Installation, Operation, Maintenance Manual

MHS CONVEYOR

IntelliROL®
Motorized Roller Conveyor

PN 90480001
Revision Date: 06/09/2015

Contents

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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 IntelliROL conveyors**.**

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 MHS Conveyor Distributor or MHS Conveyor 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

MHS Conveyor Environment Standards

MHS Conveyor equipment is designed to be installed in a clean, dry warehouse environment. Exposure to extreme humidly, direct sunlight, blowing dirt or rain can permanently damage some components of MHS Conveyor. In particular, the curing agents in concrete are known to attack and degrade the urethane conveyor components.

When installing conveyor on a new construction site, be sure that the concrete is properly cured before setting conveyor on it. In addition, if conveyors are stored in the proximity of curing concrete, proper ventilation must be used to direct the curing agent fumes away from the conveyor.

Failure to comply with these guidelines will void the MHS Conveyor warranty on any failed components that result from these environment tissues.

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

MHS Conveyor Safety Recommendation

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

MHS Conveyor 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 29CRF 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.

MHS Conveyor 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.

MHS Conveyor 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. These posters can be downloaded from the CEMA Web Site at http://cemanet.org/safety/posters.htm or for more information on the CEMA Safety Program visit the CEMA Web Site's Safety Page at http://cemanet.org/safety/index.html.

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

Conveyor Equipment Manufacturers 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 signal 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, chains, 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:

WARNING

- Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

- Indicates a situation which, if not avoided, could result in property damage.

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 hairnets.
- 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 crewmember 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.

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.

Product: Unit Handling

Equipment: Motor Driven Live Roller Conveyors

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.

"A"

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

To be placed along the sides of these conveyors to warn personnel that the conveyor can start automatically

"C"

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

Optional Label to be placed either on the side or top of rails when space available does not permit application of the larger label

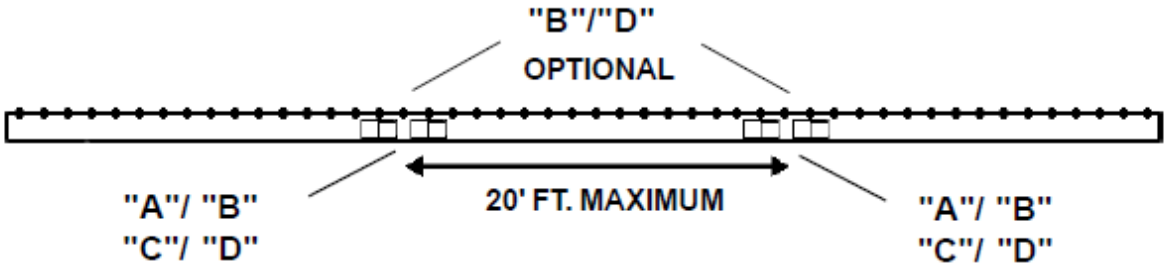
"B"

SPACE UP TO A MAXIMUM OF 20 FT. CENTERS (Sides or top surface of both rails)

Optional Label to be placed either on the side or top of rails when space available does not permit application of the larger label

"D"

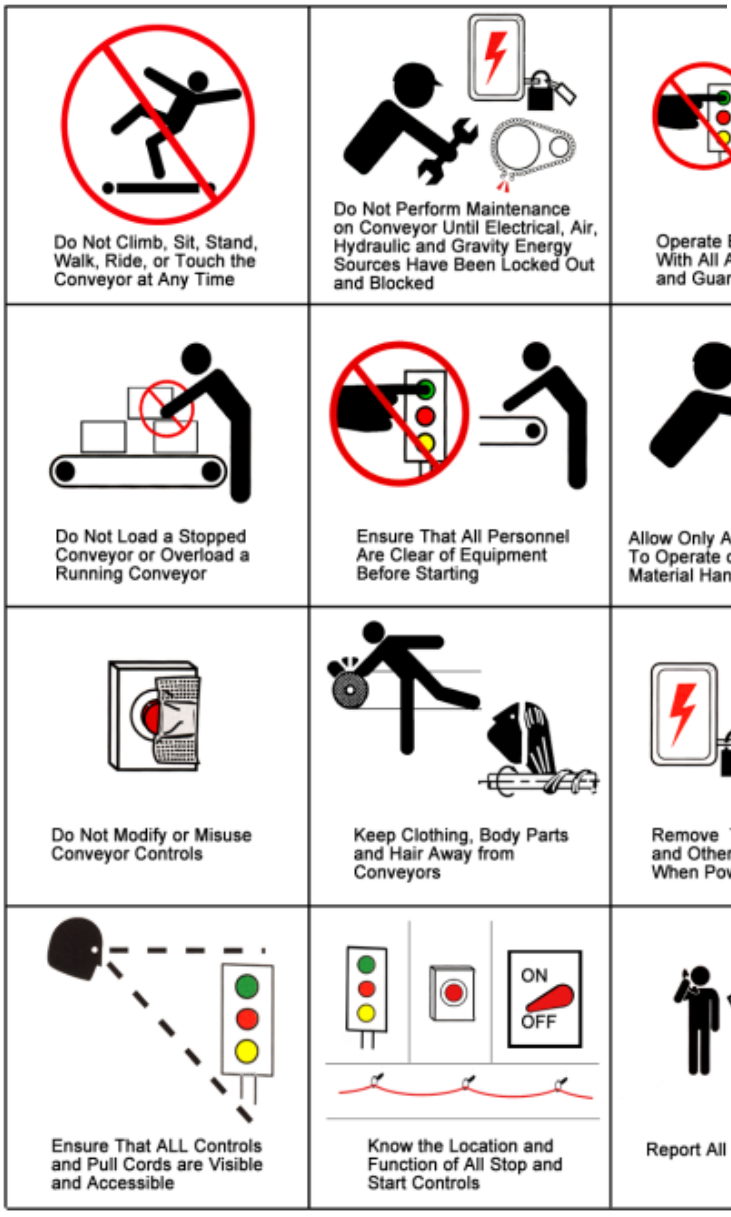
SPACE UP TO A MAXIMUM OF 20 FT. CENTERS (Sides or top surface of both rails)



NOTE: Due to the design of these conveyors, there may not be room on the side rails to place the larger labels. In that case, the smaller labels may be used. Optionally, they may also be placed on the top surface of both rails. The key is the space available and visibility by operators and maintainers.

CEMA - August, 2010 UH - 8

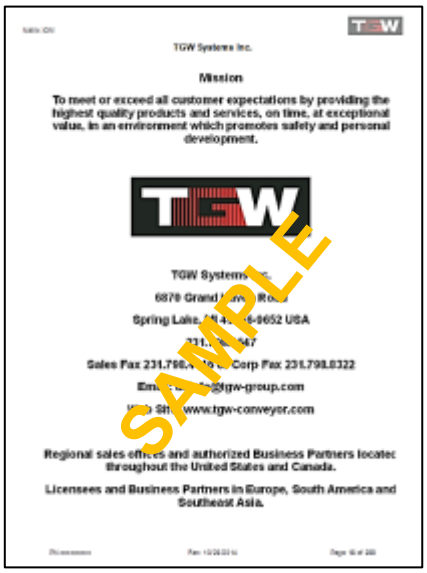
Package Conveyors



Manual Structure

You s h o u l d receive a separate documentation for each product line of MHS Conveyor implemented in your installation. You can identify the respective product line on the back of the folder or on the cover sheet of the IOM (Installation Operation Maintenance Manual)

- IOM Conveyor System
- PN = Part Number
- Revision Date (MM/DD/YYYY)
- Page Numbers



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WARNING

Pay attention to the safety instructions!

- Prior to working at or in the immediate vicinity of the system it is recommended that you make yourself familiar with the safety instructions included in the present document!

Introduction to IntelliROL

Concept

Utilizing 24V DC motorized roller, this technology is the most revolutionary since the advent of the line-shaft conveyor in the late-‘60s. Its impact is currently expanding rapidly as more users and manufacturers begin to see the benefits of this technology. MHS Conveyor’ experience with IntelliROL goes back to 1996 with a major tire handling system.

This fast advancing technology uses a self-contained 24-volt DC motorized roller to power a segment or zone of the conveyor. Rollers adjoining the motorized roller are slave-driven with the same components MHS Conveyor developed in the ‘60s.

XenoROL® line-shaft driven live rollers and IntelliROL equipment both drive product through the developed tangential force at the conveyor roller surface. The relationship between tangential forces, product weight and product characteristics have been at the root of MHS Conveyor technology for the past 30 years. This natural extension places MHS Conveyor at the forefront of applying this technology.

Operation

The product-carrying rollers are slave-driven by a series of pre-tensioned belts to the motorized roller in each zone. Since every motorized roller can be individually controlled, every segment of the system can become a zero-pressure zone.

Accumulation begins when an external signal “arms” the first sensor (discharge end). External signals may originate from electrical controls, sensing devices, manually activated switches, etc. The first product stops at the discharge sensor, which arms the sensor in the upstream zone. A product travels through a zone, until blocking, the sensor (Armed from the previous zone) all carrier rollers within the zone stop. As accumulation takes place from zone-to-zone, accumulated products do not touch each other as long as the product is sorter then the zone length.

Feature/Benefits

- Flexible Modular design / easy to reconfigure
- Run on demand / less noise, wear, and energy consumption
- Non-contact zero-pressure / product protection
- Compact low profile / multi-level usage
- Reversible / less electrical hardware cost
- No scheduled maintenance / lower operating cost
- Low voltage / safety and lower cost
- Simple installation / lower cost
- Soft start/stop / low G-forces
- Variable speed / versatility to suit each requirement
- Intelligent control capabilities / cost no greater than need

Most IntelliROL modules have a maximum depth profile of 6-3/8" T.O.R to bottom of flange. Devices such as UBT, Wheel Diverters, etc... Require a deeper channel profile. A bi-directional urethane belt transfer has a maximum rate of 30 cases per minute.

CAUTION

- **Urethane belt, transfer belts should only run while transferring a load. (Run on Demand)**

All curves except the minimum radius curve are based on MHS Conveyor' true taper roller for all widths.

IntelliROL optional run-on-demand software can selectively deactivate conveyor zones when not carrying product. Because each IntelliROL module has its own drive and control, any level of control sophistication is possible, including product tracking, diagnostics, and data collection.

The technology behind IntelliROL is growing and changing quickly. Most applications use a 24-volt DC, 1.9" diameter, brushless motorized roller, and these rollers are the basis of design for most IntelliROL modules. Special applications requiring slow speeds and high torque may require the use of geared motorized rollers and 3-phase AC voltage motorized rollers have been used in heavy-duty applications.

Application Options

Application

The application of IntelliROL breaks down into two areas. One is complete systems; the other is the application of specific modules within a system that may be based on line-shaft or some other conveyor technology.

MHS Conveyor has standard designs for straight bed sections for transportation or zoned accumulation. Standard zone lengths are 24”, or 30”. MHS Conveyor also offers curves in 30°, 45°, 60° and 90°, 30° or 45° spurs, UBT transfers, three designs of product stops, belted inclines and declines, gates, minimum radius curve, and anti-rollback brakes (inclining). Many options are available including different roller centers, bearings, roller coatings, etc.

Application Specific Modules may be used to solve certain requirements within a system at a most cost-effective manner using IntelliROL conveyor.

Application Specific Module examples include:

- Short spurs
- Workstations
- Fill gaps between conveyors or devices
- Providing power to a lift bed
- Transfer car
- The bed of a turntable
- Gates
- Low Profile requirements over aisles, multi-level, etc.

In nearly all the above examples, space is a major consideration. Weight and balance may even be a consideration on something like a scale, lift, or vertical conveyor.

Definition of Terms

Accumulation - Act of queuing, holding, or backing up of product on a conveyor.

Carrying Roller - The conveyor roller upon which the object being transported is supported. It has circumferential grooves near one end to allow the slave belts to ride below the carrying surface.

Coefficient of Friction - A numerical expression of the ratio between the force of contact between two surfaces and the resistant force tending to oppose the motion of one with respect to the other.

Conveyor Width - The dimension outside to outside of frame rails. For the inside dimension, the abbreviation "BF" (between frames) is used.

Crossmember - Structural member, which is assembled between two sides, channels of a conveyor bed.

Frame - The structure, which supports the components of a conveyor bed consisting of formed channel rails, bolted together with crossmembers.

Indexing Control - Maintains non-contact accumulation and functionality of gates, transfers, curves, etc. by not allowing accumulation in these areas.

IntelliROL Non-Contact Accumulation - "Pure" zero-pressure accumulation which guarantees that one product will not touch any other during accumulation, release, or any time. (Requires product to be inducted singularly and be 3" to 4-1/2" shorter than zone).

Roller Centers - Distance between centerlines of adjacent rollers. For curves, roller centers are measured at the inside radius.

Roller Groove - The groove that is fabricated into the carrying roller to provide a seat for the slave belt below the carrying surface.

Singulation Release - A method of individual zone release that spaces product approximately one zone length apart.

Slave Belt - An endless round belt manufactured from elastic material, typically urethane, connecting a motorized roller, or carrying rollers or other carrying rollers within a zone.

Slug Release - Simultaneous release of several products.

Tapered Roller - A conical conveyor roller for use in a curve with end and intermediate diameters proportional to their radius.

Zone - A portion of conveyor activated by a motorized roller that may be controlled by a photoeye.

Zone Length - The distance between sensing devices (typically containing one motorized roller).

Zero-Pressure Accumulation - The lack of force between products after accumulation. (Industry standard)

Installation Arrangements

General

IntelliROL conveyors are offered in four standard widths of 16BF, 22BF, 28BF, and 34BF with the overall conveyor width being 3.25" plus the BF. Standard available bed lengths are multiples of the two standard zone lengths of 24" and 30", up to 10'. Standard roller center distance is 3". Other roller centers and widths may be available.

Driver Cards

The driver cards that are supplied with each motorized roller are mounted inside the side channel of a bed, opposite the slave O-ring side of the conveyor. These driver cards condition the 24VDC power coming from a separate power supply. Standard IntelliROL beds are prewired and tested prior to shipping. MHS Conveyor provides an optional plastic shroud that snaps into grooves in the 7.5” deep CRUZchannel to cover the driver cards and wiring. These shrouds are translucent to allow monitoring of the LED condition lights on the driver cards.

Drive / Slave Belt Break-in

The roller-to-roller round drive belts is installed under tension with predetermined initial tension. After a time of static and running time, this initial tension drops to a running tension.

Run all IntelliROL transportation conveyors 48 hours empty before running product. This will ensure motorized rollers are not overloaded under the higher initial belt tension. This run time is best accomplished during installation as soon as the power supplies are wired and during the commissioning phase.

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 close as possible to demonstrate its 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 and 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 commissioning personnel. All personnel must familiarize themselves with all safety features of the system such as emergency stops and power supply disconnects.

After commissioning, conduct operator training on all safety and operational aspects of the system. This must include systems start-up, location of emergency stops and familiarity with all operator controls.

Precautions

ULTRAVIOLET RAYS of sunlight will weaken polyurethane slave belts.
OILY OR WET CONDITIONS impair frictional drive characteristics between polyurethane slave belts and roller grooves. CORROSIVE SUBSTANCES, such as concrete curing agents will adversely affect various components, voiding the warranty.

Receiving & Site Preparation

General

MHS Conveyor IntelliROL units 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.

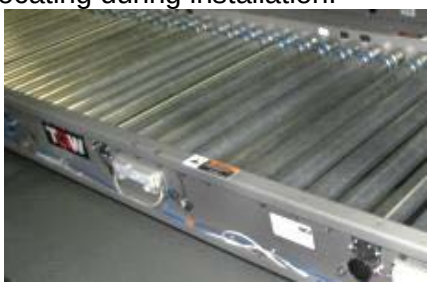
Preparation of Site

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. Identify and separate components by type or tag number, for inventory and ease of locating during installation.



An identification label is attached to the outside of one side channel or on a cross member, close to one end of each conveyor bed.
This label contains:

- Item number
- Description
- Job Number
- Mfg. Number
- Date of manufacture
- Tag number (if specified)
- Assembler's clock number
- QR (Quick Retrieval) Label
    - Scan Code For IOM Manual

On the 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.
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.

⚠ WARNING

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

Dimensional Reference Points

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

Conveyors should be installed with the centerline of the bed matching the centerline of the conveyor path within 1/8" of true center. Locate and mark the center of the crossmembers at each end of the conveyor. Use a plumb line or other acceptable means to ensure accuracy to the chalk line.

