapped between these points.

Conveyors should be installed with the center line of the bed matching the center line of the conveyor path. Locate and mark the center of the crossmembers at each end of the conveyor. Use a plumb line or other acceptable means to ensure accuracy to the chalk line.

Always carry out a thorough check for any obstructions such as building columns, manholes, etc. It may be necessary to reroute the conveyor to avoid the obstruction. In this case it would be advisable to begin installation at this point, using the obstruction as a reference point (Datum), and install the sections in either direction as required.

All conveyor sections must be checked for squareness prior to installation as "racking" or being knocked out of square may have occurred during shipping and handling.

ELEVATIONS

All top-of-belt (TOB) heights should be installed in accordance with the elevations shown on the drawings. In addition, all sortation devices must be level across both the frame width and length. Leveling of the frames is best done using a rotating laser level along the length of the conveyor and a builder's level across the width.

After the first elevation is established at a critical point, the elevation of all other points shall be relative to this first point. Normal practice is to dimension the layout and measure elevations from the floor at each point of support.

As the conveyor system proceeds onto another floor or into another building or room, a new elevation will be measured from the floor at that point. This new elevation will then become the reference for subsequent elevations.

When installing an overhead system, the first elevation is measured from the floor and becomes the reference elevation point until a change in elevation is shown on the layout. Any new elevation is also measured from the floor and becomes the new reference point. The process is repeated each time an elevation change occurs.

CAUTION

Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building if any conveyor is ceiling hung.

COMPONENT ORIENTATION

Using your conveyor system layout drawing and the numbers on the I.D. tags on each component, position and orient the conveyor sections. You must know:

- The direction of product flow
- The elevation height
- The drive is positioned at the discharge end
- The end pulley is positioned at the charge end

IMPORTANT! Do not make alterations to the equipment without consulting with user's representative and MHS Conveyor. Unauthorized modifications to the equipment may impair its function, create a hazardous condition, affect its useful life and/or void the warranty.

Supporting Arrangements

FLOOR SUPPORTS

Install bolts used to attach the standhead to the frame so the nut is on the bottom. Standhead bolts should be left finger tight while the conveyor is being assembled and aligned.

Floor supports are ordered by nominal height range, which is the dimension from the floor to top of the support. Conveyor elevations are shown on the layout by top-of-belt elevations. The difference between top of belt (TOB) and top of support is 7-5/8". This dimension must be subtracted from the TOB height to set support height.

It is important that conveyor frames be installed level. Floor supports will accommodate normal irregularities in the floor surface. Adjustment for elevation in floor supports is accomplished with metal-on-metal bolt clamping force. To achieve the support's stated load rating, it is necessary to tighten the elevation adjustment bolts (3/8" diameter) to 23 ft./lbs. of torque.

Supports should always be installed in the vertical position, and any variations due to conveyor pitch or floor slope will be compensated for in the pivoting standhead of the support.

ANCHORING

Anchoring in concrete floors is accomplished by drilling into the floor and inserting the suitable anchor bolt. The hole diameter and depth must be in accordance with the anchor bolt manufacturer's instructions.

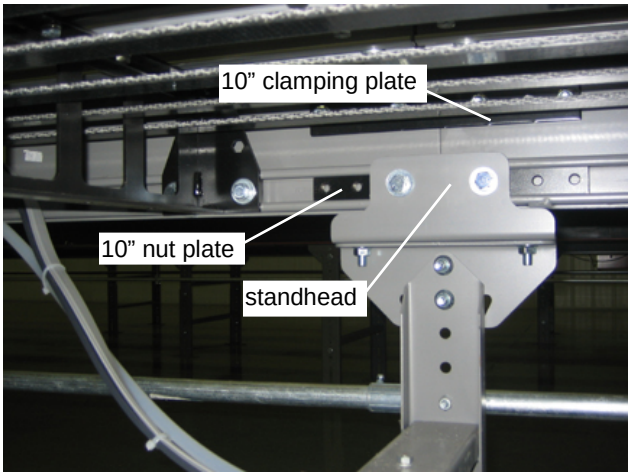
Anchor intermediate floor supports with two anchor bolts, one through each support foot plate using at a minimum 3/8" diameter anchor bolts. For floor supports over 5' high or when supporting drives, use 1/2" diameter anchor bolts.

Stagger anchors from front hole on one side of the support, to rear hole on opposite side. Anchor bolts for equipment subject to impact loads should be a minimum of 1/2" in diameter.

WARNING
Place a bolt through the frame and support immediately with finger tight nut. This will prevent the frame from falling off the support, if bumped, and causing injury.

BED/SUPPORT CONNECTORS

NBS can only be supported at bed joins. Adjoining beds are connected using 3/8” thick by 10” nut plate, 3/16” thick by 10” clamping plate and 3/8” hardware. These parts are shipped with other loose parts. Insert 10” nut plate halfway into the formed channel end of each bed. Then mount standhead support with two 3/8-16 X 1” hex head bolts with flat and lock washers. After that mount 10” clamp plate to channel ends with four 3/8-16 X 1” hex head bolts with nut, flat and lock washers (see picture below). It can be seen that a crossmember could be moved into the recessed area of the standhead support bracket if needed.



Maintaining the rigidity and flatness of the conveying surface is the end result of proper support installation.

ALUMINUM EXTRUSION T-NUT CONNECTORS

The aluminum extrusions that hold the UHMW belt guides are installed at the factory with tee bolts up through their mounting crossmembers. The placement of these extrusions is gauged precisely (2-5/16" center-to center) so that the triple T-nut connectors between the extrusions line up at installation. The triple T-nut connectors are mounted, at the factory, flush with the ends of the aluminum extrusions on the discharge side of all NBS bed assemblies. These triple nut connectors should be extended half-way out of the extrusions before "plugging in" the next bed downstream during installation. After all bed components are installed, leveled and straightened the 5/16-18 hex head bolts used in the triple T-nut connectors should all be loosened, to straighten the aluminum extrusion joints and re-tightened.

Belt Installation

PRE-INSTALLATION

Belts, as shipped from MHS Conveyor, are cut to length with lacing installed. Rolls of belting should be stored on edge on a pallet (see belt below). Never leave a belt where it may absorb moisture. Remove any tight shipping banding immediately upon arrival. Lacing pins are taped inside the lacing on each belt.

The NBS90-SP conveyor should be completely installed and aligned before belt installation.

Remove the plexiglass side covers from the sides of the auxiliary belt take-up frame, exposing the take-up pulleys. Switch the take-up air switch to the un-tensioned position, raising the take-up pulleys to the minimum take-up position. Then remove or slide covers between the aluminum belt track extrusions so that the belt guide wheels are exposed. Do the same for each NBS 30 diverter and the charge end pulley.

Remove the o-ring from the o-ring driven gap roller.

BELT THREADING

Because NBS uses multiple narrow belts of long length, it will be most efficient to have two people working together during the threading process.

The belting must be uncoiled and laid out flat on the sorter, with the smooth black carrying surface up. The belts must not be allowed to twist along their length as they are installed. Start at the charge end (farthest from the drive) and feed all of the belts through together at the same time. Start the belts down between the gap roller and the end pulley. Guide the belts under the 5" diameter end pulley and up and over the 4" diameter snub pulley, before passing through the belt guide wheels.

All belts must pass over any return rollers positioned to minimize belt sag and through holes in crossmembers.

NBS90-SP divert rollers fit up between the narrow belts.

The black PVC surface of the belt should be up and the rough surface rides in the UHMW tracks.

