

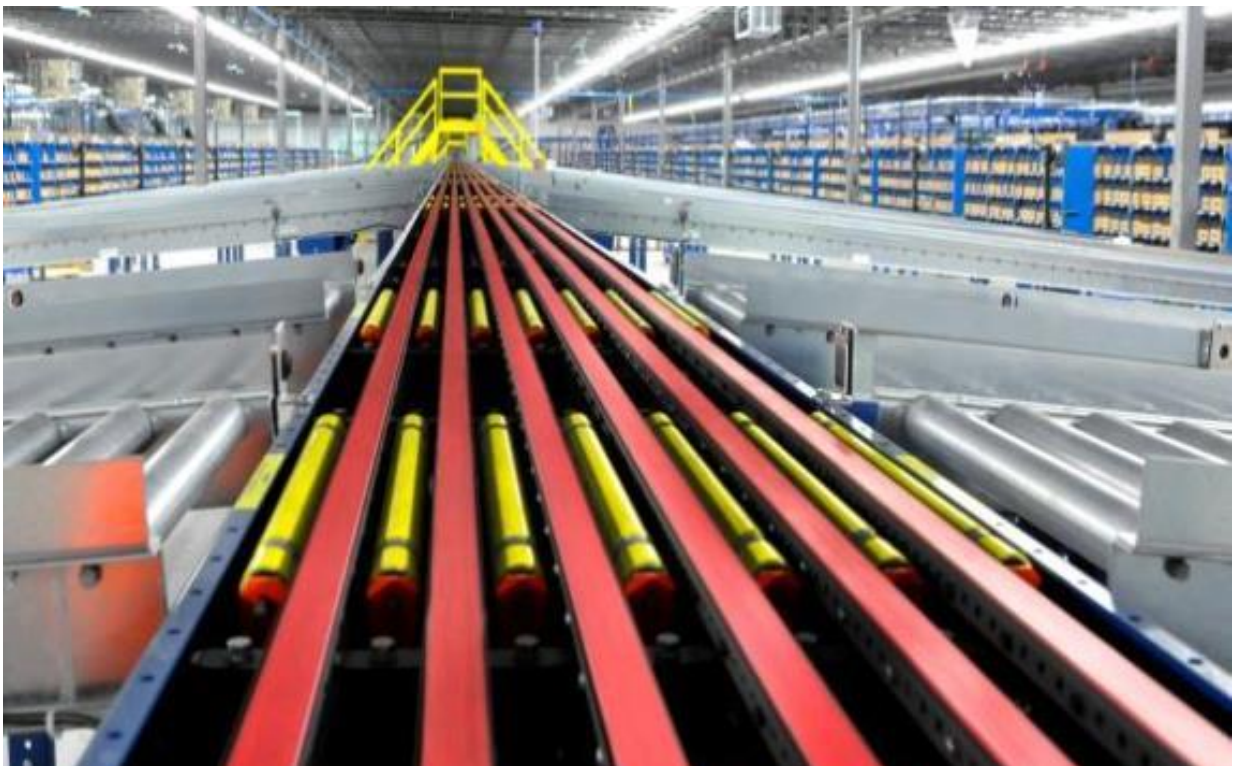
# INSTALLATION, OPERATION, MAINTENANCE MANUAL



## NBS<sup>®</sup>BR IOM

### Narrow Belt Sorter – Low Friction Bearing Rail

PN 1116149  
Revision Date: October 28, 2014





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## 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-BR (Narrow Belt Sorter – Bearing Rail).

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 TGW Distributor or TGW Lifetime Services at 231-798-4547 or Fax 231-798-4549.

## MHS Conveyor 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 MHS Conveyor 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.

### IMPORTANT

*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.*

*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 08/22/2011



## Conveyor Design and Safety Guidelines

A safety risk evaluation is required for all of our standard equipment. The safety risk evaluation considers every potential hazard on the conveyor, weighs the probability and the severity of the potential injury, and addresses methods of mitigation to make the risk of injury either low or negligible. We use the ANSI B11 TR3 standards for all of our risk evaluation.

In addition, all of our equipment is designed to comply with the following national and industry standards:

CEMA Safety Standards and Labels - (CEMA is the Conveyor Equipment Manufacturers Association)

ASME B20.1- Safety standard for Conveyors and Related Equipment

ASME B15.1 – Safety standard for Mechanical Power Transmission Apparatus

OSHA 1910.147 – The Control of Hazardous Energy

OSHA 1910.212 - General Requirements for all Machines

OSHA 1910.95 – Occupational Noise Exposure

ANSI 2535 – Safety Color Code

Product Life Cycle Testing Criteria:

- 10,800 hours (one shift for five years) or 20,000,000 cycles for transfers before replacement parts are required.

## TGW Safety Recommendation

For additional safety information: TGW agrees to the following safety instruction or guidelines listed within this manual. This is not to conflict with your state or legal requirements.

TGW Recommends for maintenance or repair purposes, to incorporate a lock out or tag procedure. To ensure all starting devices, prime movers, or powered accessories are off before attempting to maintenance or repair.

The procedures below are designed to protect everyone involved with the conveyor against an unexpected restart. To include understanding of potential hazard of stored energy, which can exist after the power source is locked out.

For additional information, refer to the latest issue of ANSI Z244.1, American National Standard for Personnel Protection – Lockout/Tagout of Energy Sources– Minimum Safety Requirements. <http://www.ansi.org/>

OSHA 29CFR Part 1910.147 “*Control of Hazardous Energy Sources (Lockout/Tagout)*”, which includes requirements for release of stored energy and OSHA Safety and Health Regulations for Construction 1926.555 Conveyors <https://www.osha.gov/>

## ANSI Standards for Conveyors

It is essential for safe and efficient system operation that safety information and guidelines presented here are properly understood and implemented.

TGW recognizes American National Standard Institute (ANSI) booklet entitled *Safety Standards for Conveyors and Related Equipment B20.1*. For more information go to: <http://webstore.ansi.org/default.aspx>

With any piece of industrial equipment, conditions exist that might cause injury to you or your co-workers. Because it is not possible to describe each potentially hazardous situation that might develop, you must be alert at all times for unsafe conditions. To avoid injury, use maximum possible care and common sense and adhere to all safety standards.

Take special care while maintaining and inspecting electrical equipment and devices. All personnel working on or around the system should be aware of, and adhere to, all **CAUTION**, **DANGER**, and **WARNING** signs.

Labels or signs are posted to reduce the risk of injury to all personnel. Never assume that the signs and notices are applicable only to inexperienced personnel. Maintain signs in a legible condition. Contact your supervisor to post additional safety signs if you feel they are necessary. <http://www.ansi.org/>



### ANSI Conveyor Safety Rules

Conveyor safety rules, as well as specific regulations and guidelines listed in this publication:

- DO NOT touch moving Conveyor parts.
- DO NOT walk, ride, or climb on the Conveyor.
- DO NOT operate the Conveyor with chain guards or other protective guards removed.
- Keep jewelry, clothing, hair, etc., away from the Conveyor.
- Know the location and function of all start/stop devices and keep those devices free from obstruction.
- Clear all personnel from the equipment before starting the Conveyor.
- DO NOT attempt to clear product jams while the Conveyor is running.
- Allow only trained and authorized personnel to maintain or repair Conveyor equipment.
- DO NOT load the Conveyor beyond specified design limits.
- DO NOT attempt to make repairs to the Conveyor while it is running.
- DO NOT modify equipment without checking with the manufacturer.
- DO NOT operate or perform maintenance on equipment when taking any type of drug, sedative, when under the influence of alcohol, or when over fatigued.
- Report any unsafe condition to your supervisor or maintenance staff.

## Conveyor Equipment Manufacturers Association (CEMA)

The Conveyor Equipment Manufacturers Association (CEMA) provides safety information related to conveyor systems. There are Conveyor Safety Video and Conveyor Safety Poster produced by CEMA.



TGW recommends these video for training and education purposes for a safe working environment around conveyor equipment. The video introduces awareness of operation personnel maintenance technicians, and management to safety hazards commonly associated with the automated material handling conveyor equipment.

Safety poster reviews the important safety labels and is intended to be posted in public places as a day-to-day reinforcement of good safety practices.

Both the safety poster and the video can be purchased from CEMA ([www.cemanet.org](http://www.cemanet.org)). Visit their web site – [www.cemanet.org](http://www.cemanet.org) for additional information or contact them at:



Conveyor Equipment Manufactures Association  
6724 Lone Oak Blvd. Naples FL 34109  
Phone (941) 514-3470

### ***CEMA Safety Label Meanings***

The word or words that designate a degree or level of hazard seriousness. The signal words for product safety signa are: DANGER, WARNING, and CAUTION.



- **DANGER** -Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.
- **WARNING** – Indicates potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.
- **CAUTION** – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

## Warnings and Safety Instructions

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

Your MHS Conveyor 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-related components – including sprockets, belts, shafts, universal joints and pneumatic devices – can be dangerous. We have installed or provided guards to prevent accidental contact with these parts, along with warning labels to identify the hazards.

Special attention must be paid to the following areas of this manual:

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</li></ul>

<b>CAUTION</b>	
<ul style="list-style-type: none"><li>Indicates a situation which, if not avoided, could result in property damage.</li></ul>	

### NOTE

This is where you will be notified of helpful information.



## WARNING



After maintenance, REPLACE guards immediately.  
Keep ALL warning labels clean and clear of any obstructions. Never remove, deface or paint over WARNING or CAUTION labels. Any damaged label will be replaced by MHS Conveyor at no cost by contacting Lifetime Services.  
It is very important to instruct personnel in proper conveyor use including the location and function of all controls.  
Special emphasis must be given to emergency stop procedures. 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.  
Loose clothing, long hair and jewelry must be kept away from moving equipment.  
Maintain enough clearance on each side of all conveyor units for safe adjustment and maintenance of all components.  
Provide crossovers or gates at sufficient intervals where needed to eliminate the temptation for personnel to climb over or under any conveyor.  
Walking or riding on a moving conveyor must be prohibited.  
Before performing maintenance on the conveyor, make sure 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 crew member is working on the conveyor, **EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCKOUT.**  
All pneumatic devices must be de-energized and air removed to prevent accidental cycling of the device while performing general maintenance.  
Make sure all personnel are clear of all conveyor equipment before restarting the system.  
Before servicing or performing any work in the motor control panel, disconnect and lock out the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.



## WARNING



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



**CEMA Safety Labels****Placement Guidelines****Product: Unit Handling****Equipment: Belt Driven Live Roller Conveyors - Center and End Driven**

To be located on conveyors where there are exposed moving parts which must be unguarded to facilitate function, i.e. rollers, pulleys, shafts, chains, etc.

To be placed along both sides of these conveyors since these conveyors provide surfaces and profiles attractive, but hazardous, for climbing, sitting, walking, or riding.

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards

**"A"**

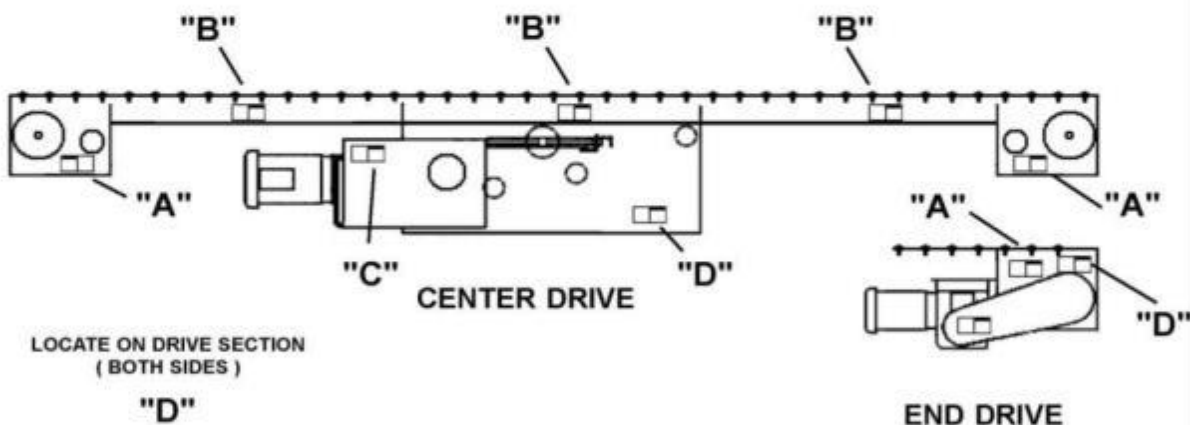
LOCATE AT TERMINAL ENDS  
( BOTH SIDES )

**"B"**

SPACE UP TO A MAXIMUM OF 20 FT.  
CENTERS ( BOTH SIDES )

**"C"**

LOCATE ON DRIVE GUARDS  
AND CHAIN / BELT GUARDS



LOCATE ON DRIVE SECTION  
( BOTH SIDES )

**"D"**

General purpose label to warn maintenance personnel that conveyors should be shut off and locked out prior to servicing; Examples: drives, take-ups, lubrication points which require guard removal.



CEMA - October, 2004

UH - 4





# Package Conveyors



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

POST IN PROMINENT AREA

## Definition of Terms

Definition of Terms		
KEY WORD	ABBREVIATION	DESCRIPTION
ALUMINUM RAIL	AR	Original NBS UHMW belt guide holders
AIRBAG		Inflatable lifting device used in NBS30
BEARING	BRG	Low friction rotating or sliding device
BEAR RAIL	BR	NBS-BR belt guides composed of small ball bearings between steel side rails
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	Holds two parts together (Mechanical or Electrical)
CONSTRUCTION ORDER	CO	Item number of modified standard
CROSSMEMBER	XM	Holds channels apart
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 distance counter used to track package location along the sorter length
END PULLEY	E-PULL	4" or 5" diameter roller at charge end of NBS sorter
EXTRUSION		Aluminum base that holds UHMW belt strips (See ALUMINUM
FEET PER MINUTE	FPM	Speed sorter belts are traveling
FILTER / REGULATOR		Combination air pressure air filter / regulator
FLOOR STAND	FS	Name for conveyor bed support
FLOW CONTROL		Needle valve used to control airflow
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	IDL	Un-driven pulley used as a tensioning device
ITEM NUMBER	IT #	TGW Systems part identification 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
MODULE	MOD	A self-contained mechanical assembly
MOUNT	MNT	Part used to hold another, similar to a bracket

## Definition of Terms Continued

Definition of Terms		
KEY WORD	ABBREVIATION	DESCRIPTION
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
ORDER NUMBER	11	Original factory order / tracking number
O-RING		Polyurethane cord belts of differing lengths
PHOTOEYE	PE	Optical sensing device used for product control
PLATE	PL	Flat piece of metal usually bolted on for strength
PROGRAMMABLE LOGIC CONTROLLER	PLC	Self-contained programmable control unit that can control several input and output devices
PULLEY		Roller described by diameter and body length
REFLECTOR	RF	Target used to reflect a light back to a photo eye
REGULATOR	REG	Air device that reduces pressure to usable level
ROLLER		Described by axle size and BF dimension
SCANNER		A device that recognizes products by bar codes
SCHEMATIC		Line drawing of a electrical or pneumatic circuit
SEAL		Sealing device on a rotating shaft or cylinder rod
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	SKW	2" diameter X 5/8" wide X 1/4" axle hole roller
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
TRANSFER	TRNS	NBS90 and NBS-SP module
ULTRA HIGH MOLECULAR WEIGHT	UHMW	Industry standard term for the hard milky white Polyethylene used in wear strip applications
VALVE		An air shut-off or switching device
VENT		Small hole in gearbox to allow air expansion
WEARSTRIP		Low-friction material used to reduce rubbing wear
WELDMENT	WLDMT	Any part that requires welding in its manufacture
VFD	VFD	Variable Frequency Drive for motor speed control

## Introduction to Narrow Belt Sortation

### ***Concept***

The MHS Conveyor NBS Narrow Belt Sorter technology was developed to provide an economic alternative to other sortation devices, as well as providing sorting options that were not easily available. This technology is similar to sorters that use wide flat load carrying belts and pop-up wheels to divert product but has eliminated many of the high cost / maintenance features associated with these sorters. Limitations on availability of bi-directional diverts, long divert lane center-line distances, as well as the high costs associated with the skilled labor required to install these wide belts have been addressed with this technology.

### ***Features and Benefits***

Features and benefits common to the NBS 30, NBS 90 low friction rail technologies include:

- Product is continuously carried on multiple narrow belts for smooth bump-free conveying and excellent tracking accuracy
- Narrow belts slide on low friction roller bearing guides, resulting in reduced noise and virtually eliminating tracking problems
- Multiple narrow belts are progressively guided through the sorter to minimize belt tracking issues
- Narrow belts run flat and straight through NBS modules without snubbing or back-wrapping resulting in reduced horsepower requirements
- Simple user-friendly design allows ease of installation and maintenance
- Compact modular design of modules allows closer divert/transfer lane center distances
- Modularity and universal mounting of modules allows easy repositioning or reconfiguration in the field
- Gravity take-aways or spurs may be used in many applications to lower initial costs
- NBS technology costs less than conventional full width belt sorters in material as well as installation costs



***NBS 30 and NBS 30 WAVE™***

- Simple 30 degree diverter design means less maintenance and higher uptime
- Diverters use proven true vertical lift for reliability, consistency and low cost 3 rows and 5 rows only.
- High friction, diverter wheels with precision bearings for positive quiet sorting
- Conveyor Action allows for close product centers and higher through put rates.

***NBS-90 & NBS90-SL***

- Separate drive within the transfer module allows a space saving single or bidirectional unit NBS90 is driven with a MOVIMOT motor. NBS-SL is driven off the return side of the belt.
- Coated rollers allow positive product acceleration and transfer rate
- Pickup of product “on the fly” allows maximized sort rate



## NBS Application

### ***NBS Selection Guidelines***

#### ***Use NBS when:***

- Medium to high speed sortation is required
- Product may be same size and weight, or mixed
- Product weight: 1-75 lbs., 1500 lbs. total load
- Product size: 6" x 9" Min -- 28" x 28" Max
- Ambient temperature is +33° to 120°F

#### ***Application Notes***

1. Matching conveyor rates before and after NBS sortation are vital to proper application decisions.
2. The take-away lanes from NBS can be either Skatewheel / gravity (used as a deceleration area), or powered conveyor, run at a speed, which can receive products as fast as they are released from the NBS.
3. The maximum divert rate for a NBS 30 is 100 CPM (18" X 18" cases moving at 300 feet per minute); for NBS 30 WAVE it is 200 CPM at 425 FPM; for NBS 90 it is 65 CPM, and single-direction, bi-directional rate it is 55 CPM.
4. When feeding NBS sortation, use a split metering belt to singulate individual products with a minimum gap of 18". For NBS 30 WAVE, minimum gap is 6".
5. For NBS30 and NBS 30 WAVE justify all products along the divert lane side of the NBS sorter.
6. When the NBS over-all-length is over 80', a 6' drive bed with an automatic air take-up is required.
7. The maximum length of a NBS sortation conveyor is 200'.
8. The Gearmotors used for NBS drives are all VFD (variable frequency drive) rated.

### **CAUTION**

- The use of a VFD (Variable Frequency Drive) is required for NBS drive motor control. Ignoring this point will void the belt and motor manufacturer's warranty.

#### ***Elevation (TOB)***

The minimum elevation at the discharge end of an NBS sortation line is 24". The drive unit, located at the discharge end requires a minimum TOB to floor elevation of 24". The length of the drive is based on the overall length, under 100' is a 5' drive bed and over 100' would be a 6' drive bed. Extra room alongside the drive should be provided to allow maintenance personnel access to either side of the drive unit.

***Divert Locations***

- The leading edge of the first divert module must be a minimum of 28" from the charge end of the sorter.
- The trailing edge of the last divert module must be a minimum of 70" (5' DR bed) and 80" (6' DR bed) from the discharge end.
- The leading edge of a 30° spur mounts 6" ahead (upstream) of the center line of the second row of wheels on a NBS 30 divert.
- The leading edge of a 30° spur mounts 13½" ahead (upstream) of the FOURTH roller on an NBS 30 WAVE divert.
- The location of a divert lane is centered or slightly downstream of the center line of the transfer rollers in a NBS 90.
- One NBS 90 transfer with rollers up to 45" in length can transfer to two or four separate lanes.
- A single direction transfer to two lanes is called a "Dual Transfer"
- A bi-direction transfer to two lanes each side is called a "Quad Transfer"

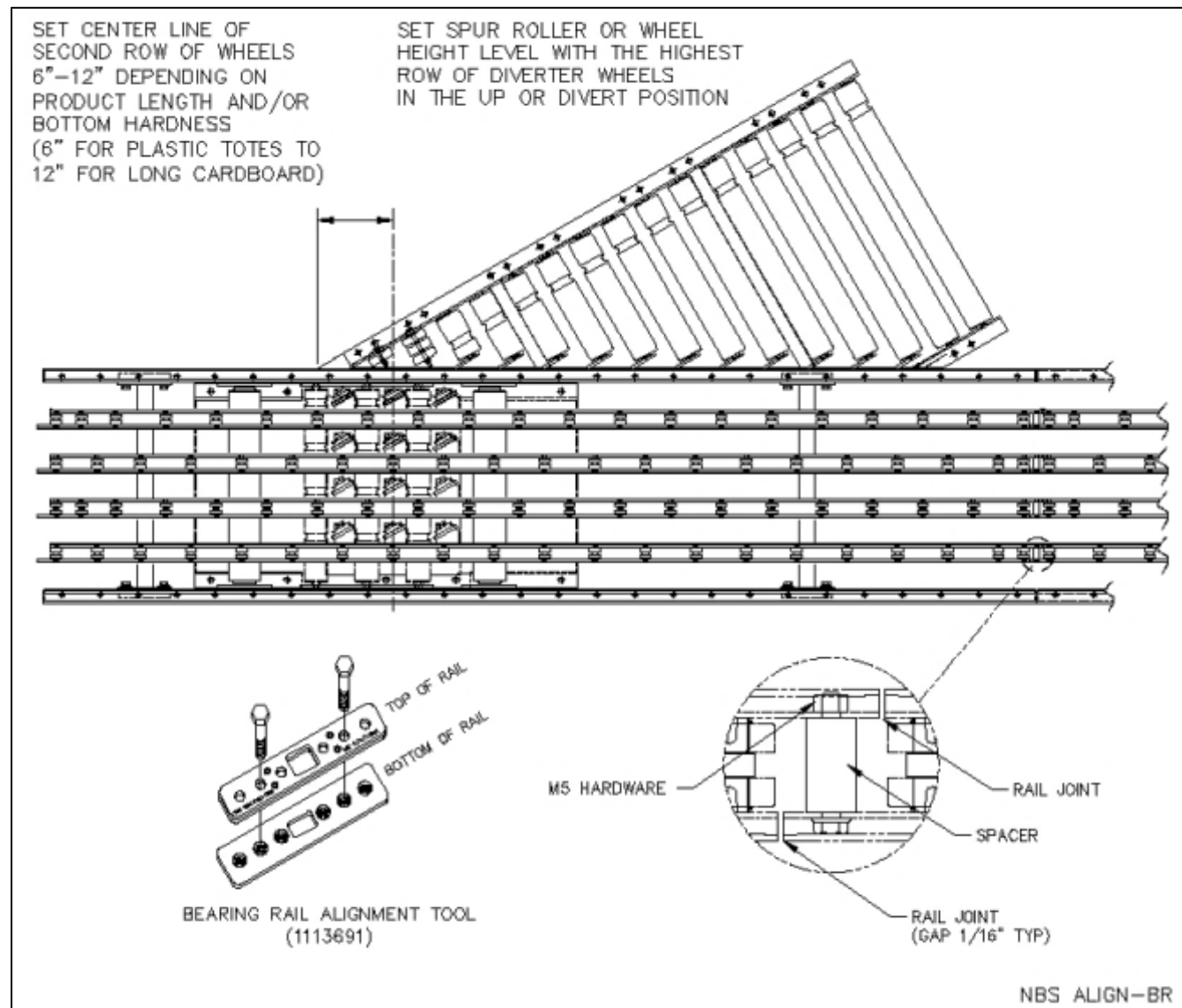
***Available Drive Selections***

- 2 HP @ 120, 150, 180 FPM
- 2 HP @ 200, 220, 250, 300 FPM
- 3 HP @ 180, 200, 220, 250, 300 FPM
- 5 HP @ 250, 300 FPM
- 7.5 HP @ 300, 325, 375, 425 FPM

***Sorter Nominal Widths (Number of belts)***

- 18" with 4 Belts on 3-1/2" Centers
- 25" with 6 Belts on 3-1/2" Centers
- 32" with 8 Belts on 3-1/2" Centers

## NBS-30 SPUR LOCATION



SPUR NOTES:  
THESE ARE GUIDELINES ONLY!  
ADDITIONAL FIELD TUNING MAY BE NECESSARY!

CONVEYOR RUNNING MIXED PRODUCT  
SHOULD BE SET UP TO WORK WITH THE  
TOTES, FLARE INSIDE GUARD RAIL TO  
ACCEPT BOX'S.