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

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

Basics of IntelliROL Installation

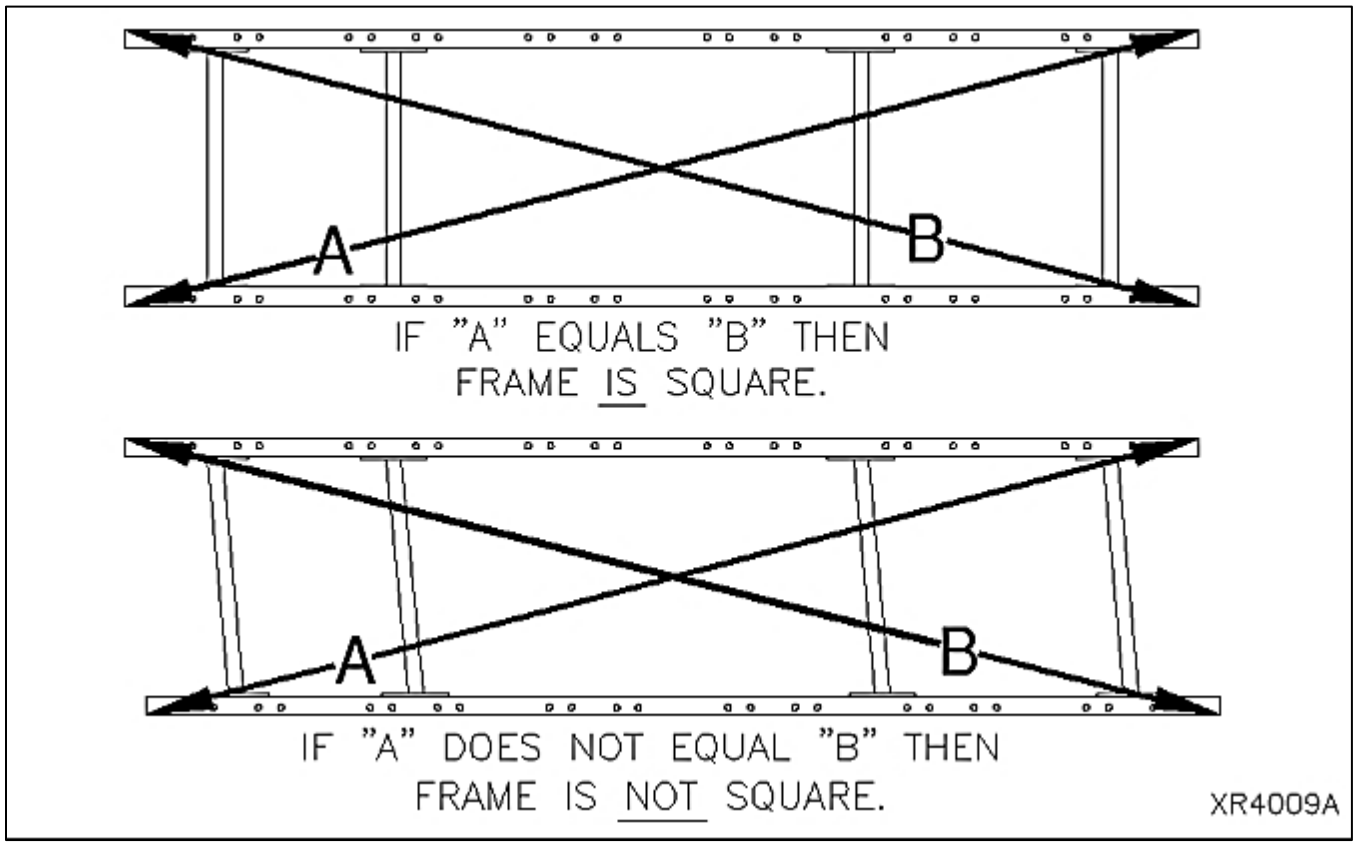
General

IntelliROL conveyor may be installed using any of the supporting arrangements described under Support Arrangements in this manual. As each bed is installed in the system, level the conveyor from side to side using a bubble level on the roller at each support. The bubble location should be within the level indicator lines of the level. The centerline of the conveyor should not bow to the right or left more than 1/8" in either direction from a centerline drawn between the centers of the conveyor end assemblies.

A simple way to check this is to tie a nylon string around the center of the end roller, pull it taut, and tie it to the center of the roller at the opposite end. Put a wood spacer under the string at each end so it does not rest on the rollers. With the taut string centered on each end and suspended above the rollers, check the center of the rollers at each support relative to the string and adjust accordingly. (Note that this must be done after side-to-side leveling of the conveyor at each support.)

When joining bed frames it is important to align the side channels. Care must be taken to make sure the rollers are level (carrying surfaces) from bed to bed.

All bed frames should be checked for squareness. To check, measure diagonally from corner to corner. Measure the opposite corners in the same manner. If the bed is square, the two measurements will be the same within 1/16".



Typical Bed Description

Descriptions

Straight Bed: BED, (i.)BF ITR (ii.)-C (iii.) - (iv.) - (v.) X (vi.) (vii.), (viii), (ix.)MR, (x.)

__BF Width (16, 22, 28, 34)
ITR__ ITR Variation (HB, CB)
C_ Channel (Z or 6)
__ __ Rollers/Belt (R or B) and centers (3”, 2”, etc.)
__ Zone (24”, 30”, etc.) Do not use with ITRCB
__’__” OAL
____ Hand (RH/LH)
F_-__ Roller type & speed code (FE-60 standard)
__MR Number of motorized rollers

Example: BED, 22BF ITRHB-CZ-R3-30 X 10’-0” RH, FE-60 4MR
(22BF, HB-510 card, Cruz channel with 3” Roller Centers
30” zone, 10’-0” OAL, Right Hand Flow, Roller Model, 4 motors)

Curve: CURVE, (i.)BF ITR (ii.)-C (iii.)- (iv.) (v.) (vi.), (vii), (viii.)MR

__BF Width (16, 22, 28, 34)
ITR__ ITR Variation (HB, CB)
C_ Channel (Z or 6)
___ Angle (90, 60, 45, 30)
_Z Number of zones, Do not use with ITRCB
__ __ Hand (RH/LH)
F_-__ Roller type & speed code (FE-60 standard)
__MR Number of motorized rollers

Example: CURVE, 22BF ITRHB-CZ-60 1Z RH FE-60 2MR
(22BF, HB-510 card, Cruz channel, 60˚ curve, 1 zone,
Right Hand Flow with 2 motorized rollers)

UBT/Transfer: **UBT, (i.)BF ITR (ii.)-C6X (iii.) BD (v.)S LH/RH, (vi.)MR**

__BF Width (16, 22, 28, 34)
ITR__ ITR Variation (CB)
_’_” OAL (standard 3’-4”, but 3’-0” available as a special)
_S Number of strands (normally 6 (4”RC) or 5/7 (3.25”RC))
F_-__ Roller type & speed code (FE-60 standard)
_MR Number of motorized rollers

Example: UBT, 22BF ITRCB-C6 X 3’-4” BD 6S LH/RH FE-60 3MR
(22BF, CB-016 card, C6 channel, 3’-4” OAL, bi-directional, 6-strands, roller model FE-60, 3 motors in unit)

Other Examples:

PM, 22BF ITRCB-C6-R3-30 X 7'-6" RH FE-60 5MR
WD, 22BF ITRCB-C6-R3-30 X 7'-6" RH FE-60 6MR 4-ROW
SPUR, 22BF ITRCB-C6-R3-45 RH FE-60 2MR

Elevations

All conveyors should be installed in accordance with the elevations shown on the drawings. In addition, all conveyors must be level across the frame width and length (if horizontal). Leveling of the frames is best done using a rotating laser level or a builder's level.

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 section is ceiling hung.

Component Orientation

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

- The direction of product flow
- The elevation height
- Charge and discharge end beds

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.

Establishing Conveyor Flow

Standard IntelliROL beds are supplied as either RH or LH flow. Looking across from the side of the IntelliROL bed the O-rings away from you and the product conveying to the right, the bed is considered a right hand (RH) flow bed. Using the same position as noted above and with the product conveying to the left, the bed is considered a left hand (LH) flow bed. The identification label described under Parts Inventory & Identification has all of the information required to identify the piece of equipment.

Support Arrangements

Floor Supports

All IntelliROL bed side channels are punched to match hole spacing for MHS Conveyor standard 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-roller elevations. This difference must be recognized when setting the support elevations. IntelliROL conveyor is 6 5/16” from top-of-support to top-of-rollers with a 7 1/2” deep channel. (Rollers mounted low in frame.)

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 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

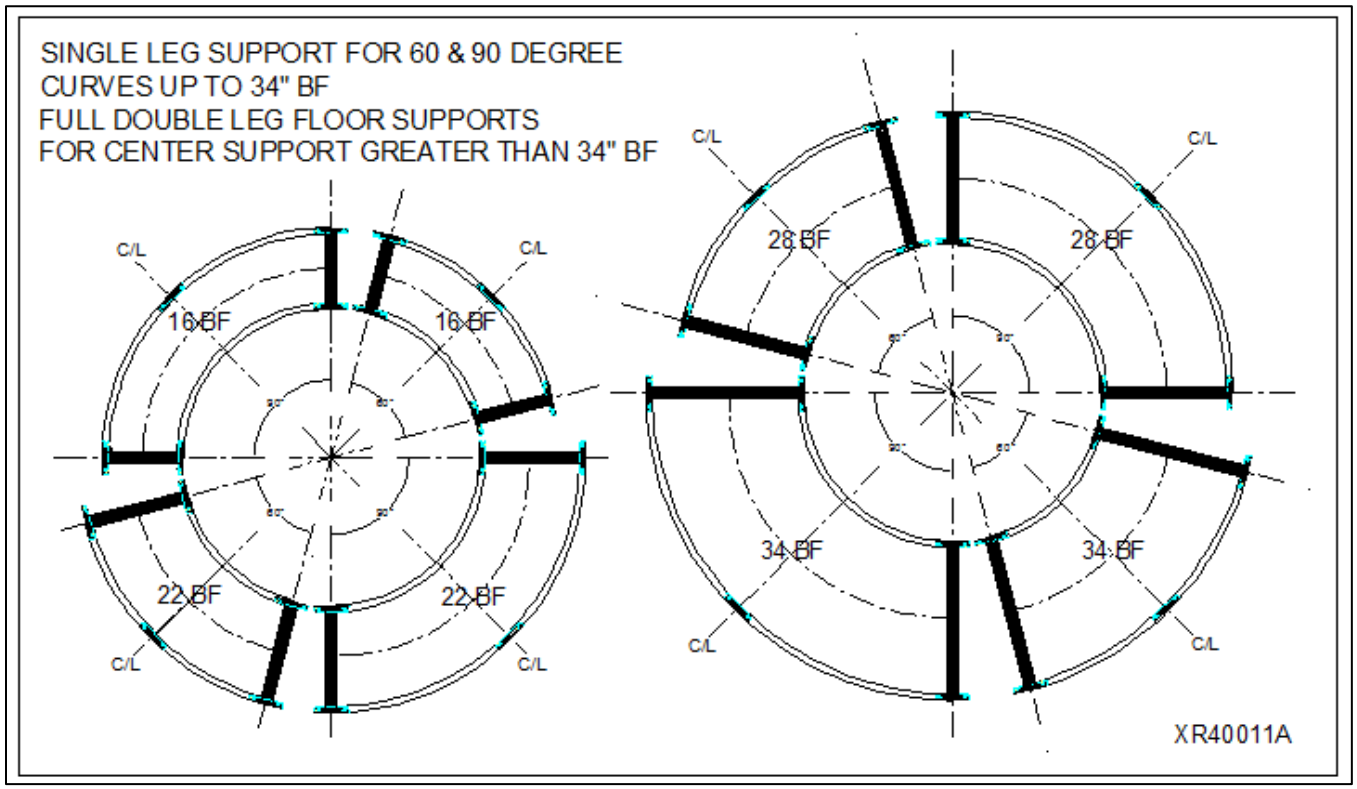
⚠ WARNING

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

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 minimum 3/8" diameter anchor bolts. Stagger anchors from front hole on one side to rear hole on opposite side. For floor supports, over 5’ high use 1/2" diameter anchor bolts. Anchor bolts for equipment subject to impact loads should be a minimum of 1/2" diameter.

Curve Support Points

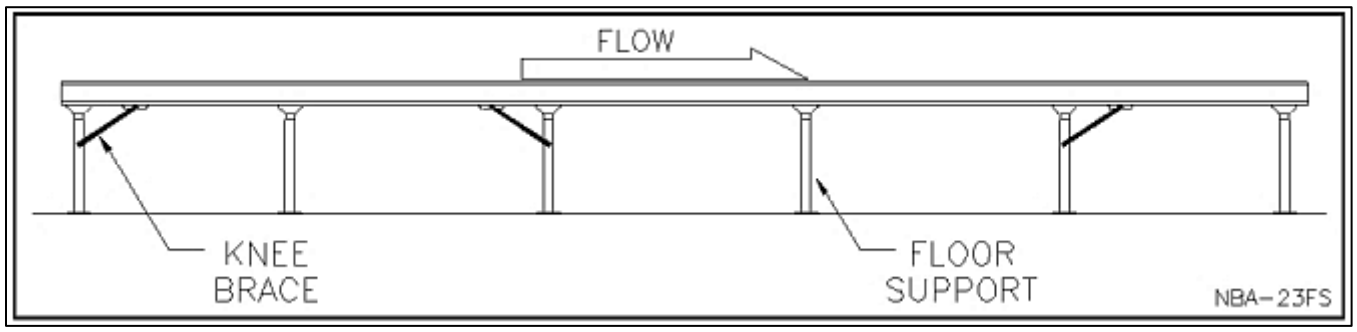


This curve illustration indicates proper support locations for curves of various degrees and widths. The dark lines indicate a full width support. A single dark line on the outside center of the curve indicates that the outer curve rail is supported with either a ceiling hanger drop or a single leg floor support.

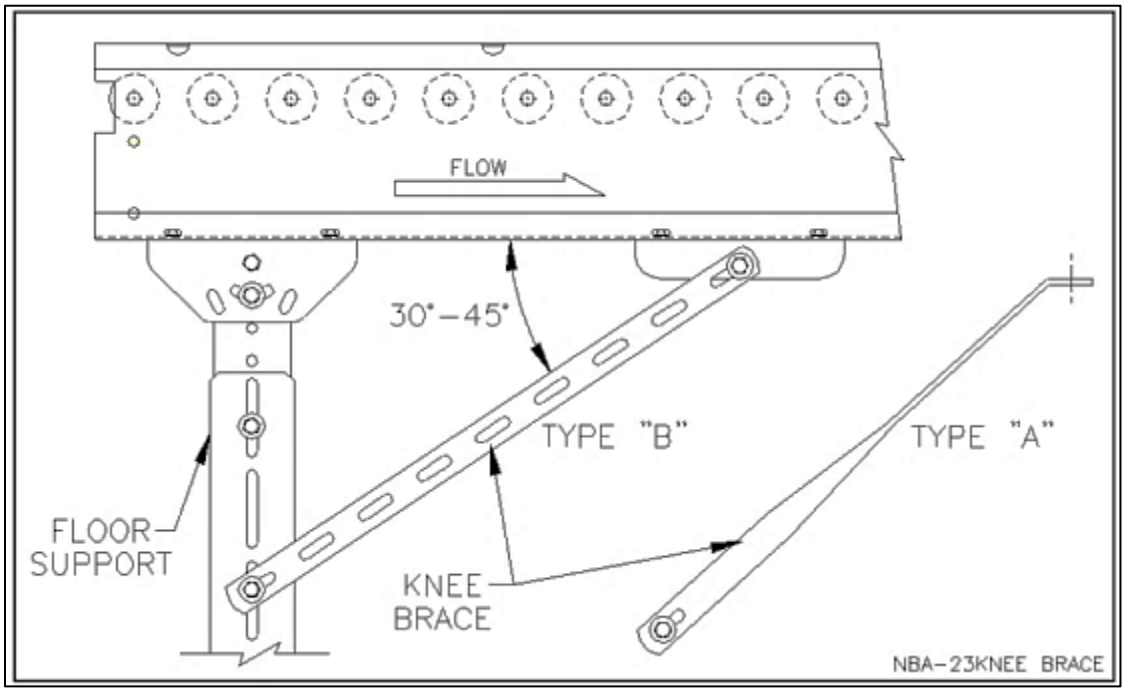
If a full width support with crossmember is supplied where only a dark line is indicated, use the full support.

Knee Braces

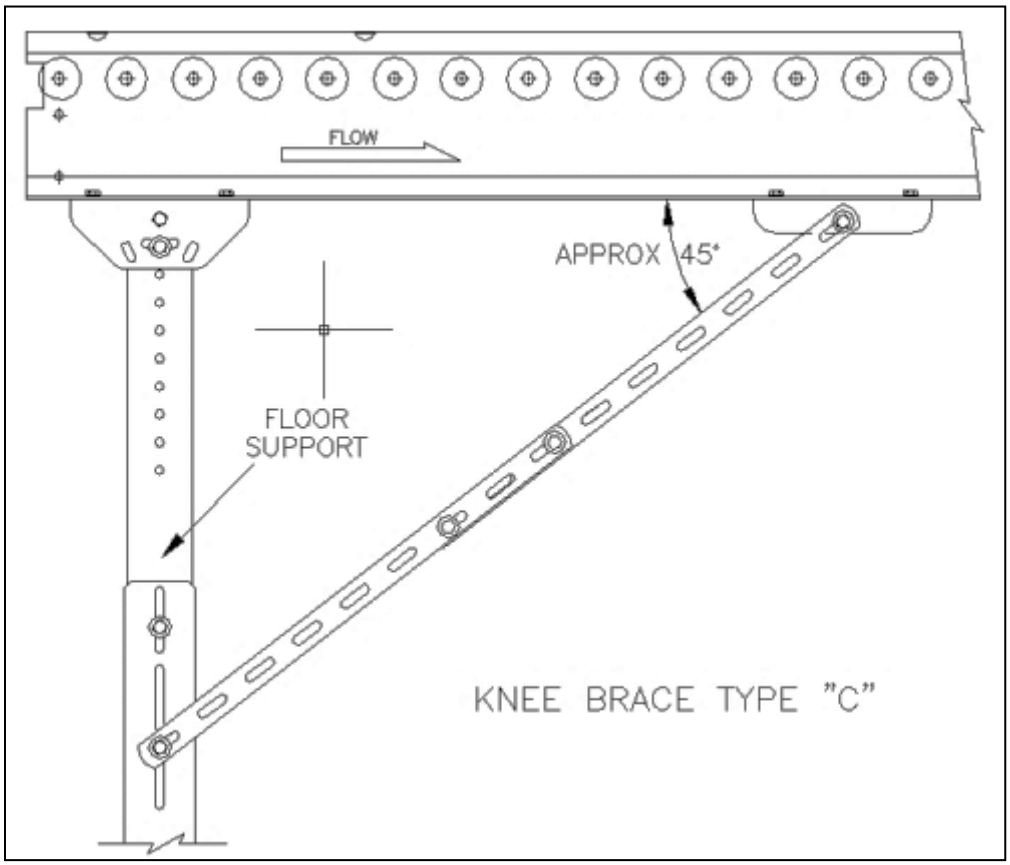
Stability along the conveyor length is achieved with knee braces. Braces resist stresses caused by direction of product flow, stops, and starts. Not every support requires bracing. Braces are used at the ends of straight runs and approximately every 30' in between. Braces should be located toward the discharge end (DOWNSTREAM) side putting them in tension. Starting the conveyor puts opposite stresses on the supports, which are resisted by installing a brace 1/3 to 1/2 conveyor length toward the receiving end (UPSTREAM).