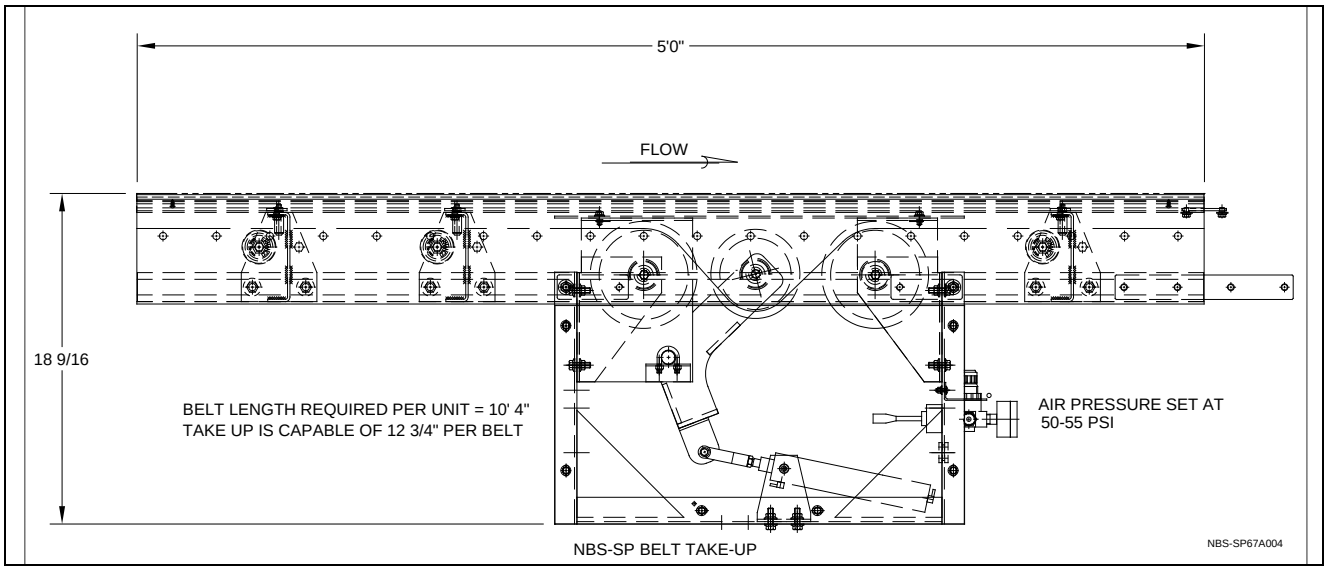
Mesh the loops of the lacing on one end of the belt with the loops on the other, so the sides of the belt are even, and install the lacing pin.

Because the different width sorters have different numbers of belts, the air pressure to properly tension the belts is different for each width.

BELT TRACKING

With the belts tensioned, "bump" the motor to be sure rotation is correct, the belts are running smoothly and maintaining their position. Most NBS90-SP conveyors do not require belt tracking. However, each conveyor should be checked at the charge and discharge ends to be sure the belts are floating in a neutral position not crowding the sides of the UHMW guide tracks. If the belts are out of their grooves or riding hard to one side adjustment can be made on the driven pulley jackscrew, at the discharge end, or the snubber roller in the end pulley assembly at the charge end, to realign them.

Reinstall the bottom pan on the end pulley assembly and access covers on the auxiliary belt take-up.



BELT SPECIFICATIONS AND LACING

- PVC 200 belt
- Width: 15/16" + /- 1/32"
- Thickness: .203" +/- .015 thick, with a recessed
- Thickness at recess: .125" to .156"
- Lace: Clipper P/N 05265 U2S12 (tote); minimum number of hooks = 5 on one end, 6 on other end.
- Lacing Pin: Nylostainless .093 dia. x 7/8” +/- 1/32” long (316 stainless steel w/nylon coating); clipper P/N 02670

CAUTION
Only use the specified lacing and pin. Any substitution will result in premature belt failure.

For field repair chamfer belt corners, no more than 1/8”.

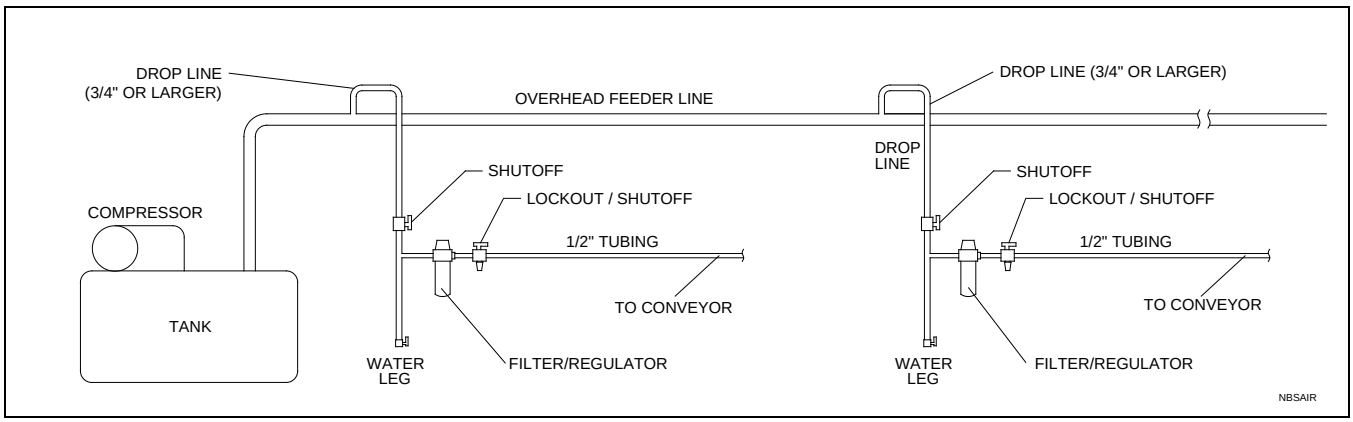
BELT REPLACEMENT

Replacement belts may be ordered by the original "P" part number marked on the belt or belt length can be determined by the following information.

1. The 2’-9’ drive bed requires 5’-11.25” (71.25”)
2. The 18" end pulley bed 3'-0" (36")
4. NBS90-SP transfers require 0" each
5. Auxiliary take-up with 5’ bed requires 10’-4” (124”)
6. All other beds require 2 times their length.

NOMINAL WIDTHS (# OF BELTS)
11.5" with 3 Belts on 2-1/2" Centers
14.0" with 4 Belts on 2-1/2" Centers

Air Supply Requirements



Suggested requirements for NBS sorter and diverts

GENERAL

Every conveyor system is unique, with its own specific requirements. Therefore, the following is a general guide.

MAIN FEEDER: Air velocity through the main feeder piping can be kept smooth with lower losses using large diameter pipe with minimum bends and restrictions. Standard weight black pipe or copper is suitable for plumbing the compressed air overhead to all points of use.

AIR DROPS: MHS Conveyor recommends using 3/4" pipe on air drops for high flow and low pressure loss. The drop is terminated with a drain at the bottom. A tee located prior to the drain branches off to the conveyor. This branch line must contain a lockout/shutoff. A shutoff must also be located in the drop before the branch tee. OSHA Rule 29, CFR1910.147 requires energy sources (air drops) be turned off and capable of being locked or labeled with a warning tag.

Note: NBS pneumatic systems does not require lubrication. Lubrication may affect the valving operation and cause sluggish or erratic operation.

Important: If your air compressor uses synthetic oil, a coalescing filter plus a regular filter of 5 micron is required. Synthetic oils will shrink the seals in pneumatic devices and valving.

CAUTION
All air lines must be thoroughly blown out (of all debris) and the regulator must be set as required before connecting air to the NBS.

PNEUMATIC REQUIREMENTS

1. Maximum conveyor length each way from regulator is 80'. Locate regulator in center of conveyor, if possible, for maximum efficiency.
2. Overhead feeder line pressure to be 100 PSI minimum
3. Low pressure switch to be set at 90 PSI
4. In high humidity or low temperature, use air dryer

5. Use 5 micron filter
6. Lockout/shutoff valve to be provided by air system installer
7. Regulators pressure set to unit requirements:
   NBS SP
   - Air take-up 50-55 PSI
   - 90º transfer 45-50 PSI

FORMULAS

NBS 90SP transfers are actuated by a single air cylinder with a 2" bore and 1/2" stroke.
The air consumption per transfer is calculated by:
.0092CF (cubic feet) X CPM (cycles per min.) = SCFM (Standard Cubic Feet / Minute)

Adding together the air requirements of all transfers connected to one regulator will give total air flow requirements for that NBS air system.