SPURS FOR TOTES OR MIXED PRODUCTS SHOULD  
HAVE URETHANE COATED ROLLERS OVER 350 RPM

### RECOMMENDED CONVEYOR/SPUR COMBINATIONS

- TOTES, BOX'S OR MIXED PRODUCT
  - 18NBS/24W (22BF) SPUR
  - 25NBS/30W (28BF) SPUR
  - 32NBS/36W (34BF) SPUR
- BOX'S OF CONSISTENT SIZE AND WEIGHT CAN BE  
DIVERTED DOWN NARROW SPURS BUT MAY REQUIRE  
MORE CONVEYOR TUNING.
  - 18NBS/18W (16BF)SPUR COATED ROLLERS
  - 25NBS/24W (22BF)SPUR COATED ROLLERS
  - 32NBS/30W (28BF)SPUR COATED ROLLERS

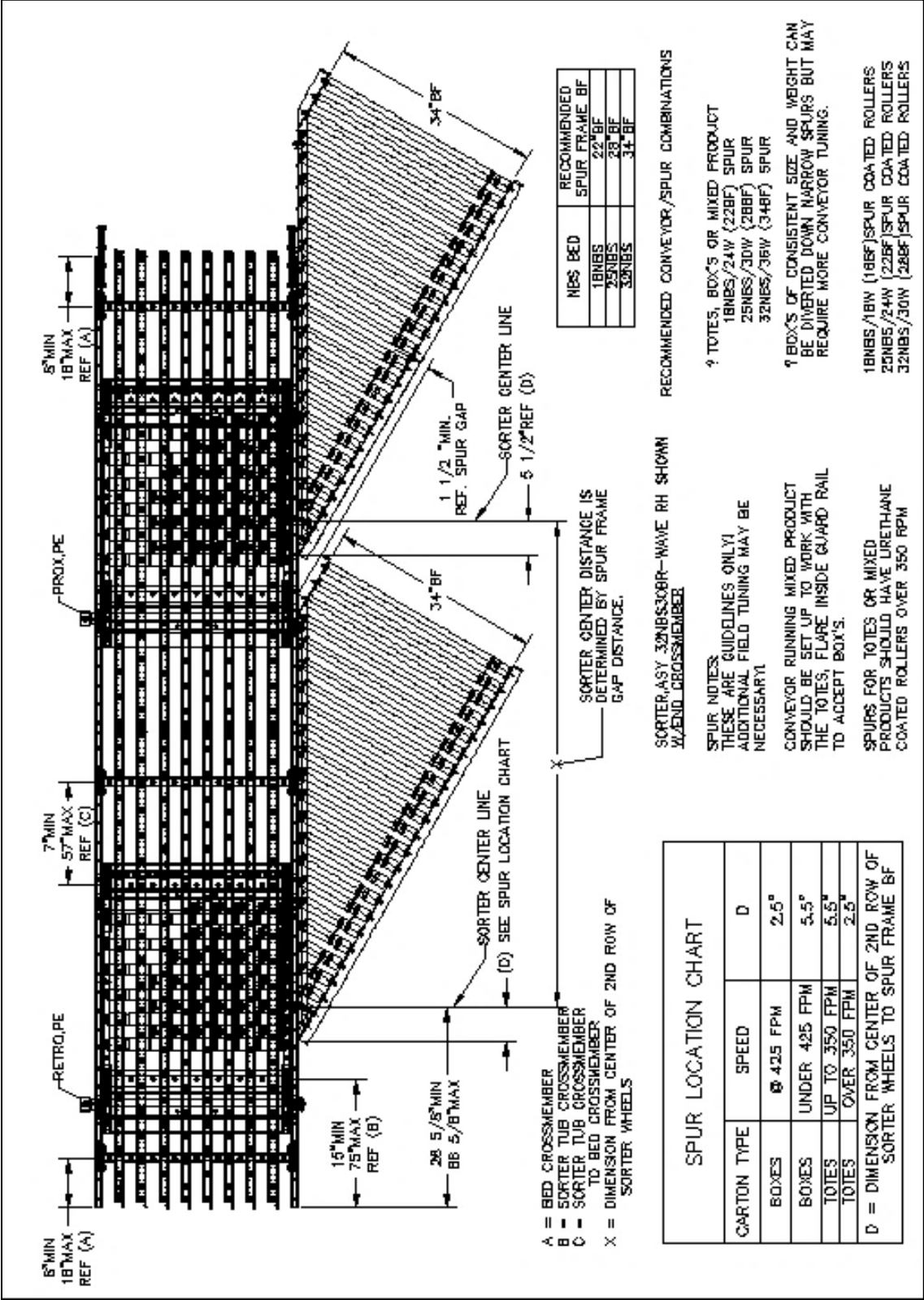
### SPUR LOCATION CHART

CARTON TYPE	SPEED	D
BOXES & TOTES	UP TO 350 FPM	5.5"
D = DIMENSION FROM CENTER OF 2ND ROW OF SORTER WHEELS TO SPUR FRAME BF		
SET SPUR HEIGHT TO BE LEVEL WITH THE 3RD ROW OF WHEELS ON THE DIVERT (APPROXIMATELY 3/8" ABOVE THE BELTS)		

Ref dwg. 661021

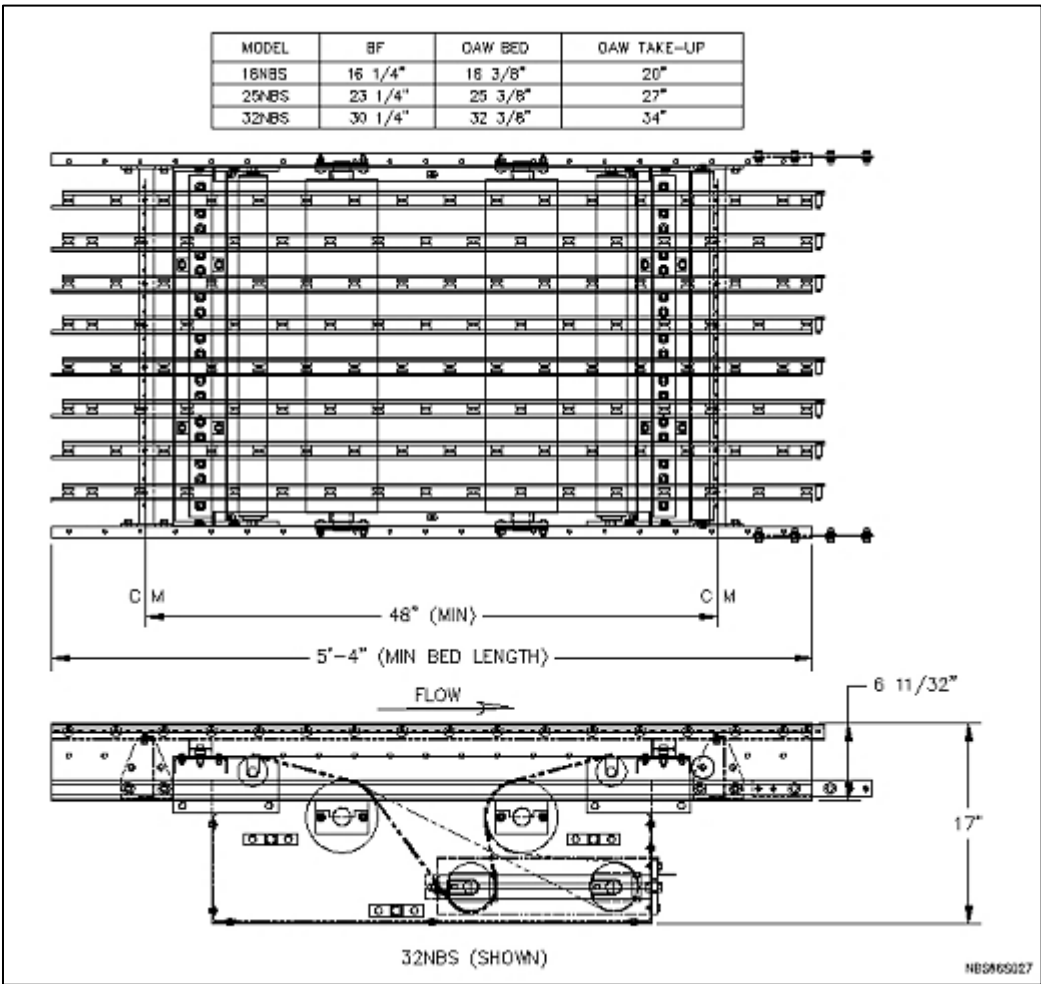


NBS Wave Spur Location



Ref dwg. 661023

**NBS-BR Manual Auxiliary Belt Take-up**



The amount of stretch that a set of belts might develop is dependent on the unit loads of the products conveyed and the passage of time.

The standard NBS take-up is designed to individually tension each belt within a limited range of belt length mismatch. NBS narrow belting is expected to stretch less than 2% of its original length, which the standard take-up is able to handle for 100' or less of sorter length.

The take-up screws on the auxiliary screw belt take-up should always be tightened or loosened together to keep the take-up pulley square with the belt's path. As with all belt equipment, the ease of tracking a belt is dependent upon the attention that is paid to keeping all rotating members square to the belt's travel path.

The manual auxiliary belt take-up is not necessary if a 6' drive bed is used because of the extra belt take up range in that red.

## 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, cross member or any part of the equipment.



### **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 cross member, close to one end of each conveyor bed.

This label contains:

- (1) Item number 'IT#
- (2) Description 'DESC
- (3) Order number (Job)
- (4) Tag number
- (5) Assembler employee #
- (6) Date of manufacture
- (7) QR Code (New Feature)




New Identification Label with scan code. Allows for Quick Retrieval (QR Label). Scan for Installation Operation Maintenance Manual

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.

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

## 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.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• 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.</li></ul>

### ***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 within 1/8" of true center. Locate and mark the center of the cross members 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

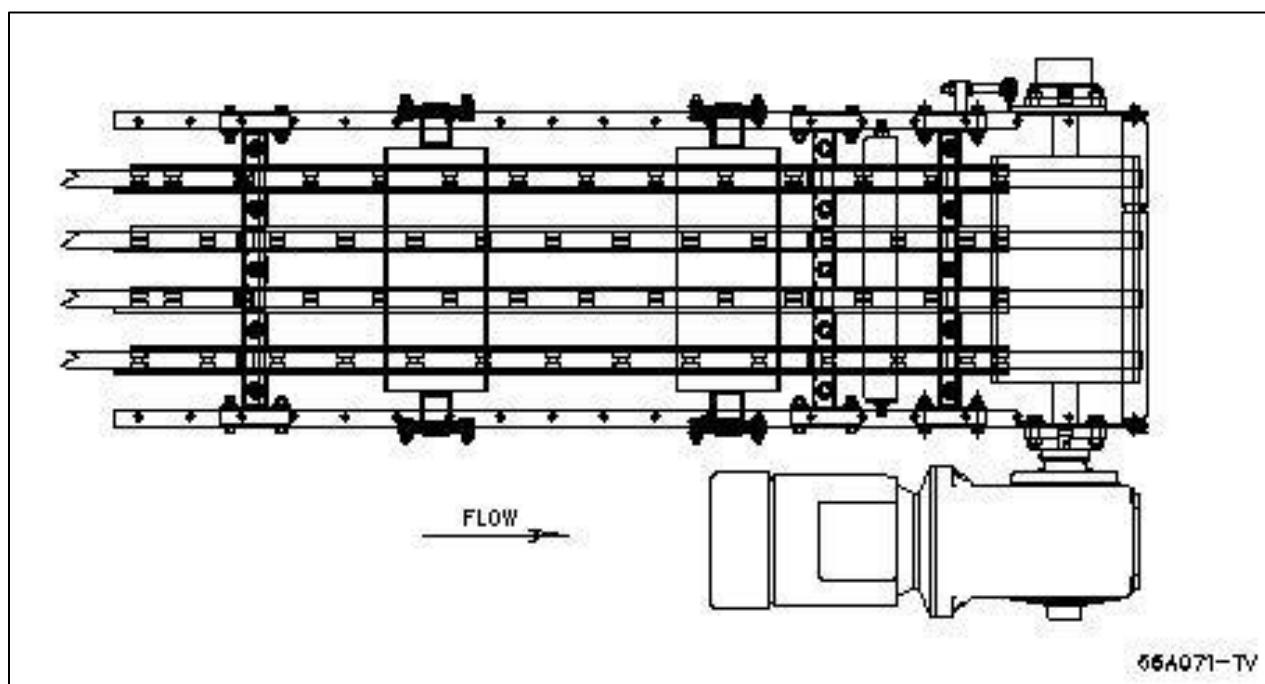
- Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building if any conveyor is ceiling hung.

### **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.



*Discharge end drive bed with product flow*



# Supporting Arrangement

## 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.

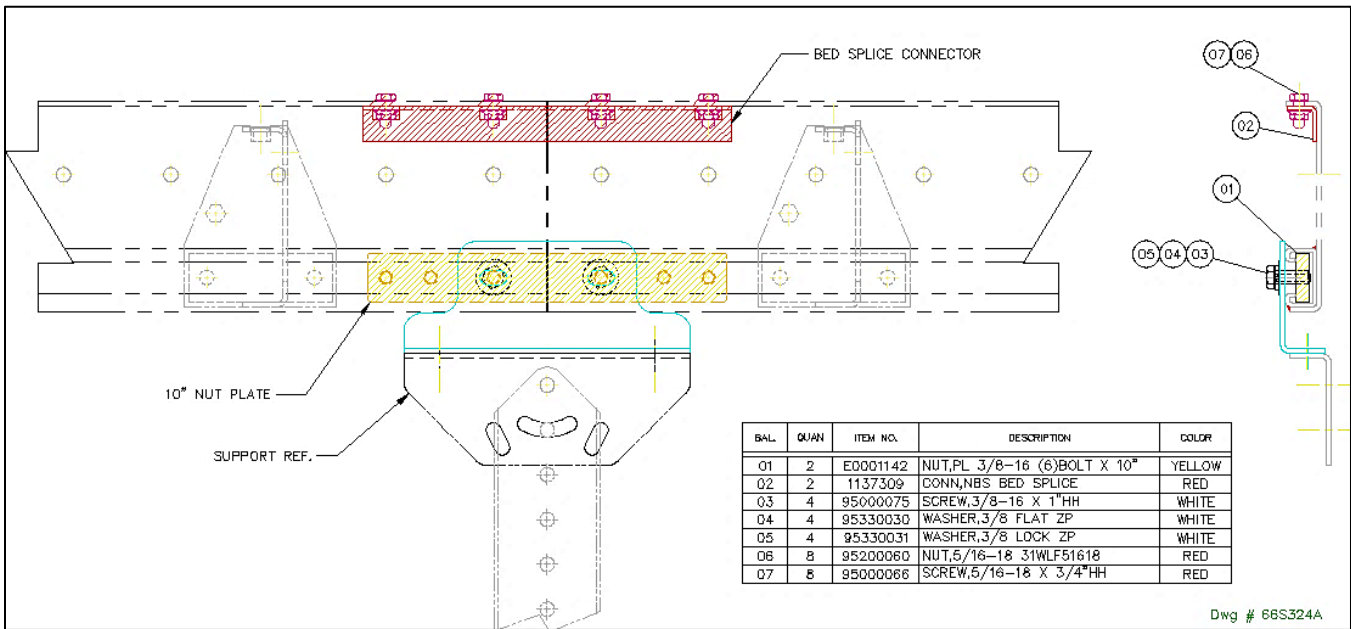
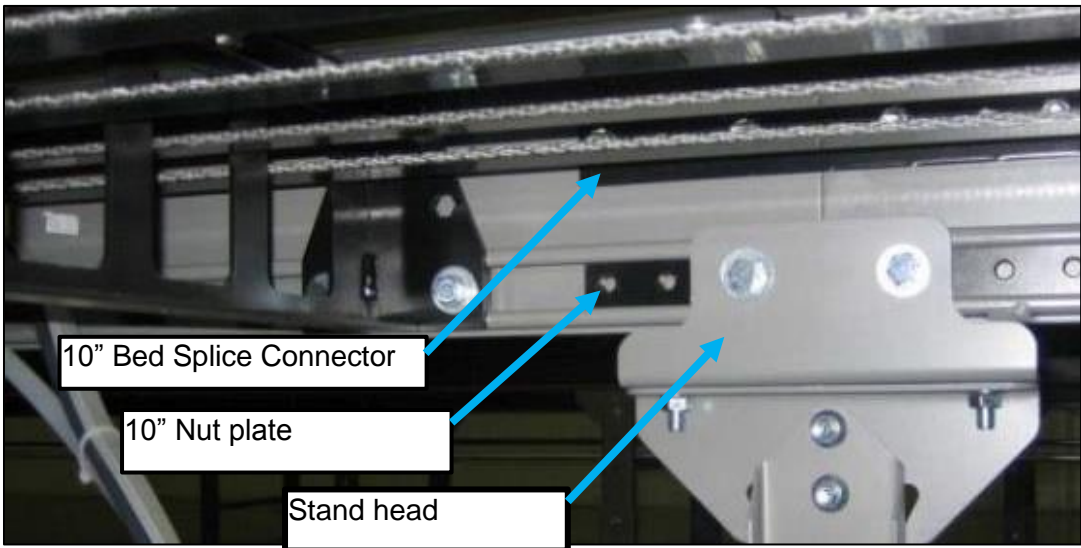
 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>Place a bolt through the frame and support immediately with finger tight nut. This will prevent the frame from falling off the support, if bumped, and causing injury.</li></ul>

**Bed/Support Connectors**

**NBS can ONLY be supported at bed joints.** Install the sortation conveyor (drive bed thru end pulley) on supports. Leave approximately 1/16" gap between low friction rail joints. The conveyor must be level and straight. 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.

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.

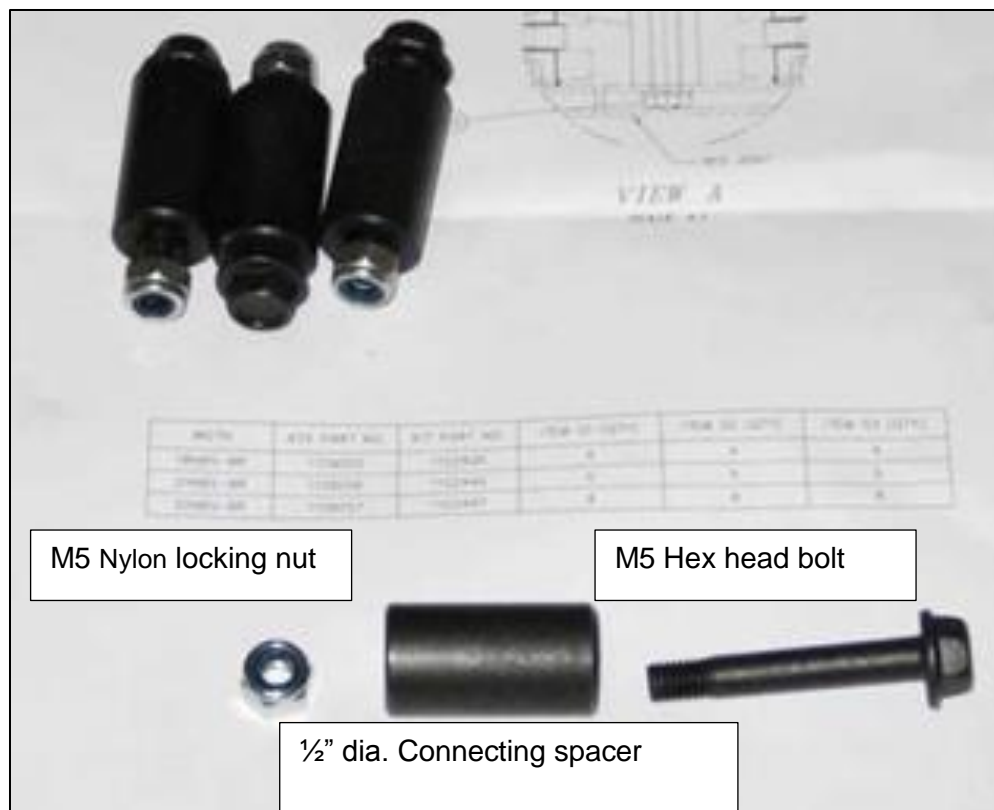
**Maintaining the rigidity and flatness of the conveying surface is the end result of proper support installation.**





### ***Low Friction Rail Overlapping Splice Connection***

Install low friction rail connectors at all rail joints. Each low friction rail connection consists of a M5 hex head bolt, a M5 nylon locking nut, and a ½" dia. connecting spacer. These parts are bagged with the quantity required for each bed, and shipped with other loose parts.



### ***Railing Alignment Procedure***

Install rail connector by placing the connector between the offset rails at the joint. Slide mounting screw thru rails and spacer and place nut on the other end. **Do not tighten connector hardware at this time.**



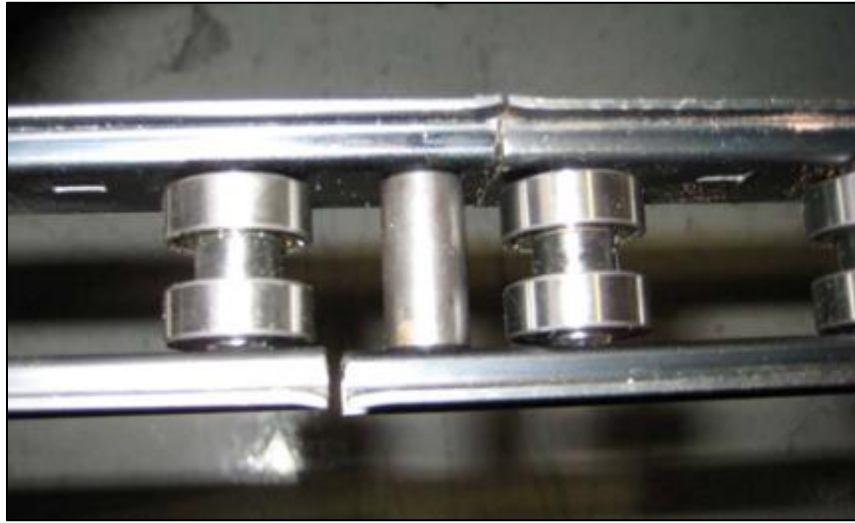
Installation of the connecting spacers requires an alignment tool (part no.1113691). The tool is used to ensure a smooth straight transition from bed to bed with each job and should be shipped with the loose parts for the end pulley assembly.

Place top plate of rail alignment tool between guide covering bearings at the joint. Slide the bottom nut plate under the low friction rail with the nuts facing down. Thread (2) 3/8-16 x 2" hex head screws thru top plate and into the bottom nut plate and snug hardware to clamp plates to rail.

## **CAUTION**

- Do not over tighten clamp plates to the rails as this may crush and permanently damage the rails.





The rail assemblies are built with a 1" offset and are mounted flush to the charge end of the bed. The offset extends beyond the discharge end of the bed allowing an overlap with the upstream bed. There should be approximately a 1/16" gap between the low friction rails at the joints. Tighten M5 hardware for rail connector. After connector hardware is snug remove alignment tool and repeat process for each rail joint.



The low friction rail belt guides are installed at the factory with clamping plates which hold them down to the top surface of their mounting crossmembers. These crossmembers have a built in locating feature for ensuring the correct placement of the across the width of the conveyor. The rail assemblies are built with a 1" offset and are mounted flush to the charge end of the bed. The offset extends beyond the discharge end of the bed allowing an overlap with the upstream bed. There should be approximately a 1/16" gap between the low friction rails at the joints. A splice kit consisting of spacers and M5 hardware is provided with each bed and it is used to connect the rails at the overlap. A 9/16" socket wrench, 8mm socket wrench, and an 8mm box wrench are recommended for this installation.

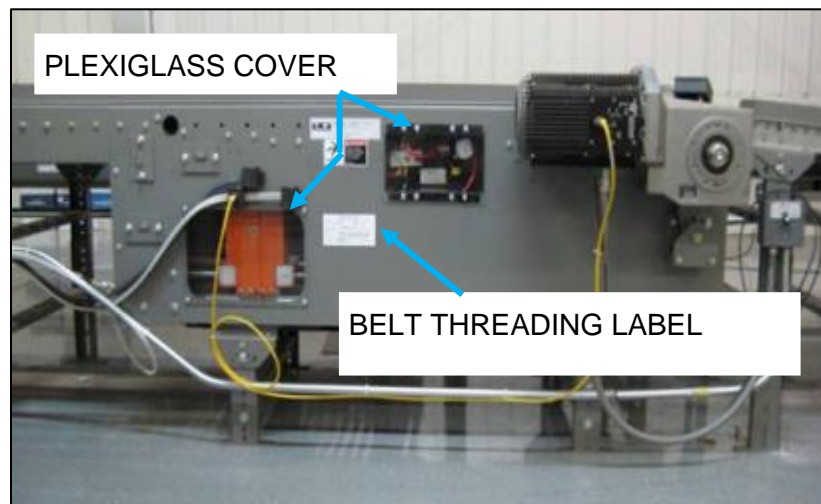
## Belt Installation

### ***Pre-Installation***

Belts, as shipped from MHS Conveyor, are cut to length with lacing installed. Rolls of belting should be stored laying on the edge on a pallet. 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.

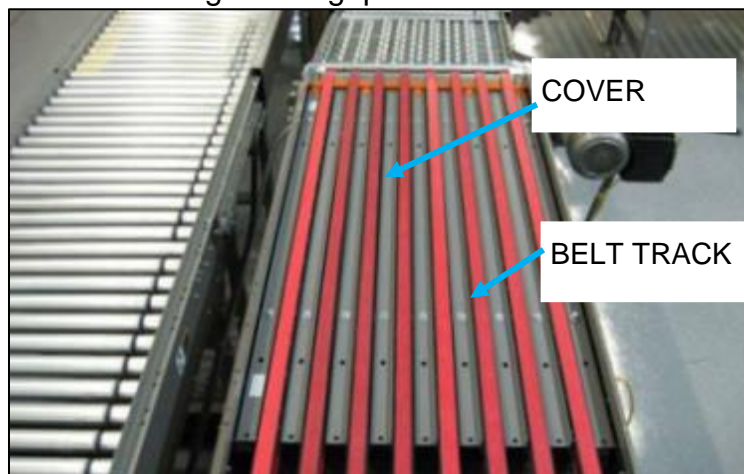
The NBS conveyor should be completely installed and aligned before belt installation.

Remove the plexiglass side covers from the sides of the drive frame, exposing the take-up pulleys. Switch the take-up air switch to the un-tensioned position, raising the take-up pulleys on the 5' drive bed and retracting the take-up pulleys on the 6' drive bed to the minimum take-up position. Replace all covers and guards.



Then remove the covers between the belt tracks so that the belt guides are exposed. Do the same for each NBS 30 diverter.

Remove the O-rings from the O-ring driven gap roller.





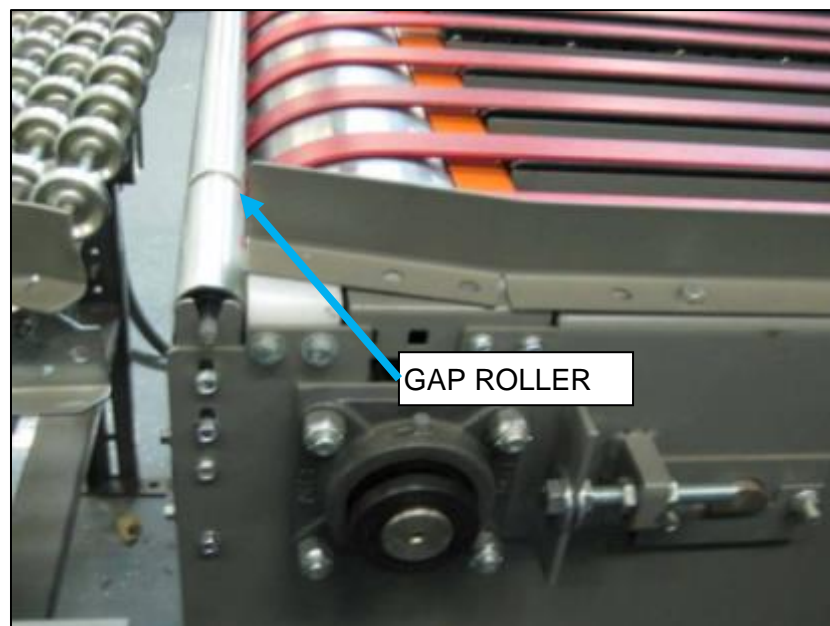
### ***Belt Threading Instructions***

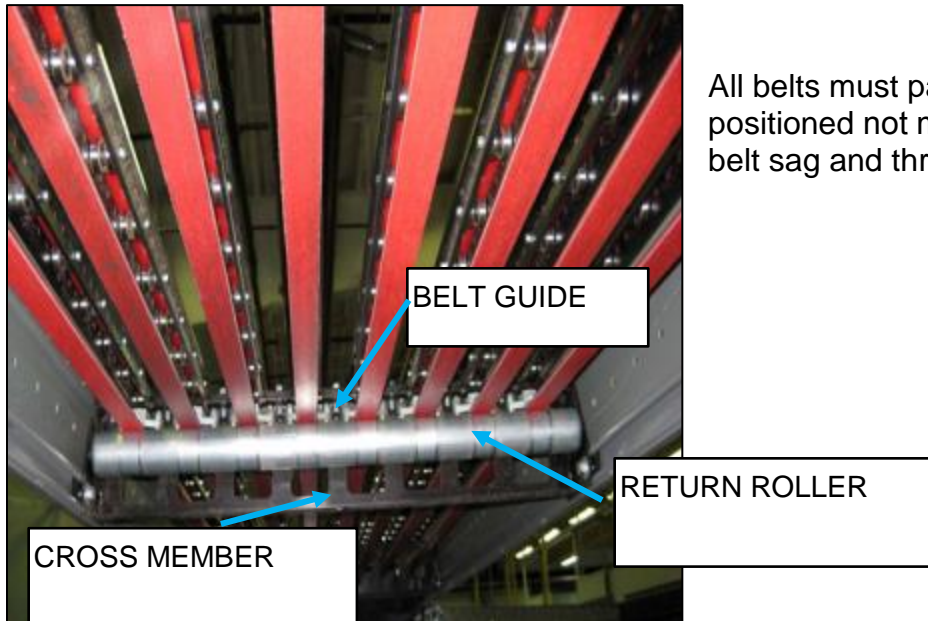
Because NBS uses multiple narrow belts of long length, it will be most efficient to have two people working together during the threading process.