For best results, the angle between the knee brace and frame should not exceed 45 degrees, or be less than 30 degrees. On short supports where a small angle results, the knee brace may need to be shortened.



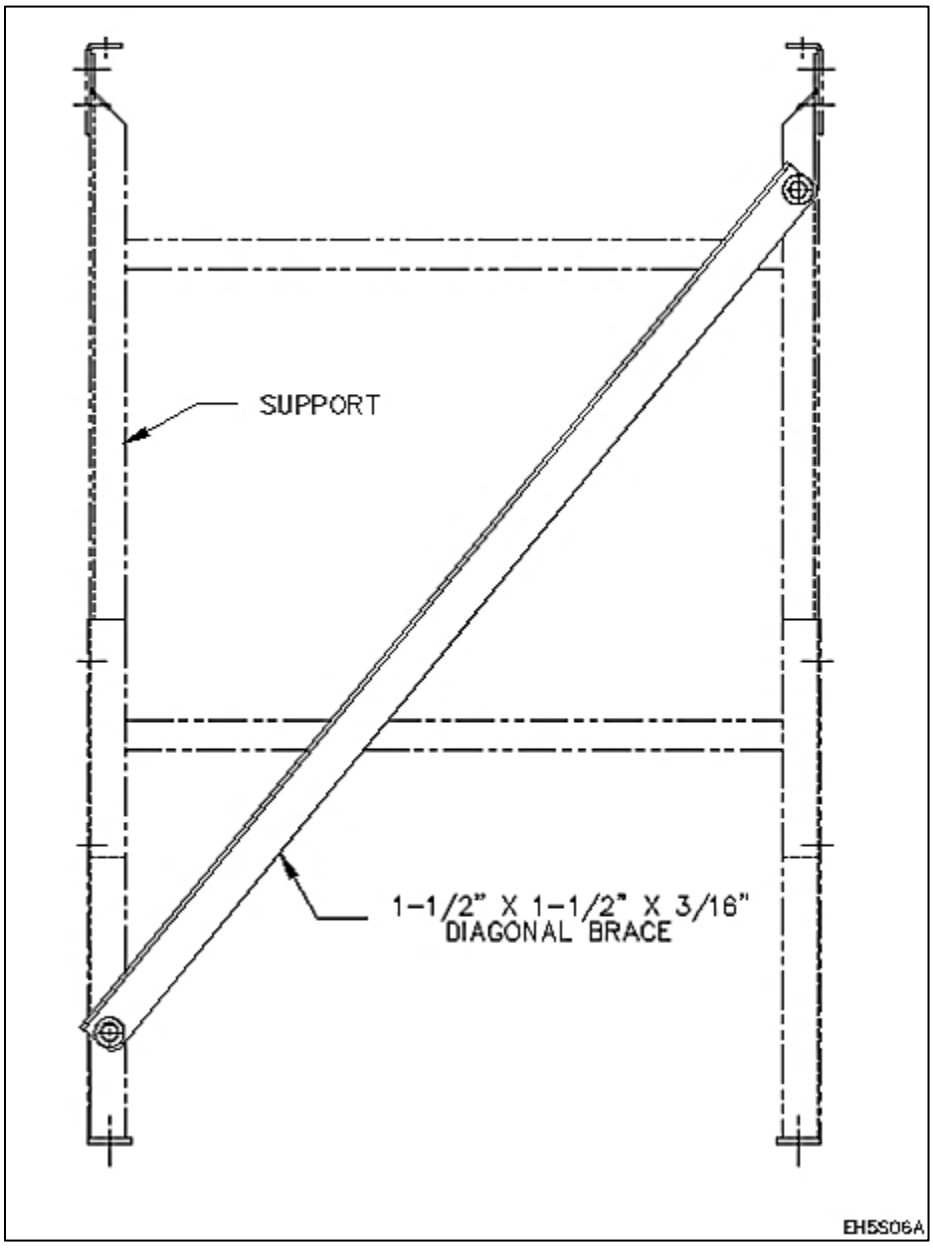
Type "C" braces use two type "B" braces overlapped and bolted together for extended length when conveyor height is 48" or more.


FLOW
APPROX 45°
FLOOR
SUPPORT
KNEE BRACE TYPE "C"

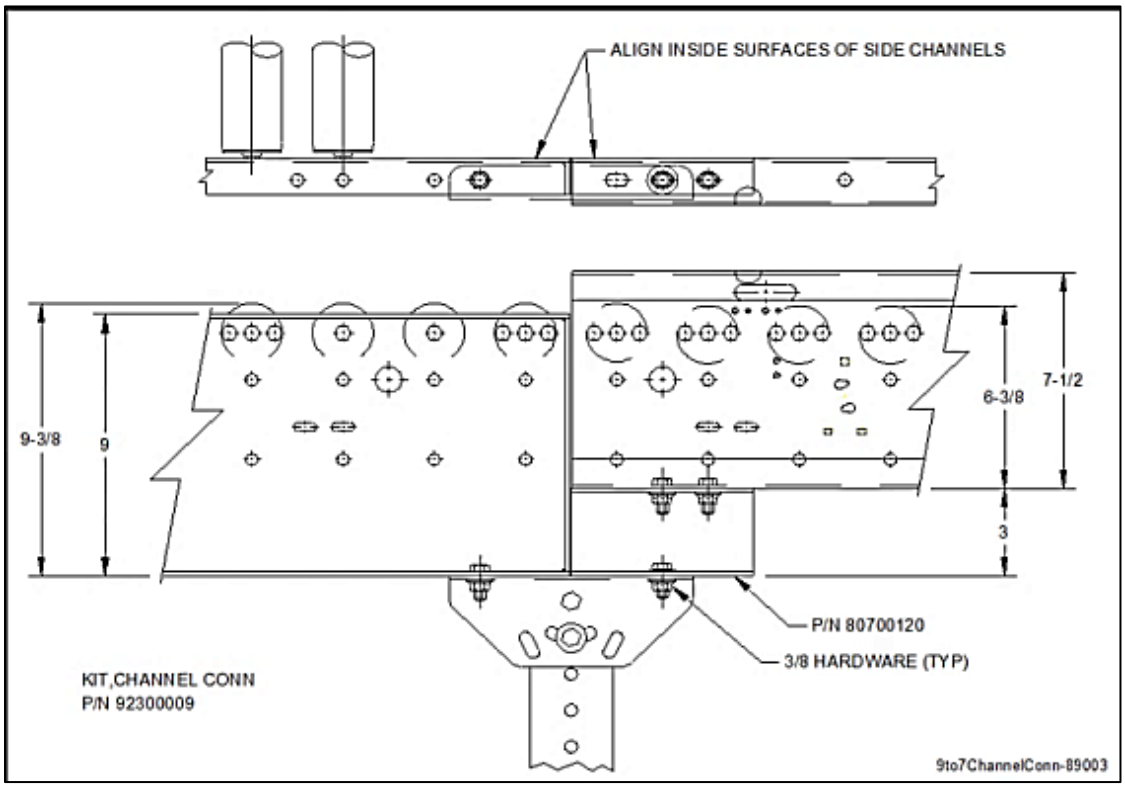
Diagonal Sway Brace (floor support)

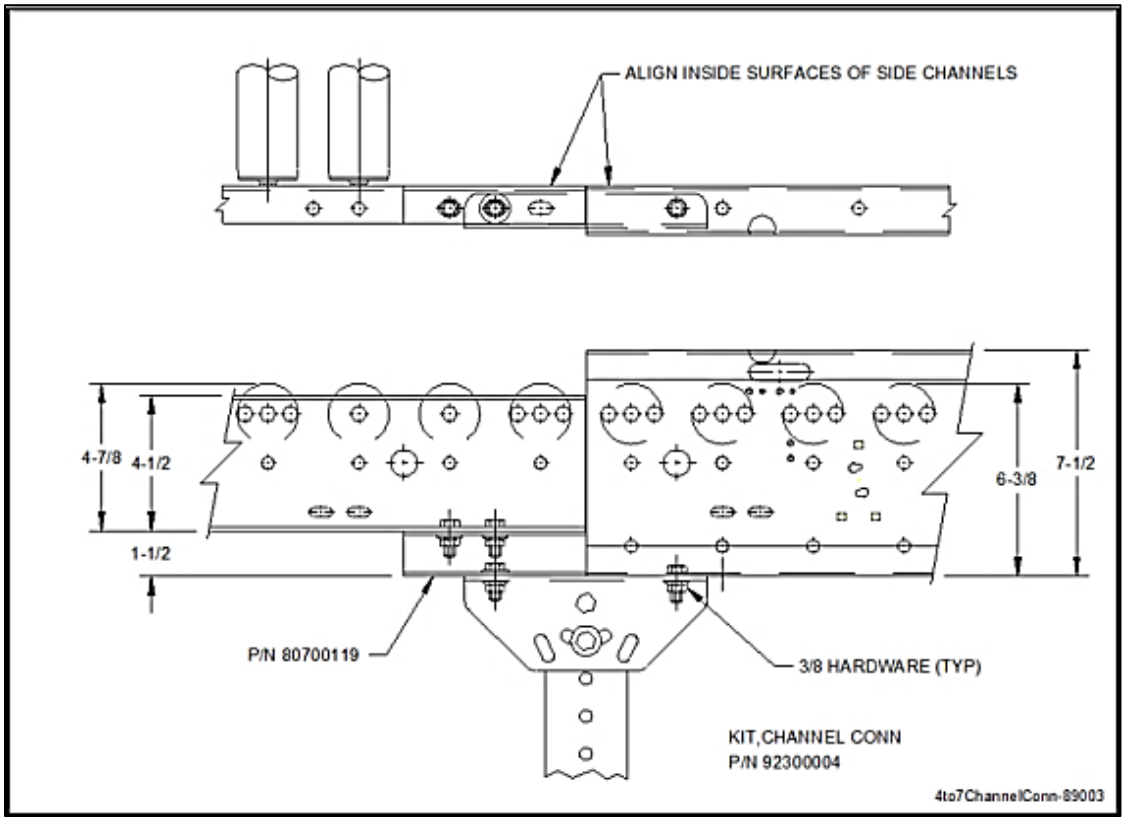
Floor support, Sway Bracing consists of one 1-1/2" x 1-1/2" structural angle and mounting hardware.

Application:
A diagonal sway brace has been designed to reduce side movement in the standard floor support. Side movement is most prevalent in long straight lines which are not side braced by adjoining conveyors, curves, etc. or where they cannot be braced to columns, machinery, or other conveyors. This is more noticeable when the conveyor elevation is greater than its width. One brace can be mounted to every third or fourth support diagonally across the support with the low end on the opposite side of every other brace (alternate orientation). The holes in the support uprights need to be field drilled.

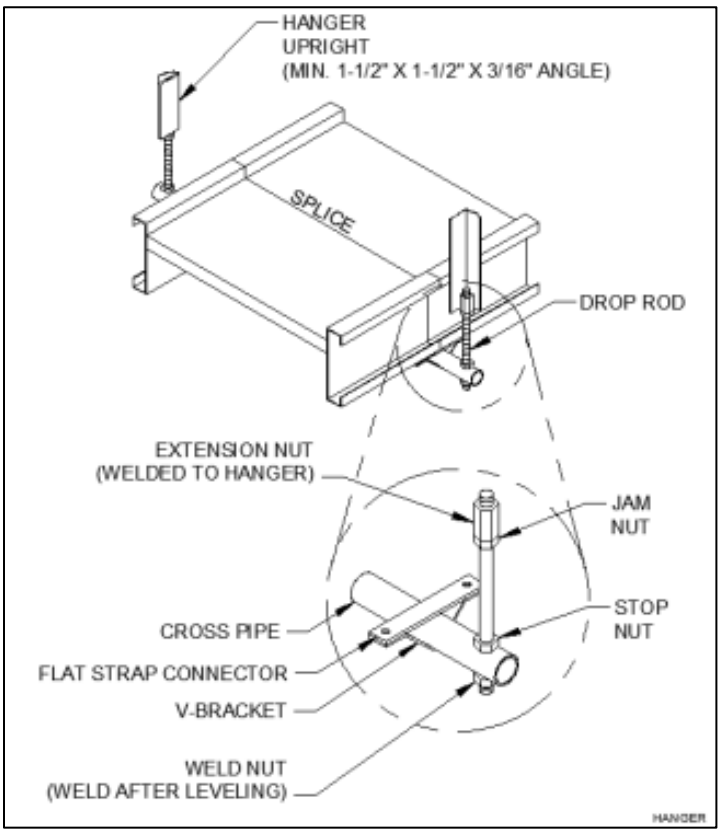


CRUZ®channel to XenoROL® Channel Connections





Ceiling Hangers



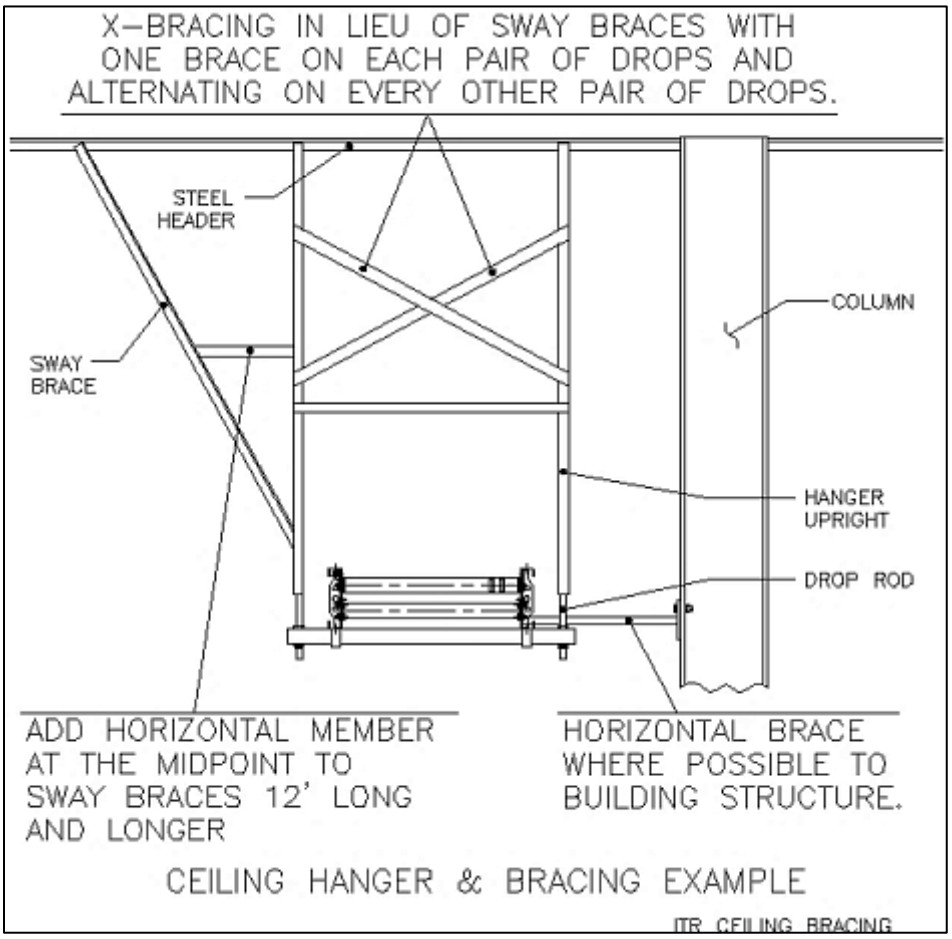
Drop rods and nuts are optionally available. The extension nut is welded into the angle hanger upright during installation.

Cross pipes and V brackets are provided with ceiling hangers. Flat Strap (Used at CRUZchannel belt joints) connectors and 3/4" threaded rod and attaching nuts are available as an option. If hanger uprights are field fabricated, they should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.

⚠ WARNING	
⚠	• Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building for sizing header steel.

⚠ WARNING	
⚠	• Consult your distributor or a structural engineer to determine what size hangers should be used to support your maximum anticipated load.

After hanger, uprights are installed and the heavy extension nuts welded to angle hangers, thread the drop rods into the extension nuts. Thread the jam nuts and stop nuts on the drop rods far enough up the rods to allow installation and adjustment of the cross pipe.



For C channel conveyors

Drop rods and cross pipes should already be installed in the ceiling before lifting IntelliROL beds into place. Host the bed sections into place on the cross pipes and bolt end flanges to each other.

It is important to align the side channels, care must be taken to make sure the rollers are level (carrying surfaces) from bed to bed.

Level the bed lengthwise and side to side by threading the drop rods up or down by using a wrench on the weld nuts. Tighten the jam nuts against the extension nuts and the stop nuts against the cross-pipe. Continue for the length of the conveyor.

CAUTION
• Before adding X-braces between uprights, check for adequate product clearance.

Sway Bracing (ceiling hanger)

1. Sway bracing should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.

2. Sway bracing is secured to the hanger upright near the conveyor support and extended upward at an angle of approximately 30 degrees from the hanger upright. The sway brace angle should not be over 45 degrees to the upright. When hangers are installed adjacent to building columns, a horizontal brace may be installed securely to the column with the customer permission.

3. Hanger uprights over 12’-0" in length must have horizontal bridging angles connected between the upright and the sway brace at approximately the half-way point.