Air Line Connections

SOURCE AIR CONNECTION

Select the best position along the conveyor to connect the source air from a drop line. Ideally the regulator should be centrally located along the sorter and should not be more than 80' from the furthest diverter/transfer or drive.

Attach the filter/regulator assembly to the bottom flange of the side frame using the mounting bracket supplied with the kit.

The source air line that distributes air to the diverters/transfers should be 1/2" hose that is rated to handle a pulsating 60psi line pressure. MHS Conveyor part number 89000572 TUBING, URETHANE 1/2 OD is available for this purpose.

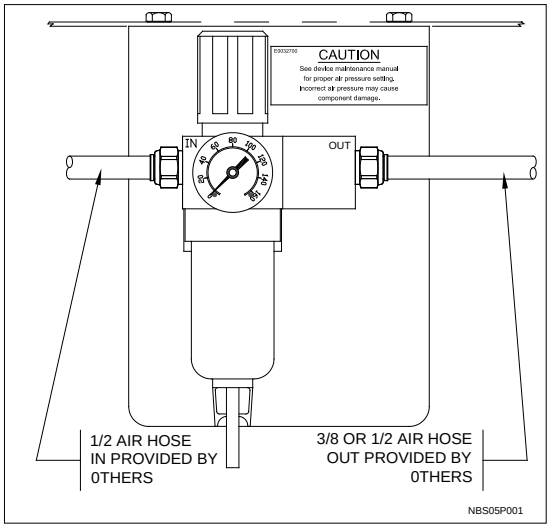
Cut into the supply line along the sorter bed and install the source air line tee fitting (89000640). Connect the source air line between this fitting and the filter/regulator output.

The hose size at each diverter/transfer is 3/8 OD and the source air line can be tapped at each location using a 89000431 1/2"-3/8"OD Barbed Tee, and required length of 89000585 TUBING, POLYETHYLENE 3/8OD,CLR.

LOW PRESSURE AIR SWITCH

The installation of an air pressure switch in the NBS air supply circuit, to detect a drop in air pressure below required levels, is recommended. If pressure drops below approximately 40 PSI, the conveyor system should shut off.

It is recommended that this air switch be located either at the furthest end of the source air line away from the regulator or at the pneumatic belt take-up located in or near the drive bed at the discharge end of the sorter.



CAUTION
Do not use a lubricator. When replacing filter/regulator bowl, lightly lubricate seal with mineral oil. Do not use synthetic oils such as esters or silicones. DO NOT get oil inside filter/regulator bowl.

CAUTION

The function of the low pressure air switch is to protect the drive pulley and the NBS narrow belts from being damaged from slipping under load in the event of an air pressure disruption. Loss of air pressure may also cause diverter / transfer jams.

SOLENOIDS

For the sake of simplicity only two different solenoids are used to actuate the NBS90-SP transfers, 120VAC or 24VDC.

Both models use spring return, 4-way solenoids with a DIN electrical connector, mounted on the outside, opposite the discharge direction of the diverter/transfer.

The lift mechanism of the NBS90-SP is powered in both directions and has combination needle-valve / exhaust mufflers installed in ports "EA" & "EB" that are used to adjust actuation speeds.

Solenoids are plumbed such that the diverter/transfer is normally in the down position and raises on solenoid activation.

The MHS Conveyor part numbers for replacement solenoids are:

E0002998 VALVE, SMC 4-WAY 24VDC DIN CONN
E0002995 VALVE, SMC 4-WAY 110VAC DIN CONN

Electrical

GENERAL

WARNING
All electrical controls must be installed, wired and connected by a licensed electrician only.

All motor controls and wiring must conform to the National Electrical Code as published by the National Fire Protection Association and approved by the American National Standards Institute, Inc. In addition, since specific electrical codes vary from one area to another, be sure to check with the proper authorities before starting the electrical wiring.

The electrical voltage of the motor will be stamped on the metal nameplate. This voltage should be checked to see that it matches your available voltage. Many motors, both single phase and three phase, are dual voltage. Consult the wiring diagram on the motor for the proper connections. If a three-phase motor on a single direction conveyor runs the wrong direction, two of the three leads must be switched to reverse rotation.

WARNING
Do not connect the motor to any other voltage than stamped on its metal nameplate.

Consult the wiring diagram on the inside cover of the starter and push-button station for the proper electrical connections.

Three-phase drives require transformers to reduce the push-button and control circuit to 115 volts. If primary voltage is changed, the transformer must be changed according to the wiring diagram found on the transformer.

NOTE
All control equipment is covered by the original manufacturer's equipment warranty.

NEMA type enclosure ratings are as follows:

NEMA 1 - Indoor use, provides protection against contact with internal components. Suitable for use in warehouse and distribution environments.

Gasketed NEMA 1 - Same use as NEMA 1, but with additional protection against dust and dirt.

NEMA 3 - Outdoor use, designed to keep out rain and dust.

NEMA 4 - Indoor and outdoor use, designed to keep out rain and dust.

NEMA 12 - Indoor use, provides protection against dust, dirt and oil seepage and dripping of noncorrosive liquids. Suitable for use in industrial environments.

NEMA 13 - Indoor use, provides protection against dust, dirt, sprayed oil and noncorrosive liquids.

SAFETY GUIDELINES

WARNING
All safety devices, including wiring of electrical safety devices, shall be arranged to operate in a “fail safe” manner. That is, if power failure or failure of the device itself would occur, a hazardous condition must not result.

The following are basic conveyor control safety guidelines for common controls equipment.

START-UP WARNING HORN - Ideally, all conveyors should be within sight of the conveyor start push-button. This allows the operator to verify that no one is on the conveyor or would be in danger if the conveyor were to start up.

If all conveyors being started cannot be seen from the start push-button location, then an audible warning device is required. It could be a horn, buzzer or bell unique to that conveyor for that location. It must be loud enough to be heard at any point on the conveyor being started. It should sound for the duration of five seconds after the start push-button is pushed, prior to the conveyor starting. Any auxiliary equipment such as vertical lifts, turntables, etc. must be included in the warning circuitry.

All conveyor sections that stop and restart automatically should be marked with appropriate signs or labels. Order CEMA label CHR930002.

START PUSH-BUTTON - Start push-button must be the flush type or guarded such that inadvertently leaning against them will not actuate them. They should be provided with a legend plate clearly defining which conveyors will be started.

STOP PUSH-BUTTON - Stop push-button should be the extended type such that any contact with it is sufficient to stop the conveyor. They should have a legend plate defining which conveyors will be stopped.

OPERATOR CONTROLS - Additional operator controls should be designed into the system with the same guidelines that go into start and stop push-button, depending upon their function. Devices which are repeated on multiple control stations, such as emergency stops, should be located at the same relative location on each station. All operator controls shall be clearly marked or labeled to indicate the function controlled.

EMERGENCY STOPS - All locations where an operator must work directly at the conveyor or areas of high pedestrian traffic must be protected by an emergency stop. Operators should not have to leave their position to actuate the emergency stop.

For protection of equipment or product, emergency stops may be located throughout a system such that it is possible to shut down the system. The location will depend on likely observation points and areas with special devices and interfaces between equipment.

Emergency stops can be of the push-button or cable operated switch type. The push-button type should be a red, mushroom head, maintained push-button which requires resetting after it is actuated. Cable operated switches should trip by pulling the cable and require resetting at the switch.

An emergency stop normally stops all conveyors in the system. Very large systems may involve dividing a system into zones of control based on proximity of personnel, safety hazards, walls, obstacles, etc.

WARNING

Before restarting a conveyor which has been stopped because of an emergency, an inspection of the conveyor must be made and the cause of the stoppage determined. The starting device must be locked out before any attempt is made to correct the cause of stoppage.