The belting must be uncoiled and laid out flat on the sorter, with the smooth red urethane surface down contacting the bearing assemblies on the rails. The belts must not be allowed to twist along their length as they are installed.

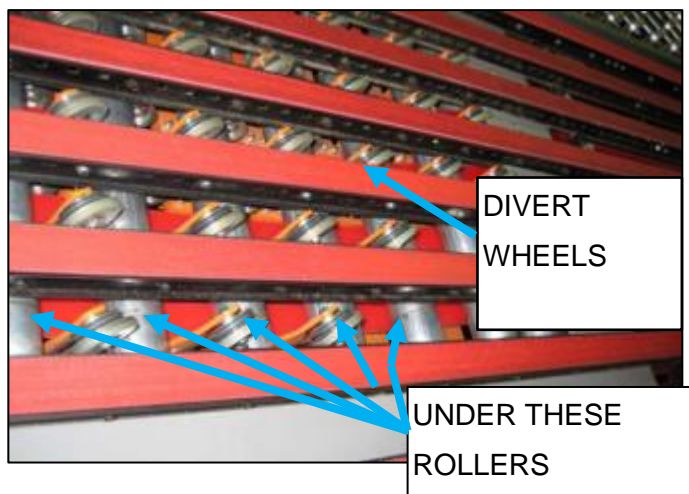


Start at the charge end (farthest from the drive) and feed all of the belts through together at the same time. Start the belts down between the gap roller and the end pulley. Guide the belts under the 5" diameter end pulley and up and over the 2.5" diameter snub roller, before passing through the crossmember mounted belt guides.





All belts must pass over return rollers positioned not more than 9' apart to minimize belt sag and through holes in crossmembers.



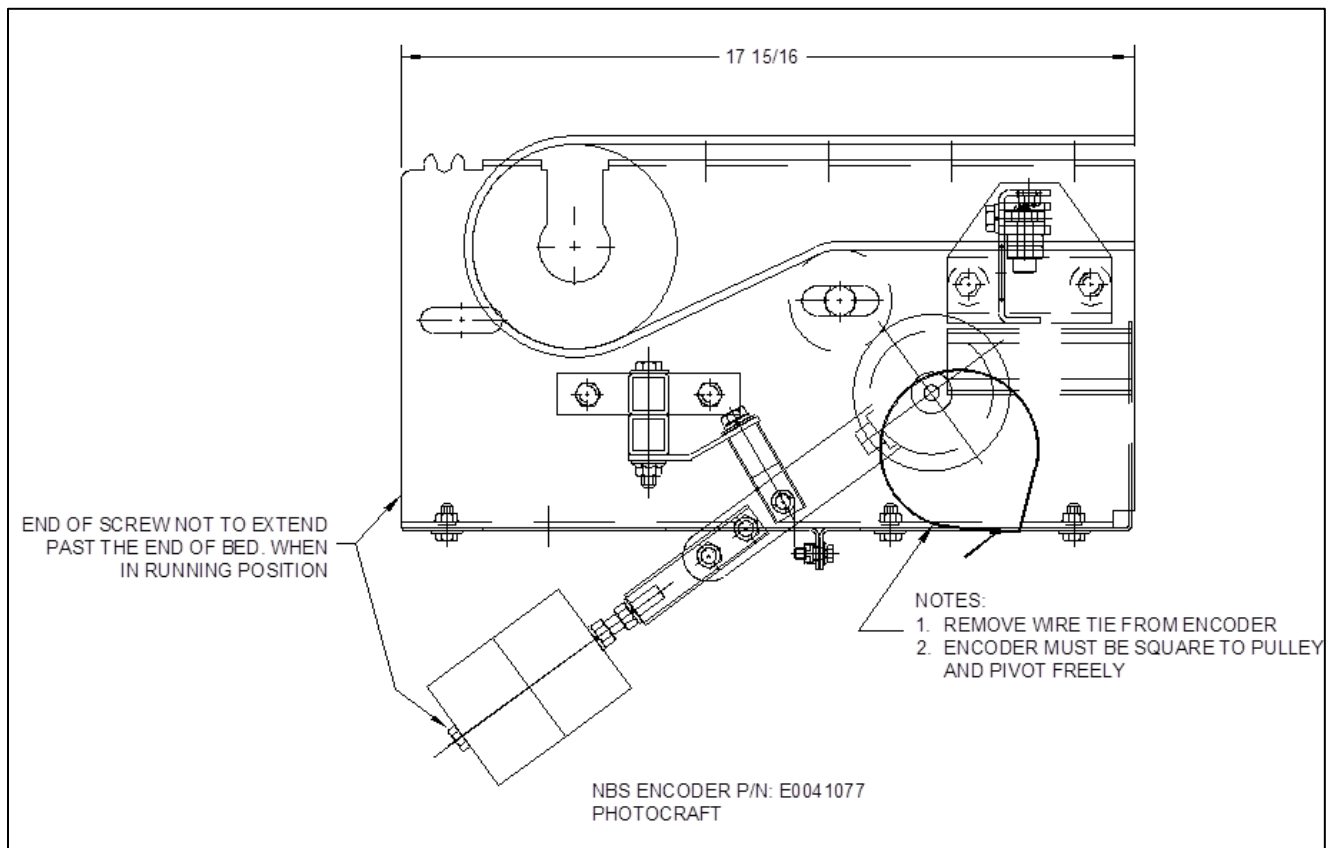
NBS 30 diverts use the moving narrow belts to drive the pop-up divert wheels. The narrow belts must pass over the first 2.5" dia. roller in the diverter, under the next three, five or six rollers, depending on the number of rows in the diverter, which power the divert wheels over the last 2.5" dia. roller and then between the belt guides, as they exit the diverter.



NBS 90 transfer rollers fit up between the narrow belts.

Thread the belts through the drive unit using the diagram on the side of the unit as a guide. The red urethane surface of the belt should be down contacting the drive pulley and bearings in the rails.

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.

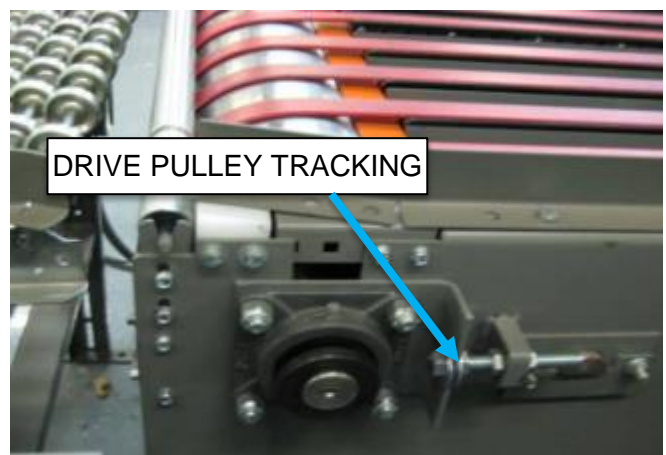
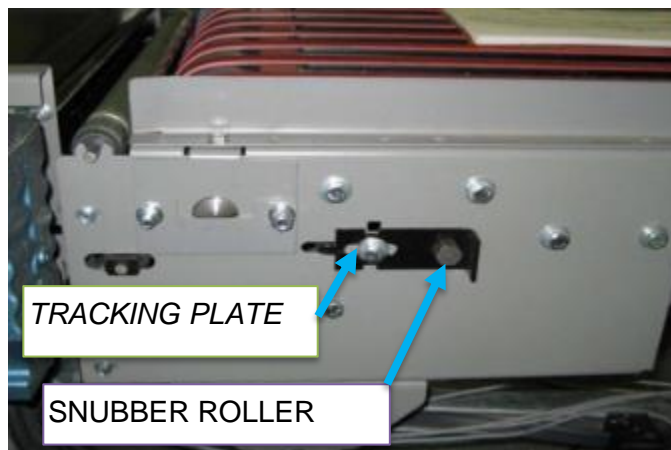
***NBS Encoder Assembly at Charge End of Sorter***

## ***Belt Tracking***

Prior to belt tracking, all guards, plates and bottom pans must be re-installed. With the guards in place, switch the take-up air switch to the tensioned position, moving the take-up pulleys to tension the belts. At this time you can "bump" the motor to be sure rotation is correct, the belts are running smoothly and maintaining their position.

Most NBS 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 low friction rail guide tracks.

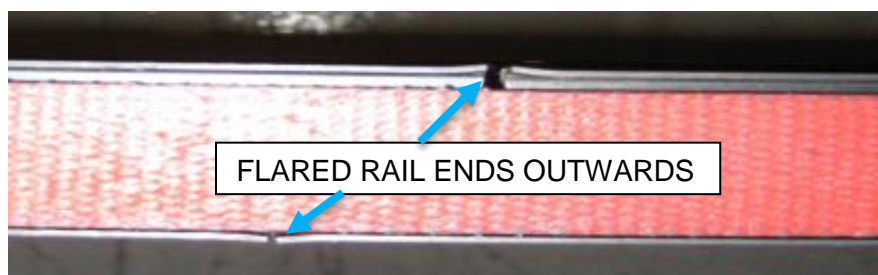
If the belts are out of their grooves or riding hard to one side adjustment can be made on the driven pulley jackscrew after loosening the four bolts holding the drive pulley 1-7/16" bearing at the discharge end. The snubber roller in the end pulley assembly is used to track the belts at the charge end.



After running a few hours inspect rail joints for belt wear at these points. All beds come from the factory with the ends of the rails pre-flared, but if belt dust occurs at the joints additional flaring out of the rails may be necessary.

To do this simply clamp pliers to the guide portion of the rail on the end and twist outward away from the belt. A slight amount of flare is all that should be necessary to prevent belt wear at the joints.

Once the belt is tracking properly verify that all of the bottom pans, guards and access covers on the drive bed, end pulley, and all diverts have been reinstalled.





## Belt Specifications and Lacing

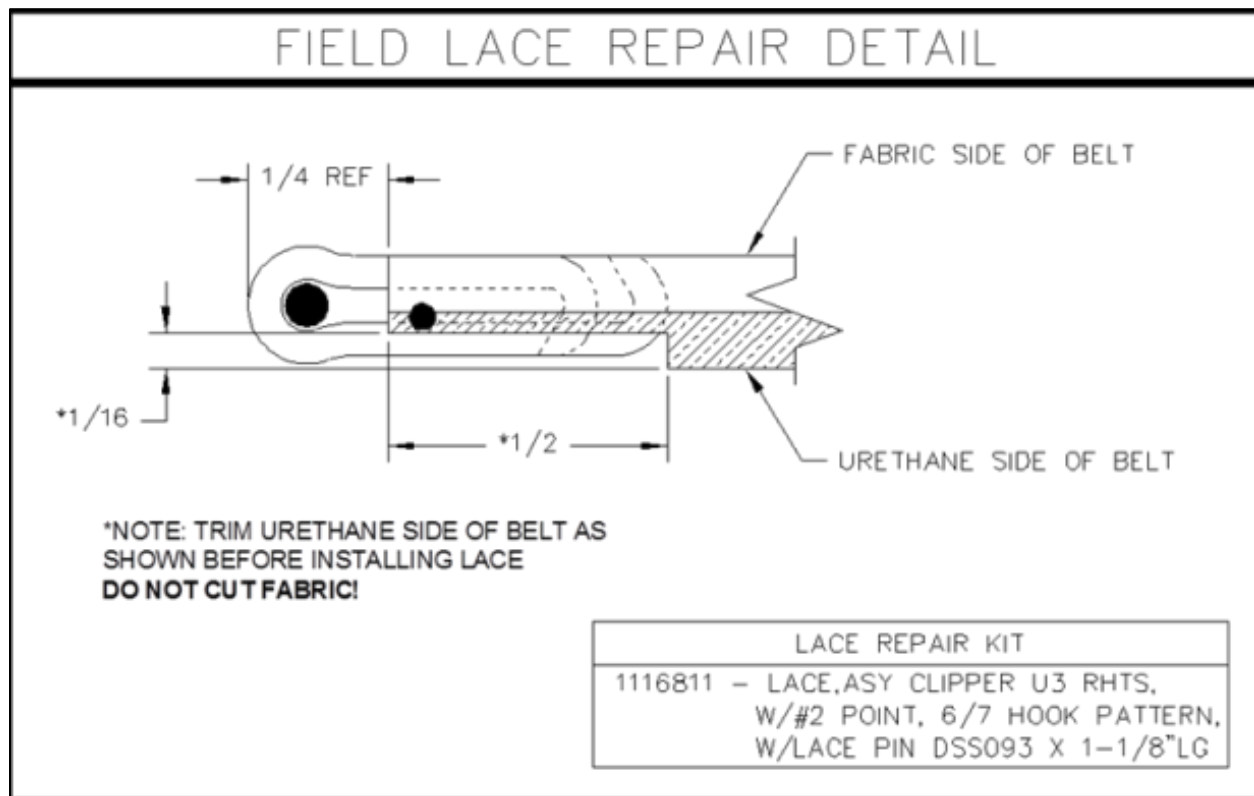
### Belting:

- Endurethane 150 2-ply
- Width: 1-1/4" +0/-1/16"
- Thickness: .203" +/- .015 with a hidden lace
- Lace: Clipper U3RTS w/#2 point
- Lacing pin: DSS093 (Dura Stainless Steel) x 1-1/8" +/- 1/32" long .093 "WHITE DURAPIN COATING" .048 304 stainless steel core

### CAUTION

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

For field repair lacing can be done without hidden lace without damage to the unit. Belts without hidden lace may make additional noise as the lace passes thru snubbed areas. See diagram below. **Belts must have six (6) hooks on one side and seven (7) hooks on the other for maximum strength.**



### TGW Belt Lacing Information

NBS LACING KIT	PN 1116811		FACE PLATE	#2 - #4 Face Plate
TYPE	Part #	Qty Per	Units	DESCRIPTION
Item	1116801	1	EA	LACE,CLIPPER U3 RHTS W/ #2 POINT 6-HOOK PATTERN
Item	1116802	1	EA	LACE,CLIPPER U3 RHTS W/ #2 POINT 7-HOOK PATTERN
Item	1116810	1	EA	PIN,LACE .093" Dia X 1-1/8" LONG (.093" Dia Dura-Stainless)

### Belt Replacement Lengths

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

1. The 5' drive bed requires 10'-8" (128")
2. The 6' drive bed requires 16'0" (192")
3. The 18" end pulley bed 3'-0" (36")
4. NBS 30 diverters require 3/8" each
5. NBS 30 WAVE diverters require 3/8" each
6. NBS 90 SL transfers require 3/8" each
7. Auxiliary take-up requires 1'4" (16")
8. All other beds require 2 times their length.

### Nominal Widths (Number of Belts)

- 18" with 4 Belts on 3-1/2" Centers
- 25" with 6 Belts on 3-1/2" Centers
- 32" with 8 Belts on 3-1/2" Centers

## Pneumatic General Guidelines

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 (NBS30-3R, NBS30-5R, and NBS90)**

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.

### **Air Drops (NBS30 WAVE, and NBS30 Aligner)**

The NBS WAVE and aligner require higher air capacity than the NBS30 or NBS90 divert. As six rows of divert wheels must fire within a fraction of a second, the "burst" air capacity must be adequate or sluggish and inconsistent divert action will result. MHS Conveyor recommends the following minimum air plumbing for the WAVE divert and aligner.

- A 1" air drop and 3/4" black pipe or copper header for every 5 WAVE diverts. 3/8" polyethylene tubing and be plumbed to each divert from the 3/4" header provided the length doesn't exceed 5'. Do not plumb more than one divert with 3/8" poly tube.
- A 1" air drop and 3/4" black pipe or copper header for each pre-aligner. 3/8" polyethylene tubing can be run from the 3/4" header to each solenoid bank on the pre-aligner. The length of the poly tube must not exceed 5'.
- MHS Conveyor can provide a standard 3/4" filter regulator for each drop. The part number is 1103388.

**NOTE:** The NBS pneumatic system does not require lubrication. Lubrication may affect valve action 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 valves.

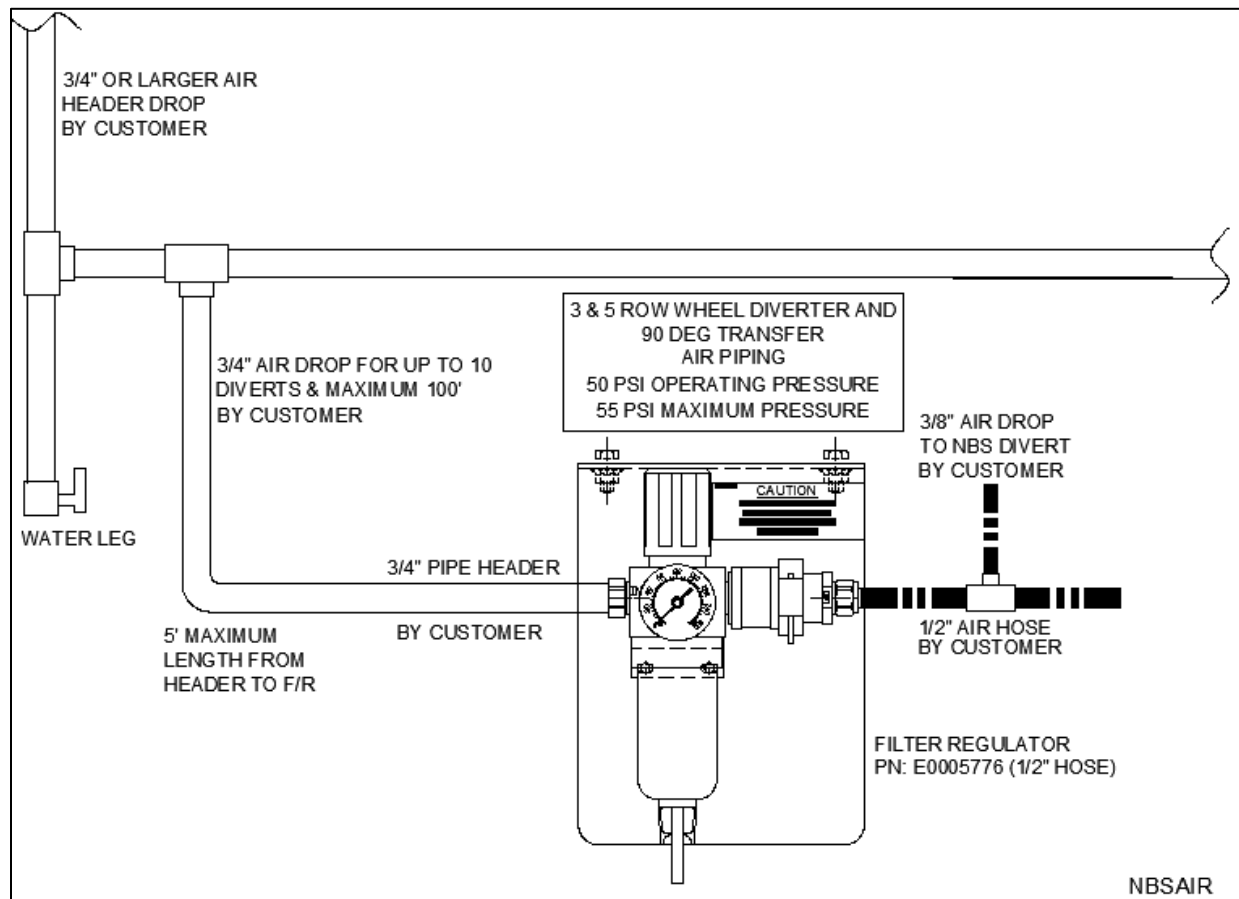
### **CAUTION**

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

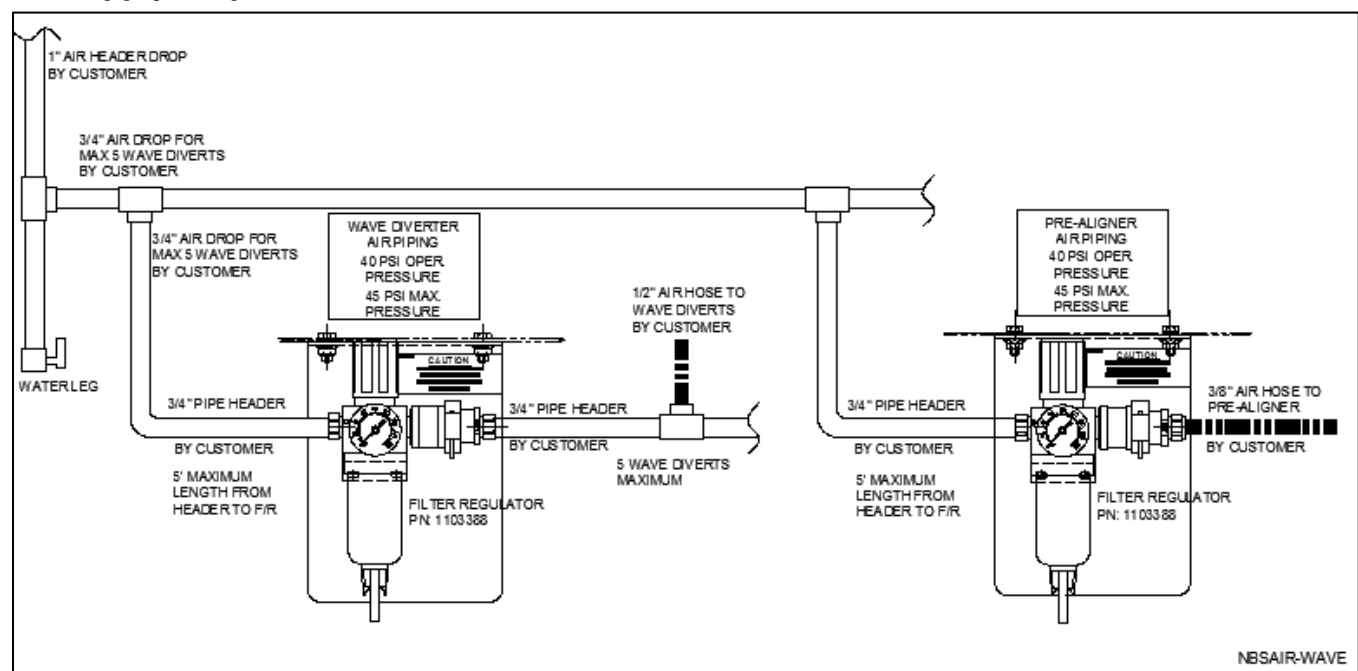
### **CAUTION**

- BS 30 WAVE™ diverters must not be operated above 55 PSI. Exceeding this may damage unit.

### Air Supply Requirements NBS30-3R, NBS30-5R, NBS90



### Air Supply Requirements NBS30 WAVE, NBS30 ALIGNER



### ***Pneumatic Pressure 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. Pressure switch motor disconnects to be set at 90 PSI on the incoming airline.
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:
  - a. 5' drive with air take-up 50-55 PSI
  - b. 6' drive with air take-up 80-85 PSI (Requires separate shop air drop)
  - c. 30° 3 row /5 row sorter 50-55 PSI
  - d. 30° WAVE sorter/aligner 40-45 PSI
  - e. 90° transfer 50-55 PSI

### ***Pneumatic Volume Formulas***

NBS 30 3-Row Diverters are actuated by a single air bag.

The air consumption per divert is calculated by:

$$.028\text{CF (cubic feet)} \times \text{CPM (cycles per min.)} = \text{SCFM (Standard Cubic Feet / Minute)}$$

NBS 30 5-Row Diverters are actuated by two air bags.

The air consumption per divert is calculated by:

$$.054\text{CF (cubic feet)} \times \text{CPM (cycles per min.)} = \text{SCFM (Standard Cubic Feet / Minute)}$$

NBS 30 WAVE diverts are actuated by six air cylinders.

The air consumption per divert is calculated by:

$$.010\text{CF (cubic feet)} \times \text{CPM (cycles per min.)} = \text{SCFM (Standard Cubic Feet / Minute)}$$

NBS 90 transfers are actuated by a single air cylinder.

The air consumption per divert is calculated by:

$$.054\text{CF (cubic feet)} \times \text{CPM (cycles per min.)} = \text{SCFM (Standard Cubic Feet / Minute)}$$

NBS 30 aligners are actuated by twelve (12) air cylinders.

The air consumption per divert is calculated by:

$$.020\text{CF (cubic feet)} \times \text{CPM (cycles per min.)} = \text{SCFM (Standard Cubic Feet / Minute)}$$

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

## Air Line Connections

### Source Air Connection

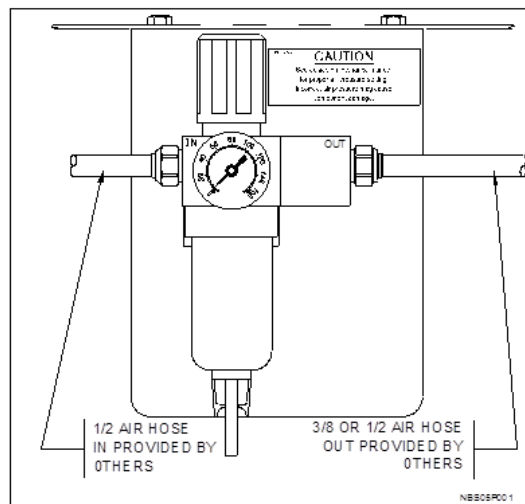
Ideally the regulator should be centrally located along the sorter and should not be more than 80' from the furthest diverter/transfer.

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

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

Cut into the supply line along the sorter bed at each diverter/transfer location and install the source airline tee fitting P/N: 89000640 UNION, TEE 1/2".

Connect the source airline between this fitting and the diverter/transfer with P/Ns:  
E0038781 REDUCER, PLUG-IN 1/2"-3/8" and  
89000585 TUBING, POLYETHYLENE 3/8" OD,  
CLR.