4. Sway bracing should be installed on every third hanger (maximum of 30’-0" centers).

5. If sway bracing cannot be placed on the outside of the uprights, alternate X-bracing between every other pair of uprights.

6. Additional bracing should be used:
   - Before and after curves
   - At product start – stop locations (Accumulations beds)
   - At product diverting points

Anchoring ceiling hangers

Open Building Steel
The following references are from the American Institute for Steel Construction manual (AISC).
http://www.aisc.org/
Welding of auxiliary steel (stringers or headers) to building steel is prohibited.
Drilling and bolting to building steel is not recommended and will be done only with the customer's written permission.
Clamping of stringers or headers to building trusses will normally be done only at panel points. Specific customer permission and load calculations by a qualified engineer are necessary to safely clamp between panel points.
Headers when used for short spans, such as between roof purlins, will be securely clamped to building steel. Stringers, when used between headers, may be welded or bolted to the headers directly or with suitable angle clips.

Concrete Ceilings

Accomplish anchoring by drilling into the concrete ceiling and inserting suitable anchor bolts. The hole diameter and depth must be in accordance with the bolt manufacturer's instructions. Anchor each hanger with four bolts (two per upright) minimum size 1/2" diameter. Consult your distributor or structural engineer to determine your needs.

WARNING	
	• Do not use explosive type anchors

For heavier concentrated loads where movement or vibration can occur, use 5/8" diameter through bolts with backup plates. If this is not permissible or possible, then header steel must be installed using several anchor bolts to spread the load.

Concrete/Masonry Walls

Equipment may be supported from concrete walls through use of suitable bolts and anchors or by bolting through the wall if the condition of the wall or load dictates it. A 1/2" diameter through bolt should be used with a backing plate.

Ceiling-hung conveyor header steel should be installed well ahead of the conveyor frame installation to minimize congestion.

Wood Joists/Beams

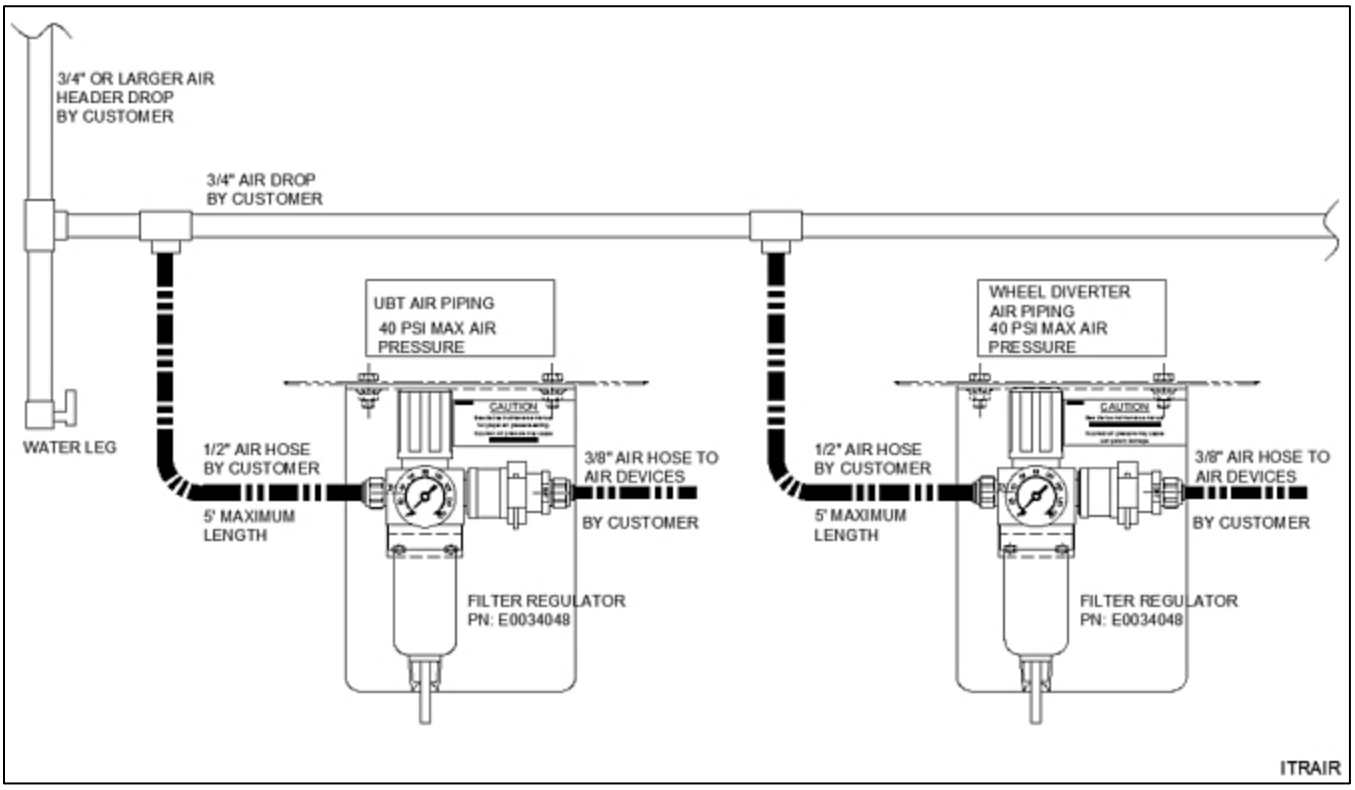
Hangers may be attached directly to the joists providing the load rating of the building will permit. Attach hangers to the vertical side of the joist in two places, one above the other, on each hanger upright. Anchoring is accomplished by drilling through the joist in the upper position and using a 1/2" diameter through bolt with a backup plate or heavy washer. A 1/2" diameter lag screw may be used in the lower position.

When a header is required to support the load, it must bridge across two or more joists. This header will be attached to each joist in the manner specified in paragraph above. Hanger uprights should then be bolted or welded securely to the headers.

NOTE

Consult a structural engineer to determine which method should be used for your load requirements.

Air Supply Requirements



General

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

Main Feeder

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

Air Drops

MHS Conveyor recommends using 3/4" pipe on air drops for low pressure loss. The drop is terminated with a drain at the bottom. A tee located prior to the drain (drop leg) 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 https://www.osha.gov/ requires energy sources (air drops) be turned off and capable of being locked or labeled with a warning tag.

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.

Low Pressure Switch

An air pressure switch is recommended to be installed into the pneumatic circuit to detect a drop in air pressure below required levels. If pressure drops below approximately 35 PSI, the conveyor system should shut off.

Pneumatic Requirements

- Regulator pressure set at 40-45 PSI.
- Maximum conveyor length each way from regulator is 100'.
    - Locate regulator in center of conveyor for maximum efficiency.
- MHS Conveyor supplied regulator is available.
- Low pressure switch to be set at 35 PSI.
- In high humidity or low temperature, use air dryer.
- Use 5 micron filter.
- Lockout/shutoff valve to be provided by air system installer.

Power Supplies

MHS Conveyor 24VDC power supplies are specially designed to work with IntelliROL systems. They are available with either 10, 20, or 40 amps of output current. These supplies require either 120 or 240 VAC single-phase or 480 VAC three-phase, and the DC power side is wired to the motorized rollers. Wiring for the 24 VDC power along the length of the conveyor is provided by MHS Conveyor. See Replacement Parts in this chapter for other parts and cables for IntelliROL. All power supplies are offered with or without branch circuit protection. All power supplies include a 10.5' power harness (1102286) to connect to bed 24VDC power harness.

NOTE: With Branch Circuit Protection, supply side fuses are included with power supply. Without Branch Circuit Protection, fuses are not included with power supply. Fuses for the DC output side included.

24VDC STANDARD POWER SUPPLIES WITHOUT BRANCH CURCUIT PROTECTION FOR INTELLIROL

TGW Item Number	Drawing Number	Input Voltage	Power Supply Size	Input Current	Output Current	Typical Number of MDR	Enclosure Type	UL Listed	Enclosure Dimensions (H x W x D)
1159645	130E121	480VAC/3PH/60HZ	40A	2.4A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1159647	130E122	480VAC/3PH/60HZ	20A	1.2A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166697	130E177	480VAC/3PH/60HZ	10A	2.5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160953	130E123	240VAC/1PH/60HZ	40A	9.6A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160954	130E124	240VAC/1PH/60HZ	20A	4.8A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166698	130E178	240VAC/1PH/60HZ	10A	2.5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160955	130E125	120VAC/1PH/60HZ	40A	19.2A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160956	130E126	120VAC/1PH/60HZ	20A	9.6A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166699	130E179	120VAC/1PH/60HZ	10A	5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"

24VDC STANDARD POWER SUPPLIES WITH BRANCH CURCUIT PROTECTION FOR INTELLIROL

TGW Item Number	Drawing Number	Input Voltage	Power Supply Size	Input Current	Output Current	Typical Number of MDR	Enclosure Type	UL Listed	Enclosure Dimensions (H x W x D)
1160913	130E115	480VAC/3PH/60HZ	40A	2.4A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160915	130E116	480VAC/3PH/60HZ	20A	1.2A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166694	130E174	480VAC/3PH/60HZ	10A	2.5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160948	130E117	240VAC/1PH/60HZ	40A	9.6A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160949	130E118	240VAC/1PH/60HZ	20A	4.8A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166695	130E175	240VAC/1PH/60HZ	10A	2.5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160950	130E119	120VAC/1PH/60HZ	40A	19.2A	40A	18	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160951	130E120	120VAC/1PH/60HZ	20A	9.6A	20A	9	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166696	130E176	120VAC/1PH/60HZ	10A	5A	10A	3	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"

Standard 24VDC power supplies are used for IntelliROL conveyor only. Standard power supplies can be powered from a separate power source input or taped into a high voltage motor to a corresponding conveyor that the IntelliROL conveyor will directly interface with. Use only with motors **without** VFD.

24VDC COMBINATION POWER SUPPLIES WITHOUT BRANCH CURCUIT PROTECTION FOR INTELLIROL AND CRUZCONTROL										
TGW Item Number	Drawing Number	Input Voltage	Power Supply Size	Input Current	Output Current		Typical Number of MDR	Enclosure Type	UL Listed	Enclosure Dimensions (H x W x D)
					ITR	CRUZ				
1160923	130E109	480VAC/3PH/60HZ	40A	2.4A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160924	130E110	480VAC/3PH/60HZ	20A	1.2A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166703	130E183	480VAC/3PH/60HZ	10A	2.5A	6	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160925	130E111	240VAC/1PH/60HZ	40A	9.6A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160926	130E112	240VAC/1PH/60HZ	20A	4.8A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166704	130E184	240VAC/1PH/60HZ	10A	2.5A	6	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160927	130E113	120VAC/1PH/60HZ	40A	19.2A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160928	130E114	120VAC/1PH/60HZ	20A	9.6A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166705	130E185	120VAC/1PH/60HZ	10A	5A	6	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"

24VDC COMBINATION POWER SUPPLIES WITH BRANCH CURCUIT PROTECTION FOR INTELLIROL AND CRUZCONTROL										
TGW Item Number	Drawing Number	Input Voltage	Power Supply Size	Input Current	Output Current		Typical Number of MDR	Enclosure Type	UL Listed	Enclosure Dimensions (H x W x D)
					ITR	CRUZ				
1160917	130E103	480VAC/3PH/60HZ	40A	2.4A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160918	130E104	480VAC/3PH/60HZ	20A	1.2A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166700	130E180	480VAC/3PH/60HZ	10A	2.5A	6	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160919	130E105	240VAC/1PH/60HZ	40A	9.6A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160920	130E106	240VAC/1PH/60HZ	20A	4.8A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166701	130E181	240VAC/1PH/60HZ	10A	2.5A	6	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160921	130E107	120VAC/1PH/60HZ	40A	19.2A	36	4	17	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1160922	130E108	120VAC/1PH/60HZ	20A	9.6A	16	4	8	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"
1166702	130E182	120VAC/1PH/60HZ	10A	5A	16	4	2	Type 12	Yes	15-3/4" X 15-3/4" X 7-7/8"

Combination 24VDC power supplies are used with IntelliROL and conveyor with CRUZcontrol. The power supplies have two 24VDC circuits, Class I for the IntelliROL and Class II for the CRUZcontrol. Combination power supplies can be powered from a separate power source input or taped into a high voltage motor to a corresponding conveyor that the IntelliROL conveyor will directly interface with. Use only with motors **without** VFD.

MOTOR CONTROL POWER SUPPLY FOR INTELLIROL (USED ONLY WITH MOTORS W/O VFD)								
Part Number	Output Current	Input Voltage	Input Current	ITR Output Current	Typical # Motors	W x H x D	UL Listing	Enclosure Type
1145930	10A	480 VAC / 3 PH	0.6	10A	4	12 x 12 x 8	Yes	Nema 1
1145931	20A	480 VAC / 3 PH	0.65	20A	9	12 x 12 x 8	Yes	Nema 1

The Motor Control 24VDC power supply is used with a 480 VAC motor. The Motor Control power supply is powered from the same power source as the high voltage motor that IntelliROL will directly interface with. Use only with motors **without** VFD.

Standard IntelliROL Power Supply with Branch Circuit Protection (20A 480 VAC shown)

Motor Control Power Supply with Branch Circuit Protection (10A 480 VAC shown)

Applications Guidelines

Application Standard

The ITR product line is based on the following features and concepts: http://itohdenki.com/

- Itoh Denki motorized rollers and drivercards (CBM-105 or HB-510) are standard.
- Cables are pre-engineered with the appropriate connectors.
- All channels are designed to accommodate any of the electrical variations.
- All CRUZchannels including C6 channels have welded connectors and CRUZbelt tube crossmembers.
- AutoCAD blocks for ITR devices are available upon request.

ITR^{HB} – HB-510 (accumulation)

- Standard product offered in Core Technologies.
- ZPA conveyor based on the Itoh HB-510 drivercard and FE-60 motorized roller.
- Can be a standalone conveyor. It may not require an input from a control panel depending on application.
- CRUZ channel with welded butt bolt bed connectors and integrated photoeyes.
- 24” and 30” zones with 3” centers are standard.
- A start signal can be used to activate the conveyor when using run on demand.

ITR^{CB} – CBM-105 (transportation)

- Standard product offered in Core Technologies.
- Transportation conveyor based on the Itoh CBM-105 drivercard and FE-60 motorized roller.
- Each drivercard is wired to power, but requires a 24VDC run signal (provided by others) to run each card. Beds include a run harness distributing that signal to each card.
- C6 channel with welded butt bolt bed connectors.
- 30” roller groups with 3” centers are standard.

Straight Bed Construction

- Straight bed, curve, & spur channels – CZ or C6.
- C6 channel standard has 1.625” flanges.
- C6 channel top flange are punched at ends for transition bezel (1120166) from C6 to CRUZchannel.
- All channels come with a welded bed connector.
- Straight bed crossmembers are tube style as used in the CRUZbelt product line.
- Straight beds will be punched for HB-510 and CBM-105 cards in every zone.

Curve Construction

- 36” is the standard inside radius a curve CRUZE® side channel.
- Curve channels are notched with welded in 10ga backers.
- No straight tangents, full straight section arc only.

- All channels come with a welded bed connector.
- CBM-105 and/or HB-510 cards located on the outer channel with an adapter plate (CBM-105 Plate: E0006531, HB-510 Plate: E0006532).
- Sensor location is 6” from the end of the zone.

UBT Construction

- 3’-4” OAL is a standard.
- C6 channels are 10ga construction with welded butt bolt bed connectors.
- Transfer belt centers are on 4” center standard.
- ERS or Pick Zone Module transfer belt centers are 3.25” center.
- ERS or Pick Zone Module transfers require 1.75 diameter carrier rollers.
- UBT’s with sensors, PE’s (ZL2) & reflectors are available.
- UBT's are universal LH/RH. The power harness is installed for LH flow, but can be reversed by cutting two wire ties and flipping cable end for end at installation.

Power Merge Construction

- ITRCB is the only version of a standard power merge (Transportation only).
- The C6 channel with welded butt bolt bed connectors is standard.
- Standard spur angles are 30 & 45 degree RH/LH beds.
- Spur BF is 6” wider than abutting bed.
- PE’s by others.

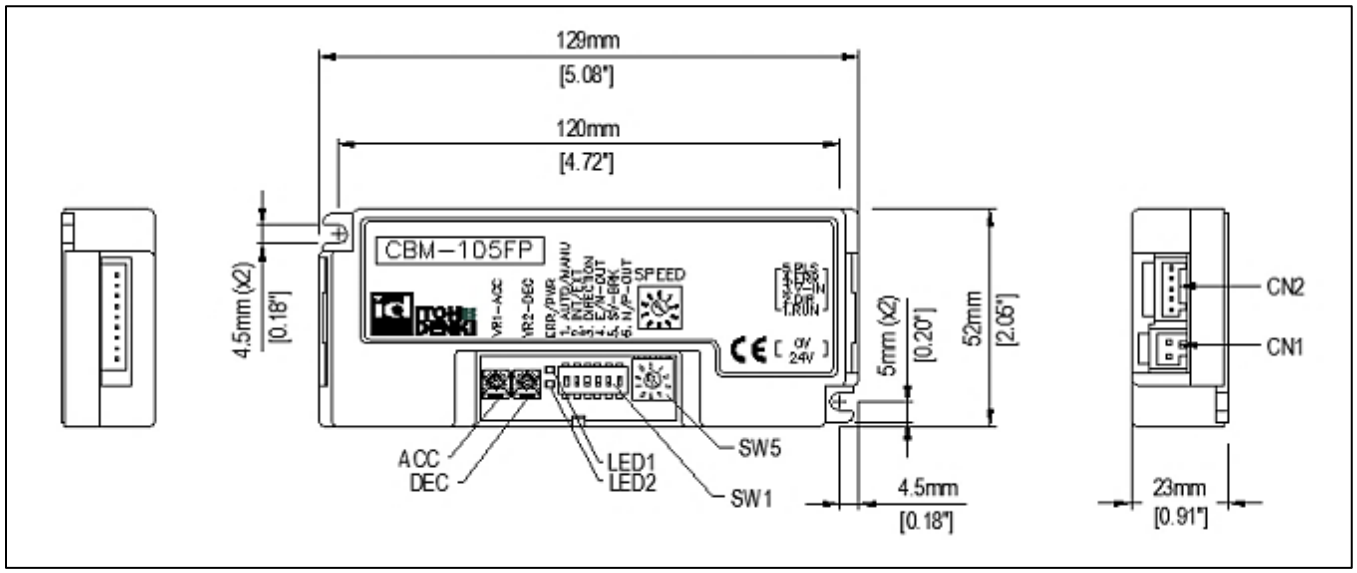
Wheel Divert Construction

- ITRCB is the only version of a standard wheel diverter (transportation only)
- The C6 channel with weld bed connectors are a standard.
- Standard spur angle is a 30 degree RH/LH beds.
- Spur BF is 6” wider than abutting bed.
- Diverter has 4 independently acting rows. Each divert wheel row is controlled by a separate solenoid. Having separate solenoids allows for independent control to raise or lower each wheel row independently allowing increased throughput.
- Solenoids are included as a standard. 120 VAC or 24 VDC voltages are available.
- PE’s by others.