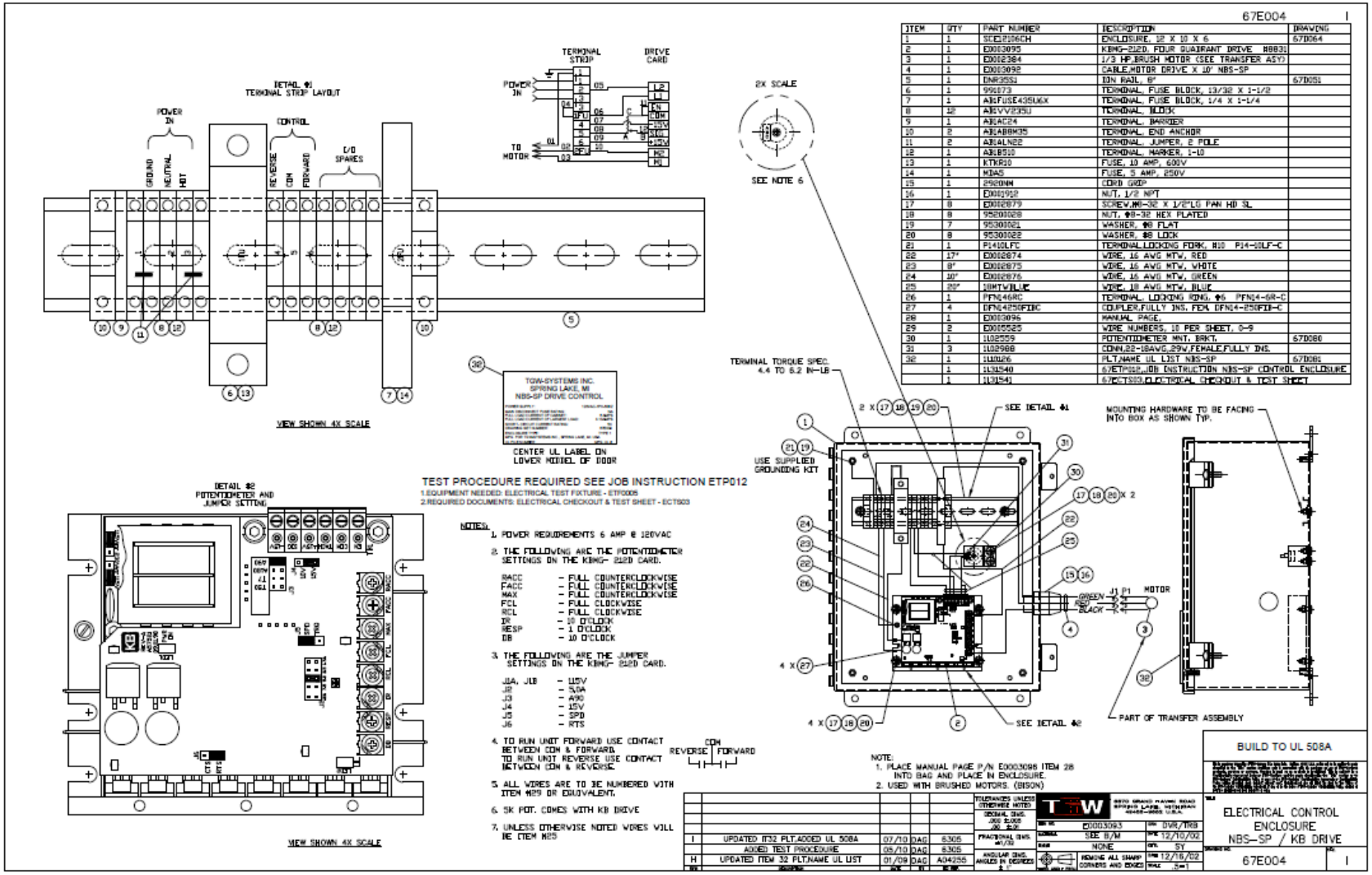
CONTROLS LOGIC - Solid state controls logic devices, such as programmable controllers, are used extensively for conveyor control. They are very reliable, but a hardware failure or software bug could cause the device to function erratically. For this reason, start circuits, warning horn circuits and emergency stops should usually be configured using conventional relay logic.

SAFETY SWITCHES - All conveyor control cabinets and motors must be provided with safety (or disconnect) switches. These switches must have provisions for padlocking. As required for maintenance, equipment should be locked in the off position.

SPECIAL DEVICES - Special devices and equipment such as vertical lifts, turntables, high speed conveyors, etc. all have unique design and safety requirements. These must be examined in each case to determine what the requirements might be.

Controls Engineering quotation is available upon request. Please contact MHS Conveyor Customer Support.

Electrical Control Enclosure for NBS90-SP



ITEM	QTY	PART NUMBER	DESCRIPTION	DRAWING
1	1	SCE2106CH	ENCLOSURE, 12 X 10 X 6	67D064
2	1	E0003095	KBMG-212D, FOUR QUADRANT DRIVE H8836	
3	1	E0002384	1/3 HP,BRUSH MOTOR (SEE TRANSFER ASY)	
4	1	E0003092	CABLE,MOTOR DRIVE X 10' NBS-SP	
5	1	DNR3552	DIN RAIL, 8"	67D051
6	1	990272	TERMINAL, FUSE BLOCK, 13/32 X 1-1/2	
7	1	ABJFUSE435UGX	TERMINAL, FUSE BLOCK, 1/4 X 1-1/4	
8	12	ABWV2351	TERMINAL, BLOCK	
9	1	ABJAC24	TERMINAL, BARRIER	
10	2	ABJABBM35	TERMINAL, END ANCHOR	
11	2	ABJALN22	TERMINAL, JUMPER, 2 POLE	
12	1	ABJBS10	TERMINAL, MARKER, 1-10	
13	1	KTKR10	FUSE, 10 AMP, 600V	
14	1	MDA5	FUSE, 5 AMP, 250V	
15	1	2452DNN	CORD GRIP	
16	1	E0001919	NUT, 1/2 NPT	
17	8	E0002879	SCREW,M6-32 X 1/2"LG PAN HD SL	
18	8	95200028	NUT, #8-32 HEX PLATED	
19	7	95301021	WASHER, #8 FLAT	
20	8	95301022	WASHER, #8 LOCK	
21	1	P1410LFC	TERMINAL,LOCKING FORK, #10 P14-8LF-C	
22	17'	E0002874	WIRE, 16 AWG MTW, RED	
23	8'	E0002875	WIRE, 16 AWG MTW, WHITE	
24	20'	E0002876	WIRE, 16 AWG MTW, GREEN	
25	20'	18MTWBLUE	WIRE, 18 AWG MTW, BLUE	
26	1	PFN46RC	TERMINAL, LOCKING RING, #6 PFN14-6R-C	
27	4	DFN4256FDBC	COUPLER,FULLY INS. FEM DFN14-250FDB-C	
28	1	E0003096	MANUAL PAGE,	
29	2	E0005525	WIRE NUMBERS, 10 PER SHEET, 0-9	
30	1	1102559	POTENTIOMETER MNT. BRKT.	67D080
31	3	1102988	CONN,22-18AWG,.29W,FEMALE,FULLY INS.	
32	1	1101026	PLT/NAME UL LIST NBS-SP	67D081
	1	1101540	6/ETP012,,JOB INSTRUCTION NBS-SP CONTROL ENCLOSURE	
	1	1101541	6/ECT503,ELECTRICAL CHECKOUT & TEST SHEET	

Commissioning of Equipment

GENERAL

Commissioning of the equipment can best be defined as the final adjustments and test of the installed equipment required for its proper operation. The need for commissioning is inherent, since the individual components of equipment are brought together at the installation site to operate as a system.

Mechanical and electrical commissioning are most often carried out simultaneously. Commissioning must simulate the actual operation of the system as closely as possible to demonstrate the ability to perform reliably at the specified rate in the prescribed operational sequence.

During the Commissioning Phase, it is necessary to load the equipment with product to be conveyed, which provides the means of detecting those areas requiring adjustment. Personnel will be required to support operational functions. This may serve as part of operator training and familiarity with the system. During the commissioning activity, special attention should be directed toward personnel safety. No unnecessary risks should be taken that would endanger the safety of any personnel. All personnel must familiarize themselves with all safety features of the system such as emergency stops and motor disconnects.

MECHANICAL STATIC CHECKOUT

(No power to the conveyor.)