## 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.





### **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 90 PSI, the conveyor system should shut off.

It is recommended that this air switch be located either at the furthest end of the source airline 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**

- 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 either NBS 30 diverters or NBS 90 transfers, and that difference is in control voltage only. The NBS 30 WAVE™ diverter is actuated by a 6-station valve bank, and is only offered in 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 NBS 30 is spring returned and the 4-way solenoid is plumbed as a 2-way solenoid using three ports and plugging the “B” & “EB” ports.

The lift mechanism of the NBS 90 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 in both models are plumbed such that the diverter/transfer is normally in the down position and rises on solenoid activation.

The MHS Conveyor part numbers for replacement solenoids are:

- E0038769 VALVE,SMC 4-WAY 24VDC DIN CONN
- E0038770 VALVE,SMC 4-WAY 110VAC DIN CONN
- 1112930 VALVE,4-WAY 24VDC MANIFOLD MT (FOR NBS 30 WAVE DIVERT)

## Field Installation Wave Diverter

This instruction sheet is intended as a supplement to the Installation, Operation, and Maintenance Manual for the narrow belt sorter.

All of the precautions, warnings, and safety instructions are applicable to this supplement. Obtain a copy of the IOM Manual for your sorter while performing the below described installation. Refer to the IOM Manual for instructions on disconnecting power to the NBS before beginning any work.



### ***Initial Preparation***

Before attempting to install your new Wave Diverter there are a few details that must be taken care of:

The area under the bed where the Wave Diverter will be installed must be clear. This includes any conduit runs, wires, and air lines that may interfere with the ability to raise the Wave Diverter into place.



The bed that will be accepting the Wave Diverter must have hardware installed. Check to see that there are at least four (4) nut plates (two (2) on each side) installed in the channels on the inside of the bed side channels.

Nut Plate

If the bed does not have the appropriate nut plates, the beds must be separated and nut plate part number E0001143 can be installed.

The sorter belts must be separated at the lacings before installation of the Wave Diverter. Position the lacing under the bed, beside where the Wave Diverter will be positioned, prior to separating the belts. Refer to the appropriate section of the NBS Installation, Operation, and Maintenance Manual for instructions.

## **CAUTION**

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

Move the Wave Diverter near the bed where it will be installed. The Wave Diverter must be supported so it can be moved under the bed and lifted into place.

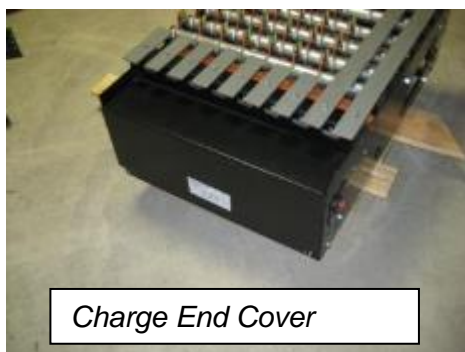
Some suggested methods are: hydraulic floor jacks at each corner, two floor jacks with a pair of supporting 4x4's running the width of the Wave Diverter, or a forklift, provided the forks are long enough to support both sides of the Wave Diverter. The method you use will depend on the width of the Wave Diverter and how high it has to be lifted.



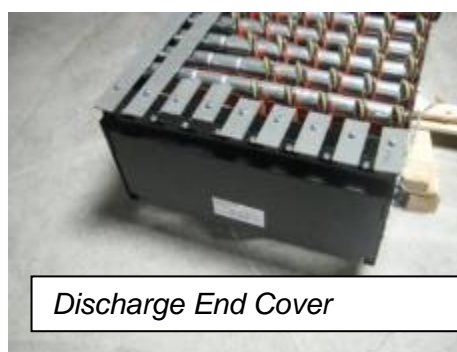
*Wave Diverter supported on lift truck forks*

NOTE: Avoid pinching wires or hoses when positioning or moving wave diverter.

Remove the charge end and discharge end covers.



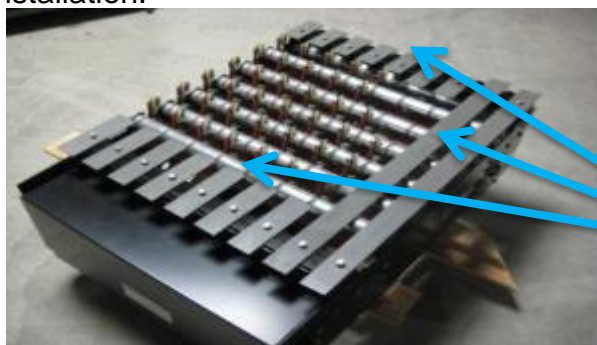
*Charge End Cover*



*Discharge End Cover*

Remove the top cover plates. Set aside for later reinstallation.

NOTE: Although it is not necessary, removing the outside bearing rails will facilitate the installation.



*Top Cover Plates*

## Installation

Place Wave Diverter on the supports to be used to lift it into place. Move Wave Diverter into position under NBS bed.



Position nut plates in approximate location in channel.

*Nut Plate approximately aligned with mounting holes in Wave Diverter*

Raise Wave Diverter into desired location until mounting holes align with nut plates.

Insert eight (8) 3/8-16 x 1 hex head bolts, lock washer, and washer through the Wave Diverter crossmember into the nut plate. **DO NOT TIGHTEN.**



Move the Wave diverter to its final position, and then tighten the mounting screws.

Reinstall bearing rail, if removed.





Install the Long Top Cover Plates where there are no wheels.

*Long Top Plates*

Install the 7 5/8" long cover plates at the charge end of the sorter. The longer side goes toward the Wave Diverter.



Install the 5 3/8" long top plates at the discharge end of the Wave Diverter. The longer side goes away from the Wave Diverter.

View showing all Cover Plates installed.



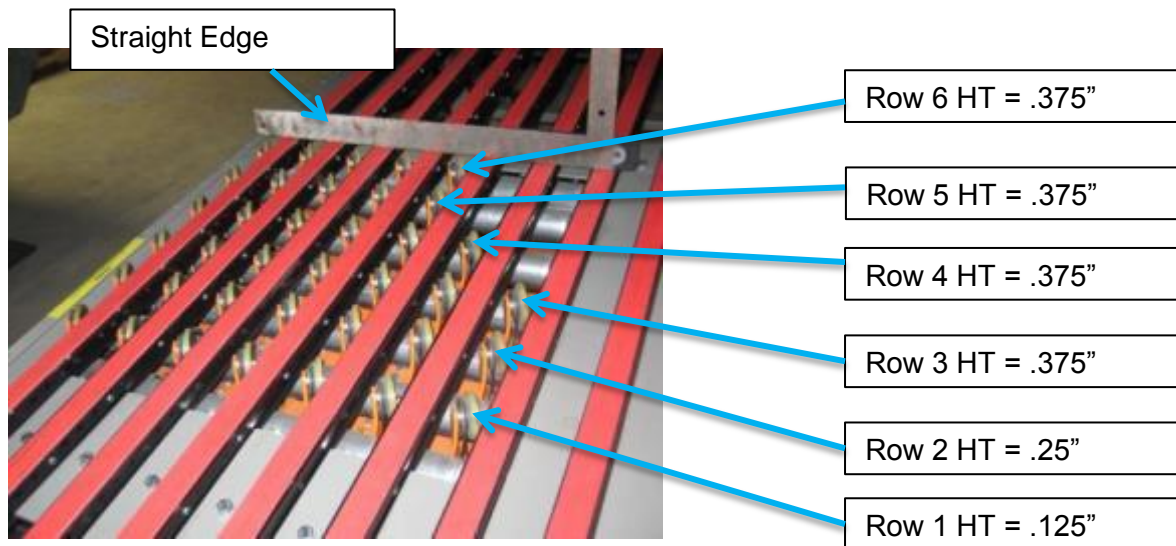
Thread the belts through the Wave Diverter and reconnect ends. Refer to NBS Installation, Operation, and Maintenance Manual for instructions.

Reinstall charge end and discharge end covers.

Establish control and air connections.

Test roller height as follows:



- Place a straight edge long enough to bridge at least two belts across the belts near the wheels. Slide the straight edge over the wheels, making sure the wheels do not touch the straight edge.
- Apply air pressure to raise the wheels. Check the wheel height above the belt as shown below.





Test and commission as outlined in the NBS Installation, Operation, and Maintenance Manual.



## Electrical

 <b style="font-size: 1.2em;">WARNING</b>	
	<ul style="list-style-type: none"> <li>All electrical controls must be installed, wired and connected by a licensed electrician only.</li> <li>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.</li> </ul>

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.

 <b style="font-size: 1.2em;">WARNING</b>	
	<ul style="list-style-type: none"> <li>Do not connect the motor to any other voltage than stamped on its metal nameplate.</li> </ul>

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, and drippings 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**

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• 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.</li></ul>

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.

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>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.</li> </ul>

**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.

## Commissioning of Equipment

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 is 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. 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, all of the belts must be captured between crossmember mounted belt guide assemblies, and no belt should be threaded under a crossmember (belt path labels are attached at each diverter location from the factory). Label on the side of the sorter.
- 5) Visually inspect the installation. Is the conveyor straight? Is the conveyor level from side to side? From end-to-end? Are the bed joints straight?
- 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.
- 15) Set all needle valve mufflers to the same settings (4-5 turns out).

***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.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• NBS 90 Transfer motors must be controlled to run on demand ONLY! Motors running continuously will cause component failure.</li></ul>

# Preventive Maintenance

## General PM



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 oil is leaking, pulley worn; or you can hear a faulty bearing, 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.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• 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, <b>EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT.</b> 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.</li><li>• Make sure personnel are clear of all conveyor equipment before restarting the system.</li></ul>

## Gearmotor

The drive unit should be checked monthly. Check the Gearmotor for leaking seals. Check the gear case 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 synthetic lubricant for the specified mounting position. Under special circumstances such as high or low ambient temperatures optional oils should be used.

### Pulley and Timing Belts

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


 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• REPLACE ANY GUARD REMOVED in order to adjust, check or lubricate components. Guards are furnished and installed to prevent personal injury during operation; maintain them on the unit.</li> </ul>

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.</li> </ul>

### 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, shrink-wrap, etc. to build up on roller or pulleys. This can cause rollers to jam and the belt to miss-align in the track. If this is a common occurrence due to the product packaging, clean up on a regular schedule.

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Use a blunt object to remove rollers from frame. A screwdriver or similar pointed object could slip and cause injury.</li> </ul>

## 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 airline filter bowls weekly for accumulated water and drain if necessary. Check for proper PSI settings on air regulators.

### CAUTION

#### 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.

## Maintenance Schedule



Periodic maintenance intervals shown may vary with load, speed, hours of daily operation, ambient temperature, humidity, etc. Maintenance intervals can be established after fairly frequent maintenance. First, lengthen the intervals as justified by observation, and re-adjust 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 for any oil leakage.
- Check for 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 and motors for excessive noise or heat.
- Clean breather cap on Gearmotor (if used).
- Check operation of all electrical controls.
- Inspect motor mounting bolts.
- Check for proper PSI on air regulators.

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Prohibit riding on conveyor by anyone.</li> <li>• Think before making any adjustments. It may prevent an injury. Remember, all moving components are potentially dangerous.</li> <li>• 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.</li> </ul>

### Monthly

- Check air filters for cleanliness.
- Check drive unit for leaking seals and oil level in gear case (if applicable), unusual noises, vibration and stress cracks.

### Semi-Yearly

- Inspect and clean motor control centers.
- Grease re-greasable bearings.

**Yearly**

- Inspect tightness of all nuts and bolts on units. Re-adjust 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.

## NBS Troubleshooting Guide

NBS Troubleshooting Guide			
#	Problem	Possible Cause	Remedy
1	Belts rolling out of guide tracks	Conveyor not installed straight	Straighten conveyor
		Conveyor not installed level	Inspect conveyor to insure there are not low/high spots at the divert points. Re-level conveyor as necessary
		Air pressure for the belt take-up is set too low	Set air pressure to the proper PSI. Reference IOM manual
		Divert is not rising up to proper height	Verify air pressure setting.
		Divert is not rising up to proper height	Verify the number of diverts per air drop. Consult IOM Manual to verify that number of diverts per air drop does not exceed TGW recommendations.
		Divert spur isn't set to the proper height	Inspect and adjust height of divert spur as needed.
		Rail joints are not aligned/installed properly	Loosen rail splice hardware and use the rail alignment tool to adjust the alignment of the rail(s) accordingly. Reference IOM Manual for additional assistance.
		Verify wave commander program is matched to the conveyor speed	Set VFD for the motor to proper speed. Contact TGW for additional assistance if needed.
		Vertibelt speed is incorrect	Verify speed of vertibelt, and make corrections to VFD as necessary. Refer to IOM Manual for additional assistance.
2	Divert Tub engaging at wrong time	Divert is not staying in the up (transfer) position long enough	Inspect and verify timing of divert, adjust accordingly to ensure product is fully off transfer before lowering unit.
		PLC programming	Inspect timing of logic with encoder to ensure data is correct.
		Solenoid wired incorrectly	Inspect wiring, and adjust accordingly.
3	Belt Failure	Clogged solenoid	Inspect solenoid valve to ensure no water is present
		Routing of belt within drive train	Inspect belt routing to ensure proper installation. Refer to IOM Manual for additional information.
		Belting rails not aligned properly	Check rail alignment at joints to ensure proper alignment. Refer to IOM Manual for additional information.
4	Product not diverting correctly	Incorrect belt tension	Inspect air pressure within belt take-up to ensure proper setting
		Discharge conveyor unit not in proper location	Based upon product being handled on NBS discharge conveyor location is variable; refer to IOM Manual for further assistance.
		Height of discharge conveyor not correct	Inspect discharge conveyor, and adjust accordingly.
5	Loud humming noise	Belts installed incorrectly	Inspect belt installing to ensure proper side is making contact with the rail.
6	Wheels not turning within divert tub	Belt not routed correctly	Inspect belt routing and adjust accordingly. Refer to IOM Manual for detailed information.



## Repair Procedures

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• 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, <b>EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT.</b> The air pressure must be turned off to the work areas.</li><li>• 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.</li></ul>

### ***Gearmotors***



NBS drive units use Gearmotors which are properly filled at the factory with sufficient lubrication for their mounting position. A synthetic lube is the standard lube supplied in all MHS Conveyor Gearmotors (Mobilgear SHC630).

Disassembly/assembly procedure as follows:

1. Remove necessary guards to access maintenance areas.
2. Disconnect any electrical connection.
3. Remove Gearmotor.
4. Perform required maintenance.
5. Reverse procedures for assembly.
6. After all fasteners are tight, double check chain tension and sprocket alignment.
7. Replace all guards.

### ***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.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• Before removing a valve or other pneumatic component, shut off and exhaust the entire pneumatic circuit and shut off and lockout electrical supply.</li></ul>

### ***Sensing Switches***

Sensing switches are of two types:

1. Retro reflective photoeye
2. Proximity switch.

Adjust the retro reflective 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.

## 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 through crossmember belt guide assemblies.
  - c. Remove any residue or built up of fibers between low friction rails at joints.
2. Intermediate Bed Assembly
  - a. Remove any residue or built up of fibers between low friction rails at joints.
  - b. Remove any residue or built up on carrier rollers.
3. Drive Assembly
  - a. Remove any residue built up on drive pulley.
  - b. Check to see if belt is tracked correctly through crossmember belt guide assemblies.
  - c. Examine belt guide carrier rollers. Remove any residue built up on rollers.
  - d. Examine individual take up wheels for wear. Clean off any build up on wheels.
  - e. Examine take up snubber pulleys. Clean off any residue built up on pulleys.
4. Divert Assembly (NBS30)
  - a. Replace missing or excessively worn divert wheels.
  - b. Remove any residue or fiber that has built up in drive groove of diverter wheels and idlers.
  - c. Check to see if all O-rings for driving divert wheels are in place. Replace all missing or worn O-rings. (Note: there are two O-rings used to drive each divert wheel. One clear colored O-ring which transmits power from drive roller to lower idler, and one black colored O-ring which transmits power from lower idler to divert wheel).
  - d. Check to see if belt is tracked correctly through crossmember belt guide assemblies.
  - e. Examine divert snubbers, and drive rollers for residue build up. Clean off any residue.
  - f. Check to see that all wheel brackets are tight. Replace any missing hardware, and tighten any loose hardware.
5. Transfer Module (NBS90)
  - a. Remove any residue or build up on transfer rollers.
  - b. Check tension of both timing belts. (SEW-MOVIMOT drive and jump belt). Reference section ***Using the Gates 505C or 507C Sonic Meter.***
  - 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. Reference NBS ***90 Transfer Roller Adjustment Procedure.***
6. Encoder
  - a. Remove any residue or buildup on encoder wheels under the charge end pulley snubber roller.

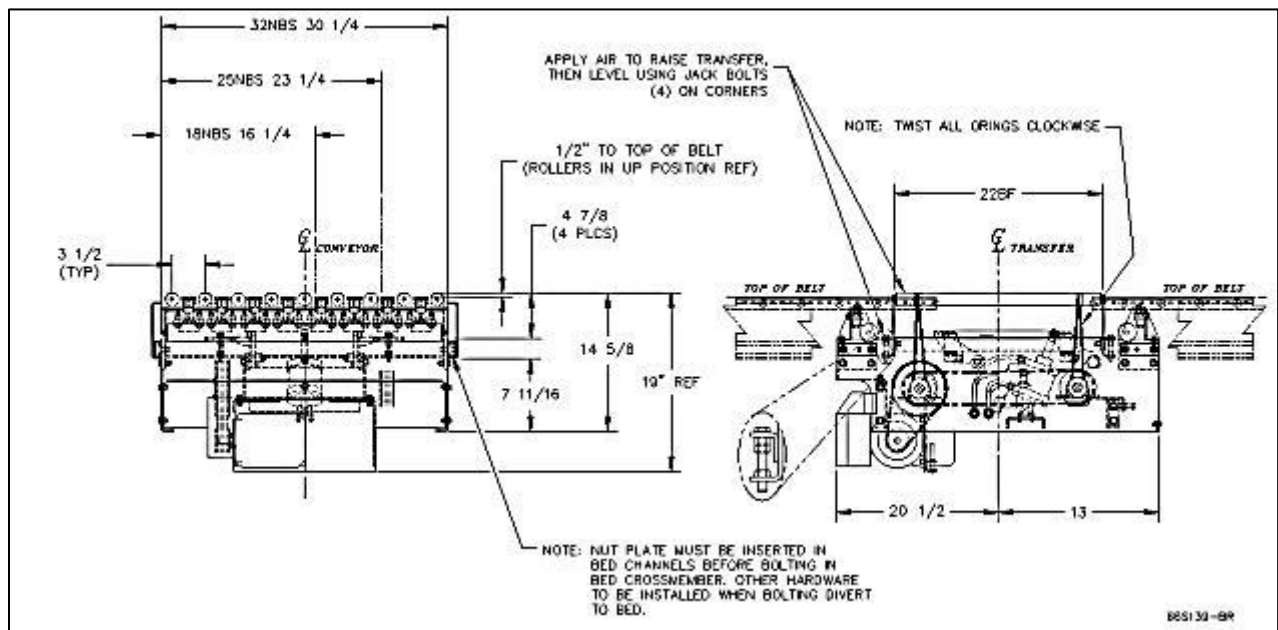
## NBS 90 Transfer Roller Adjustment Procedure

NBS 90 transfers are assembled as a stand-alone unit that is inserted into an NBS bed section. The height of the roller is set by the use of a setting gauge, and adjustment is performed at each of the four corners of the unit on the assembly bench.

When the unit is inserted into the bed and secured into place, the roller heights are within our assembly tolerance of  $\pm 1/32"$ . Depending upon the speed of the sorter, weight of the product, and condition of the transferred product's bottom surface, slight adjustments of the transfer rollers' heights may be necessary to effectively transfer these products.

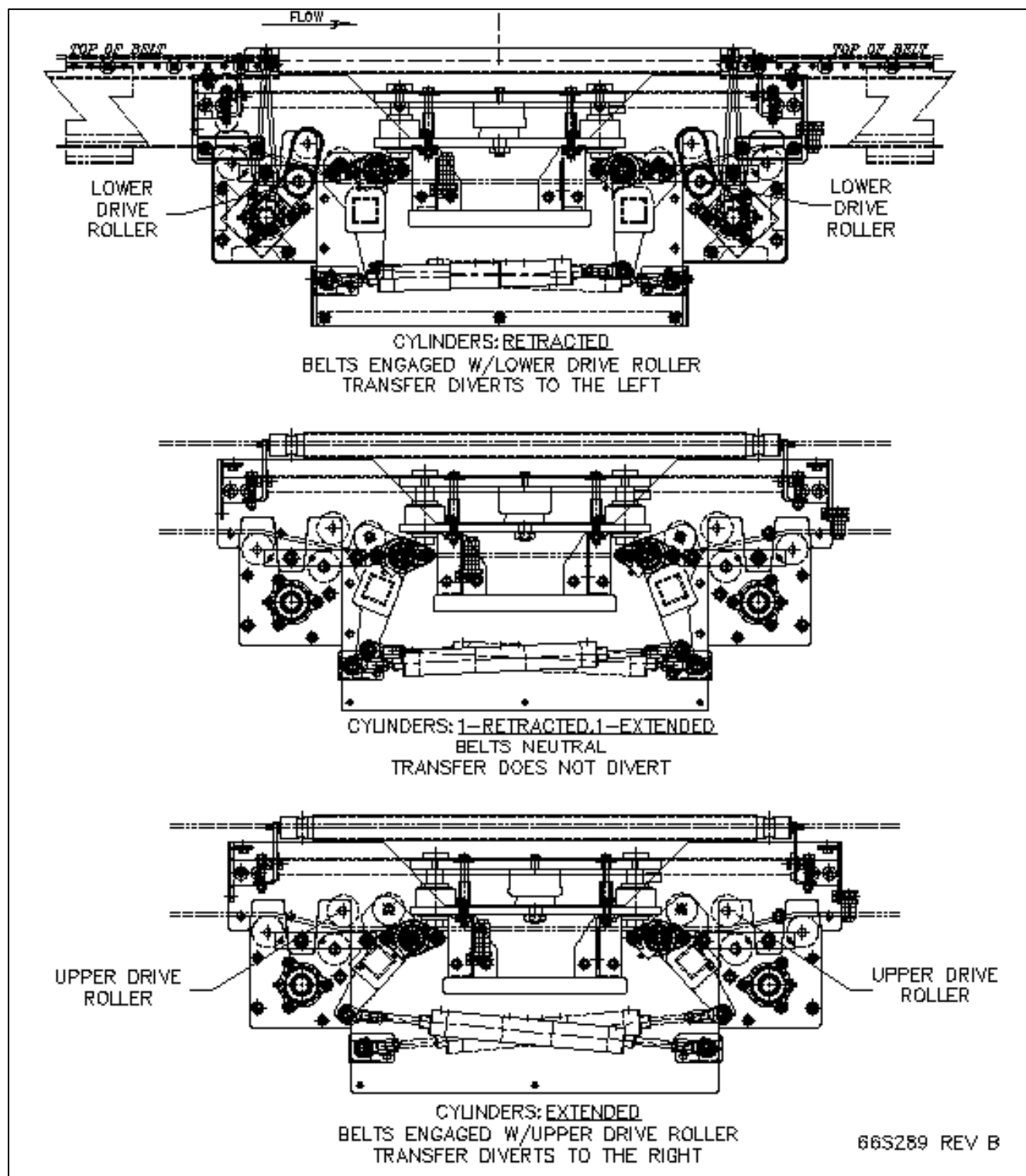
Adjustment in the field is performed by the following steps:

1. Determine which corners need height adjustments. This can be determined by placing a straight edge across the sorter belts and measuring the distance from the bottom of the straight edge to the top-of-roller at each transfer corner. If the transfer rollers can be forced into their up position, the straight edge can be placed on the roller surfaces and the measurements can be made down to the belt surfaces. (The roller mounting forks are usually in their full up adjusted position, and lowering the roller height is usually the easiest way to adjust.)
2. Remove the two flat orange end guards from both ends of the transfer (this will allow access to the four adjustment locations).
3. The roller mounting forks have  $3/4'$  long slots in their faces and are clamped between the jack bolt angle and the longitudinal crossmember that separates the two forks.
4. Loosen the two hex head cap screws in the corner that is being adjusted as well as the jam nuts on the jack screw. Use the jack screw jam nut that moves the fork in the direction necessary. Repeat this procedure on each corner that needs adjustment.
5. When transfer roller are all parallel to the sorter belt surfaces, tighten all fasteners and replace the guards.



## Using the Gates 505C or 507C Sonic Meter

### NBS90-BR SL 33 Transfer



## For Timing Belt Tension Measurement

- There are three known measurements that need to be set in the Sonic Meter to correctly measure belt tension. These measurements are:
  - Weight of the belt in grams per meter of belt length.
  - Width of the belt in millimeters.
  - Belt Span between timing belt sprockets measured in millimeters.
- TGW has standardized on using “HPR”, 8 mm tooth pitch, 30 mm wide synchronous timing belts in all American domestic conveyor / sorter equipment.
- The weight of this style synchronous timing belt is 5.8 grams / meter.
- The belt width is 30 millimeters.
- The Belt Span between timing belt sprockets is fairly standard for the different equipment types using these synchronous timing belts.
- NBS90 Transfers use two synchronous timing belts in each different transfer.
- The SEW-MOVIMOT drive belt (PN 90050600 BELT, TMG HPR 600-8M-30) is always the same Belt Span distance (137 millimeters).
- The correct tension can be either measured in Pounds of Tension: 20 – 30 lbs. or Frequency measured in Hertz: 110 – 130 Hertz
- There are only two other timing belts used in NBS90 transfers and their use is determined by the length of the transfer rollers (either 24 inch long or 30 inch long).
- Part number 90051120 BELT, TMG HPR 1120-8M-30 is used in 24” long transfers. (424 mm Belt Span)
- The correct tension can be either measured in Pounds of Tension: 30 – 50 lbs. or Frequency measured in Hertz: 40 – 57 Hertz
- Part number 90051440 BELT, TMG HPR 1440-8M-30 is used in 30” long transfers. (576 mm Belt Span).
- The correct tension can be either measured in Pounds of Tension: 30 – 50 lbs. or Frequency measured in Hertz: 33 – 42 Hertz
- After setting the correct parameters in the Sonic Meter hold the sensing probe a few millimeters above or below the belt 30 mm wide face. Tap the belt to generate a vibration and read the measurement on the Sonic Meter.



## Parts Identification

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

Parts which specifically pertain to NBS30 3-row, NBS30 5-row, NBS30 WAVE & NBS90 are included with illustrations.

A Recommended Spare Parts List is available for all conveyor orders. This spare parts list should be requested approximately two (2) weeks before the equipment order is shipped. It includes part numbers, description, pricing and recommended quantities to be kept in stock for maintenance as well as Risk Classification for each part.