Spur Construction

- ITRCB is the only version of a standard spur. (Transportation only).
- The C6 channel with welded butt bolt bed connectors are a standard.
- Standards created for 30 & 45 degree RH/LH spurs.
- Each spur has a conversion cable to allow for proper power and control signal flow.

Controls Guidelines - Itoh Denki CBM-105 Drivercard



General Notes:

- For “transportation” conveyor segments, and devices not requiring zoned accumulation (transfers, merges, wheel diverts). Requires PLC or other external control for basic run and reverse functions.
- MHS Conveyor CBM-105 (ITR^{CB}) conveyor includes:
  - Power harness – installed with taps to individual drivercards and bed-to-bed plug-in connections.
  - Drivercard – installed, connected to power harness, and speed pre-set.
  - CN2 – 5-PIN connector installed in card with “run harness” pre-wired to all cards.
  - Motorized rollers – installed in bed, motor cable connected.

All beds factory tested for direction, speed, and proper cable connections.

CBM-105 Features:

- Adjustable acceleration and deceleration time (0 to 2.5 seconds)
- Stable speed operation
- Manual or automatic recover of the thermal overload device
- One (1) rotary switch to select up to 10 different fixed speeds or external voltage input for up to 20 fixed speeds
- Forcibly stops motor if motor is locked for more than 4 seconds or thermal overload error lasts for 1 second or more
- Two (2) LEDs (red & green) to identify the type of error and power
- Back EMF error for over speeding protection
- Pulse signal output to indicate motor revolution
- Servo brake control allows product to maintain its position after run signal is removed
- Error output selection for output in normal or abnormal status
- Low Voltage Protection – See “LED’s and Error Indications” section
- External Direction control – See “User Interface Switch Settings” section

CBM-105 Specifications:

Operation:

- Cycle: 1 second ON; 1 second OFF (max on-off cycles 30/minute)
- Continuous duty permissible
- Do not overfeed by 150% of no-load operating speed (back EMF will be generated)
- Power: +24V DC +/-10% (full-wave rectified, smoothed current <10% ripple
- Power ON delay <1 second
- 4 Amp locking current
- Input signal level for activation minimum 18V for PNP
- See “Connections” section for I/O circuit current limitations/requirements
- PNP circuitry for all I/O, except for CN2 output 2-4, which is configurable as PNP or NPN.
- Servo brake mode – See “User Interface Switch Settings” section

Protection:

- Thermal Overload 185°F (85°C) on PCB
- Thermal Overload 221°F (105°C) in motor
- 5 Amp Internal fuse (non-replaceable) to power supply
- Internal diode circuit protection (Voltage Polarity)

Environment:

- Ambient Temperature 32-104°F (0-40°C)
- <90% Relative Humidity (No condensation)
- No Corrosive Gases
- Vibration <0.5G

CBM-105 Connections

CN1 – 2 PIN connector for Power	Male Connector on Card WAGO #734-162	Female Connector for Wiring WAGO #734-102 MHS Conveyor PN:1104417 & 18

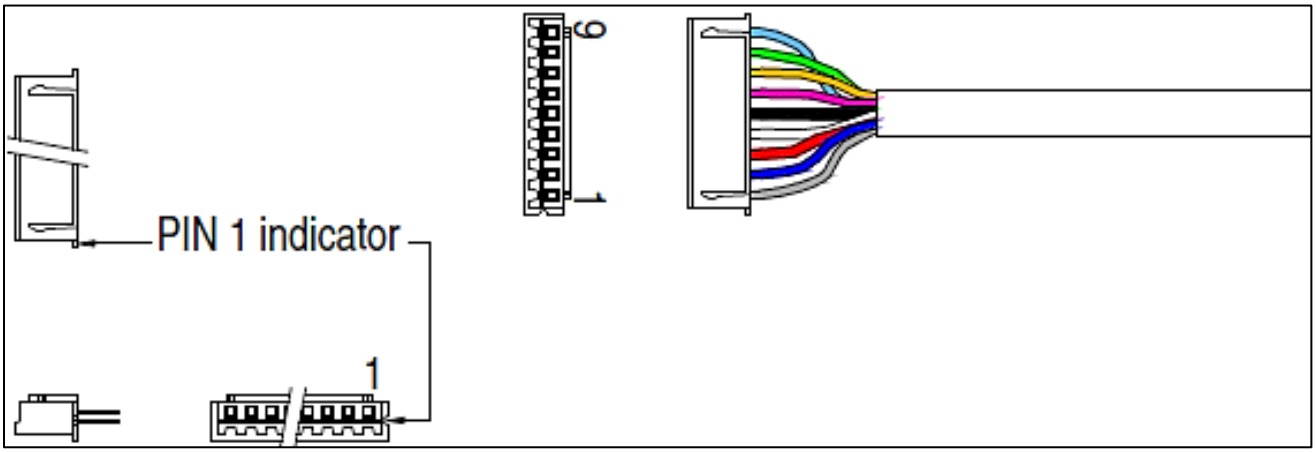
PIN	Description	
1	+24VDC +/-10% (full-wave rectified, smoothed current <10% ripple)	Wire Size: 28-14AWG
2	0V	

CN2 5 PIN connector for external control	Male Connector on Card WAGO #733-335	Female Connector for Wiring WAGO #733-105 MHS Conveyor PN:733105 & 1104417

PIN	Description	
1	+24V DC (Input) – RUN	Wire Size: 28-20AWG
2	+24V DC (Input) – DIR	
3	0-+10V DC (Input) – V-IN (Allows analog speed control, 1.6mA/card)	
4	+24V DC (Output) – ERR (Open collector: 25mA max)	
5	+24V DC (Output) – PLS (Open collector: 25mA max)	

CN3 – 9 PIN connector for Motor	Male Connector on Card JST #S9B-XH-A	Female Connector for Wiring JST #XHP-9

PIN	Description	
1	GND - Grey	Wire Size: 28-22AWG & 24-22AWG motor phases Terminal pins: JST #SXH-001T-P0.6
2	+12V DC – Blue	
3	Motor Phase U – Red	
4	Motor Phase V – White	
5	Motor Phase W – Black	
6	Hall Sensor U – Violet	
7	Hall Sensor V – Orange	
8	Hall Sensor W – Green	
9	Thermistor – Light Blue	



CBM-105 Installation Precautions

Precaution	Action	Reason
Power Supply	Power supply must be sized appropriately for the number of cards/rollers it provides power to. See "Power Supply Application Information" section.	Exceeding the power supply capacity can cause low voltage issues.
Multiple power supplies	0V line of all power supplies associated with a conveyor "unit" (cards, rollers, and external controls) need to be connected.	This completes the signal path between conveyor sections and system controls.
Voltage drop across power bus	Use suitable gauge wire in relation to distance and current draw.	Voltage must not drop below 21.6V DC or voltage faults will occur

CBM-105 User Interface Switch Settings

DIP Switches (SW1) – User Settings				
DIP Switch	**Function**	**ON**	**OFF**	**Default Setting**
1	Thermal device/low voltage/back EMF recover	Manual	Automatic (Thermal restarts 1min after cool down)	**ON**
2	Speed change selection	External (0~10V DC applied)	Internal (Rotary switch)	**OFF**
3	DIR* (No external DIR signal; viewed from cable side)	FS/FP – CCW FE – CW	FS/FP – CW FE – CCW	**OFF**
4	Error signal activity	Active during normal status	Active during abnormal status	**ON**
5	Brake mode	Servo	Dynamic	**OFF**
6	Error output (FN type)	PNP	NPN	**OFF**
	Error output (FP type)	PNP	NPN	**ON**

*External direction signal only. If a direction change signal should occur while the motor is running, the motor will first stop for 0.5s. The motor will then start in the new direction.

Rotary switch (SW2)

Applicable when using internal speed control (DIP-SW2 OFF)
Factory default position 9 (highest speed), MHS Conveyor presets speeds on production beds

*Potentiometers**

VR1 – Acceleration
Adjust acceleration time from 0~2.5 seconds after the RUN signal is applied
VR2 – Deceleration
Adjust deceleration time from 0~2.5 seconds after the RUN signal is removed
*VR's turn 270°

Brake

Servo Brake mode with DIP-SW 1-5 ON

- Holds Power Roller in position 0.2 seconds after the RUN signal is removed
- If external force moves the Power Roller it will return back to its initial stopped position
- Maximum holding force is 17.7 lb.-in at 1.0 Amp (Based on a PM486FE-60)
- Servo brake does not function during an error condition

Motor pulse output signal

- NPN (0V) output from CN2-5
- Two (2) pulses per motor revolution

CBM-105 LED's and Error Indications

Status	LED1	LED2	ERR Output	Error	Result	Solution

	(green)	(red)	(DIP-SW4 setting)		Condition*		
			OFF	ON			
Normal	● (ON)	○ (OFF)	○	●	n/a	n/a	n/a
No power	○ (OFF)	○ (OFF)	○	○	n/a	No operation	
Thermal overload	● (ON)	● (ON)	●	○	Motor or PCB above operating temperature		1
Motor lock	● (ON)	Blinks (1Hz) ●○	●	○	Motor locked (>4s)		2
Motor unplugged	● (ON)	● (ON)	●	○	Motor not connected to card		3
Open Fuse	○ (OFF)	Blinks (6Hz) ●○●○●○ ●○●○●○	●	○	Current exceeded 5A		4
Back EMF	● (ON)	Blinks/off (6Hz) ●○●○●○ ○○○○○○	●	○	Supply voltage >40V DC for 2s, or 60V DC for 0.1s		5
Low voltage (<15V)	● (ON)	Blinks (6Hz) ●○●○●○ ●○●○●○	●	○	<15V DC (>1s or 5x in 0.5s)		6

Solution

1. See more information under Input / Output Settings, DIP switch 1-8
    - A signal applied to CN2-1 (RUN) or CN2-2 (DIR) will reset this error status
    - Thermal overload can only be reset if the temperature has fallen back into the operating range
2. Remove the cause of the motor lock and clear the zone
3. Remove power from the card, plug in the motor connector, and then reapply power
4. Replace the card
5. If card detects back EMF over 40V DC for 2sec or 60V DC for 0.1sec, the motor will stop running and go into dynamic brake condition to slow the product down
    - Back EMF results from forcing a roller to run at >150% of its set operating speed
    - If DIP-SW1 is ON (Manual recovery), card must be reset 1sec after voltage drops under 30V DC. Applying a signal to CN2-1 or CN2-1 will reset error.
    - If DIP-SW1 is OFF (Automatic recover), card will restart roller 1sec after the voltage drops below 30V DC (if run signal is active
6. Check power supply output, voltage drop along power bus, and roller count per power supply

CBM-105 Drivercard

CBM-105 DRIVERCARD / FE- _ _ _ ROLLER

ROLLER: FE-17			ROLLER: FE-60			ROLLER: FE-100			ROLLER: FE-140		
TGW NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	TGW NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)
6	0	6.9	**25**	0	24.6	**85**	0	87.5	**85**	0	87.5
9	1	9.2	**30**	1	32.8	**115**	1	116.6	**115**	1	116.6
13	2	13.8	**45**	2	49.2	**170**	2	174.9	**170**	2	174.9
18	3	18.4	**65**	3	65.6	**230**	3	233.2	**230**	3	233.2
25	4	27.7	**95**	4	98.4		4	349.7/(285.7)	**345**	4	349.7
35	5	36.9	**130**	5	131.2		5			5	466.3/(408.2)
40	6	41.5	**145**	6	147.6	**285**	6			6	524.7/(408.2)
45	7	46.1	**160**	7	164		7	433.1/(285.7)	**405**	7	
50	8	50.7/(48.0)	**180**	8	180.4/(170.6)		8			8	566.2/(408.2)
	9	55.3/(48.0)		9	196.8/(170.6)		9			9	

Note: Speed with two numbers are " NO-LOAD / RATED". Rated numbers are what the roller is capable of doing under a continuous duty full load condition.

CBM-105 DRIVERCARD / FP- _ _ _ ROLLER

ROLLER: FP-55			ROLLER: FP-100			ROLLER: FP-140		
TGW NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)
25	0	26.7	**120**	0	121.7	**120**	0	121.7
35	1	35.6	**160**	1	162.3	**160**	1	162.3
50	2	53.4	**240**	2	243.4	**240**	2	243.4
70	3	71.2		3	324.5/(306.3)	**320**	3	324.5
105	4	106.8		4			4	486.6/(470.7)
140	5	142.4		5			5	
160	6	160.2	**305**	6	446.0/(306.3)	**470**	6	
175	7	178.0/(175.5)		7			7	627.1/(470.7)
180	8	195.8/(175.5)		8			8	
	9	213.7/(175.5)		9			9	

Note: Speed with two numbers are " NO-LOAD / RATED". Rated numbers are what the roller is capable of doing under a continuous duty full load condition.

ITR CB-016 P7 and CB-105FP Electrical Components

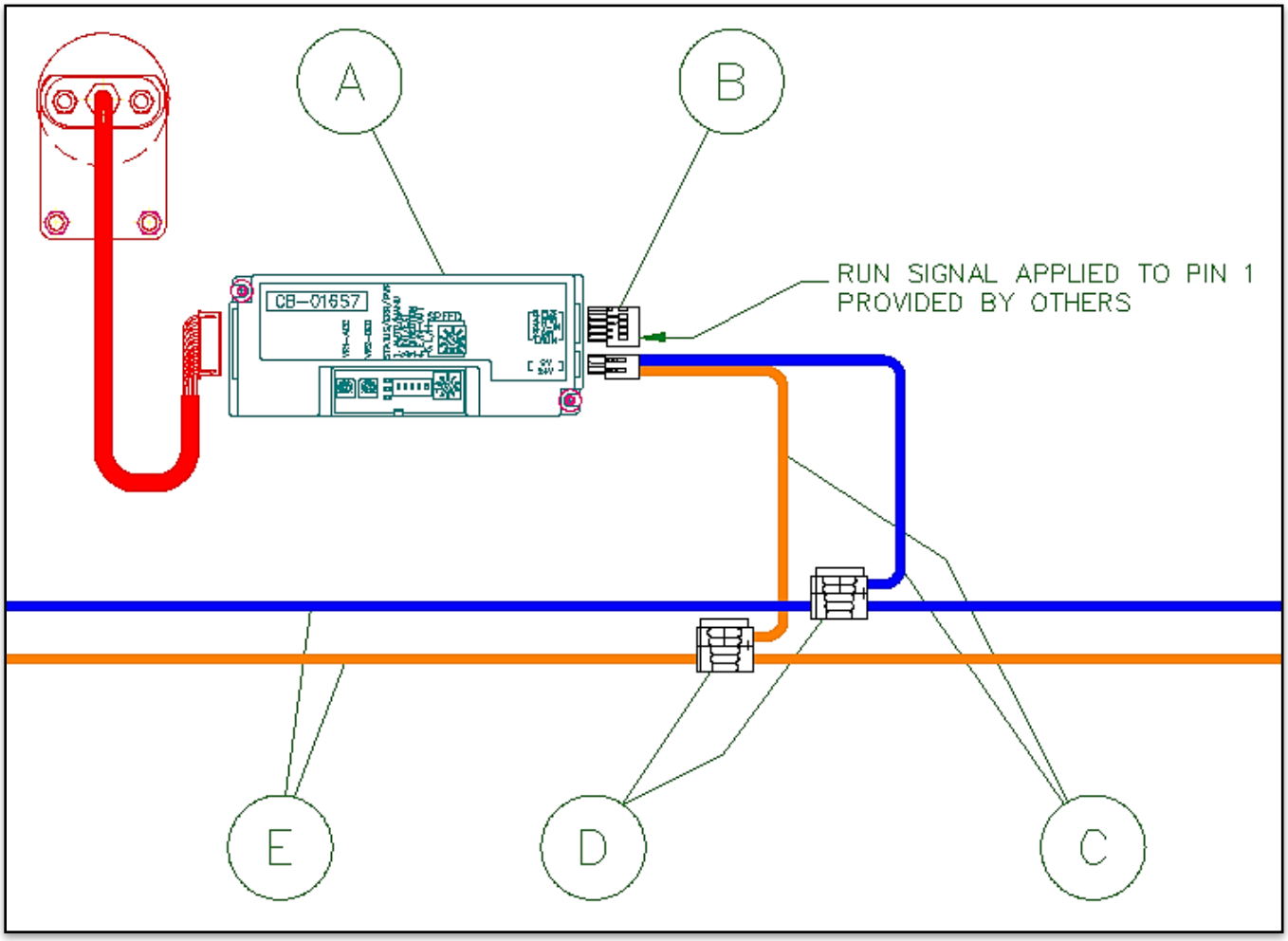


Figure 1 – CB-016 and CC-105 Drivercard

Ⓐ CB-016P7 Item (with hardware) 1139716
CB-105FP Item (with hardware) 1153931
Ⓑ 5-Pin connector (for run signal connection): 733105
Ⓒ Power tap cable (for short distances < 6”): 1139543
Ⓓ Scotchlok connectors (connect power tap to power harness): 3M567 (Brown)
Ⓔ Power harness – see power harness table