1. The belt tension air pressure must be set to the correct pressure setting, which is dependent on sorter width. Air pressure higher than required can cause belt failure.
2. Listen for air leaks after air pressure is turned on.
3. Check the plumbing of the solenoids.
4. Follow the belt path through the entire conveyor. The belt must be threaded through the drive per the diagram in the Belt Installation section, all of the belts must be captured between the grooved guide pulleys at each diverter location, and no belt should be threaded under a crossmember (belt path labels are attached at each diverter location from the factory).
5. Visually inspect the installation. Is the conveyor straight? Is the conveyor reasonably level from side to side? From end-to-end?
6. Check guard rail clearance to product.
7. Eliminate all catch points.
8. Check conveyor elevations.
9. All bolts and set screws tight.
10. Check product clearance to overhead structures.
11. Simulate all operational functions with actual product.
12. All guards in place with proper clearance.
13. All OSHA required guards in place on walkways, catwalks, ladder-ways, floor openings, etc.
14. All labels and warning signs in proper place, unobstructed.

MECHANICAL DYNAMIC CHECKOUT

(Power to the conveyor, but no product on it.)

1. Turn the motor on. With the belt moving make sure each belt has proper tension.
2. Actuate each diverter solenoid manually.

3. Check the belt tracking.

WARNING
NBS 90 Transfer motors must be controlled to run on demand ONLY! Motors running continuously will cause component failure.

Preventive Maintenance

GENERAL

The key to ensuring the expected return on investment is to protect against premature failure with a well-planned program of preventive maintenance.

Preventive maintenance programs examine what may fail and then formulate action plans which will prevent failure or downtime. This kind of maintenance includes lubrication and replacement or repair of parts before failure but after expected life has been attained.

Preventive maintenance will save expensive downtime and wasted energy. It will increase the life of components. Along with preventive maintenance, there should be a record-keeping system. You must know what problems you have had in the past and when different components were serviced.

A visual and audible inspection should be taken every day. You can see if a chain is loose, oil leaking, sprocket worn; or you can hear a faulty bearing, noisy chain or any other noise that might indicate a problem. When something major goes wrong with some component, records should be kept to see if a pattern to the problem occurs.

All personnel working in close proximity to the conveyor should inform maintenance or their supervisor of any unusual noise.

WARNING
Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

Make sure personnel are clear of all conveyor equipment before restarting the system.

GEARMOTOR

The drive unit should be checked monthly. Check the gearmotor for leaking seals. Check the gearcase for proper oil level and add the approved oil for your particular unit. Check for overheating, vibrations and dirt buildup.

Each Nord gearmotor is supplied from the factory with the correct grade and quantity of lubricant for the specified mounting position. Under special circumstances such as high or low ambient temperatures optional oils should be used.

CHAINS AND SPROCKETS

Chains and sprockets should be checked monthly. Look for correct alignment. In time, set screws may loosen and allow the sprockets to become misaligned. Use a straight edge held parallel to both sprockets to check alignment. Shift one of the sprockets if the straight edge shows it is necessary.

WARNING

REPLACE ANY CHAIN GUARD REMOVED in order to adjust, check or lubricate chain and sprockets. Guards are furnished and installed to prevent personal injury during operation; maintain them on the unit.

Keep the chain clean and lubricated. Chains may be cleaned by wiping with a rag soaked in nonflammable cleaning solvent.

Lubrication of roller chains is essential to effectively minimize metal-to-metal bearing contact of pin-bushing joints of the chain. Oil should be applied to outside plate and inside plate edges, since access to pin-bushing area is possible only through clearances between the outside plates and the inside plates. Oil applied on the center line of the rollers cannot reach pin-bushing joints.

A good grade of non-detergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. The Lubrication Guide indicates the proper lubricant viscosity for various surrounding temperatures.

WARNING
Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.

During the monthly check, look for damaged or worn links in the chain and wear spots on sprockets. If either the chain or sprockets are worn, then both must be replaced and the cause of wear corrected.

Chains should be tightened until there is 1/2" total movement at center of span (1/4" each way of center).

ROLLERS

All rollers used in NBS equipment have precision, sealed lubed for life bearings and do not require maintenance. Periodically removing the rollers has an added benefit of distributing the wear on the bearing inner race by rotating the axle to a new position. If a defective roller bearing is found, replace the roller.

Do not allow tape, banding, shrinkwrap, etc. to build up on roller or pulleys. This can cause rollers to jam and the belt to mistrack. If this is a common occurrence due to the product packaging, clean up on a regular schedule.

WARNING
Use a blunt object to remove rollers from frame. A screwdriver or similar pointed object could slip and cause injury.

AIR SYSTEM

The best preventive maintenance for any air operated device is clean air. Always be alert for air leaks anywhere in the system and correct promptly. Check all air line filter bowls weekly for accumulated water and drain if necessary. Check for proper PSI settings on air regulators.

MAINTENANCE SCHEDULE CAUTION
Check to confirm tools and foreign objects have not been left on or inside the conveyor.
Check to confirm all loosened parts have been retightened.

Check to confirm all guards have been installed.

WARNING
Prohibit riding on conveyor by anyone.
Think before making any adjustments. It may prevent an injury. Remember, all moving components are potentially dangerous.
Protect yourself from unexpected starts when working on a stopped unit by locking and tagging the control panel or disconnect switch that supplies power to the unit.

MOTOR CONTROLS
Inspection (Semi-Yearly)

WARNING
Before servicing or performing any work in the motor control panel, disconnect and lockout the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.

Excessive overheating is indicated by discoloration of components. Most often, these symptoms are a sign of loose connections. If left uncorrected this can eventually cause arcing between components, leading to destruction of the controls. It is normal to find the interior of the control cabinet very warm when it is first opened.

The condition of contacts must be checked on all contactors and starters that show signs of overheating. Make sure that they are free of dust and are not excessively pitted or burned. When badly burned or worn, the contacts must be replaced.

In the course of inspecting contact condition, spring pressure should be checked. As contact surface wears down, spring pressure can be lost because of the overheating. Contact spring resiliency can usually be detected by fingertip pressure.

Check for faulty door gaskets especially when there are excessive deposits of foreign materials. Particular attention should be given to conductive deposits because they can cause flashovers and premature component failure when allowed to collect to any great extent. Either reposition or replace defective gaskets and clean the control cabinet.

CAUTION
Avoid touching components until they have had time to cool. Some may still be hot.

Check all overload settings on motor controls. Check for loose wiring and tighten as required.

CLEANING

When cleaning a control cabinet, it is best to use a vacuum cleaner rather than compressed air. A vacuum cleaner removes rather than redistributes dust and dirt. Compressed air can damage and displace relay contacts and springs.

NBS Maintenance Checklist

1. End Pulley Assembly

a) Examine end pulley assembly. Remove any residue clinging to end pulley, and end pulley snubber.
b) Check to see if belt is tracked correctly thru lower belt guide wheels. Examine guide wheels for wear. Replace any wheels that are excessively worn.
c) Remove any residue or build up of fibers between UHMW track at joints.

2.) Intermediate Bed Assembly

a) Remove any residue or build up of fibers between UHMW track at joints.
b) Remove any residue or build up on carrier rollers.

3.) Drive Assembly

a) Examine drive pulley for excessive lagging wear.
b) Remove any residue built up on drive pulley.
c) Check to see if belt is tracked correctly thru lower belt guide wheels. Examine guide wheels for wear. Replace any wheels that are excessively worn.
d) Examine belt guide feeder rollers. Remove any residue built up on rollers.
e) Examine individual take up wheels for wear. Clean off any build up on wheels.
f) Examine take up snubber pulleys. Clean off any residue built up on pulleys.
g) Check chain tension. An over tensioned chain will cause excessive gearbox noise

4.) Transfer Module

a) Remove any residue or build up on transfer rollers.
b) Check tension of both timing belts. (Drive and jump belts)
c) Check height of transfer rollers above the belt top surface. Check the plane passing over the transfer rollers for level and parallelism to belt surfaces. Replace any missing hardware, and tighten any loose hardware.

6.) Encoder

a) Remove any residue or buildup on encoder wheels.