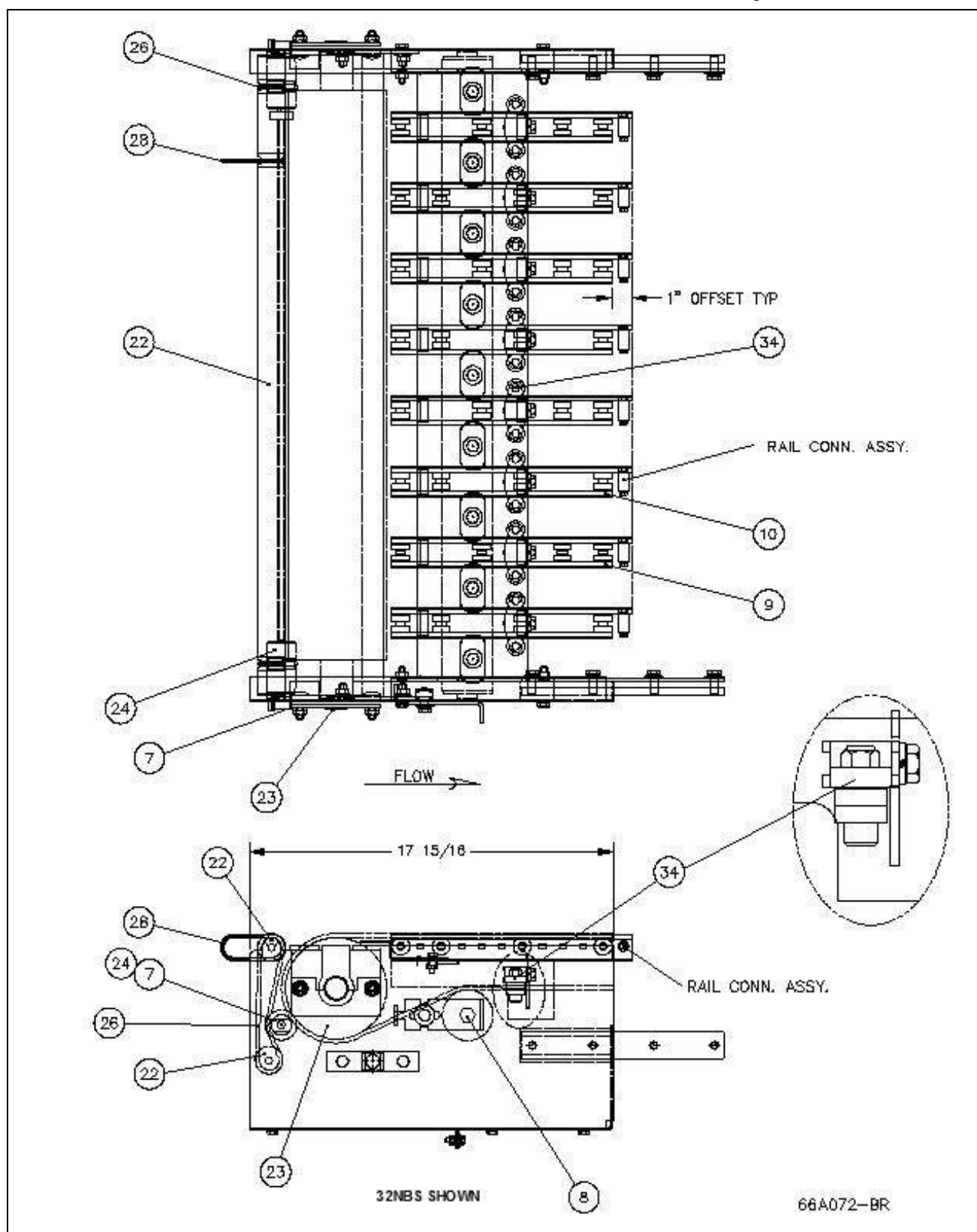
Risk Classifications for your Spare Parts List are indicated by a letter:

- |                |  |
|----------------|--|
| Level <b>A</b> | Wearing parts / Stock keeping is essential       |
| Level <b>B</b> | Normal assembly parts / Recommend stock keeping  |
| Level <b>C</b> | Minor risk for break down / Advise stock keeping |

A Recommended Spare Parts List may be obtained by contacting TGW Lifetime Services Group at 231-798-4547 or Fax 231-798-4549.

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 part charts that apply.

## Parts Identification – NBS-BR End Pulley

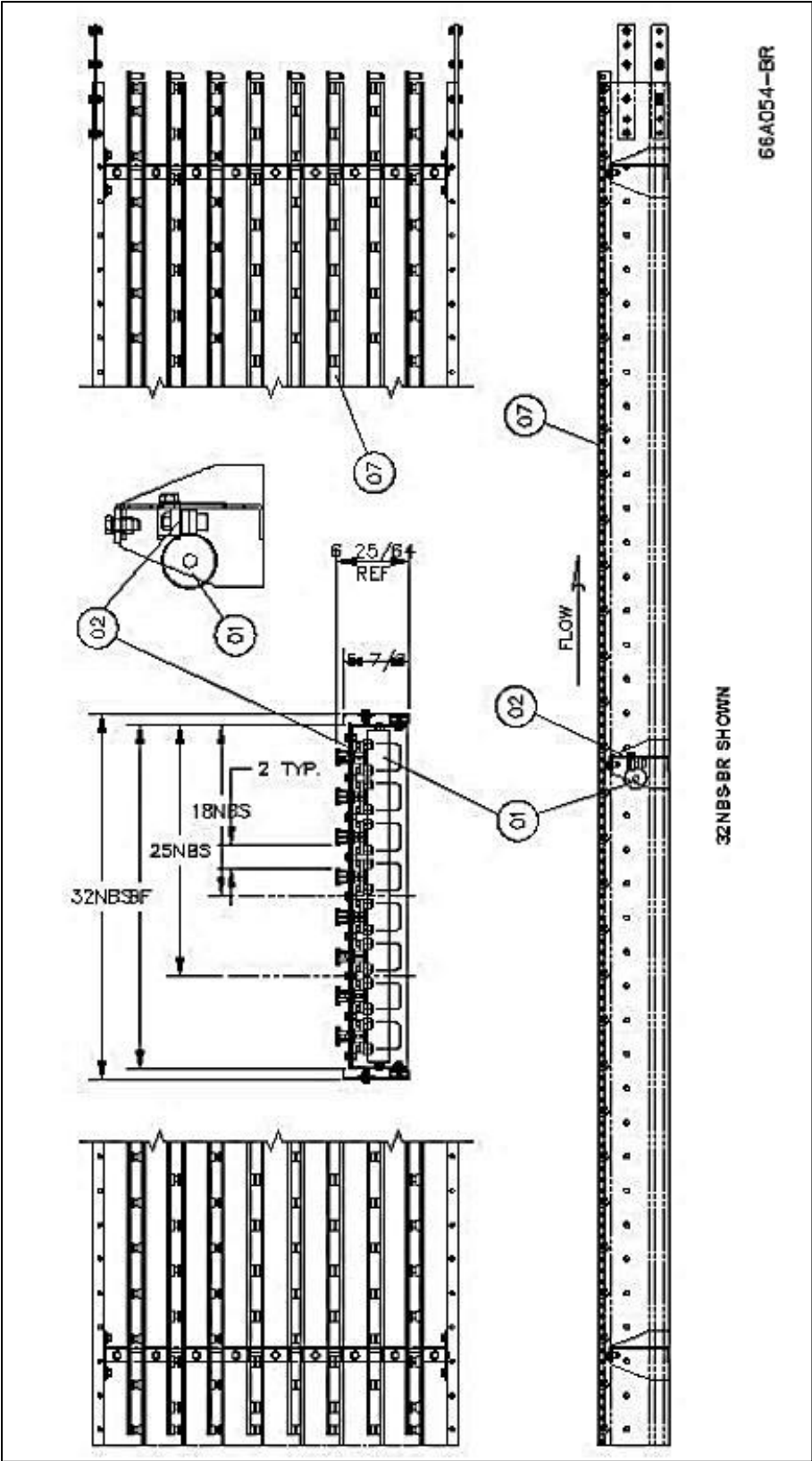


### NBS-BR End Pulley – Replacement Parts

Replacement Part Numbers and Quantities for NBS-BR 5' Endpulley Widths						
			WIDTH	18"	25"	32"
		ENDPULLEY,5" ASY __NBS-BR		1112460	1112461	1112462
BALLOON	ITEM #	DESCRIPTION	QTY			
07	E0002716	ROLLER,SLIDE 11/32" HEX	2			
08		PULLEY,ASY 2.5" DIA __NBS	1	E0040908	E0040909	E0040910
09	1108855	RAIL,ASY-A NBS-BR 1' EP		2	3	4
10	1108856	RAIL,ASY-B NBS-BR 1' EP		2	3	4
22		ROLLER,SLV __NBS ENDPULLEY	2	E0041070	E0041071	E0041072
<b>23</b>		<b>PULLEY,ASY 5" DIA __NBS C-FF</b>	<b>1</b>	<b>E0040823</b>	<b>E0040824</b>	<b>E0040825</b>
23/001		PULLEY,5" DIA __NBS C-FF	1	E0040820	E0040821	E0040822
23/002		SHAFT,1-3/16" DIA X __" __NBS 4" EP	1	E0003150	E0003151	E0003152
23/003	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE W/HDW	2			
24		ROLLER,IDLER __NBS ENDPULLEY	1	E0041073	E0041074	E0041075
26	90530019	ORING,83A 3/16" X 12-1/2"	2			
28	E0001299	ORING,83A 5/32 X 6-1/4" ST TRANS (ONLY USED FOR TWO NBS's IN LINE)	1			
<b>34</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>		<b>4</b>	<b>6</b>	<b>8</b>
34/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	16	24	32

Dwg # 66A072E-BR

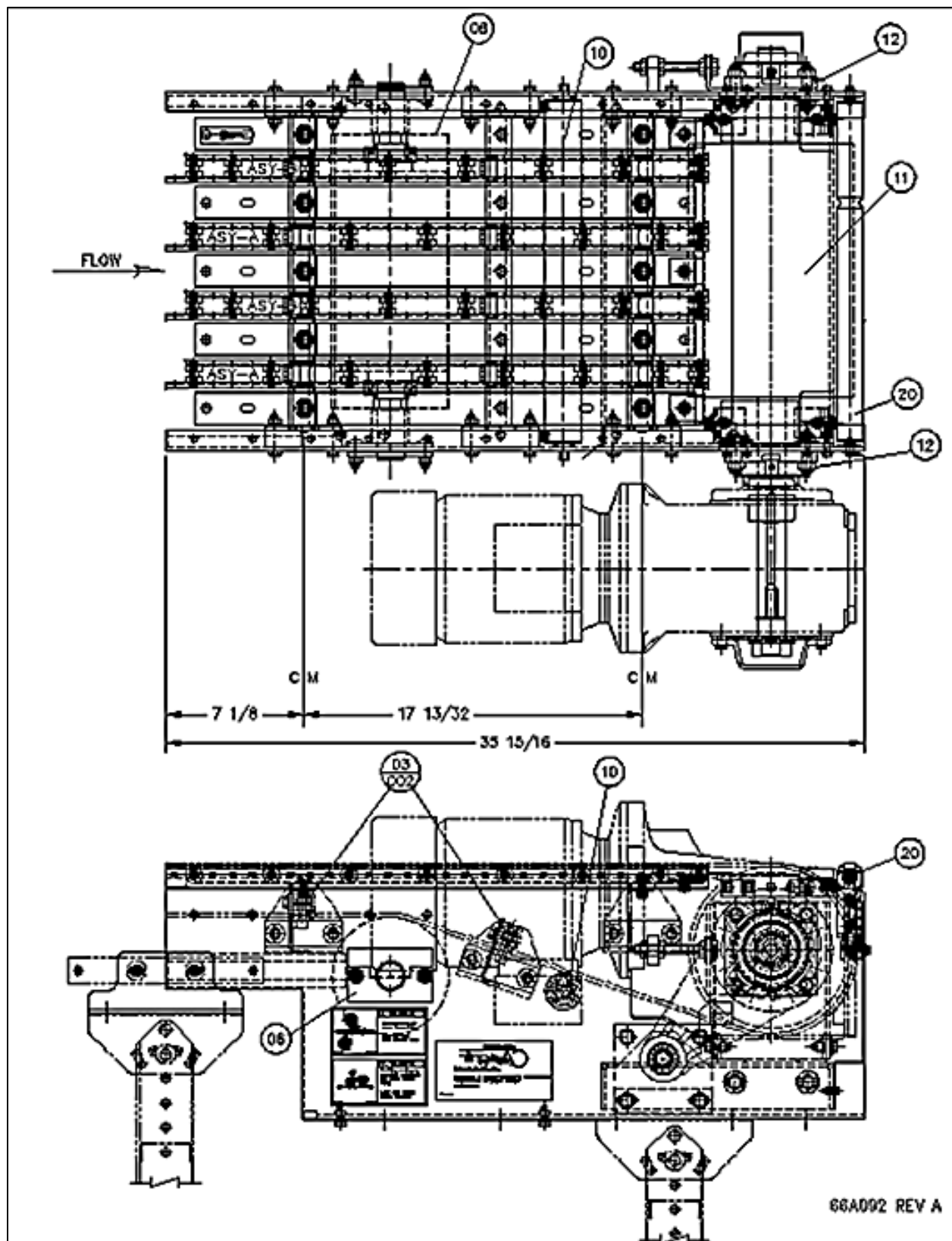
Parts Identification – NBS-BR Intermediate Bed



**NBS-BR Intermediate Bed – Replacement Parts**

Replacement Part Numbers and Quantities for NBS-BR Intermediate Bed Widths						
			WIDTH	18"	25"	32"
		BED,__NBS-BR-I x 10'		1102104	1102105	1102106
BALLOON	ITEM #	DESCRIPTION	QTY			
01		ROLLER,RET __NBS 1.9" DIA PRBG	1	E0001155	E0001156	E0001157
<b>02</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>		<b>4</b>	<b>6</b>	<b>8</b>
02/002	90050111	BRG,7/8" OD X 9/32" WDE (R6 ZZ C3)	4	16	24	32
07	1102050	RAIL,ASY-A NBS-BR 10'		4	6	8
Dwg # 66A054B-BR						

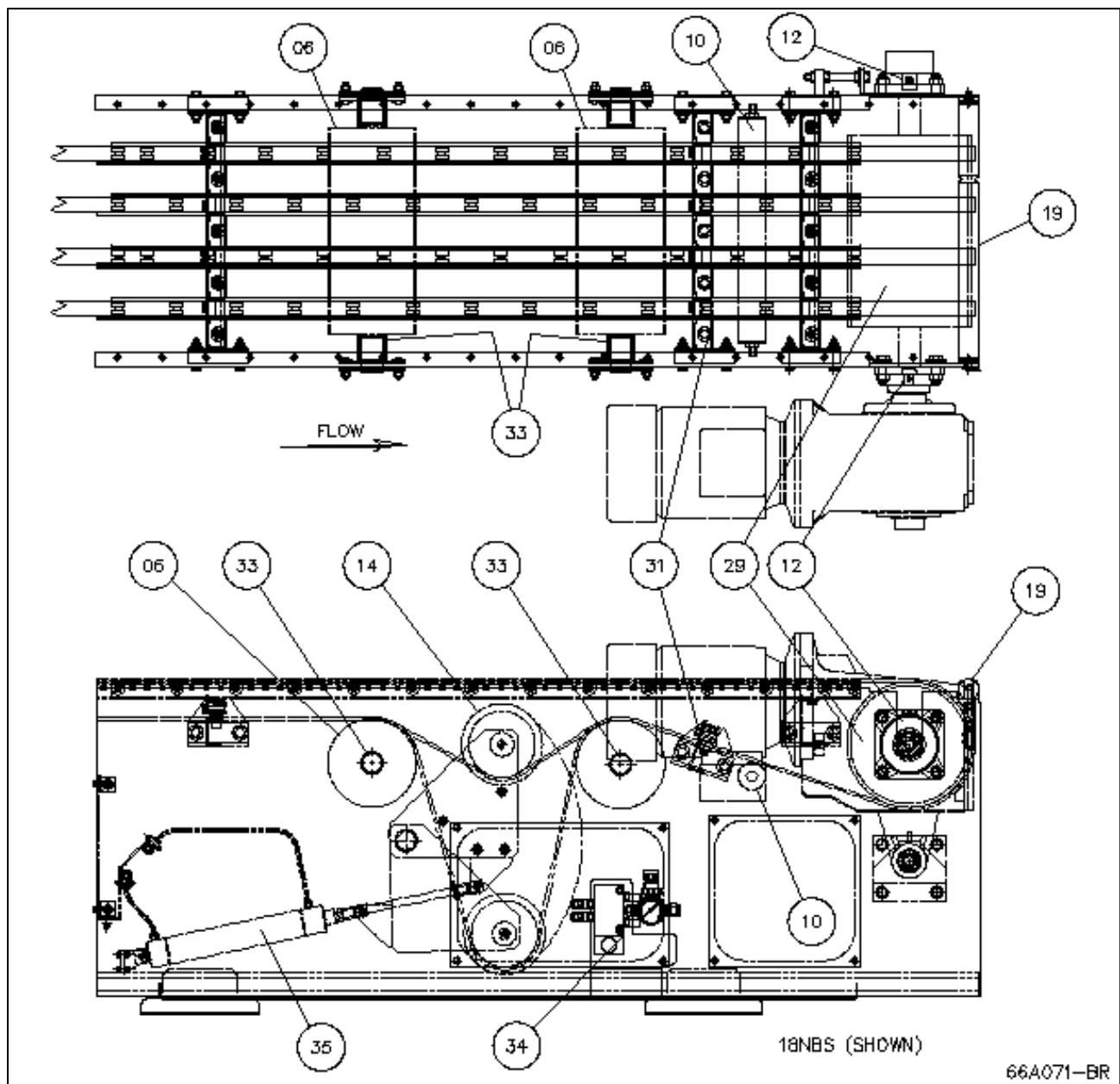
## Parts Identification – NBS-BR Drive 3' Bed RH Shown





**Parts Identification – NBS-BR Drive 3' Bed RH Shown**

Replacement Part Numbers and Quantities for NBS-BR 3' Drive Bed Widths						
	Note:	Less Independent Belt Take-up				
			WIDTH	18"	25"	32"
		BED, __ NBS 8" DIRECT DR X 3' RH		1126843	1138789	1138448
BALLOON	ITEM #	DESCRIPTION	QTY			
03/002	90050111	BRG, 7/8" OD X 9/32" WIDE		16	24	32
<b>06</b>		<b>PULLEY,ASY 6" DIA __ NBS C-FF</b>	<b>1</b>	<b>E0001274</b>	<b>E0001275</b>	<b>E0001276</b>
06/001	E0001295	SPACER, 6" PULLEY STOP 1-1/2" PVC	2			
06/002		PULLEY, __ NBS 6" DIA C-FF 1-7/16" BORE W/BRGS	1	E0001271	E0001272	E0001273
06/003		SHAFT, 1-7/16" DIA X __ -1/4 __ NBS	1	E0001265	E0001266	E0001267
06/004	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE W/HDW	2			
06/005	E0001295	SPACER,6" PULLEY STOP 1-1/2" PVC	2			
10		ROLLER, __ NBS DR 1.9" DIA PLTD PRBG	1	1115002	1115167	1115168
11		PULLEY,8" DIA DIRECT __ NBS	1	E0004508	E0004509	E0004510
12	1114091	BRG,FLG 4-BOLT X 1-7/16" BORE CLAMP	2			
20		ROLLER,GAP __ NBS	1	E0001337	E0001340	E0001343
Ref Dwg 66A092 REV A						

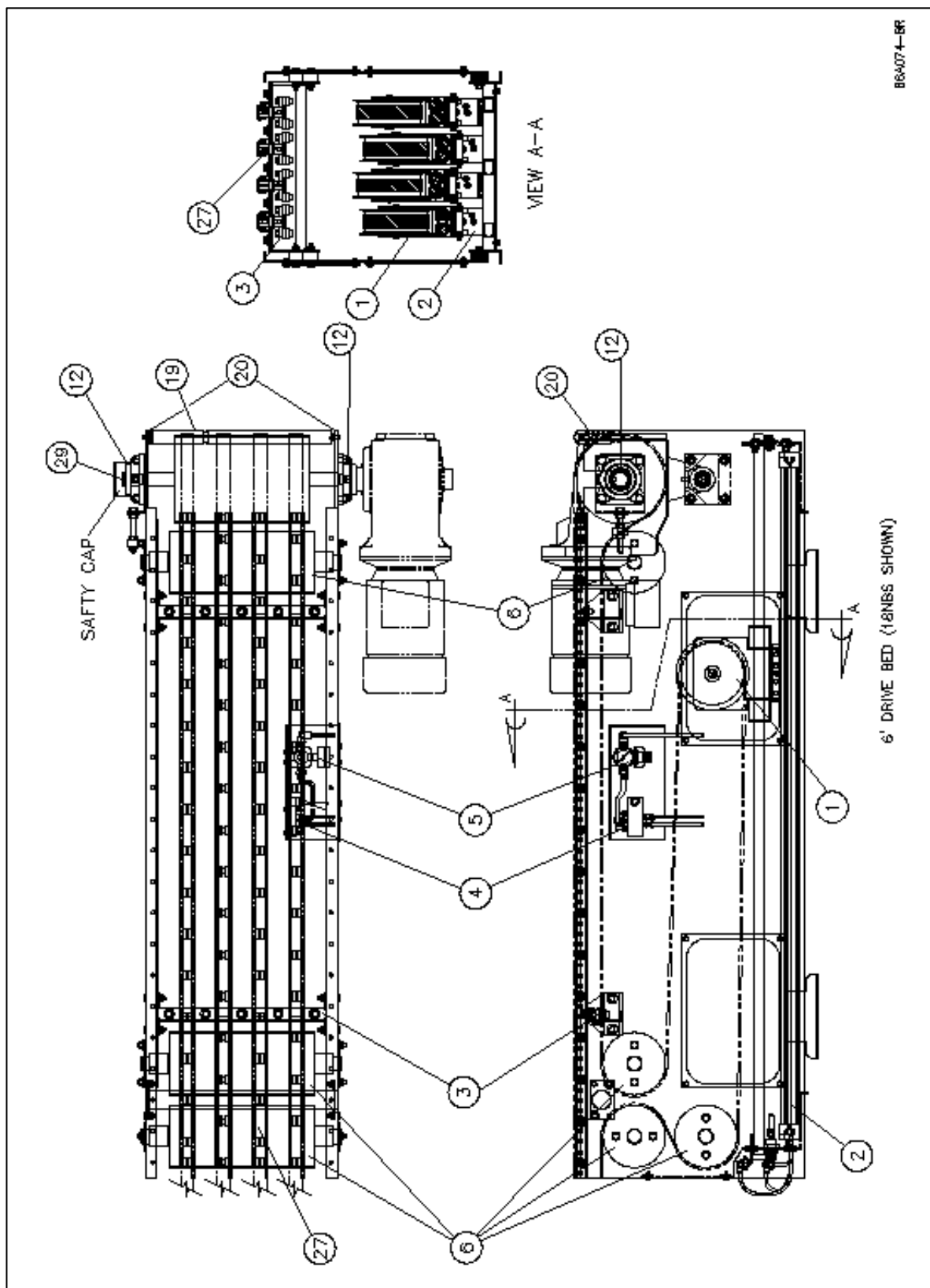
**Parts Identification – NBS-BR Drive 5' Bed RH Shown**

## NBS-BR Drive 5' Bed RH & LH – Replacement Parts

Replacement Part Numbers and Quantities for 5' Drive Bed Widths						
			WIDTH	18"	25"	32"
		BED, __ NBS-BR-RH-DR X 5'		1112450	1115203	1115376
		BED, __ NBS-BR-LH-DR X 5'		1115504	1115181	1115377
BALLOON	ITEM #	DESCRIPTION	QTY			
<b>06</b>		<b>PULLEY,ASY 6" DIA __ NBS C-FF</b>	<b>2</b>	<b>E0001274</b>	<b>E0001275</b>	<b>E0001276</b>
06/001		PULLEY, __ NBS 6" DIA C-FF 1-7/16" BORE W/BRGS	1	E0001271	E0001272	E0001273
06/002		SHAFT,1-7/16" DIA X __ -1/4 __ NBS	1	E0001265	E0001266	E0001267
06/003	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE W/HDW	2			
10		ROLLER, __ NBS DR 1.9" DIA PLTD PRBG	1	1115002	1115167	1115168
12	1114091	BRG,FLG 4-BOLT CONCENTRIC CLAMP COLLAR	2			
14	E0001560	WHEEL,ASSEMBLY NBS		4	6	8
19		ROLLER,GAP __ NBS	1	E0001337	E0001340	E0001343
29		PULLEY,8.5" DIA DIRECT DR __ NBS	1	1108334	1108335	1108336
29/001		SHAFT, __ NBS PULLEY X __ -1/8" (Replacement)	1	E0034909	E0034910	E0034911
<b>31</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>8</b>
31/002	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	16	24	32
33	E0001295	SPACER,6" PULLEY STOP 1-1/2" ID PVC X 1-3/4" LONG	4			
<b>34</b>	<b>E0004377</b>	<b>AIR,REGULATOR ASY NBS RH TAKEUP</b>	<b>1</b>			
34	1115891	AIR,REGULATOR ASY NBS LH TAKEUP	1			
34/001	89000132	REGULATOR,SCHRADER 15R213FB	1			
34/002	89000133	GAUGE,SCHRADER P781642	1			
34/003	E0002697	VALVE,5/2 HAND LEVER/DETENT				
35	E0004275	CYL,AIR 1-3/4" BORE X 8" STROKE		4	6	8