ITR Electrical Components

Table 3 Motor extension cables

Item No.	Description
1138704	CABLE,MOTOR EXTENSION, ITOH M-F-EXT-9-PIN-600mm
1138705	CABLE,MOTOR EXTENSION, ITOH M-F-EXT-9-PIN-1200mm
1138706	CABLE,MOTOR EXTENSION, ITOH M-F-EXT-9-PIN-2700mm

ITRHB-510 Electrical Components

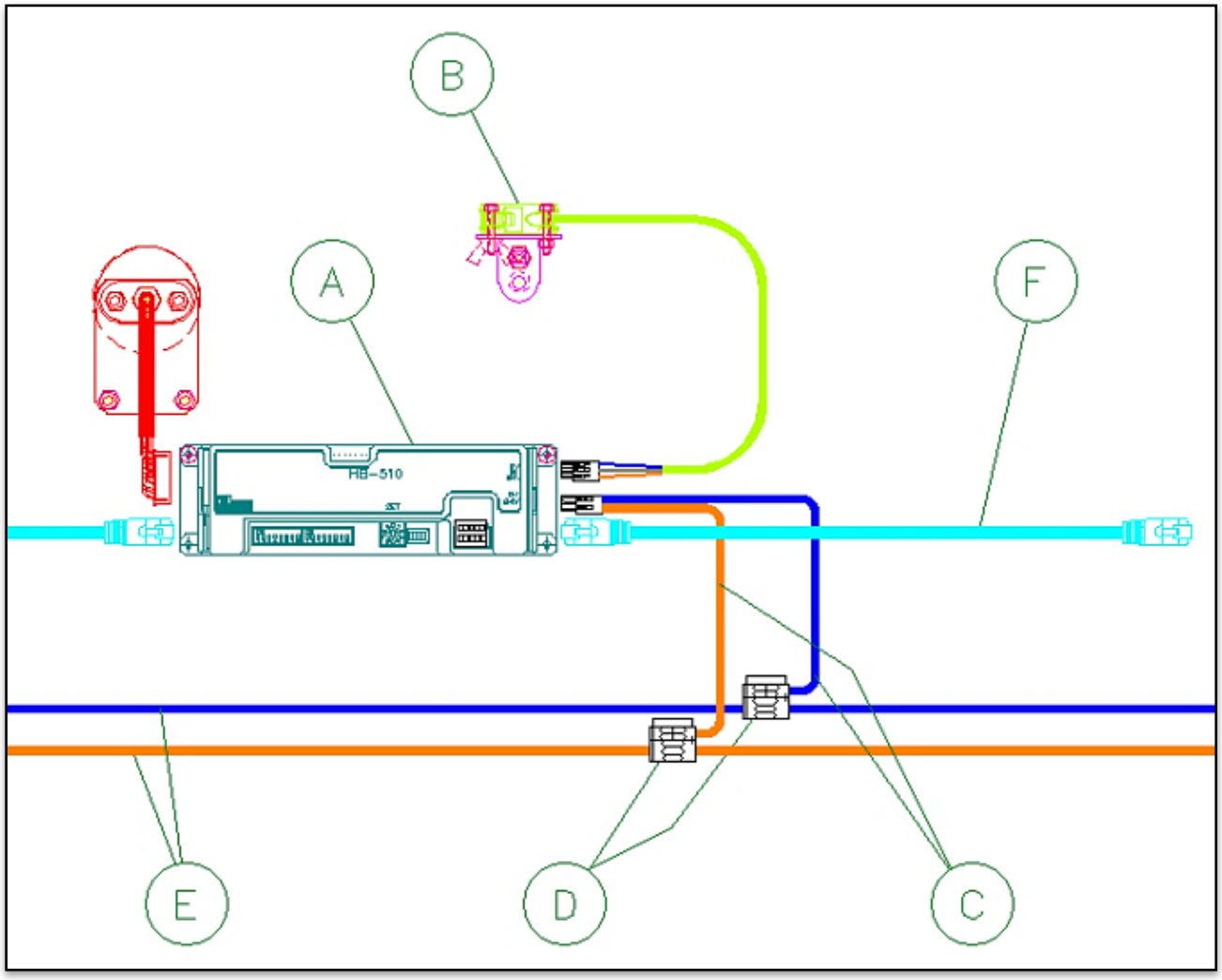


Figure 2 – HB-510 Drivercard

A HB-510 item (includes hardware and 5-pin connector): PN1137754

B Photoeye (ZL2 eye with 3-pin connector mounted to bracket with reflector in bag): PN1137686

C Power tap cables (for short distances < 6”): PN1139543

D Scotchlok connectors (connect power tap to power harness): 3M567 (Brown)

E Power harness: See table below

F Cat5E Communication Cable

Table 1: Power Harness

Item No.	Description
1102286	HARNESS,POWER,10AWG.10.5'
1102287	HARNESS,POWER,10AWG,8'
1102288	HARNESS,POWER,10AWG,5.5'
1102289	HARNESS,POWER,10AWG,3'

Item No.	Description
E0034025	CABLE,CAT5E 3” GRAY
E0034026	CABLE,CAT5E 5' GRAY
E0034027	CABLE,CAT5E 7' GRAY
E0030796	CABLE,CAT5E 10' GRAY
E0009905	CABLE,CAT5E 14' GRAY
E0009904	CABLE,CAT5E 25' GRAY

Table 2: Communication Cable

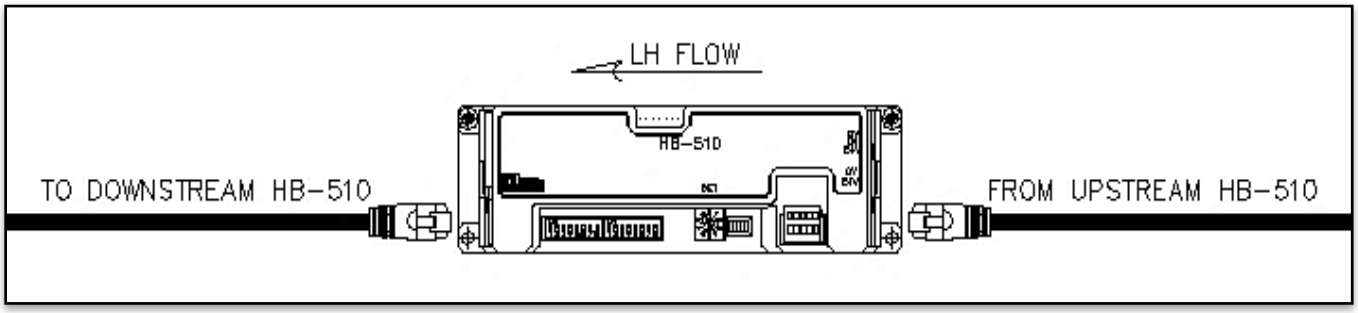


Figure 3 – HB 510 Communication Cable LH Flow

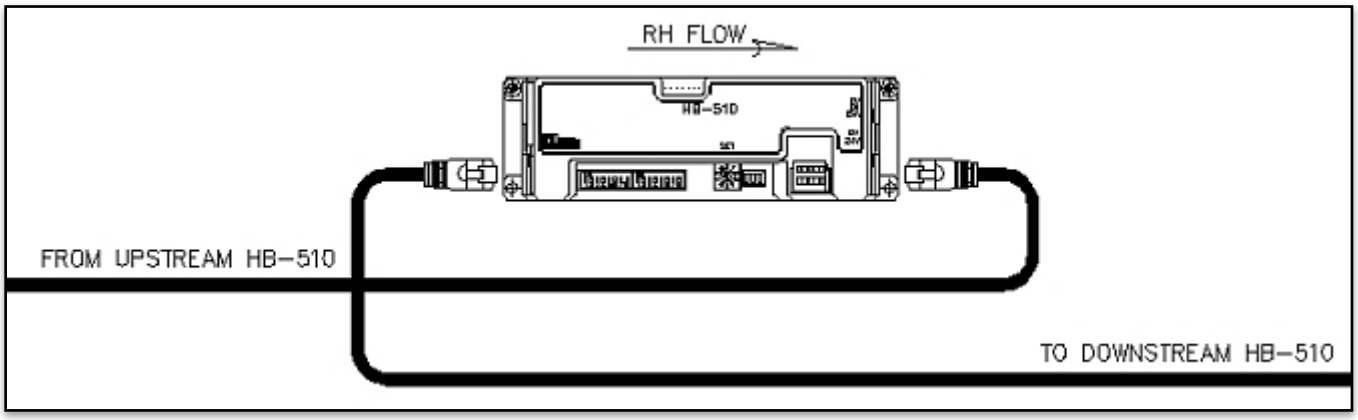
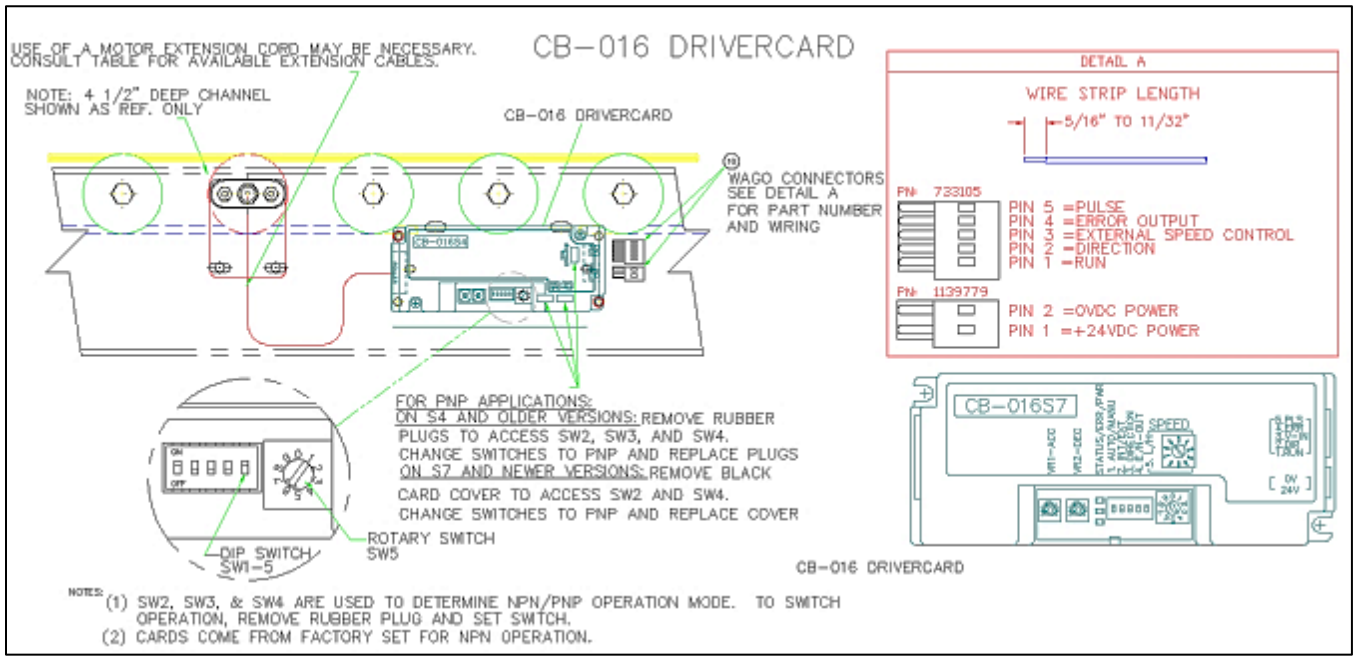


Figure 4 – HB-510 Communication Cable RH Flow

- Cat5E cable (Upstream cable goes in right side of card, and downstream cable comes out the left side of the card, RH generally requires a longer cable). See diagram below :

CB-016 Drivercard (Spurs) Speed Chart

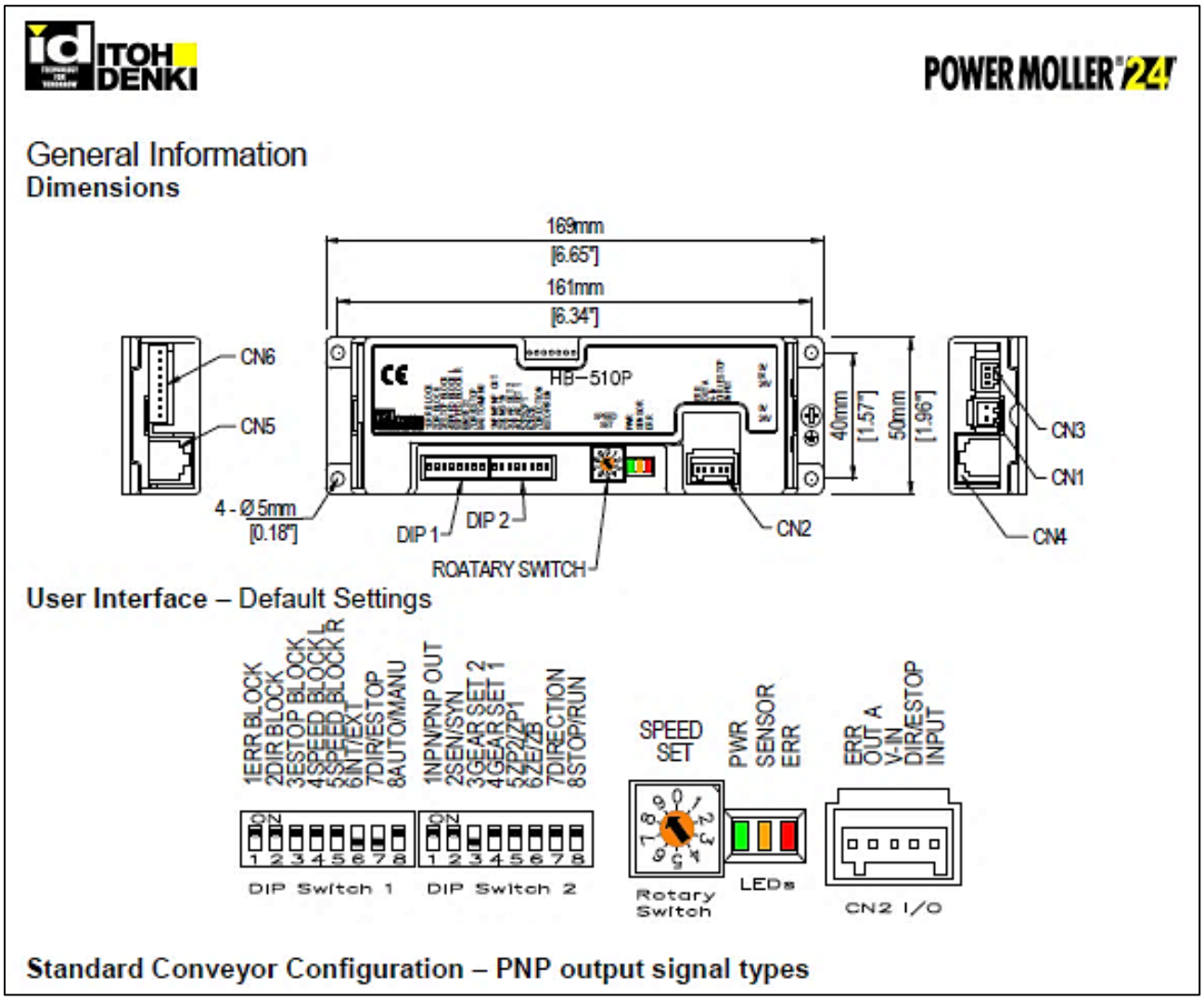


SPEED CHANGE TABLE

CB-016 DRIVERCARD

20 DISCREET SPEED CHANGE STEPS FOR INTERNAL CONTROL VIA DIP SWITCH AND ROTARY SWITCH		FP ROLLERS (FPM)			FE ROLLERS (FPM)			FS ROLLERS (FPM)	
DIP SW1-5	ROTARY SW5	100,140, 190,255	20,30, 45,55	5,8, 10,15	70,100,14 0180,210	20,30,45 55,60	5,8,10, 15,17	20,30, 45,55	5,8, 10,15
ON	9	971.9	214.1	56.8	698.9	197.5	55.4	214.1	56.8
ON	8	890.9	196.3	52.1	640.6	181.0	50.8	196.3	52.1
ON	7	850.4	187.3	49.7	611.5	172.8	48.5	187.3	49.7
ON	6	809.9	178.4	47.3	582.4	164.5	46.2	178.4	47.3
ON	5	769.4	169.5	45.0	553.3	156.3	43.9	169.5	45.0
ON	4	728.9	160.6	42.6	524.1	148.1	41.6	160.6	42.6
ON	3	647.9	142.7	37.9	465.9	131.6	36.9	142.7	37.9
ON	2	607.4	133.8	35.5	436.8	123.4	34.6	133.8	35.5
ON	1	566.9	124.9	33.1	407.6	115.2	32.3	124.9	33.1
ON	0	526.4	116.0	30.8	378.5	106.9	30.0	116.0	30.8
OFF	9	485.9	107.0	28.4	349.4	98.7	27.7	107.0	28.4
OFF	8	445.4	98.1	26.0	320.3	90.5	25.4	98.1	26.0
OFF	7	404.8	89.2	23.7	291.1	82.3	23.1	89.2	23.7
OFF	6	364.3	80.3	21.3	262.0	74.0	20.8	80.3	21.3
OFF	5	324.0	71.4	18.9	233.0	65.8	18.5	71.4	18.9
OFF	4	283.5	62.5	16.6	203.9	57.6	16.2	62.5	16.6
OFF	3	243.0	53.5	14.2	174.8	49.4	13.9	53.5	14.2
OFF	2	202.5	44.6	11.8	145.6	41.1	11.5	44.6	11.8
OFF	1	162.0	35.7	9.5	116.5	32.9	9.2	35.7	9.5
OFF	0	121.5	26.8	7.1	87.4	24.7	6.9	26.8	7.1

Controls Guidelines - Itoh Denki HB-510 Drivercard



General Notes:

- Local accumulation control with minimal higher level control system interface requirement (infeed zone, line full status, discharge zone). See Application Guideline section for details.
- MHS Conveyor HB-510 conveyor (ITR^{HB}) includes:
  - Zone sensor – installed, connected, and pre-aligned to reflector.
  - Power harness – installed with taps to individual drivercards and bed-to-bed plug-in connections.
  - Drivercard – installed, connected to power harness and sensor, and speed pre-set.
  - Card-to-card communication cables (CAT5E) factory installed.
  - CN2 – 5-PIN connector installed in card.
  - Motorized rollers – installed in bed, motor cable connected.
  - All beds factory tested for PE alignment, flow direction, speed, and proper plug-in connections.