Maintenance Schedule

Periodic maintenance intervals shown may vary with load, speed, hours of daily operation, ambient temperature, humidity, etc. Intervals can be established by fairly frequent maintenance at first, then lengthen the intervals as justified by observation of need based on history. The following is based on 5 days per week, 8 hours per day under normal conditions.

Daily

- Listen to everything for unusual noises or vibration.
- Visually inspect to see that conveyor sections are clear and free of debris.
- Check to see that all safety guards are in place.
- Check any oil leakage.
- Check any unusual noises or vibration.
- Check for loose bolts or parts.
- Check air filter bowls for accumulated water.
- Listen for air leaks.

Weekly

- Inspect bearings, gear reducers and motors for excessive noise or heat.
- Clean breather cap on gear motor (if used).
- Check operation of all electrical controls.
- Inspect motor mounting bolts.
- Check for proper PSI on air regulators.

WARNING
Prohibit riding on conveyor by anyone.
Think before making any adjustments. It may prevent an injury. Remember, all moving components are potentially dangerous.
Protect yourself from unexpected starts when working on a stopped unit by locking and tagging the control panel or disconnect switch that supplies power to the unit.

Monthly

- Check air filters for cleanliness.
- Clean chains and sprockets and lubricate with SAE 30 weight oil or equivalent. (Check chain tension and tightness of all adjusting screws.)
- Check drive unit for leaking seals and oil level in gearcase (if applicable), unusual noises, vibration and stress cracks.

Semi-Yearly

- If dry sounding, lubricate unsealed bearings in rollers with light oil. Check free spin of rollers.
- Drain and flush gearcase after each 2,500 hours of normal operation or at least every 6 months (if applicable).
- Grease motor shaft bearings.
- Inspect and clean motor control centers.

- Grease regreasable bearings.

Yearly

- Change oil in gearboxes.
- Inspect tightness of all nuts and bolts on units. Readjust and, if necessary, retighten.
- Check for plumb and level. Shims have been known to vibrate out from under supports in isolated incidents.
- Touch up paint that has been chipped. Unpainted surfaces will rust.
- Inspect for stress/fatigue cracks in frame and supports.

CAUTION
Check to confirm tools and foreign objects have not been left on or inside the conveyor.
Check to confirm all loosened parts have been retightened.
Check to confirm all guards have been installed.

Repair Procedures

WARNING
Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work areas.

Make sure personnel are clear of all conveyor equipment before restarting the system. Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.

CHAIN & SPROCKETS

Lubrication of roller chains is essential to effectively minimize metal-to-metal bearing contact of pin-bushing joints in the chain. Oil should be applied to outside and inside plate edges, since access to the pin-bushing area is possible only through clearances between the outside plates and the inside plates. Oil applied on the center line of the rollers cannot reach pin-bushing joints.

Chain drives should be protected against dirt and moisture. Oil supply should be kept free of contamination. A good grade of non-detergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. The following table indicates the proper lubricant viscosity for various surrounding temperatures.

Temperature Degrees F	Recommended Lubricant
20 to 40	SAE 20
40 to 100	SAE 30
100 to 120	SAE 40
120 to 140	SAE 50

Inspection includes:
1. Lubrication check for dirt, grit, or chips and clean if necessary by soaking chain in nonflammable cleaning solvent
2. Sprocket alignment (see following text)
3. Wear on the inner surfaces of the roller chain link plates
4. Sprocket tooth wear
5. Chain tension (see following text)
6. Set screw tightness (5/16-18 at 13 ft./lbs. & 1/4-20 at 6 ft./lbs.)

SPROCKET ALIGNMENT
1. Loosen sprocket.
2. Align loose sprocket to the other by laying a straight edge across their faces or along the chain.
3. Retighten the loose sprocket.

CHAIN TENSION
Chain should be checked for excessive slack, if the chain is running close to the tips of the sprocket teeth. This can be checked by lifting the chain away from the large sprocket, making sure the chain is in mesh with the sprocket teeth. Excess clearance is conclusive evidence that the chain has elongated in pitch and no amount of tension adjustment will keep it properly meshed with the sprocket teeth.

Continued operation will quickly destroy the sprocket teeth which otherwise may be good. If the sprocket is still serviceable, replace the chain.

TENSION ADJUSTMENT
1. Loosen mounting bolts of tension.
2. Increase tension up to 1/2" of total slack (1/4" each way of center).
3. Turn adjusting bolts on gearbox plate or move gearbox in mounting slots until there is 1/2" total chain slack.
4. Retighten all bolts after checking alignment.

If a chain should break or fail due to overload, neglect or accident, those portions of the chain which appear to remain intact are, in all probability, damaged and subject to early failure if continued in service. Replace the entire chain and sprockets.

REDUCERS/GEARMOTORS

NBS drive units use gearmotors which are properly filled at the factory with sufficient lubrication for their mounting position. A mineral oil based lubrication (Mobilegear 630) is the standard lube supplied. An optional synthetic lube is also available that is compatable with the standard lube (Mobilgear SHC630).

Disassembly/assembly procedure as follows:
1. Remove necessary guards to access maintenance areas.
2. Disconnect drive chain from drive sprockets by removing the master link.
3. Disconnect any electrical connection.
4. Remove reducer or gearmotor.
5. Perform required maintenance.
6. Reverse procedures for assembly.
7. After all fasteners are tight, double check chain tension and sprocket alignment.
8. Replace all guards.

Regularly inspect all gearbox reducers to guarantee maximum performance.
1. Tightness of bolts and screws
2. Correct alignment of shaft and couplings
3. No major oil leaks
4. No excessive heating
5. No unusual vibration or noise

Enclosed gear drives (except those tagged as prelubricated) require filling to the proper oil level before operating as indicated. Equivalent lubricants should conform to AGMA Standard Specification No. 250.03 applying to the AGMA Lubricant Number indicated for the required ambient range. Service life and efficiency of gears and bearings will be affected by oxidation or contamination of oil used. Improved performance will be obtained by periodic lubrication at regular intervals of approximately 2,500 hours of operation or six months, whichever comes first.

WARNING
Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

SOLENOID VALVES

In order to minimize downtime, it is normally not feasible to repair malfunctioning electrical or valve components while leaving the conveyor unusable. Spare components should be kept in stock for emergency replacement. If feasible, the part may be repaired later to replace maintenance stock. Items which cannot be readily repaired or are questionable should be replaced. Components under warranty should not be repaired except in an emergency.

WARNING
Before removing a valve or other pneumatic component, shut off and exhaust the entire pneumatic circuit and shut off and lockout electrical supply.

SENSING SWITCHES

Sensing switches are of two types:
retroreflective photoeye and proximity switch.