Dwg # 66A071D-BR

## Parts Identification – NBS-BR Drive 6' Bed RH Shown

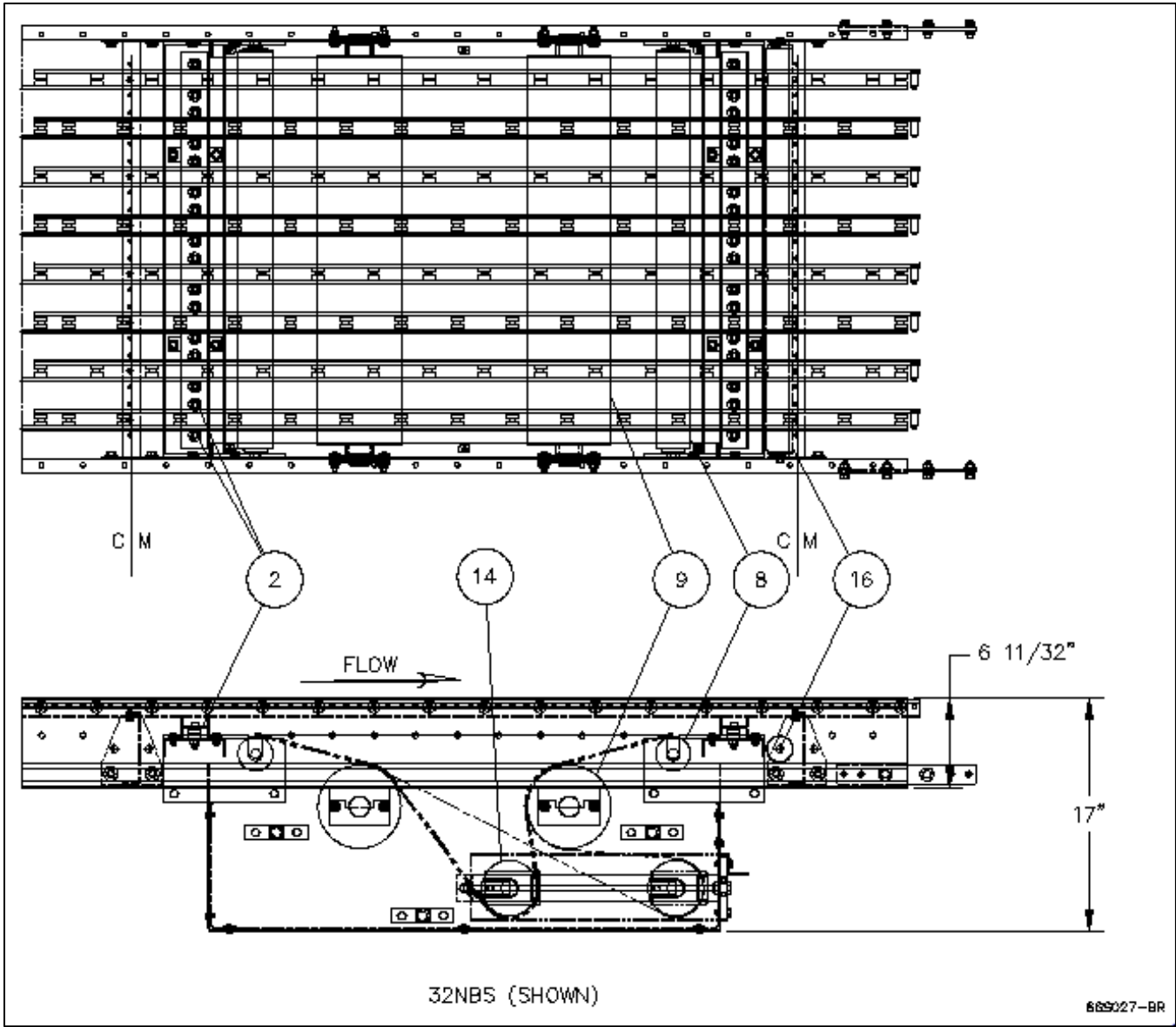


### NBS-BR Drive 6' Bed RH & LH – Replacement Parts

Replacement Part Numbers and Quantities for 6' Drive Bed Widths						
			WIDTH	18"	25"	32"
		BED, __ NBS-BR-RH-DR X 6' W/8'-10" OF BELT AIR TAKE-UP		1113355	1113350	1108538
		BED, __ NBS-BR-LH-DR X 6' W/8'-10" OF BELT AIR TAKE-UP		1117282	1121843	1117008
BALLOON	ITEM #	DESCRIPTION	QTY			
01	E0002214	PULLEY,ASY 6" DIA W/FLANGE		4	6	8
02	1107699	CYL,AIR RODLESS W/1-MALE PUSH LOCK CONN		4	6	8
<b>03</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>8</b>
03/002	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	16	24	32
04	1115797	AIR,VALVE 4-WAY HAND LEVER	1			
05	1107897	AIR,REGULATOR ASY NBS TAKE-UP W/2 ELBOW FITTINGS 1/4NPT - 3/8" OD TUBE	1			
<b>06</b>		<b>PULLEY,ASY 6" DIA __ NBS C-FF</b>	<b>2</b>	<b>E0001274</b>	<b>E0001275</b>	<b>E0001276</b>
06/001		PULLEY, __ NBS 6" DIA C-FF 1-7/16" BORE W/BRGS	1	E0001271	E0001272	E0001273
06/002		SHAFT,1-7/16" DIA X __ -1/4 __ NBS	1	E0001265	E0001266	E0001267
06/003	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE W/HDW	2			
12	1114091	BRG,FLG 4-BOLT CONCENTRIC CLAMP COLLAR	2			
20		ROLLER,GAP __ NBS	1	E0001337	E0001340	E0001343
27	1108241	RAIL,ASY-A NBS-BR 6' DR		2	3	4
29		PULLEY,8.5" DIA DIRECT DR __ NBS	1	1108334	1108335	1108336
29/001		SHAFT, __ NBS PULLEY X __ -1/8" (Replacement)	1	E0034909	E0034910	E0034911

Dwg # 66A074F-BR

Parts Identification – NBS-BR Manual Auxiliary Take-Up

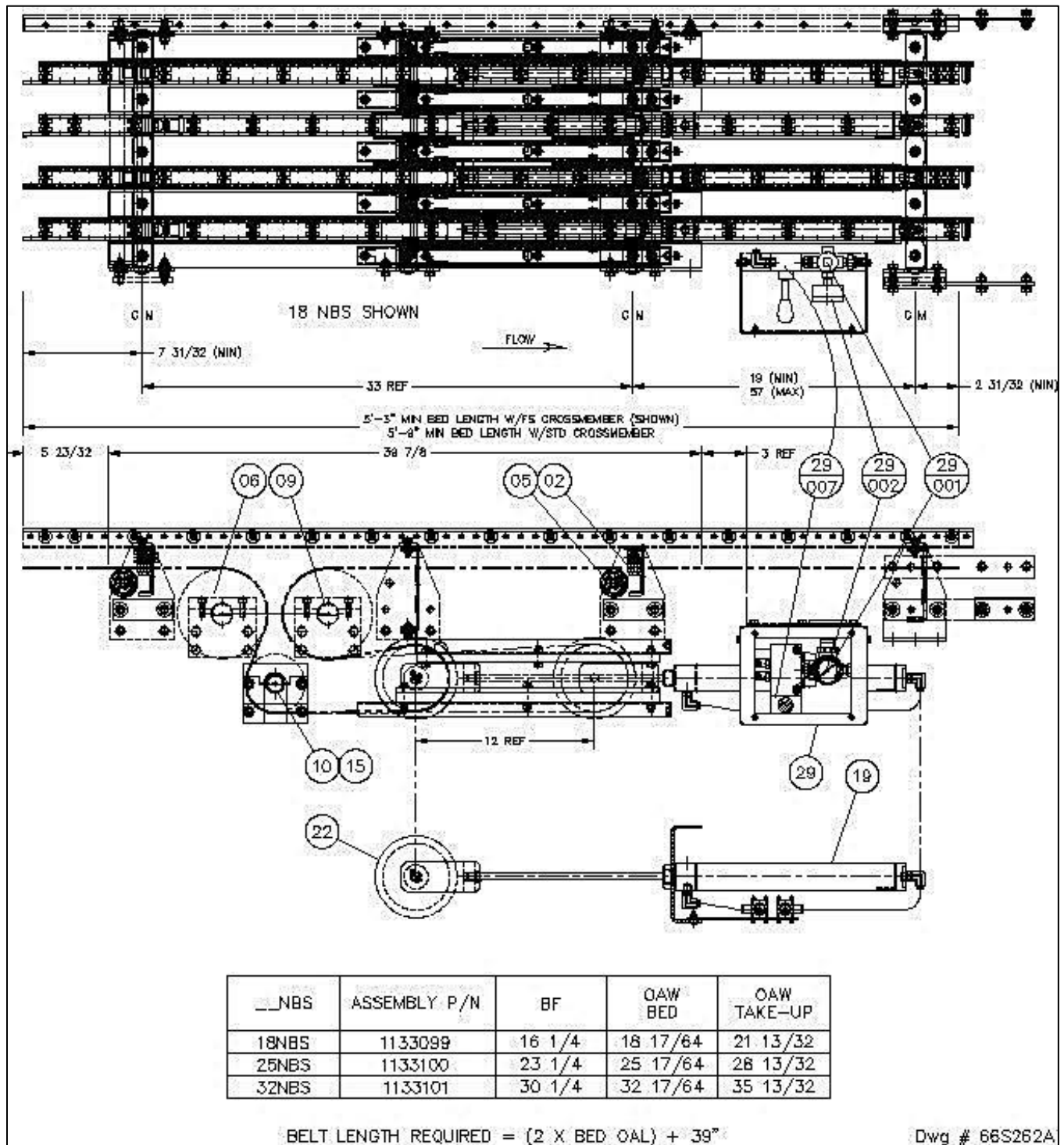




### NBS-BR Manual Auxiliary Take-Up – Replacement Parts

Replacement Part Numbers and Quantities for NBS-BR Manual Auxiliary 19" Take Up					
			WIDTH	25"	32"
		ASY,AUXILIARY TAKE-UP __ NBS-BR TAKE-UP 19"		1130050	1138651
BALLOON	ITEM #	DESCRIPTION	QTY		
02		GUIDE,__ NBS T-UP WHEEL/BLT ASY	2	E0002688	E0002689
02/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)		24	32
08		ROLLER,SNUBBER __NBS30 ABEC1 ( __ - 15/32" BF)	1	E0002691	E0002692
<b>09</b>		<b>PULLEY,ASY 6" DIA __ NBS C-FF AUXILIARY TAKE-UP</b>	<b>2</b>	<b>E0001648</b>	<b>E0001649</b>
09/001		PULLEY,__ NBS 6" DIA C-FF 1-7/16" BORE	1	E0001272	E0001273
09/002		SHAFT,1-7/16" DIA X __ -13/16" 18NBS LP TAKE-UP	1	E0001635	E0001653
09/003	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE	2		
09/004	E0001657	SPACER,6" PULLEY STOP 9/32" PVC	2		
<b>14</b>		<b>PULLEY,ASY 4" DIA __ NBS C-FF LP AUXILIARY TAKEUP</b>	<b>1</b>	<b>E0001651</b>	<b>E0001652</b>
14/001		PULLEY,__ NBS 6" DIA C-FF 1-7/16" BORE	1	E0001281	E0001282
14/002		SHAFT,1-7/16" DIA X __ -13/16" 18NBS LP TAKE-UP	1	E0001655	E0001656
14/003	1132124	COLLAR,ECCENTRIC LOCK 1-3/16" BORE	2		
14/004	E0001658	SPACER,4" PULLEY STOP 11/16" PVC AUXILIARY TAKE-UP	2		
16		ROLLER,RET __ NBS 1.9" DIA PRBG	1	E0001156	E0001157
REF: Dwg # 10D0577401A					

## NBS-BR Low Profile Air Auxiliary Take-Up

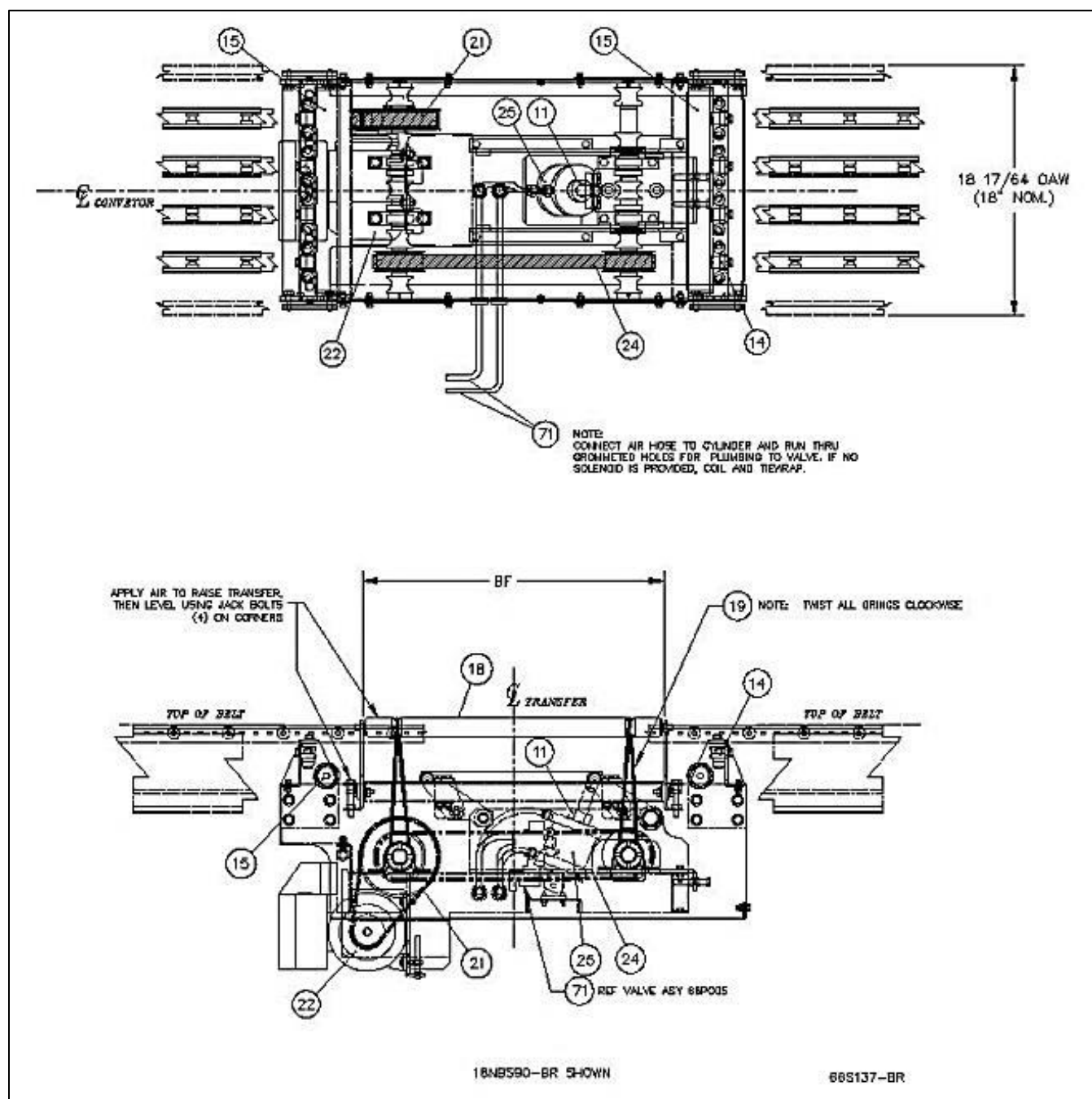


## NBS-BR Low Profile Air Auxiliary Take-Up

Replacement Part Numbers and Quantities for NBS LP Air Auxiliary Take-up Widths						
			WIDTH	18"	25"	32"
		TAKEUP,LP AUX AIR __ NBS- BR		1133099	1133100	1133101
BALLOON	ITEM #	DESCRIPTION	QTY			
<b>02</b>		<b>CROSSMEMBER,ASY 18NBS-BR W/BELT GUIDE</b>		<b>1132993</b>	<b>1132994</b>	<b>1132995</b>
02/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)		16	24	32
05		ROLLER,SNUBBER __ NBS30 ABEC1 ( __ - 15/32" BF)	1	E0002690	E0002691	E0002692
<b>06</b>		<b>PULLEY,ASY 6" DIA __ NBS C-FF</b>	<b>2</b>	<b>1133015</b>	<b>1133016</b>	<b>1133017</b>
06/001		PULLEY, __ NBS 6" DIA C-FF 1-7/16" BORE	1	E0002171	E0002172	E0002173
06/002		SHAFT,1-7/16" DIA X __ -13/16" 18NBS LP TAKE-UP	1	1133009	1133010	1133011
06/003	1132149	COLLAR,ECCENTRIC LOCK 1-7/16" BORE	2			
06/004	1133020	SPACER,6" PULLEY STOP 9/32" PVC	2			
<b>10</b>		<b>PULLEY,ASY 4" DIA __ NBS C-FF LP AUXILIARY TAKEUP</b>	<b>1</b>	<b>1133021</b>	<b>1133022</b>	<b>1133023</b>
10/001		PULLEY, __ NBS 6" DIA C-FF 1-7/16" BORE	1	E0001280	E0001281	E0001282
10/002		SHAFT,1-7/16" DIA X __ -13/16" 18NBS LP TAKE-UP	1	1133012	1133013	1133014
10/003	1132124	COLLAR,ECCENTRIC LOCK 1-3/16" BORE	2			
10/004	E0001658	SPACER,4" PULLEY STOP 11/16" PVC AUXILIARY TAKE-UP	2			
19	1133082	CYL,AIR CLIPPARD SDR-28-12 1-3/4" BORE X 12" STROKE		4	6	8
22	E0001560	WHEEL,ASY 5-1/2" OD NBS TAKEUP GLASS FILLED NYLON		4	6	8
<b>29</b>	<b>1133044</b>	<b>AIR,REGULATOR ASYNBS LOW PRO AIR AUX TAKEUP</b>		<b>1</b>	<b>1</b>	<b>1</b>
29/001	89000132	REGULATOR,SCHRADER 15R213FB	1			
29/002	89000133	GAUGE,SCHRADER P781642	1			
29/007	E0002697	VALVE,5/2 HAND LEVER/DETENT	1			

REF: Dwg # 66S262D-BR

## Parts Identification – NBS 90-BR 24 Transfer



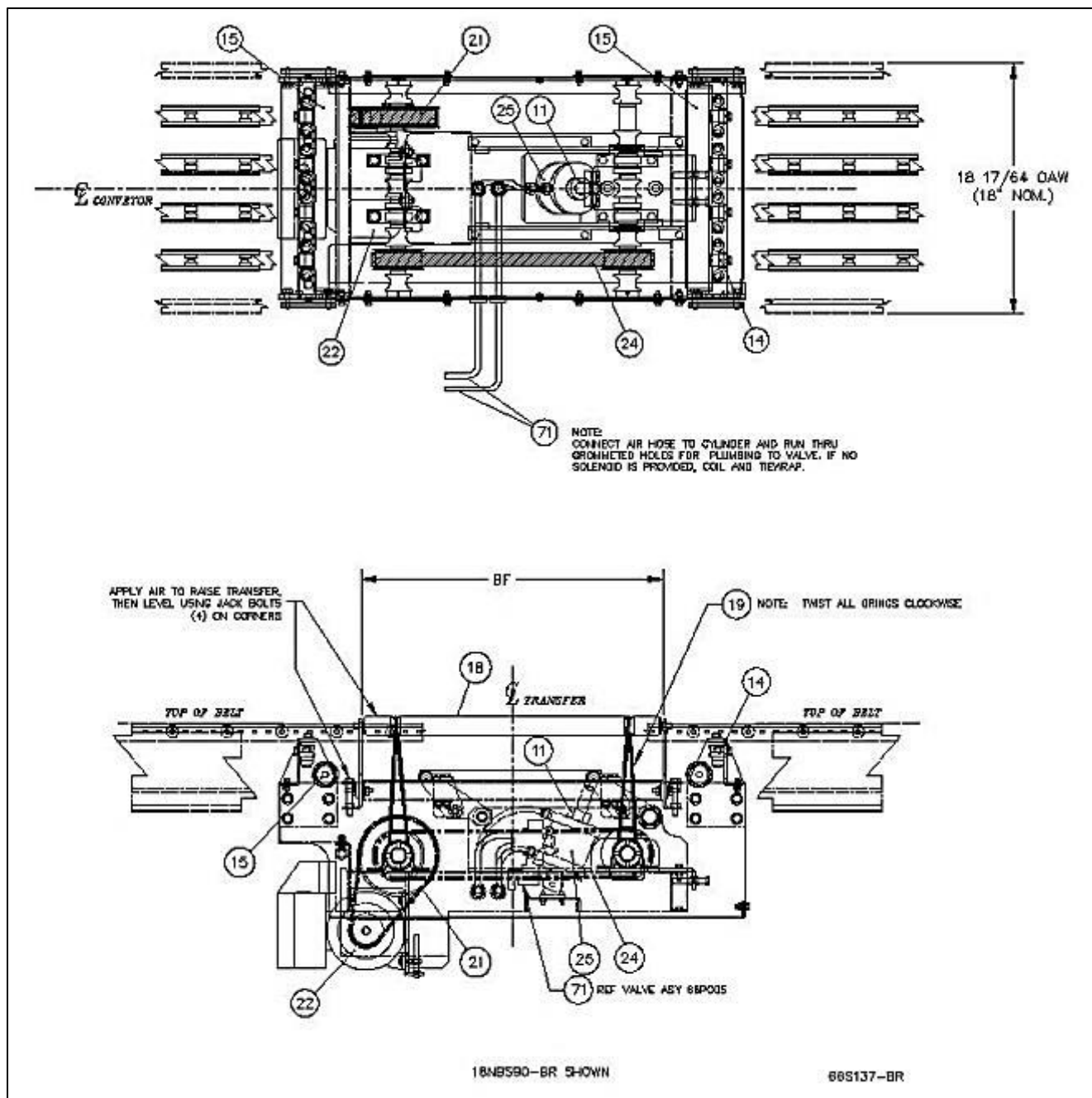
## NBS90-BR-24 Transfer – Replacement Parts

Replacement Part Numbers and Quantities for NBS90-BR-24 Transfer Widths												
With & Without MOVIMOT 24VDC Power Supply									WIDTH	18"	25"	32"
		Width	NBS __	BR-	BF-	SOL	MOTOR	XM				
WITH MOVIMOT POWER SUPPLY		TRANS, __	NBS90-	BR-	24-	110VAC	/230VAC	XM		1127039	1127051	1127059
		TRANS, __	NBS90-	BR-	24-	110VAC	/460VAC	XM		1127045	1127049	1127057
WITHOUT MOVIMOT POWER SUPPLY		TRANS, __	NBS90-	BR-	24-	24VDC	/230VAC	XM		1127038	1127050	1127058
		TRANS, __	NBS90-	BR-	24-	24VDC	/460VAC	XM		1127044	1127048	1127056
BALLOON	ITEM #	DESCRIPTION							QTY			
11	E001867	BUMPER, URETHANE 3/4" THICK 90A								1	1	1
<b>14</b>	<b>E0039089</b>	<b>BLOCK, ASY BELT GUIDE</b>								<b>4</b>	<b>6</b>	<b>8</b>
14/001	90050111	BRG, 7/8" OD X 9/32" WIDE (R6 ZZ C3)							4	16	24	32
15		ROLLER, RETURN __NBS90 (used with XM only)							2	E0043031	1100991	1100992
18	1125911	ROLLER, NBS-24 URETHANE (YELLOW)								5	7	9
19	E001530	ORING, 83A NBS 7/32" DIA X 19-7/16" LONG								10	14	18
21	90050600	BELT, TMG HPR 600-8M-30H								1	1	1
22	E0001401	MTR, EURODRIVE MOVIMOT.5HP 460VAC w/PW SY							1			
22	E0001402	MTR, EURODRIVE MOVIMOT.5HP 230VAC w/PW SY							1			
22	E0001403	MTR, EURODRIVE MOVIMOT.5HP 460VAC wo/PW SY							1			
22	E0001404	MTR, EURODRIVE MOVIMOT.5HP 230VAC wo/PW SY							1			
24	90051120	BELT, TMG HPR 1120-8M-30H								1	1	1
25	E0001594	CYL, AIR BORE 2.5" X STROKE 2.5"								1	1	1
71	E0038769	VALVE, SMC 4WAY 24VDC DIN CONN							1			
71	E0038770	VALVE, SMC 4WAY 110VAC DIN CONN							1			