HB-510 Features:

- Built in thermal protection for both driver card and Power Roller
- Three LED's to identify type of error and number of occurrences
- Dynamic brake control
- Stable speed function to ensure articles of different weights travel at the same rate
- Variable speed control by rotary switch or by external voltage input for up to 10 speeds
- Direction control by onboard DIP switch or external signal input
- Logic for general zero pressure accumulation (ZPA) control is built in
- Direct connection for photo eye to both power it and receive its output signal
- Easy connection between adjacent HB-510's with CAT 5 communication cable to simplify wiring
- Flexible Zone Recognition (patented) to handle long articles which simultaneously block multiple sensors
- Also available for rollers with built-in brakes, HB-510B
- Compatible with Motorized Rollers PM486FS, PM486FE, PM486FP, PM570FE, PM605FE, PM635FS

HB-510 Specifications:

Operation:

- Cycle: 1 second ON; 1s OFF (max on-off cycles 30/minute)
- Continuous duty permissible
- If being fed by faster upstream equipment, do not exceed 150% of no-load operating speed (back EMF will be generated)
- Power: +24V DC +/-10% (full-wave rectified, smoothed current <10% ripple
- See “Connections” section for I/O circuit current limitations/requirements
- PNP circuitry for all I/O, except for CN2 outputs 2-4 & 2-5, which are configurable as PNP or NPN.

Protection:

- Thermal Overload 185°F (85°C) on PCB (Printed Circuit Board)
- Thermal Overload 221°F (105°C) in motor
- 5A Internal fuse (non-replaceable) to power supply
- Internal diode circuit protection (Voltage Polarity)

Environment:

- Ambient Temperature 32-104°F (0-40°C)
- <90% Relative Humidity (No condensation)
- No Corrosive Gases
- Vibration <0.5G

HB-510 Connections

CN1 – 2 PIN connector for Power	Male Connector on Card WAGO #734-162	Female Connector for Wiring WAGO #734-102
PIN	**Description**	
1	+24VDC +/-10% (full-wave rectified, smoothed current <10% ripple)	Wire Size: 28-14AWG
2	0V	

CN2 – (Included with Card) 5 PIN connector for external control	Male Connector on Card WAGO #733-335	Female Connector for Wiring WAGO #733-105
PIN	**Description**	
1	+24V DC (Input) – Release, Force Run, or Force Zone Stop	Wire Size: 28-20AWG
2	+24V DC (Input) – DIR/E-stop	
3	0-+10V DC (Input) – V-IN (Allows analog speed control, 1.6mA/card)	
4	+24V DC (Output) – OUT-A (Open collector: 25mA max)	
5	+24V DC (Output) – ERR (Open collector: 25mA max)	

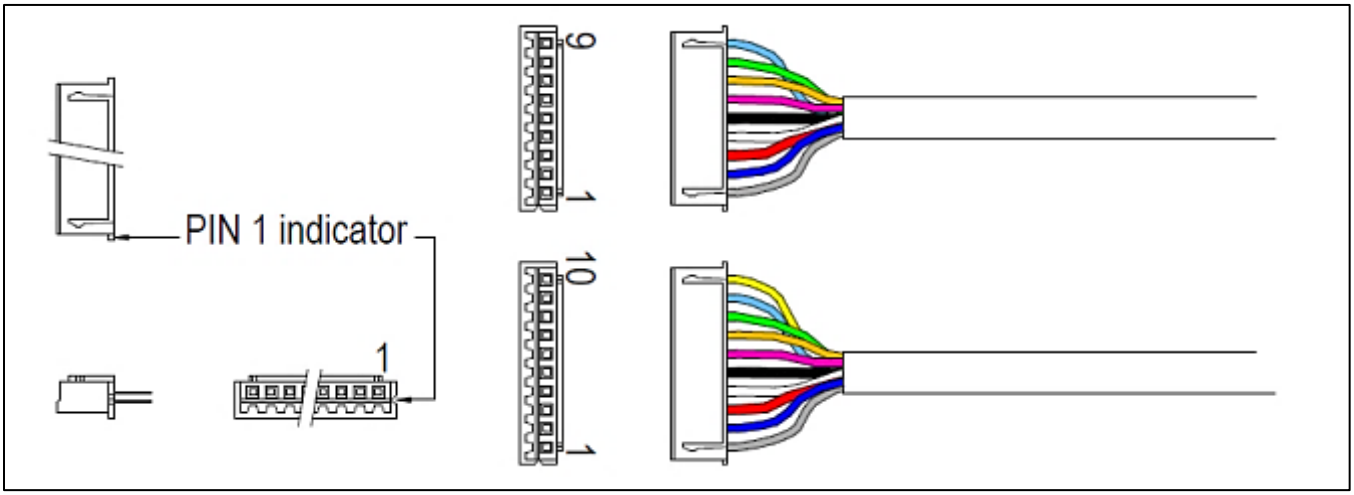
CN3 – 3 PIN connector for Sensor	Male Connector on Card WAGO #733-363	Female Connector for Wiring WAGO #733-103
PIN	**Description**	
1	+24V DC (Power supply to Sensor)	Wire Size: 28-20AWG
2	+24V DC (sensor signal input) – Dark Operate PNP sensor	
3	0V	

CN4 & CN5 – Control Interconnect

- CAT5E cable connection is for card to card signaling only, is not a network, and does not follow Ethernet PIN order.
- See Itoh Denki for additional information on CN 4 & 5 pin outs, as well as information for interfacing HB-510 drivercards with previous generation cards (HB-508).

CN6 – 9 or 10 PIN connector for Motor (10 PIN for brake roller)	**Male Connector on Card JST #S9B-XH-A (S10B if brake)**	**Female Connector for Wiring JST #XHP-9 (-10 if brake)**

PIN	Description	
1	GND - Grey	Wire Size: 28-22AWG & 24-22AWG motor phases Terminal pins: JST #SXH-001T-P0.6
2	+12V DC – Blue	
3	Motor Phase U – Red	
4	Motor Phase V – White	
5	Motor Phase W – Black	
6	Hall Sensor U – Violet	
7	Hall Sensor V – Orange	
8	Hall Sensor W – Green	
9	Thermistor – Light Blue	
10	Brake - Yellow	



HB-510 Installation Precautions

Precaution	Action	Reason
More than 30 cards connected together with the CAT5E communication cable	The first card after each set of 30* must be set as follows: DIP Switch 1-1: OFF DIP Switch 1-2: OFF DIP Switch 1-3: OFF *Standard conveyor configuration; starting with first upstream card. If using ERR, DIR or ESTOP, signal must be connected to each group of 30 cards.	When a card has it ERR, DIR or ESTOP signal activated, that signal is communicated through the CAT5E cable by sinking the signal. Each card's circuitry must be able to handle the current sourced by other cards on the chain. More than 30 cards will exceed the current limit and damage the printed circuit boards.
Powering ON	Maintain safe distance from the system when powering on, as equipment will start automatically.	When the system is first powered on, a 5-7 second startup cycle will initiate. Unoccupied zones will run at a slow speed to advance articles which may be between photo-sensors (Seek to Sensor function). After this, occupied zones will start running if there are open downstream sensors.
Low impedance connection to PNP output(s)	DO NOT connect an output terminal (CN2-4, CN2-5) set for PNP directly to 0V, GND, or a low impedance input on a controller.	When the PNP signal is active, the low impedance input will draw a high current, potentially damaging both the drivercard and the controller.
Multiple power supplies	0V line of all power supplies associated with a conveyor "unit" (cards, rollers, and external controls) need to be connected.	This completes the signal path between conveyor sections and system controls.
Voltage drop across power bus	Use suitable gauge wire in relation to distance and current draw.	Voltage must not drop below 21.6V DC or voltage faults will occur.

HB-510 User Interface Switch Settings

Signal Block Settings						
DIP Switch	**Function**	**On**		**Off**		**Default Setting**
		CN5 (Left)	**CN4 (Right)**	**CN5 (Left)**	**CN4 (Right)**	
1-1	ERR signal transmission	Transmit & Receive	Transmit & Receive	Transmit & Receive	Blocked	**ON**
1-2	DIR signal transmission				Blocked	**ON**
1-3	ESTOP signal transmission				Blocked	**ON**
1-4	SPEED signal transmission Left (Downstream)		n/a	Blocked	n/a	**ON**
1-5	SPEED signal transmission Right (Upstream)	n/a	Transmit & Receive	n/a	Blocked	**ON**

Input / Output Settings				
DIP Switch	**Function**	**ON**	**OFF**	**Default Setting**
1-6	SPEED adjustment	External: 0-10V DC	Internal: Rotary switch	**OFF**
1-7	DIR or ESTOP input (CN2-2)	ESTOP signal input	DIR signal input	**OFF**
1-8	Reset for thermal recovery	Manual input recover	Automatic recover	**ON**
2-1	Output signal type (CN2-4 & CN2-5)	PNP signal output	NPN signal output	**ON****
2-2	Sensor or Synchronous output (CN2-4)	Output is active (+24V) while internal motor RUN signal is ON.	Output is active (+24V) while photo-sensor (CN3-2) signal is ON.	**ON**
2-8	STOP or RUN input (CN2-1)	RUN signal input	STOP signal input	**ON**

Timer Settings – Allows card timers to be adjusted for fast (single stage) down to slow (three stage) rollers, default setting is for two stage. Also can be used to lengthen run timers for long (>36") zones.

Dip Switch		**Gear Stages**	**Time (seconds)**		
2-3	2-4		**Sensor Timer**	**Run Hold Timer**	**Jam Timer**
OFF	OFF	1	0.3-1.2	0.3-1.2	0.6-2.2
OFF (Default)	**ON (Default)**	**2**	1.0-4.0	1.0-4.0	2.0-8.0
ON	OFF	3	4.0-14.0	4.0-14.0	7.5-27.0
ON	ON	n/a	Motor runs continuously; for trouble shooting only		

Other Settings				
DIP Switch	**Function**	**ON**	**OFF**	**Default Setting**
2-5	Release modes	ZP1 Train/Slug release	ZP2 Singulated release	**ON**
2-6	Last zone mode	ZB	ZE	**ON**

		Standard zone		Last (discharge) zone		
2-7	Motor direction*	FE	FS/FP	FE	FS/FP	**ON**
		CCW	CW	CW	CCW	

*Motor direction (as viewed from the cable side; PM486 series) is independent of ZPA logic flow direction.

Notes:

- Table based on PM486FE-60 roller
- See Roller Performance Tables for additional card/roller speed combinations
- When using an analog signal for external speed control, note that roller speed selections are in fixed increments and not infinitely adjustable

HB-510 LED's and Error Indications

Status	LED1 (green)	LED2 (orange)	LED3 (red)	ERR Signal (CN2-5)	Error Condition	Result	Solution*
Normal	● (ON) Blinks (1Hz) ● ○ while running		○ (OFF)	● (ON)	n/a	n/a	n/a
Thermal overload	● (ON)	● (ON) When sensor signal is ON	● (ON)	○ (OFF)	Motor or PCB above operating temperature	No operation	1
Motor lock			Blinks (1Hz) ● ○	● (ON)	Motor locked (>4s)		2
Motor unplugged			● (ON)	○ (OFF)	Motor not connected to card		3
JAM error		Blinks (1Hz) ● ○	○ (OFF)		Jam Timer activated		4
Open fuse Low voltage	○ (OFF)	● (ON) When sensor signal is ON	Blinks (1Hz) ● ○		Low voltage or current exceeded 5A		5
Current limit	Blinks (1Hz) ● ○ while running		Blinks (6Hz) ●○●○●○ ●○●○●○	● (ON)	High current draw	n/a	6

Solution

1. See more information under Input / Output Settings, DIP switch 1-8
   - A signal applied to CN2-1 (INPUT) will reset this error status
   - Thermal overload can only be reset if the temperature has fallen back into the operating range
2. Remove the cause of the motor lock and clear the zone
   - A signal applied to CN2-1 (INPUT) AND DIP switch 2-8 set to ON (RUN) will reset this error status
3. Remove power from the card, plug in the motor connector, and then reapply power
4. Remove the cause of the jam and clear the zone
   - A signal applied to CN2-1 (INPUT) will reset this error status
   - As long as a signal is applied to CN2-1, jam error status will not turn ON
5. Replace the card
6. Not usually a cause for concern, unless it is occurring frequently over the entire running cycle

MHS Conveyor Nominal Speed Chart:

HB-510 DRIVERCARD / FP- _ _ _ ROLLER

ROLLER: FE-17			ROLLER: FE-60			ROLLER: FE-100			ROLLER: FE-140		
TGW NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)
13	0	13.8	**45**	0	49.2	**170**	0	174.8	**170**	0	174.9
18	1	18.4	**65**	1	65.6	**230**	1	232.9	**230**	1	233.2
20	2	23	**80**	2	82		2	290.3/(239.4)	**290**	2	291.4
25	3	27.6	**95**	3	98.4		3	349.3/(239.4)	**345**	3	349.7
30	4	32.5	**110**	4	114.8		4		**405**	4	408.2
35	5	37.1	**130**	5	131.2		5			5	466.3/(419.8)
40	6	41.7	**145**	6	147.6	**235**	6	407.4/(239.4)		6	524.7(419.8)
45	7	46.3	**160**	7	164		7		**415**	7	
50	8	50.9/(49.9)	**180**	8	180.4/(176.8)		8			8	566.2/(419.8)
	9	55.3/(49.9)		9	196.8/(176.8)		9			9	

Note: Speed with two numbers are " NO-LOAD / RATED". Rated numbers are what the roller is capable of doing under a continuous duty full load condition.

HB-510 DRIVERCARD / FP- _ _ _ ROLLER

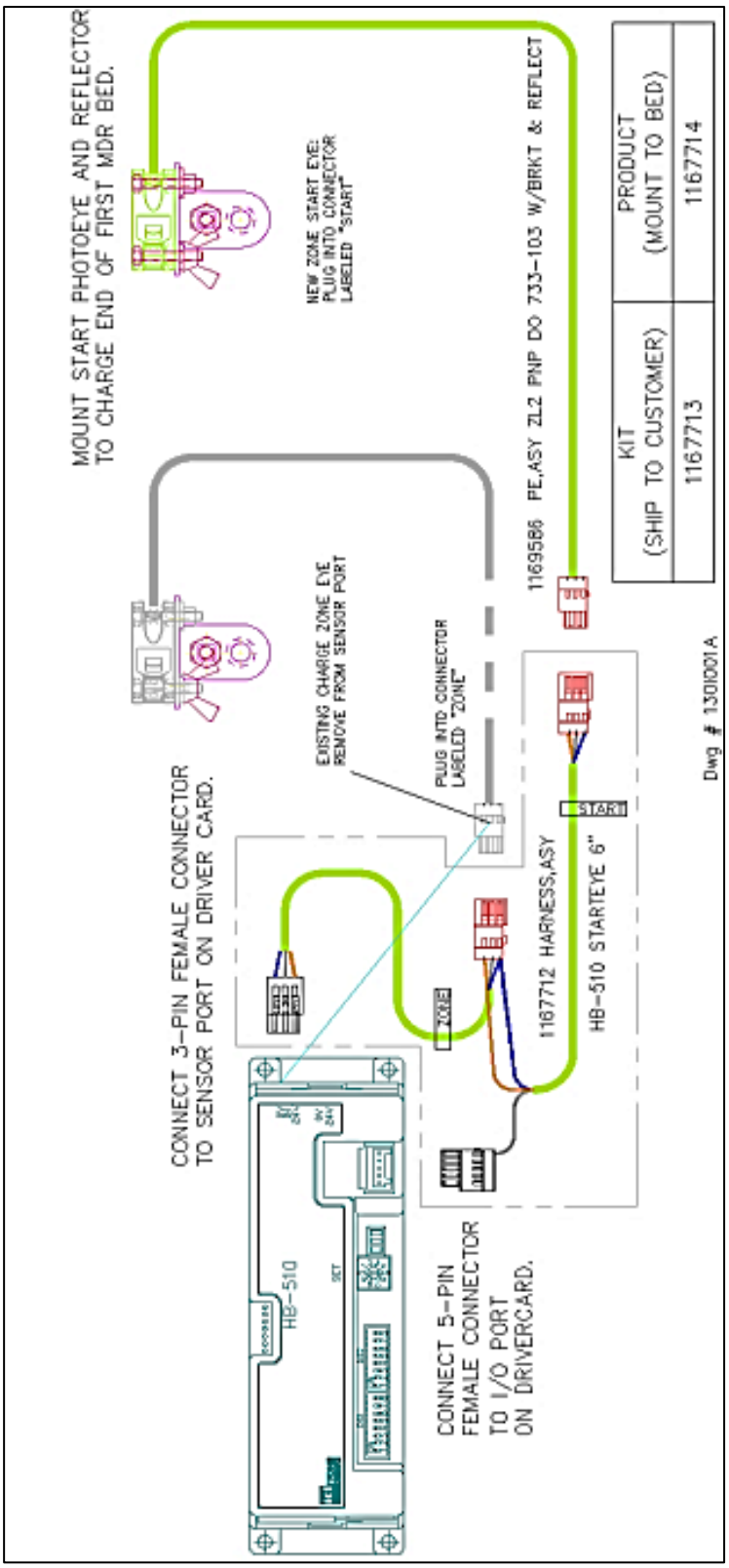
ROLLER: FP-55			ROLLER: FP-100			ROLLER: FP-140		
TGW NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)	MHS Conveyor NOMINAL SPEED	ROTARY SWITCH	ACTUAL SPEED ± 5% (fpm)
50	0	53.5	**240**	0	243	**240**	0	243.4
70	1	71.2		1	324.1/(259.1)	**320**	1	324.5
85	2	88.9		2		**405**	2	405.4
105	3	106.9		3			3	486.6/(478.2)
120	4	124.6		4			4	567.7/(478.2)
140	5	142.4	**255**	5	404.8/(259.1)		5	
160	6	160.4		6		**475**	6	
175	7	178.1		7			7	627.1/(478.2)
180	8	195.8/(181.1)		8			8	
	9	204.3/(181.4)		9			9	

Note: Speed with two numbers are " NO-LOAD / RATED". Rated numbers are what the roller is capable of doing under a continuous duty full load condition.