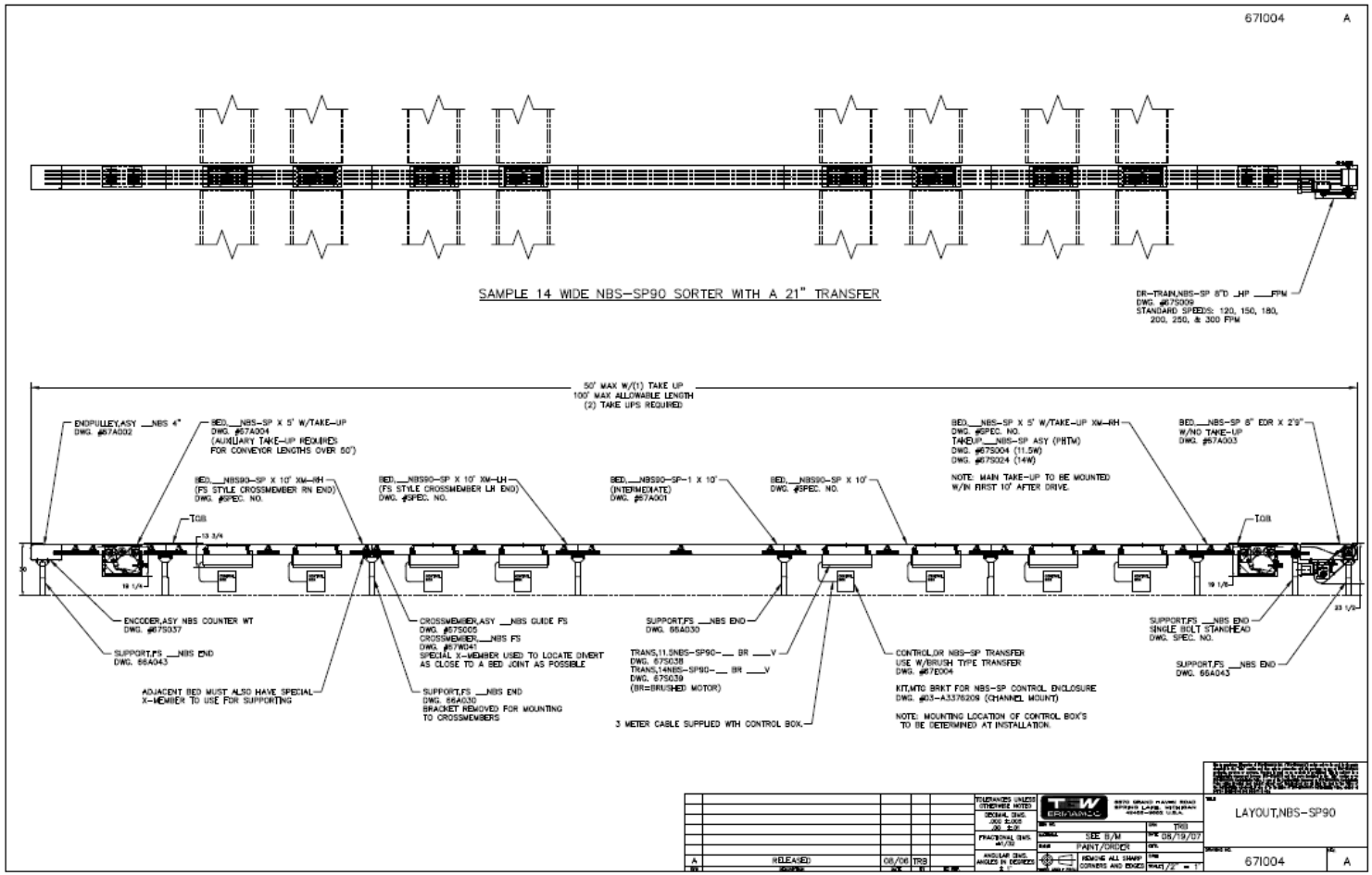
Adjust the retroreflective type as follows:

1. Determine what sizes of target the photoeye must sense.
2. Adjust for the worst case, usually smallest item, by loosening photoeye mounting nut and aligning while making sure photoeye has unobstructed view of reflector.
3. Move the target in and out of the field of detection to ensure that the photoeye energizes and de-energizes.

Adjust the proximity type as follows:

1. Loosen proximity switch mounting bolt and adjust sensing switch so that the product passes directly in front of the switch face, as close to the switch face as possible without making contact.
2. Check that the proximity switch energizes and de-energizes as the product passes in front of the switch face.
3. Tighten the mounting bolt.

General NBS90-SP Sorter Layout



Parts Identification

This section is used to identify parts that may require replacement during the life of the sorter.

Parts which specifically pertain to NBS 90SP are included with illustrations.

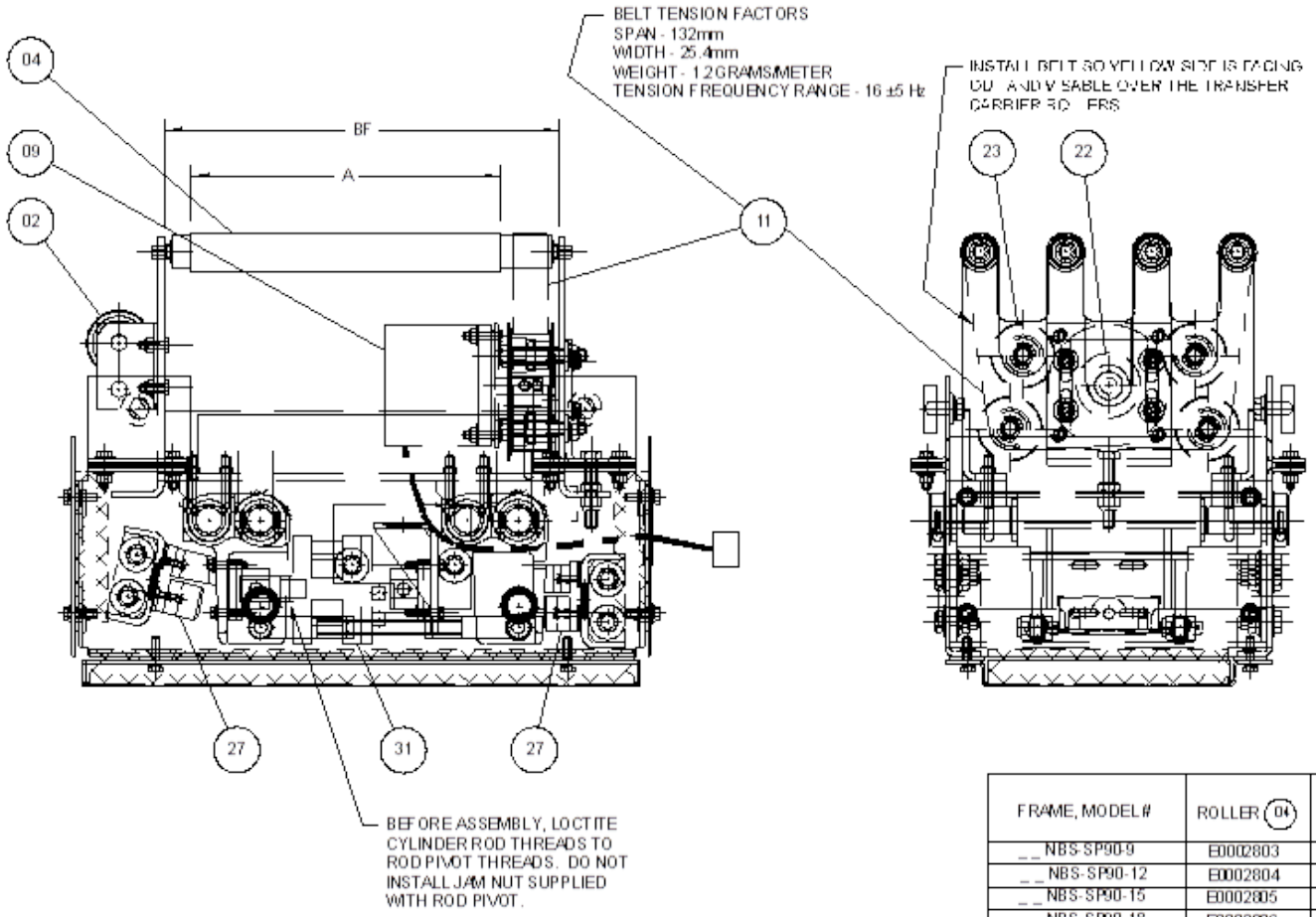
A "Recommended Spare Parts List" is published for all conveyor orders of $20,000 or more. This spare parts list is sent to the purchaser approximately (2) weeks after the order is received. It includes part numbers, description, pricing and recommended quantities to be kept for maintenance.

If you are unable to locate this document (order under $20,000 and not sent) another may be obtained by contacting MHS Conveyor Customer Support at 231-798-4547 or Fax 231-798-4146.

To identify a part and its part number, refer to the assemblies and devices on the following pages. Determine the balloon number for the required part and reference the composite parts list.