Dwg # 66S137E-BR



## Parts Identification – NBS 90-BR 30 Transfer

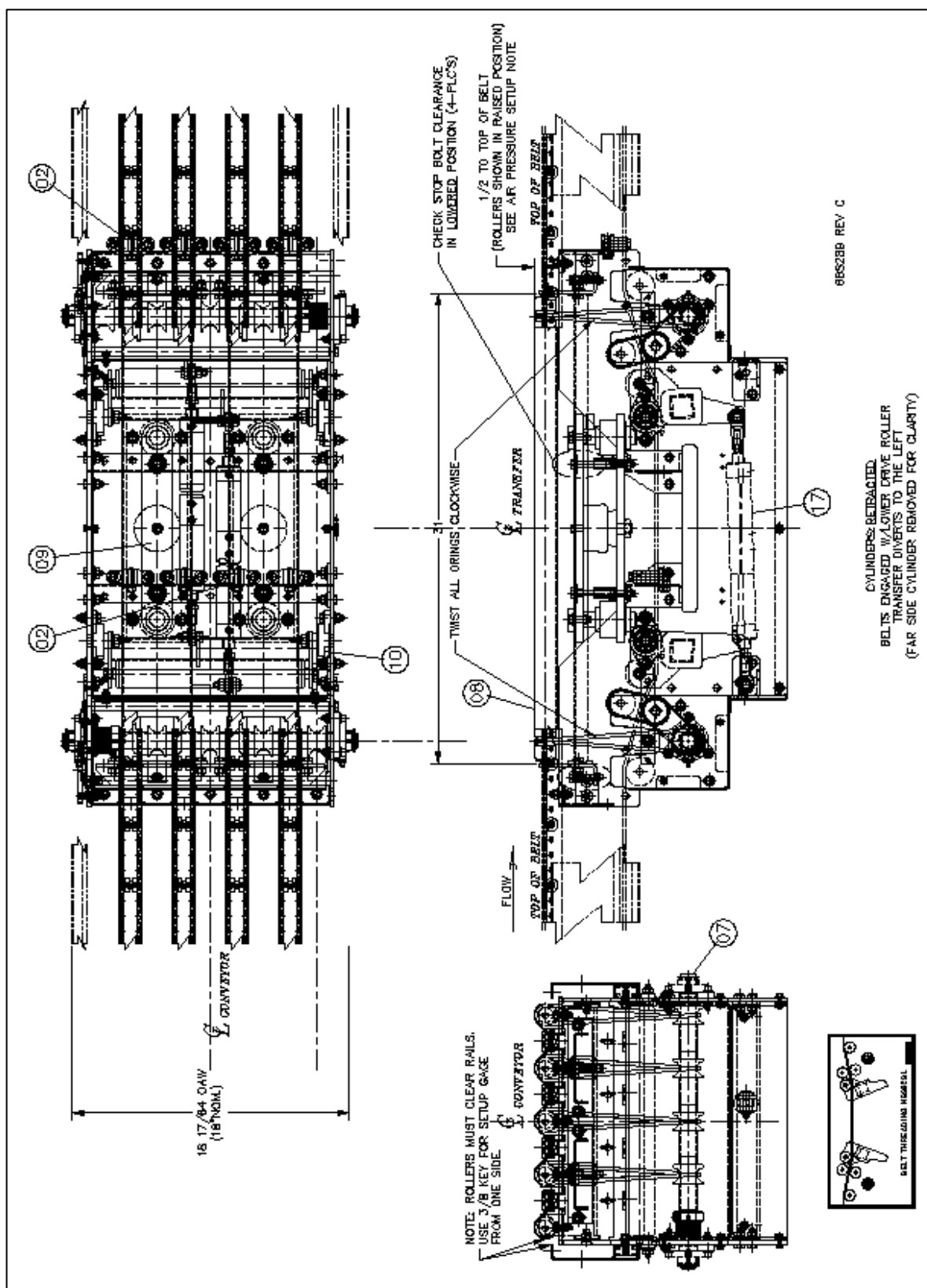


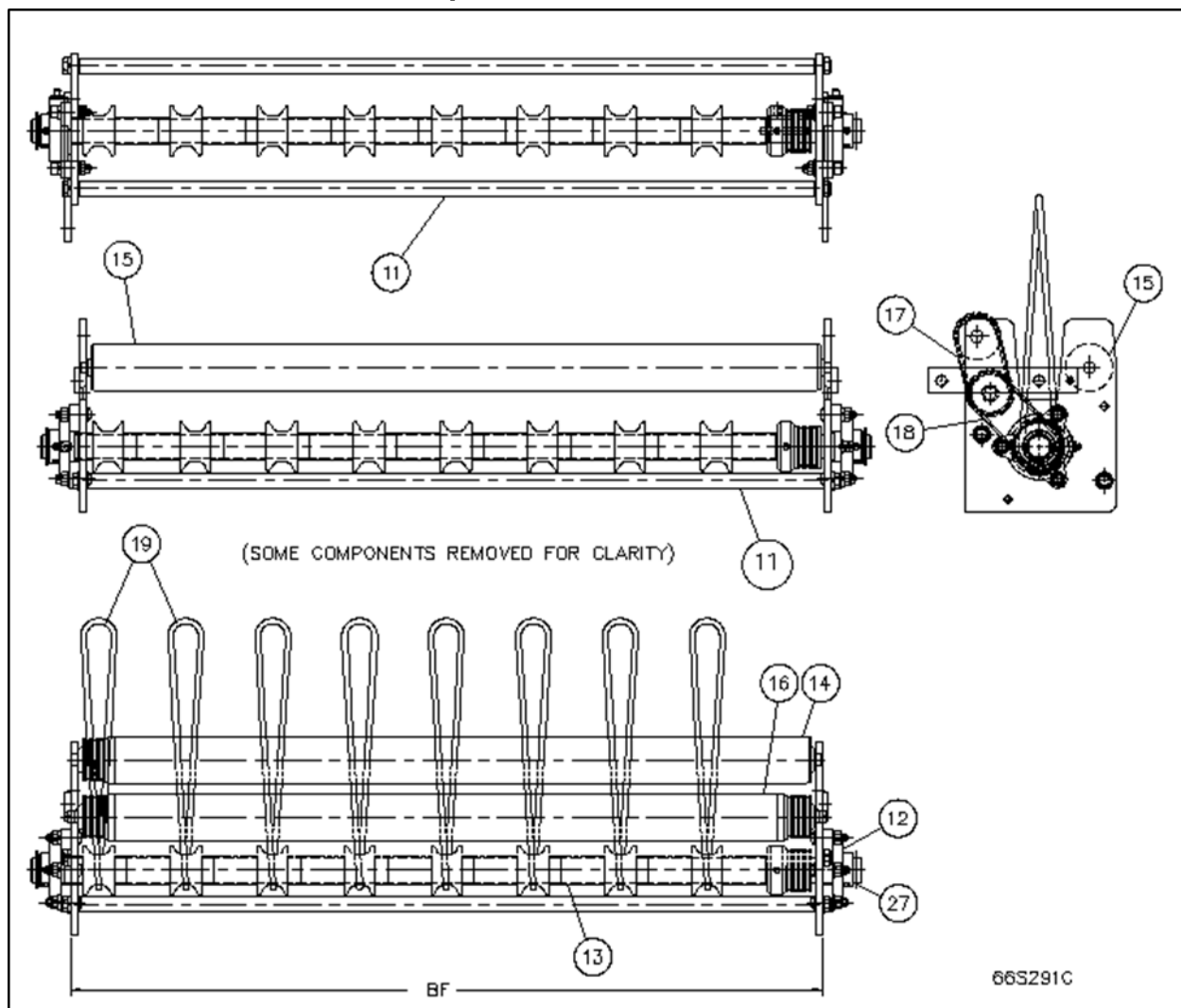


## NBS90-BR-30 Transfer – Replacement Parts

Replacement Part Numbers and Quantities for NBS90-BR-30 Transfer Widths											
		With & Without MOVIMOT 24VDC Power Supply						18"	25"	32"	
		Width	NBS __	BR- BF-	SOL	MOTOR	XM				
WITH MOVIMOT POWER SUPPLY		TRANS, __	NBS90-	BR- 30-	110VAC	/230VAC	XM	1127043	1127055	1127063	
		TRANS, __	NBS90-	BR- 30-	110VAC	/460VAC	XM	1127041	1127053	1127061	
WITHOUT MOVIMOT POWER SUPPLY		TRANS, __	NBS90-	BR- 30-	24VDC	/230VAC	XM	1127042	1127054	1127062	
		TRANS, __	NBS90-	BR- 30-	24VDC	/460VAC	XM	1127040	1127052	1127060	
BALLOON	ITEM #	DESCRIPTION						QTY			
11	E001867	BUMPER,URETHANE 3/4"THK 90A							1	1	1
14	E0039089	BLOCK,ASY BELT GUIDE							4	6	8
14/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)						4	16	24	32
15		ROLLER,RETURN __NBS90 (used with XM only)						2	E0043031	1100991	1100992
18	1125912	ROLLER,NBS-30 URETHANE (YELLOW)							5	7	9
19	E001530	ORING,83A NBS 7/32" DIA X 19-7/16" LONG							10	14	18
21	90050600	BELT,TMG HPR 600-8M-30H							1	1	1
22	E0001401	MTR,EURODRIVE MOVIMOT.5HP 460VAC w/PW SY						1			
22	E0001402	MTR,EURODRIVE MOVIMOT.5HP 230VAC w/PW SY						1			
22	E0001403	MTR,EURODRIVE MOVIMOT.5HP 460VAC wo/PW SY						1			
22	E0001404	MTR,EURODRIVE MOVIMOT.5HP 230VAC wo/PW SY						1			
24	90051440	BELT,TMG HPR 1440-8M-30H							1	1	1
25	E0001594	CYL,AIR BORE 2.5" X STROKE 2.5"							1	1	1
71	E0038769	VALVE,SMC 4WAY 24VDC DIN CONN						1			
71	E0038770	VALVE,SMC 4WAY 110VAC DIN CONN						1			
Dwg # 66S137E-BR											

## Part Identification NBS90-BR SL 33 Transfer



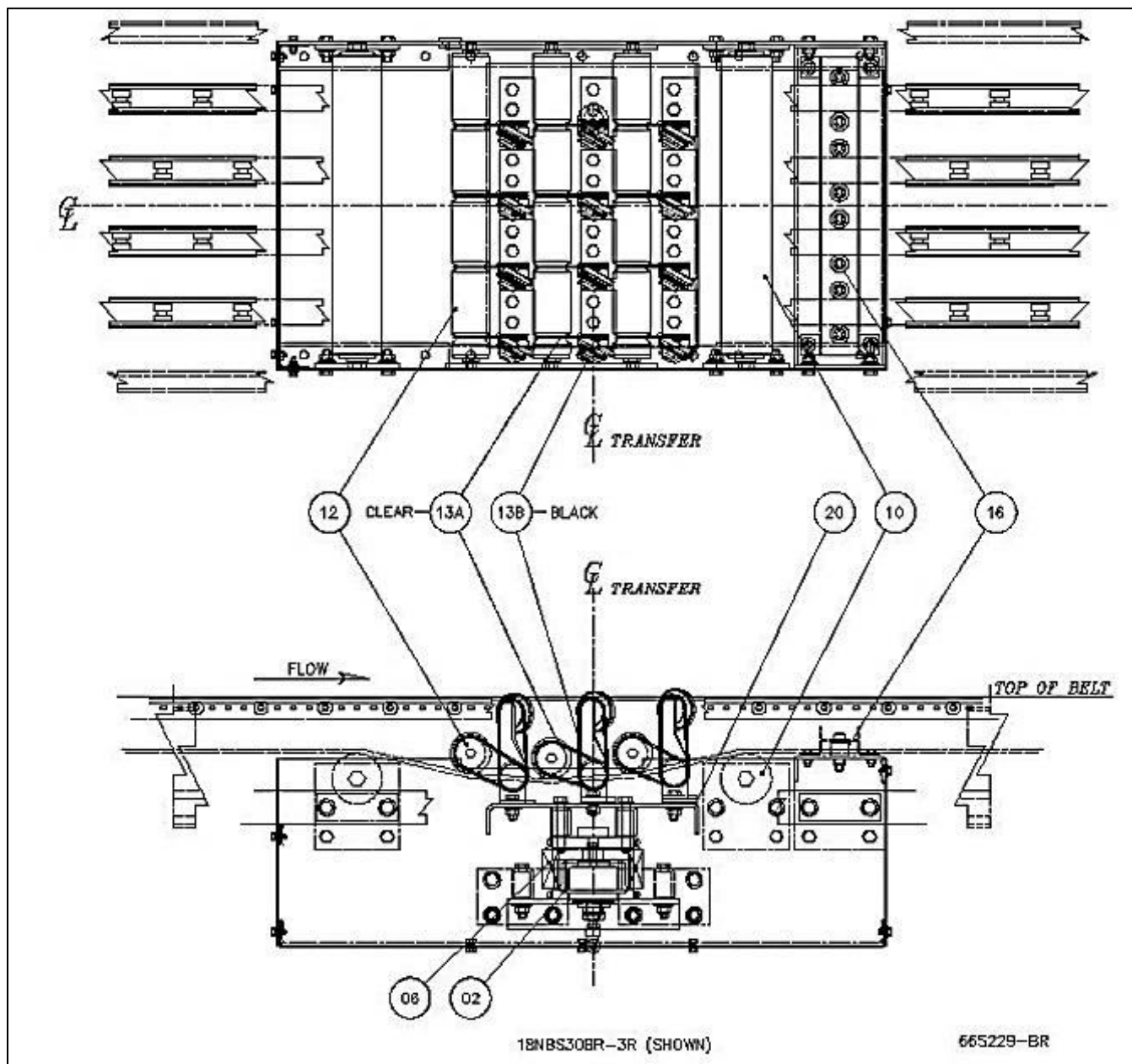
**NBS90-BR SL 33 Transfer – Replacement Parts**



**,NBS 90-BR-SL 33 Transfer Power Take Off**

Replacement Part Numbers and Quantities for NBS90SL-BR-33 Transfer Widths						
			Dwg #	66S288A	66S289B	66S290B
			WIDTH	18"	25"	32"
		TRANSFER, __ NBS90SL-BR-33 24VDC SOL ORANGE ROLLERS		1158868	1158870	1158872
		TRANSFER, __ NBS90SL-BR-33 110VAC SOL ORANGE ROLLERS		1158869	1158871	1158873
		TRANSFER, __ NBS90SL-BR-33 24VDC SOL YELLOW ROLLERS		1162495	1162497	1162499
		TRANSFER, __ NBS90SL-BR-33 110VAC SOL YELLOW ROLLERS		1162496	1162498	1162500
BALLOON	ITEM #	DESCRIPTION	QTY			
02	E0031808	BRG,RADIAL #6802ZZC3SR12	18			
08	1152174	ROLLER,NBS90SL-33 85 DURO ORANGE URETHANE		5	7	9
08	1146585	ROLLER,NBS90SL-33 65 DURO YELLOW URETHANE		5	7	9
09	90000025	AIRBAG	2			
11		CROSSMEMBER SPANNER __ NBS90SL	4	1157926	1157927	1157928
12	1127821	BRG FLG 3-BOLT X 1" BORE CAST W/HDWR	4			
13		L/S TRANSFER PTO __ NBS90SL	2	1154134	1154133	1154132
14		ROLLER PTO __ NBS90SL POLY-V 1.9 SGL SLV	2	1154130	1154129	1154128
15		ROLLER PTO __ NBS90SL 1.9	2	1154194	1154191	1131857
16		ROLLER PTO __ NBS90SL POLY-V 1.9 SGL SLV	2	1154163	1154164	1154165
17	1152170	BELT POLY-V 8 RIB 2.36" CTR (UPPER)		2	2	2
18	1152171	BELT POLY-V 8 RIB 2.36" CTR (LOWER)		2	2	2
19	E0001530	ORING 83A NBS 7/32 X 19-7/16		8	12	16
27	1130700	RING,RETAINING EXTERNAL 1" e-style	4			

## Parts Identification – NBS30-BR 3-Row Sorter Assembly



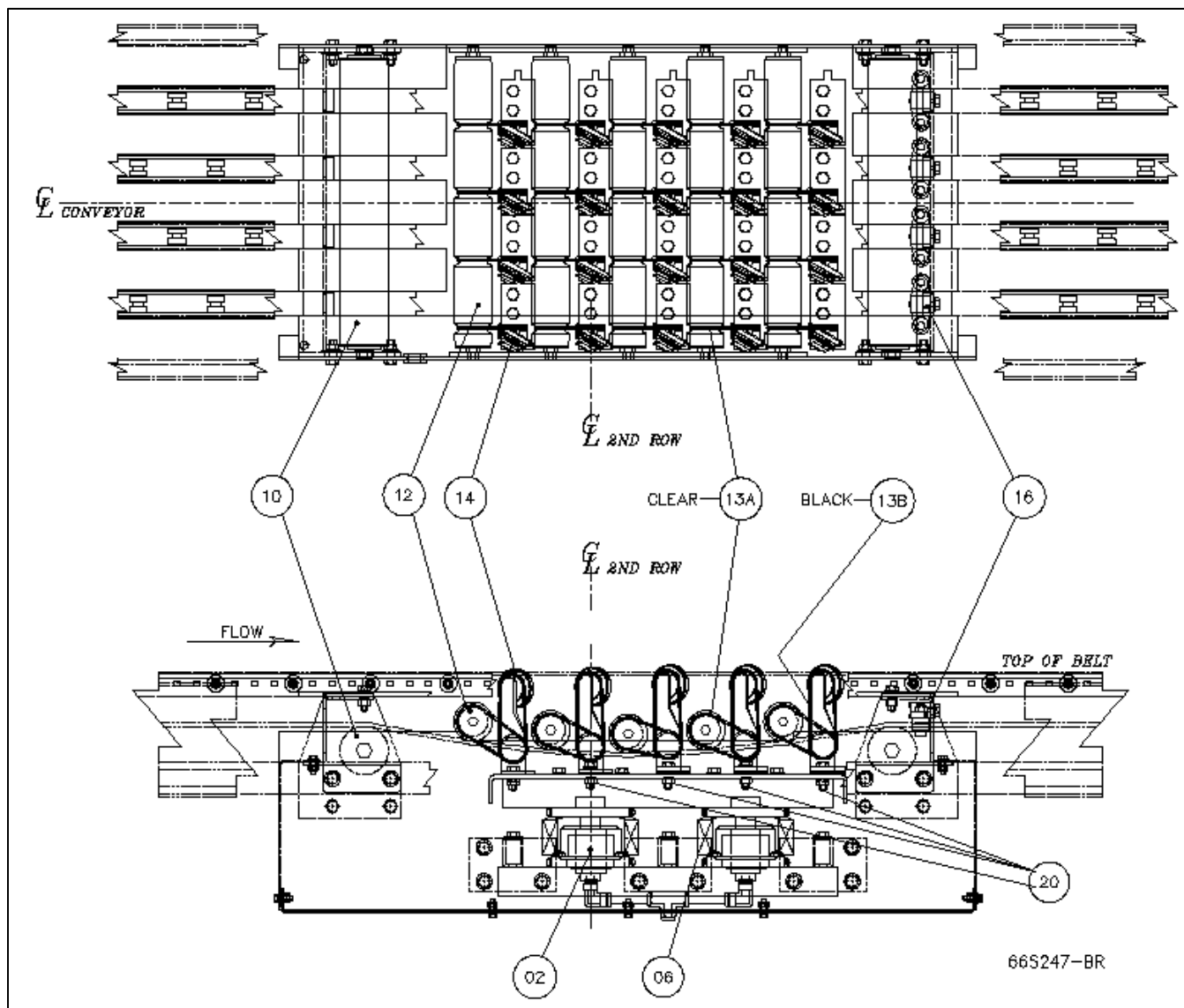


### NBS30-BR 3-Row Sorter – Replacement Parts

Replacement Part Numbers and Quantities for NBS30BR-3R Sorter Widths						
			WIDTH	18"	25"	32"
		SORTER,ASY __ NBS30BR-3R RH 24V		1114950	1114921	1112451
		SORTER,ASY __ NBS30BR-3R RH 110V		1114951	1114922	1112452
		SORTER,ASY __ NBS30BR-3R LH 24V		1114923	1112466	1112444
		SORTER,ASY __ NBS30BR-3R LH 110V		1114924	1112467	1112445
BALLOON	ITEM #	DESCRIPTION	QTY			
	E0038769	VALVE,SMC 4WAY 24VDC DIN CONN	1			
	E0038770	VALVE,SMC 4WAY 110VAC DIN CONN	1			
02	90000025	AIRBAG	1			
06	90800623	SPRING,EXT 3/4" OD X 2" LG .075" WIRE	4			
10		ROLLER,SNUBBER __NBS30	2	E0002690	E0002691	E0002692
12		ROLLER,__NBS30 PRBG WHL SORTER	3	E0002693	E0002694	E0002695
13A	E0001238	ORING,83A 1/8" X 8" CLEAR		12	18	24
13B	E0001239	ORING,83A 1/8" X 9-1/4" BLACK		12	18	24
<b>16</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>		<b>4</b>	<b>6</b>	<b>8</b>
16/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	16	24	32
20	E0001232	SHIM,WHL BRK NBS30		12	18	24

Dwg #66S229B-BR

## Parts Identification – NBS30-BR 5-Row Sorter Assembly

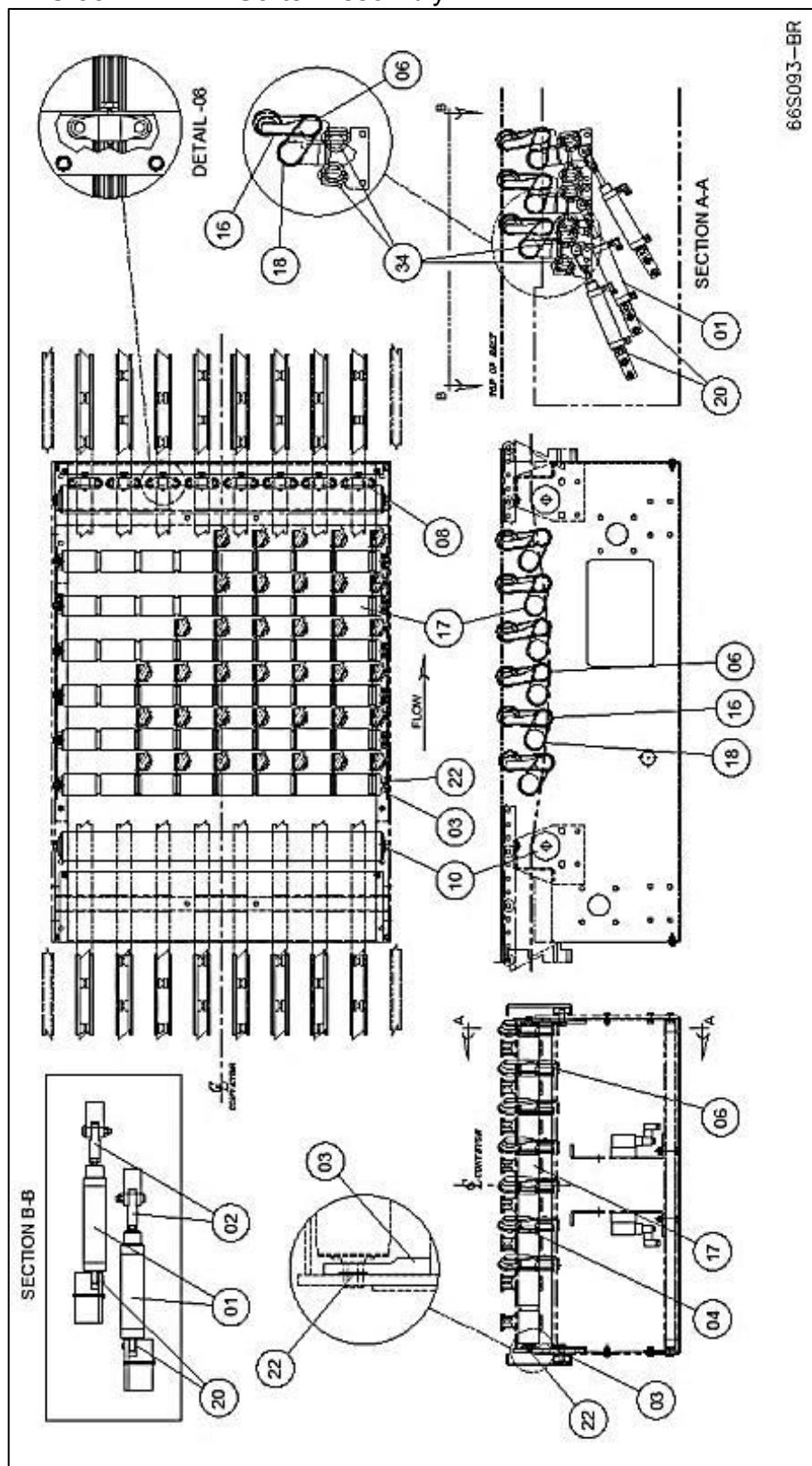


### NBS30-BR 5-Row Sorter – Replacement Parts

Replacement Part Numbers and Quantities for NBS30BR-5R Sorter Widths						
			WIDTH	18"	25"	32"
		SORTER,ASY __NBS30BR-5R RH 24V		1115141	1115145	1115149
		SORTER,ASY __NBS30BR-5R RH 110V		1115142	1115146	1115150
		SORTER,ASY __NBS30BR-5R LH 24V		1115139	1115143	1115147
		SORTER,ASY __NBS30BR-5R LH 110V		1115140	1115144	1115148
BALLOON	ITEM #	DESCRIPTION	QTY			
	E0038769	VALVE,SMC 4WAY 24VDC DIN CONN	1			
	E0038770	VALVE,SMC 4WAY 110VAC DIN CONN	1			
02	90000025	AIRBAG	2			
06	90800623	SPRING,EXT 3/4" OD X 2" LG .075" WIRE	8			
10		ROLLER,SNUBBER __NBS30	2	E0002690	E0002691	E0002692
13A	E0001238	ORING,83A 1/8" X 8" CLEAR		20	30	40
13B	E0001239	ORING,83A 1/8" X 9-1/4" BLACK		20	30	40
<b>16</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE</b>		<b>4</b>	<b>6</b>	<b>8</b>
16/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	16	24	32
20	E0001232	SHIM,WHL BRK NBS30		28	42	56

Dwg # 66S247D-BR

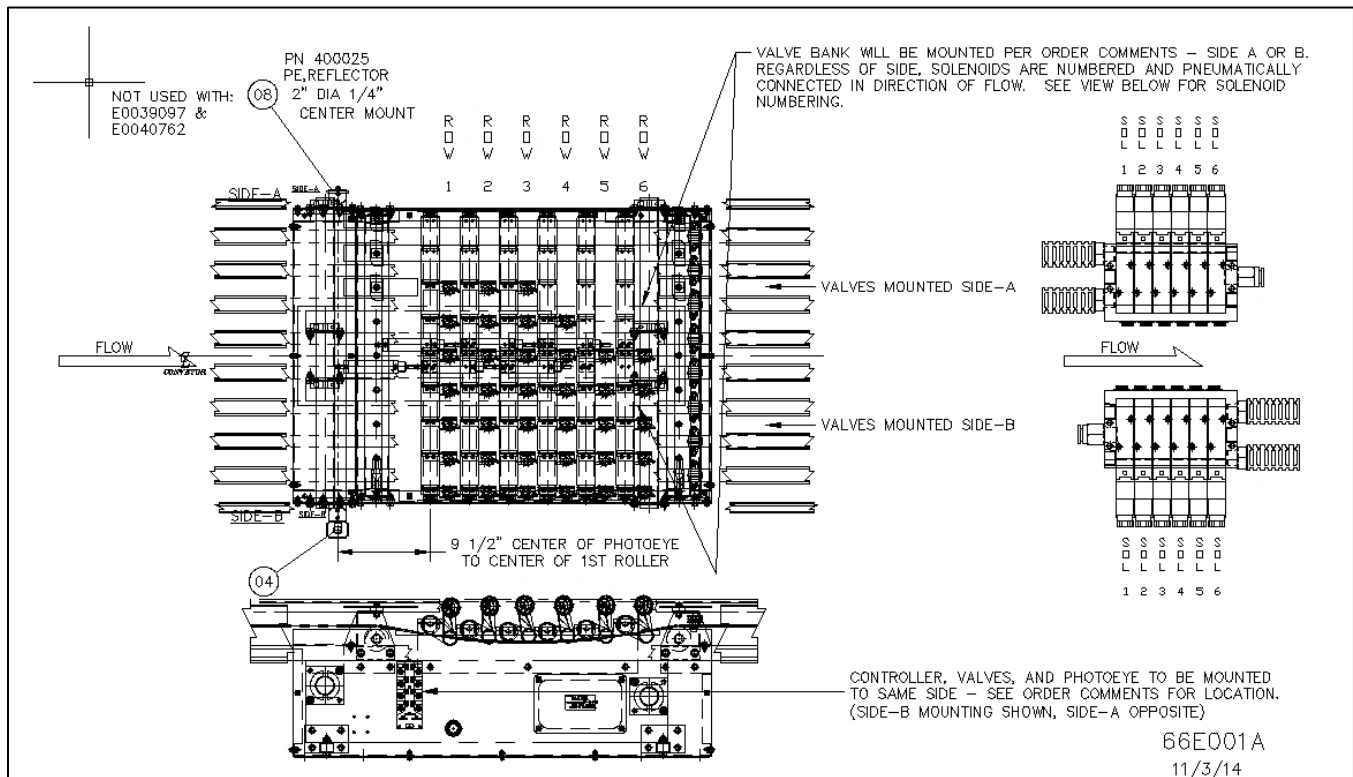
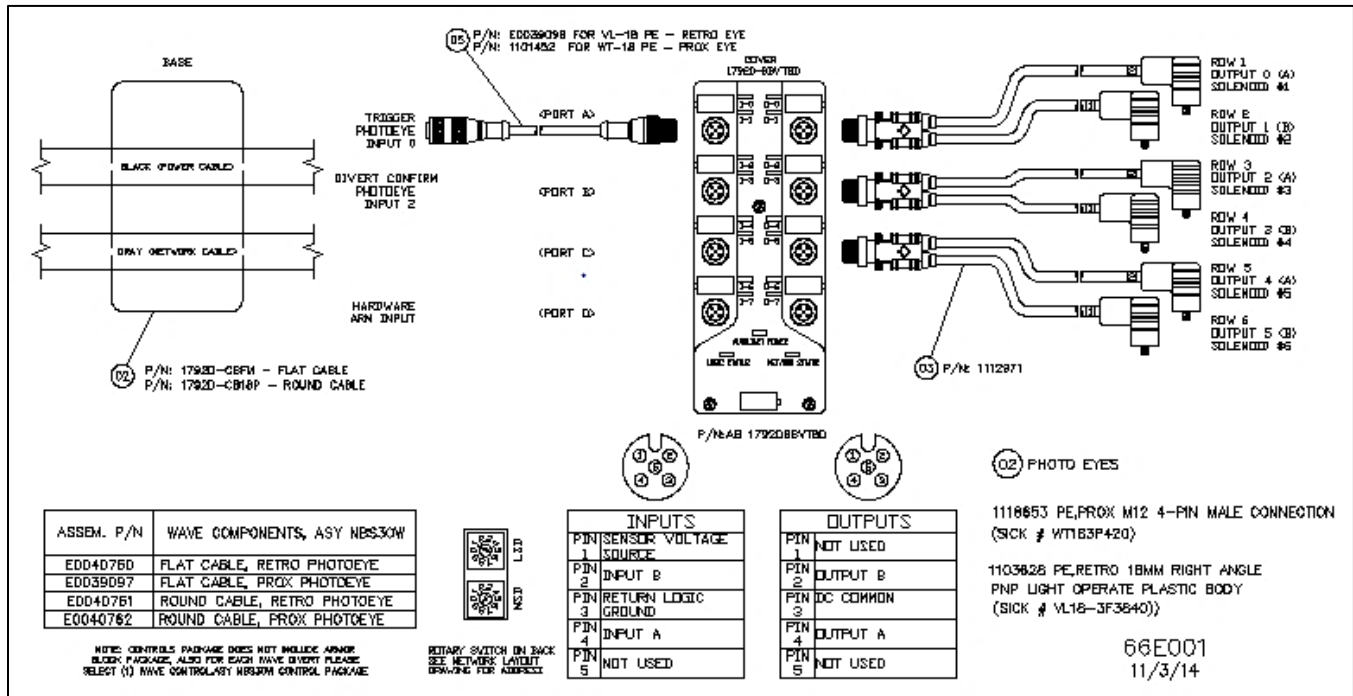
## Identification – NBS 30 WAVE™ Sorter Assembly



## NBS30-BR WAVE™ Sorter – Replacement Parts

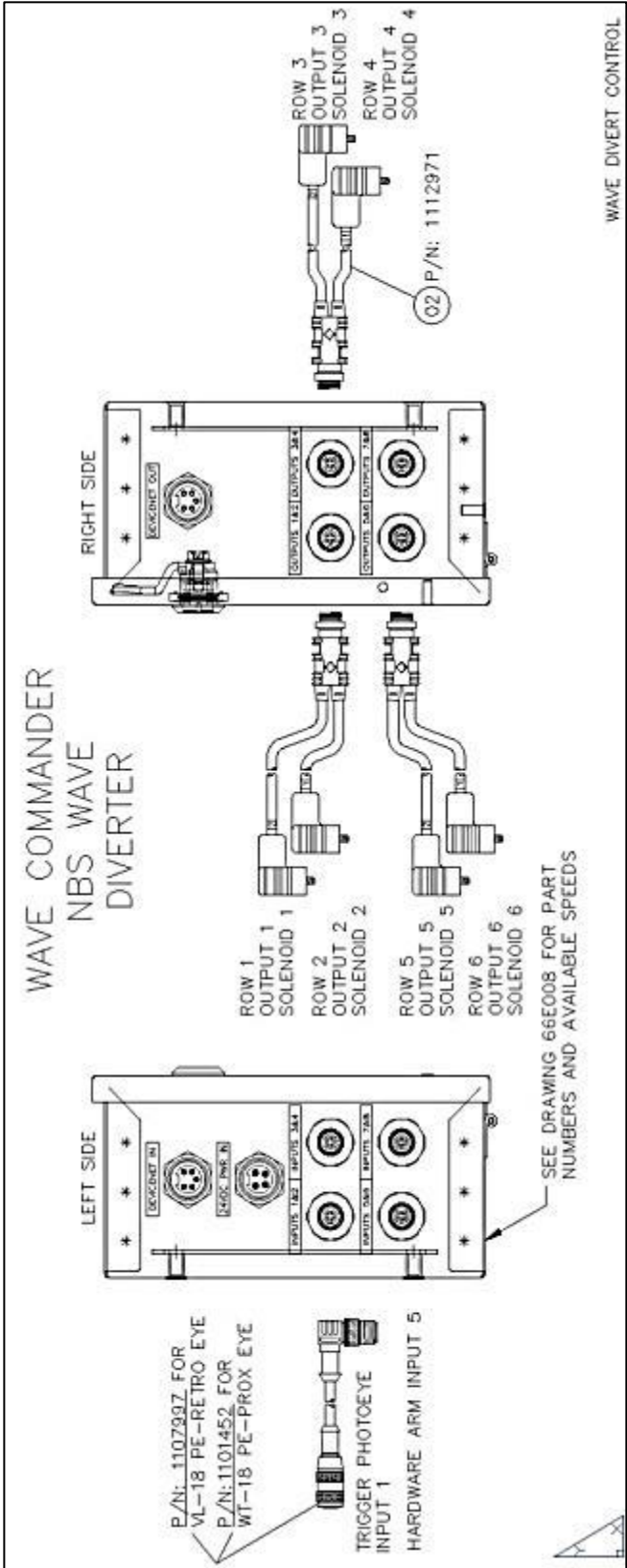
Replacement Part Numbers and Quantities for NBS30BRW6R Wave Sorter Widths						
			WIDTH	18"	25"	32"
BALLOON	ITEM #	DESCRIPTION	QTY			
		SORTER ASY __ NBS30W6R-BR LH WAVE		1107197	1107394	1107398
		SORTER ASY __ NBS30W6R-BR RH WAVE		1107193	1107385	1107389
	1112928	VALVE,ASY NBS30W 6-STATION 24V	1			
	1112930	VALVE,4-WAY 24V (REPLACEMENT) (SINGLE VALVE FOR REPLACEMENT ONLY)				
01	E0033930	CYL,AIR 1-1/8" BORE X 2" STROKE	6			
02	1106764	ROD,END SPHRCL 3/8" ID X 3/8" ROD	6			
03	E0033897	PL,ASY PIVOT BLOCK NBS30W	2			
03/001	E0031808	BRG,RADIAL #6802ZZC3SR12	2			
04	E0005801	WHEEL,ASY NBS30 MOLDED TIRE		23	33	37
06	E0001233	WHEEL,ASY IDLER NBS30		23	33	37
08	E0039089	BLOCK,ASY BELT GUIDE NBS XM MTD		4	6	8
08/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	2			
10		ROLLER,SNUBBER __NBS30	2	E0002690	E0002691	E0002692
16	E0001239	ORING,83A 1/8 X 9-1/4" BLACK		23	33	37
17		ROLLER,__NBS30 PRBG WHL SORTER	6	E0031810	E0031811	E0031812
18	E0001238	ORING,83A 1/8 X 8" CLEAR		23	33	37
20	1101423	WASHER,DELIN .750 OD X .385 ID	12			
22	E0033910	WASHER,DELIN 1.500 OD X .506 ID	24			
34	E0033912	BUMPER,RADIAL				
	1792D8BVT8D	DEVICENET,COMBINATION BLOCK 8IN/8OUT	1			
*	1792CBFM	CABLE BASE,FLAT MEDIA (FOR USE WITH COMMANDER SYSTEM™)	1			
*	1792CB18	CABLE BASE,ROUND CABLE (FOR STAND-ALONE DIVERT CONTROL)	1			
	1112971	HARNESS,SOLENOID CONNECTOR	3			
*	E0039096	CABLE,PE (RETRO-REFLECT)	1			
*	1101452	CABLE,PE (PROX)	1			
*	VL183F3840	PE,RETRO-REFLECT (STANDARD)	1			
*	WT183P420	PE,PROX (OPTIONAL)	1			
* Depends on chosen control option. See 66E001.						
Dwg # 66S200E-BR						

# Parts Identification – NBS 30 WAVE™ Armor Block Control Assembly

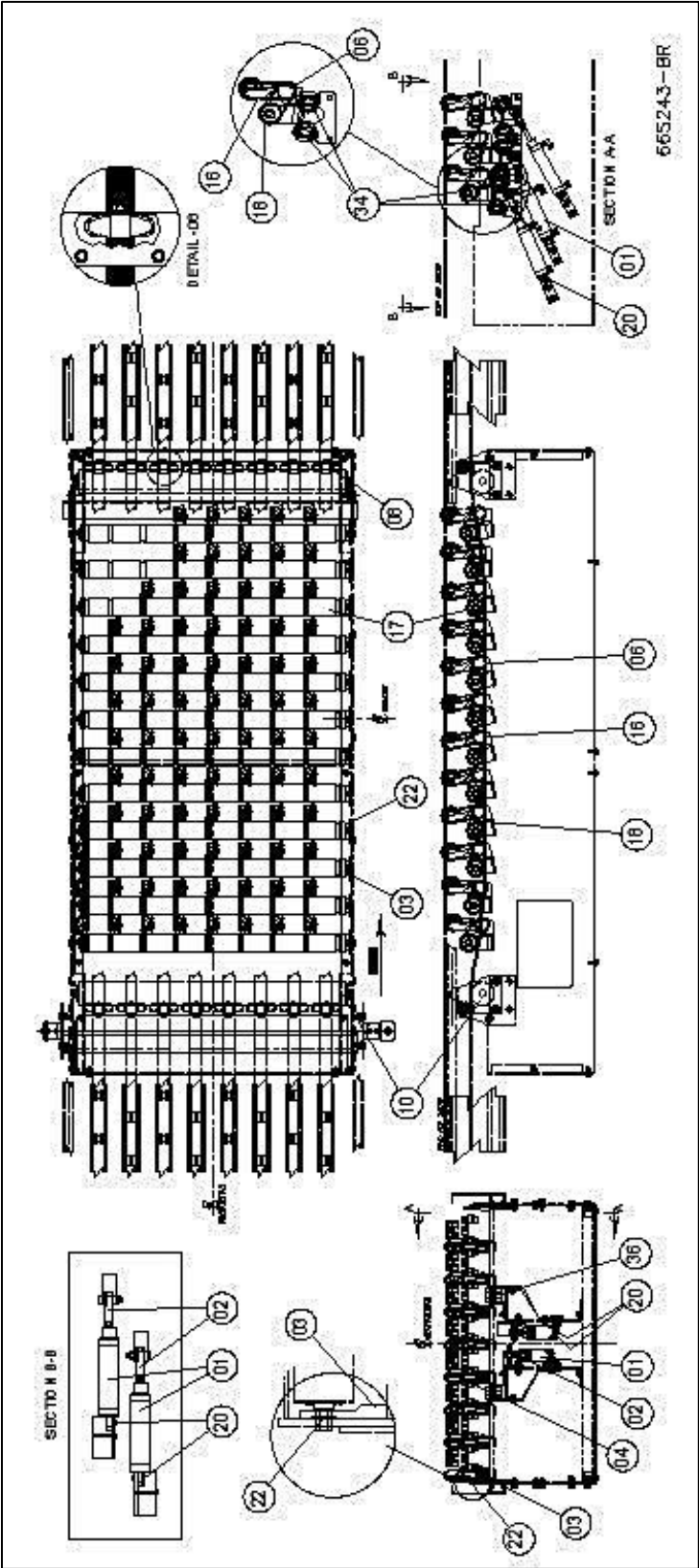




NBS Wave Diverter Commander



Parts Identification – NBS30-BR 12-Row Aligner Assembly

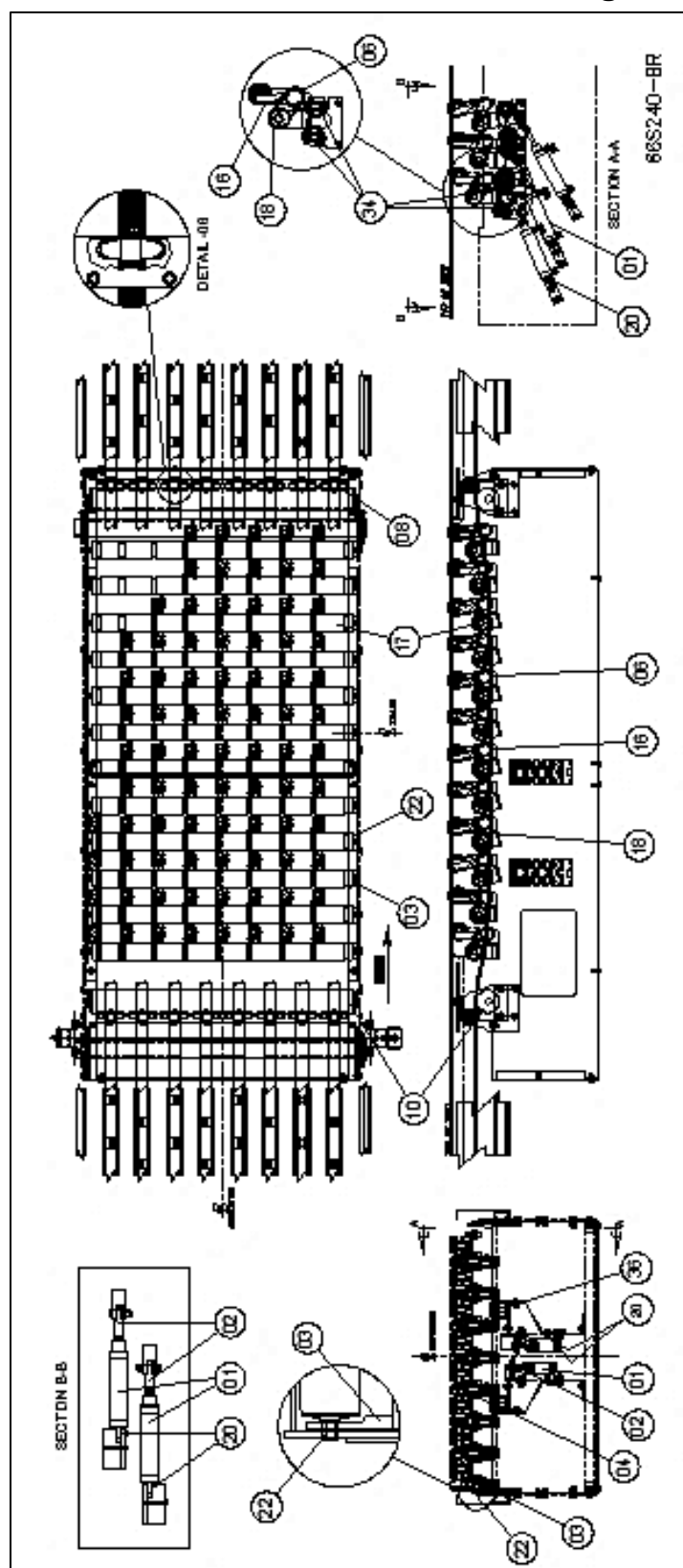


**NBS30-BR 12-Row Aligner – Replacement Parts**

Replacement Part Numbers and Quantities for NBS30-12R-BR Row Aligner Widths					
			WIDTH	25"	32"
BALLOON	ITEM #	DESCRIPTION	QTY		
	1109704	MANIFOLD,ASY NBS30-12R 4-STATION 24V	1		
	E0038769	VALVE,4-WAY 24V (REPLACEMENT) (SINGLE VALVE FOR REPLACEMENT ONLY)			
	1109705	MANIFOLD,ASY NBS30-12R 4-STATION 110V	1		
	E0038770	VALVE,4-WAY 110V (REPLACEMENT) (SINGLE VALVE FOR REPLACEMENT ONLY)			
01	E0033930	CYL,AIR 1-1/8" BORE X 2" STROKE	12		
02	1106764	ROD,END SPHERICAL 3/8" ID X 3/8" ROD	12		
<b>03</b>	<b>E0033897</b>	<b>PL,ASY PIVOT BLOCK NBS30W</b>	<b>24</b>		
03/001	E0031808	BRG,RADIAL #6802ZZC3SR12	2		
04	E0005801	WHEEL,ASY NBS30 MOLDED TIRE		60	83
06	E0001233	WHEEL,ASY IDLER NBS30		60	83
<b>08</b>	<b>E0039089</b>	<b>BLOCK,ASY BELT GUIDE NBS XM MTD</b>	<b>24</b>		
08/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	2		
10		ROLLER,SNUBBER __NBS30	2	E0002691	E0002692
16	E0001239	ORING,83A 1/8 X 9-1/4" BLACK		60	83
17		ROLLER,__NBS30 PRBG WHL SORTER	12	1101771	1101772
18	E0001238	ORING,83A 1/8 X 8" CLEAR		60	83
20	1101423	WASHER,DELRIN .750 OD X .385 ID			
22	E0033910	WASHER,DELRIN 1.500 OD X .506 ID	48		
34	E0033912	BUMPER,RADIAL	24		
36	1101780	BEARING,ROLLER 1/2 ID	24		

Ref Dwg 66S243-BR

## Parts Identification – NBS30-BR WAVE™ Aligner Assembly



## NBS30-BR WAVE™ Aligner – Replacement Parts

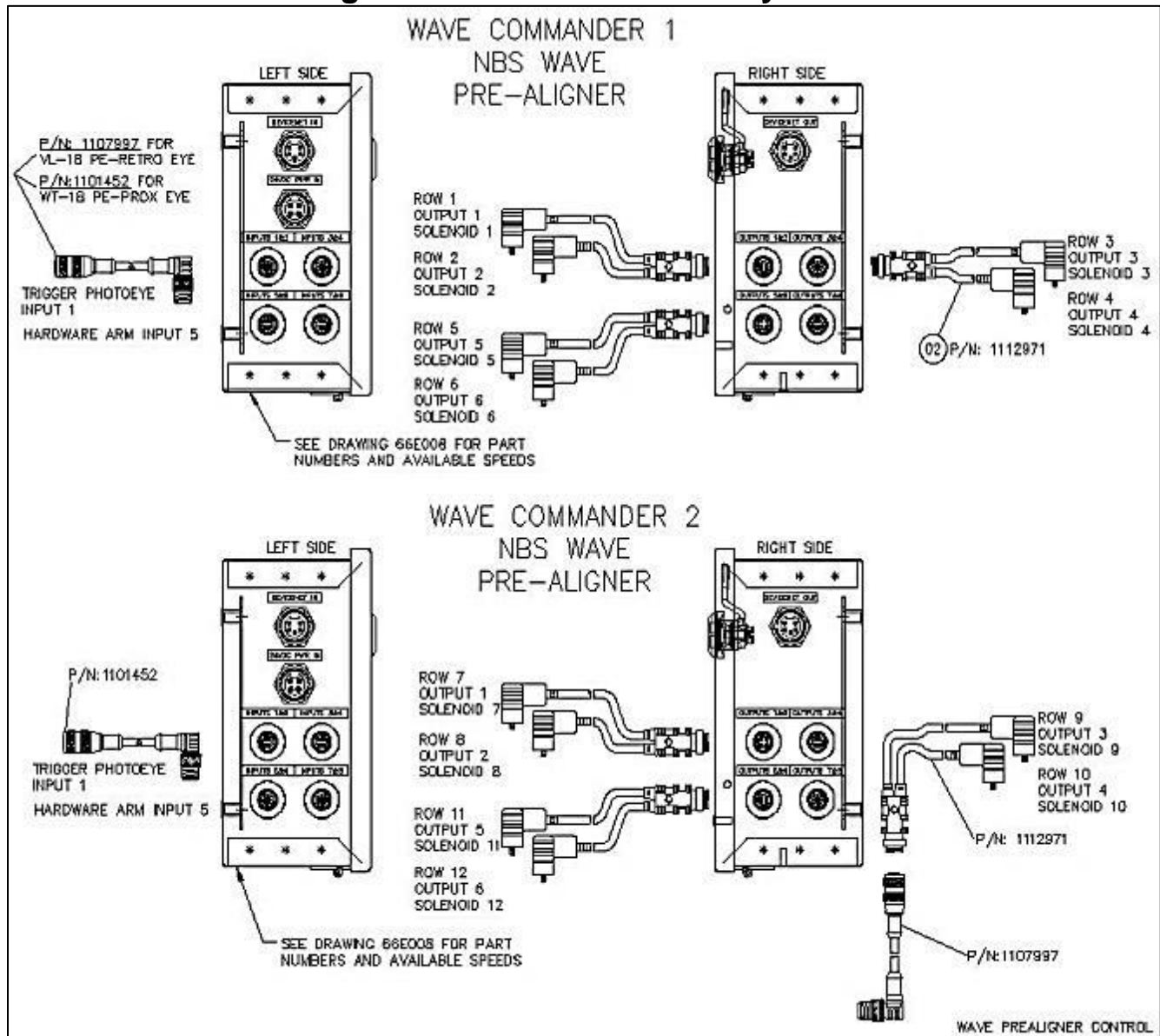
Replacement Part Numbers and Quantities for NBS30WP-BR 12 ROW Aligner Widths							
				PROXIMITY PHOTOEYE		RETROREFLECT & PROX PHOTOEYES	
			WIDTH	25"	32"	25"	32"
BALLOON	ITEM #	DESCRIPTION	QTY	PE	PE	BE	BE
		SORTER ASY __ NBS30WP RH Flat Cable		1102331	1102335	1102330	1102334
		SORTER ASY __ NBS30WP LH Flat Cable		1101786	1101820	1101785	1101819
		SORTER ASY __ NBS30WP RH Round Cable		1102333	1102337	1102332	1102336
		SORTER ASY __ NBS30WP LH Round Cable		1101788	1101822	1101787	1101821
	1112929	VALVE,ASY NBS30WP 12-STATION 24V	1				
	1112930	VALVE,4-WAY 24V (REPLACEMENT) (SINGLE VALVE FOR REPLACEMENT ONLY)					
01	E0033930	CYL,AIR 1-1/8" BORE X 2" STROKE	12				
02	1106764	ROD,END SPHERICAL 3/8" ID X 3/8" ROD	12				
03	E0033897	PL,ASY PIVOT BLOCK NBS30W	24				
03/001	E0031808	BRG,RADIAL #6802ZZC3SR12	2				
04	E0005801	WHEEL,ASY NBS30 MOLDED TIRE		60	83	60	83
06	E0001233	WHEEL,ASY IDLER NBS30		60	83	60	83
08	E0039089	BLOCK,ASY BELT GUIDE NBS XM MTD		12	16	12	16
08/001	90050111	BRG,7/8" OD X 9/32" WIDE (R6 ZZ C3)	4	48	94	48	94
10		ROLLER,SNUBBER __ NBS30	2	E0002691	E0002692	E0002691	E0002692
16	E0001239	ORING,83A 1/8 X 9-1/4" BLACK		60	83	60	83
17		ROLLER,__ NBS30 PRBG WHL SORTER	12	1101771	1101772	1101771	1101772
18	E0001238	ORING,83A 1/8 X 8" CLEAR		60	83	60	83
20	1101423	WASHER,DELRIN .750 OD X .385 ID	24				
22	E0033910	WASHER,DELRIN 1.500 OD X .506 ID	48				
34	E0033912	BUMPER,RADIAL	24				
36	1101780	BEARING,ROLLER 1/2 ID	24				
	1792D8BVT8D	DEVICENET,COMBINATION BLOCK 8IN/8OUT	2				
*	1792CBFM	CABLE BASE,FLAT MEDIA (FOR USE WITH COMMANDER SYSTEM™)	2				
*	1792CB18	CABLE BASE,ROUND CABLE (FOR STAND-ALONE DIVERT CONTROL)	2				
	1112971	HARNESS,SOLENOID CONNECTOR	6				
*	1101452	CABLE,PE (PROX)	2				
*	VL183F3840	PE,RETRO-REFLECT	2				
*	WT183P420	PE,PROX	2				
*	* Depends on chosen control option. See 66E002.						

Dwa # 66S093-B

Dwg # 66S093-BR

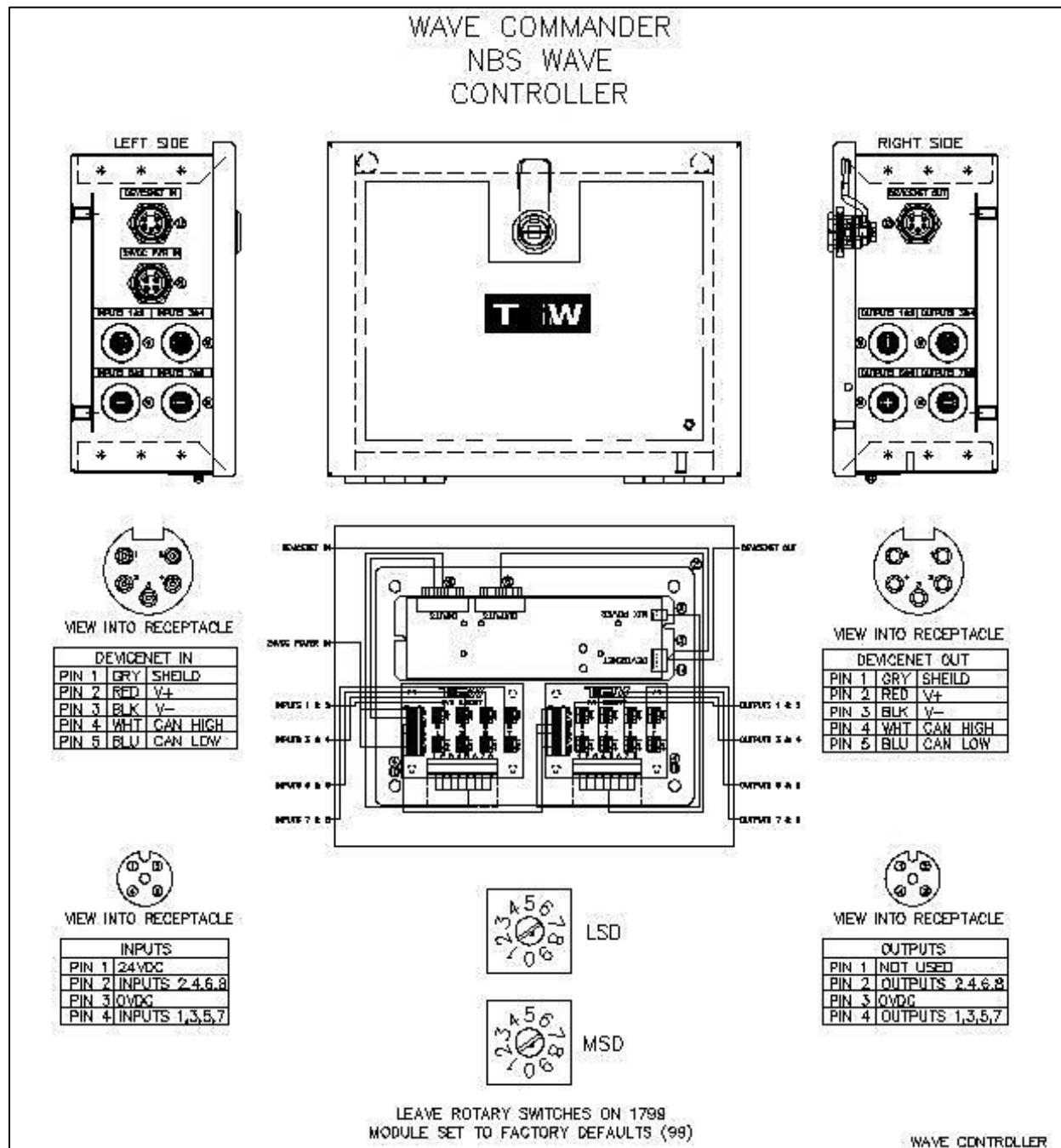
## Parts Identification – WAVE COMMANDER™

### Aligner 1799 Control Assembly Parts





## Parts Identification – NBS 30 WAVE™ 1799 Control Assembly Parts



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