NBS SP Transfer Assembly Replacement Parts Diagram

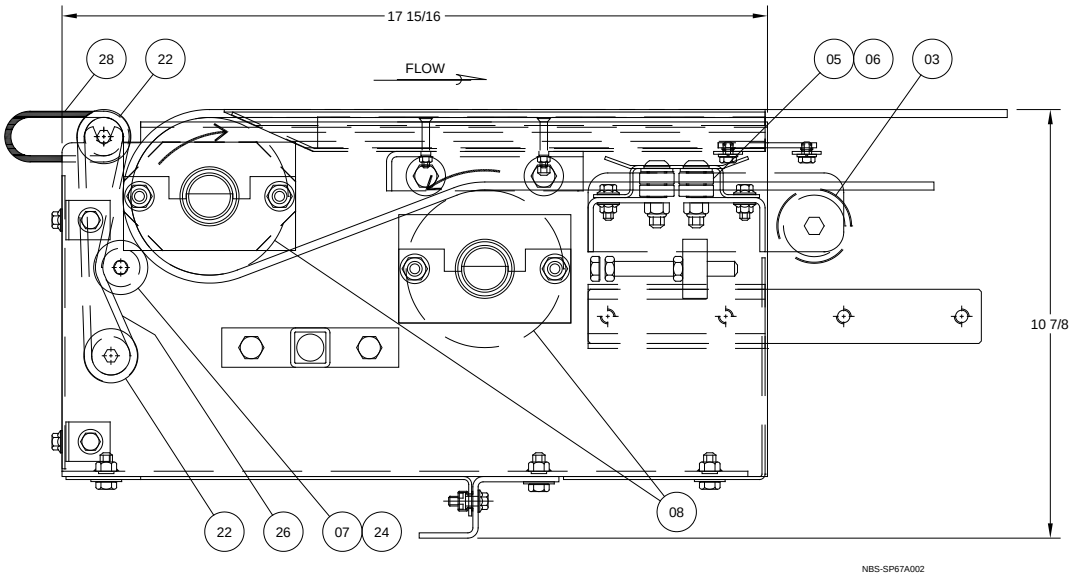
TRANSFER WIDTH	ROLLER,RETURN	MTR,BRUSHLESS	BRUSH MTR	BELT,HABISIT	SHEAVE,DRIVE	IDLER WHEEL	BUMPER ASY	AIR CYL, FLAT
	(02)	(09)	(04)	(11)	(22)	(23)	(27)	(31)
11.5 NBS-SP90	E0002809	E0002079	E0002384	E0002959	E0002808	E0002812	E0042754	E0042751
14 NBS-SP90	E0002810	E0002079	E0002384	E0003073	E0002808	E0002812	E0042754	E0042751



FRAME, MODEL#	ROLLER (04)	BF	A
_ _ NBS-SP90-9	E0002803	11 1/2	9
_ _ NBS-SP90-12	E0002804	14 1/2	12
_ _ NBS-SP90-15	E0002805	17 1/2	15
_ _ NBS-SP90-18	E0002806	20 1/2	18
_ _ NBS-SP90-21	E0002807	23 1/2	21

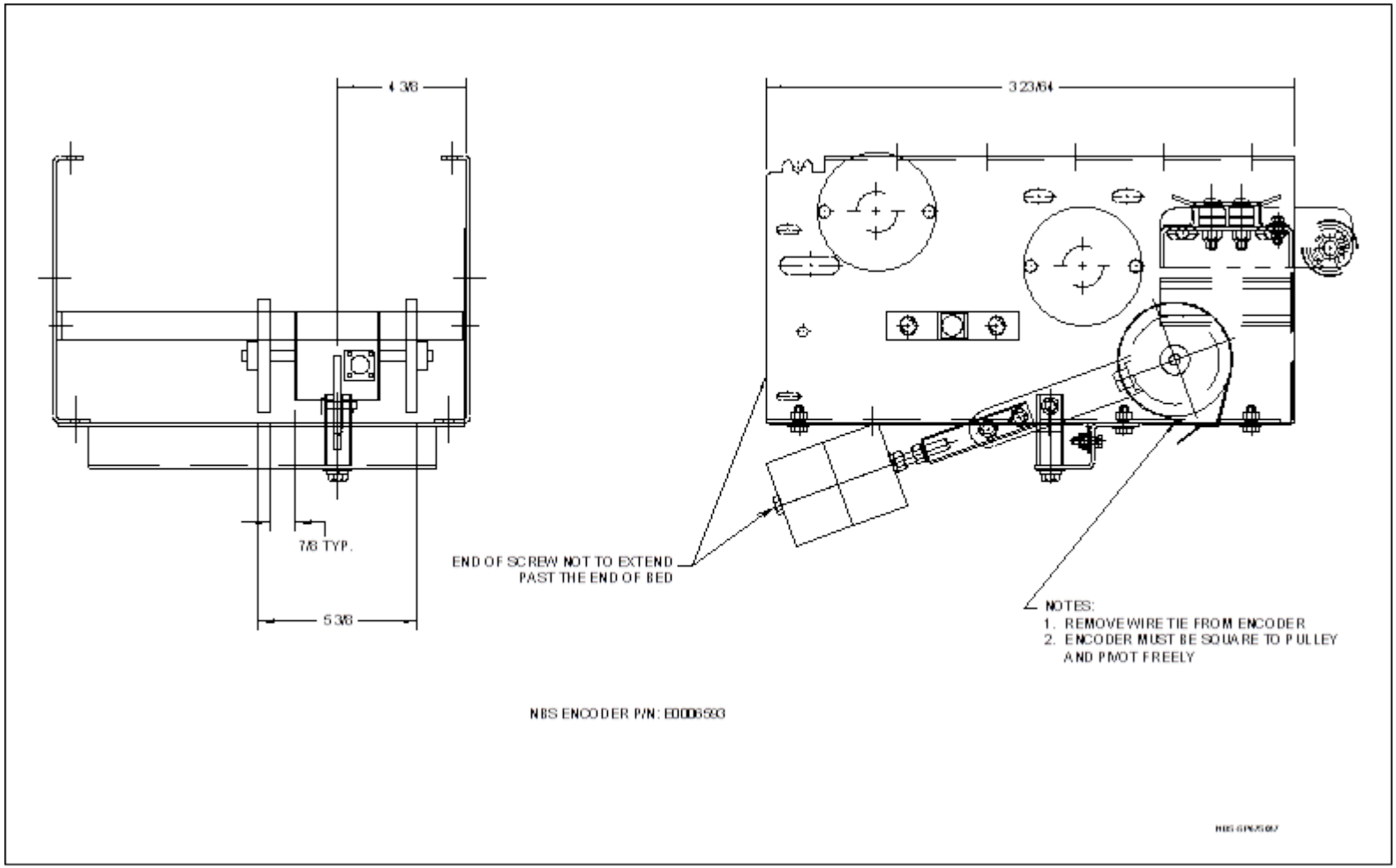
11.5 NBS-SP90 TRANSFER (SHOWN)

NBS SP End Pulley Assembly Replacement Parts Diagram



Replacement Part Numbers for NBS SP End Pulley Assembly					
				11.5NBS-SP	**14NBS-SP**
		ENDPULLEY,ASY _ _._NBS-SP		E0002850	E0002851
BALLOON	**ITEM #**	**DESCRIPTION**	**QTY**		
03		ROLLER,RET _ _._NBS-SP 1.9PRBG	1	E0002714	E0002715
05	90050111	BRG, 7/8 OD X 9/32 WIDE		12	16
06	E0002333	WASHER, 1/2 OD X 1/32 THICK		18	24
07	E0002716	ROLLER, SLIDE 11/32 HEX NBS-SP	2		
08		PULLEY,ASY 4" DIA _ _._ NBS-SP	2	E0002760	E0002761
22		ROLLER,SLV _ _._NBS-SP ENDPULLEY	2	E0002816	E0002817
24		ROLLER,IDLER _ _._NBS-SP 4"END	1	E0002818	E0002819
26	90530009	ORING,83A ST DR 3/16 X 13-1/2"	2		
28	E0001299	ORING,83A 5/32 X 6-1/4" ST TRANS	1		

NBS SP Encoder Assembly



MISSION

To meet or exceed all customer expectations by providing the highest quality products and services, on time, at exceptional value, in an environment which promotes safety and personal development.

MHS Conveyor
1300 E Mount Garfield Road
Norton Shores MI 49441-6097 USA
231.798.4547
Email: us-info@mhs-conveyor.com
Web Site: mhs-conveyor.com

Regional sales offices and authorized Business Partners located throughout the United States and Canada.
Licensees and Business Partners in Europe, South America and Southeast Asia.