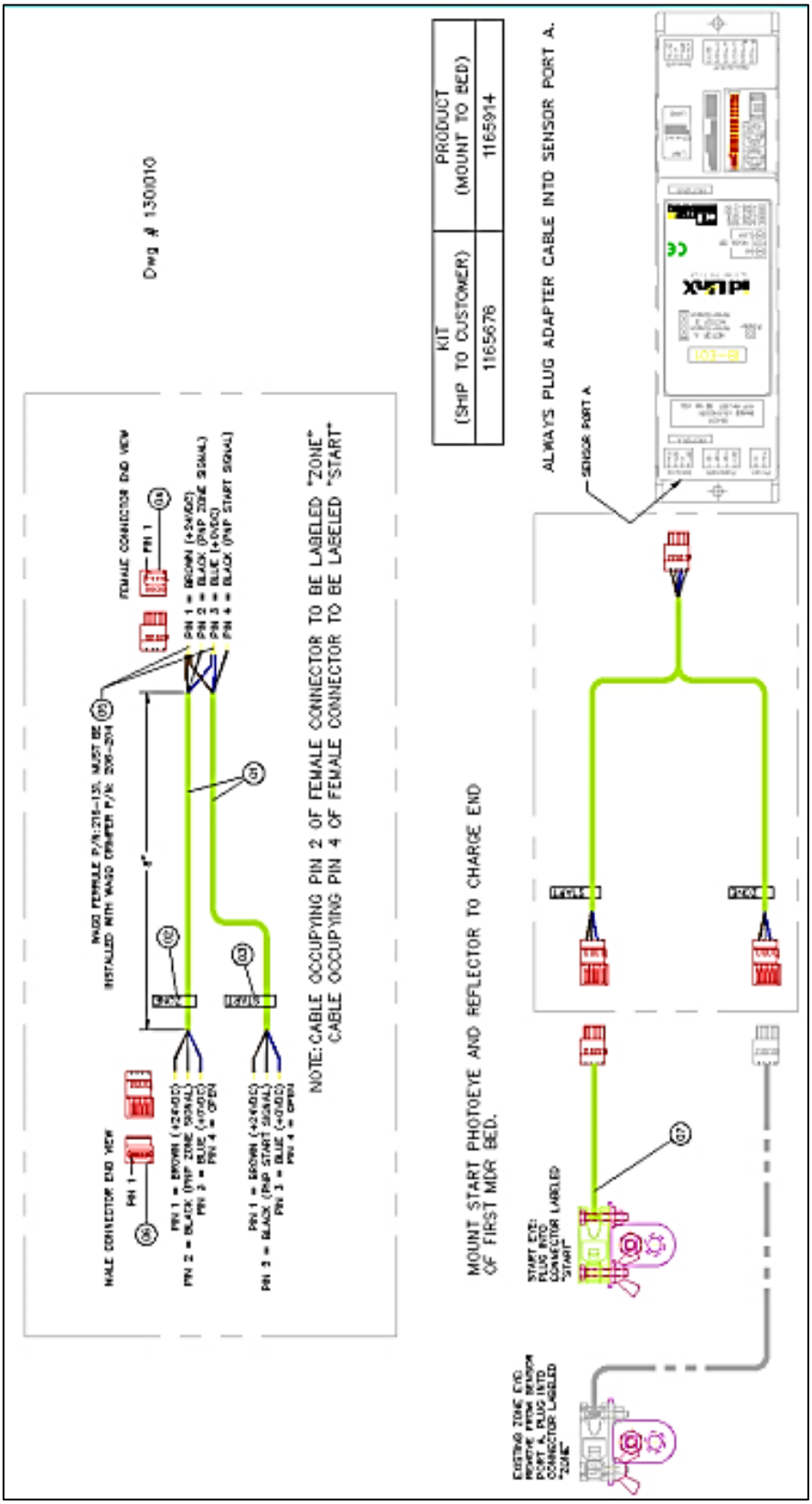
ITR^{HB} General Information

See Itoh-Denki technical document for additional information: http://itohdenki.com/

HB-510 Start Kit



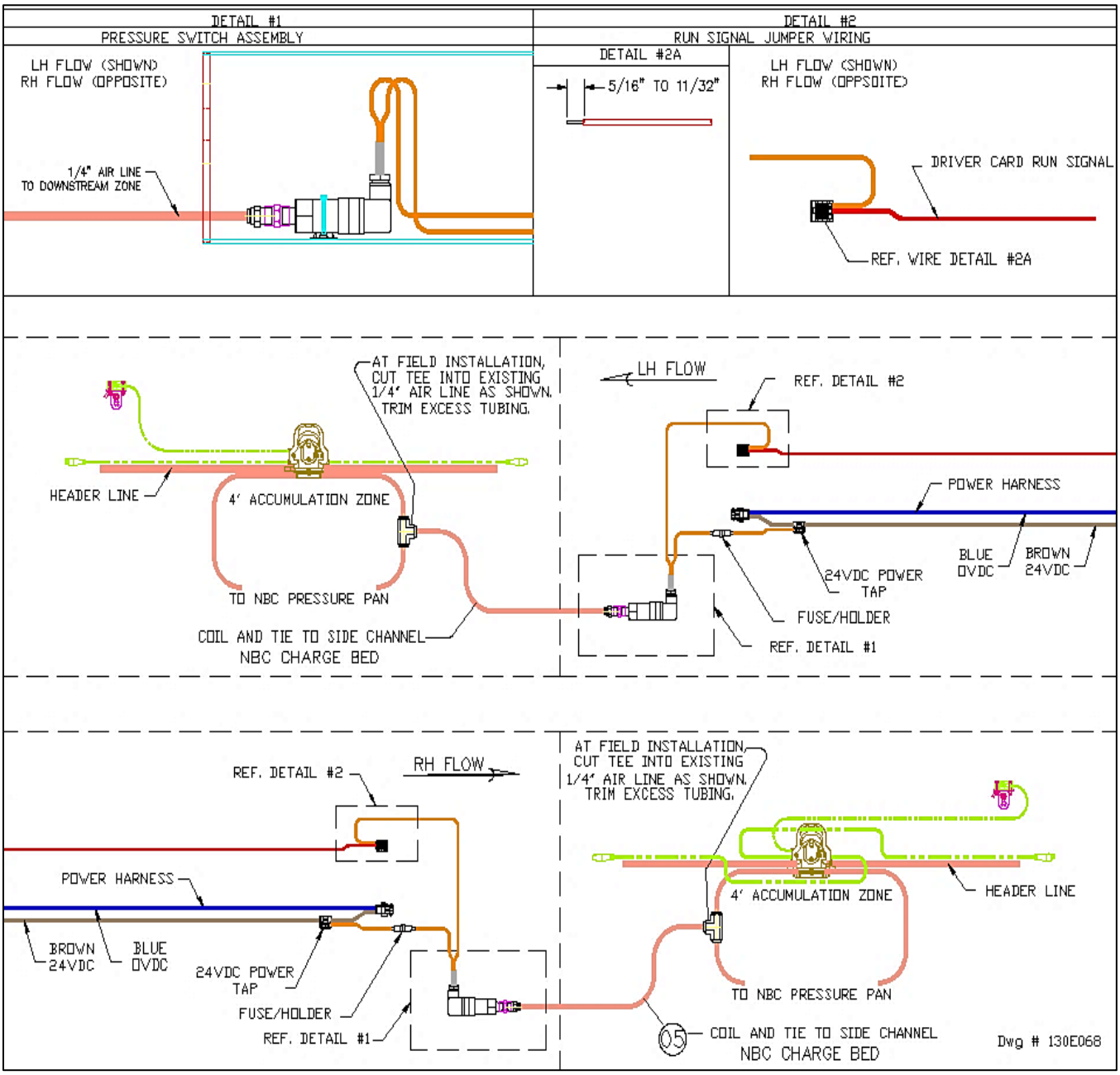
Photoeye Cable Kit



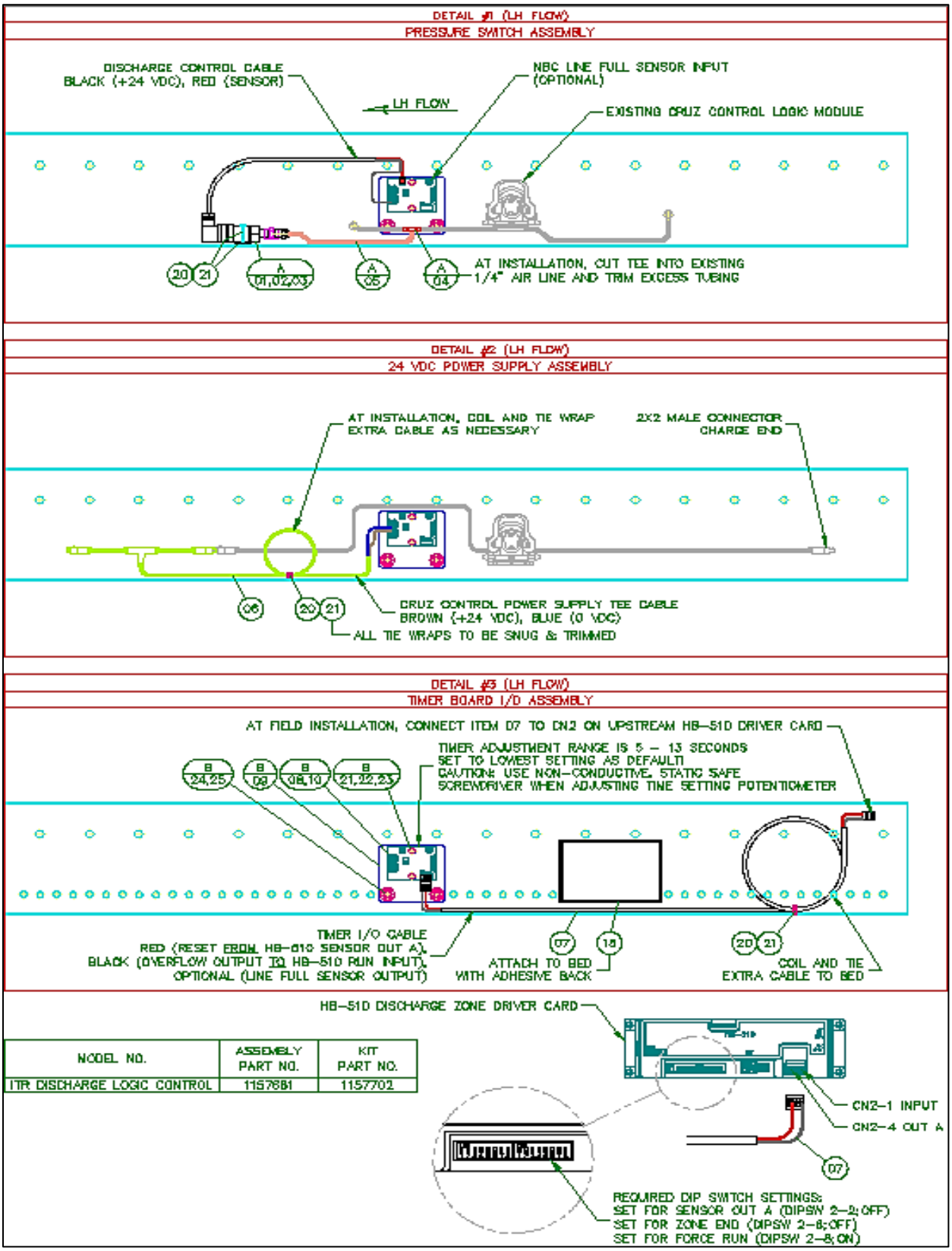
Cables & Kits

General Cables & Kits			
Item #	**Description**		**DWG #**
1167713	KIT, P/E ZONE START HB-510	FIELD MOUNTED	1301011
1165676	KIT, P/E ZONE START IB-E03	FIELD MOUNTED	1301010
1152711	KIT, PRESSURE SWITCH ITR ACCUMULATION	FIELD MOUNTED	13E068
1157702	KIT, ELEC, ITR ACCUMULATION DISCHARGE LOGIC CONTROL	FIELD MOUNTED	130E099

Accumulation Charge Zone Pressure Switch Assembly

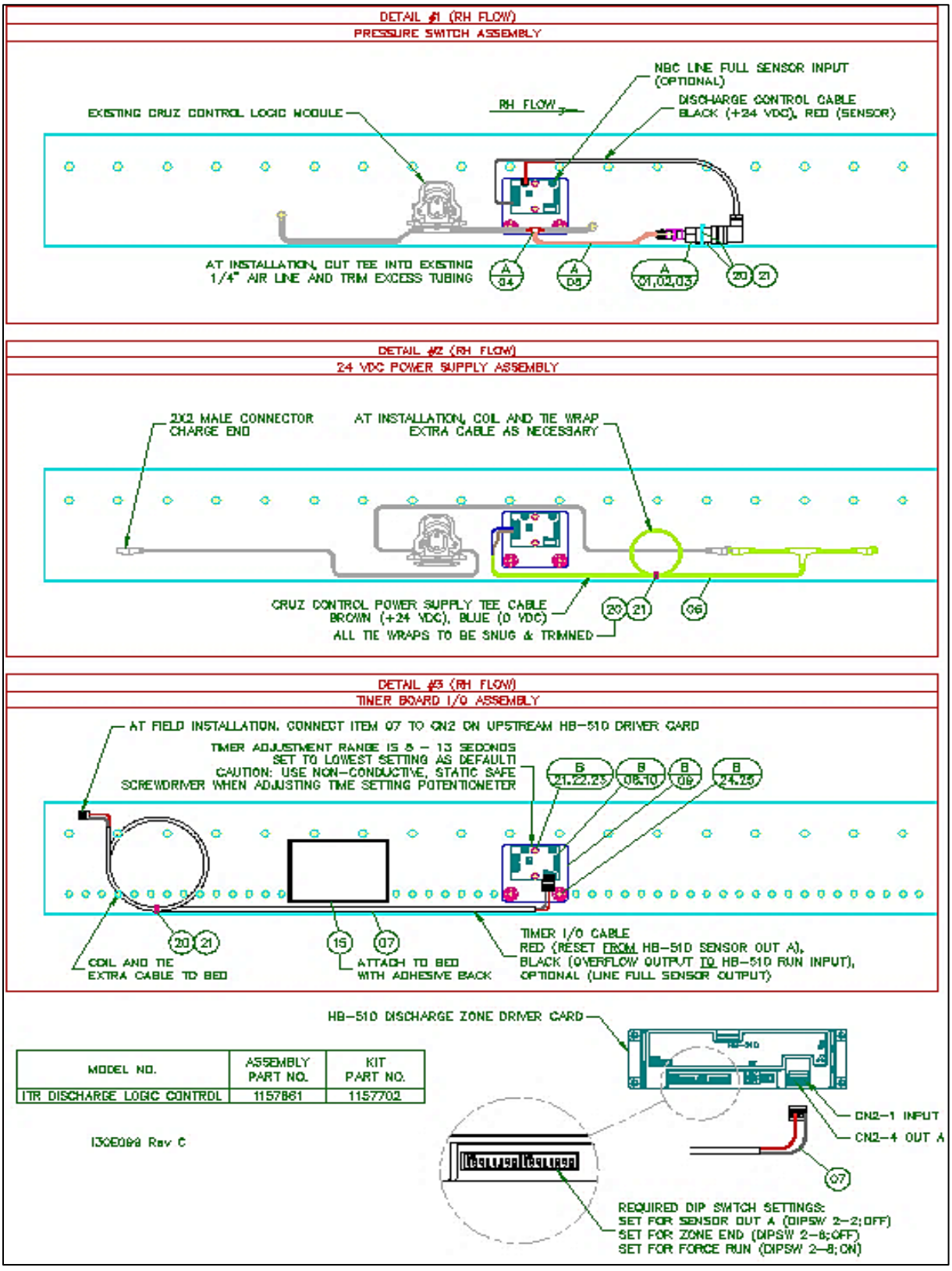


Discharge Logic Control Left Hand



MODEL NO.	ASSEMBLY PART NO.	KIT PART NO.
ITR DISCHARGE LOGIC CONTROL	1157681	1157702

Discharge Logic Control Right Hand



MODEL NO.	ASSEMBLY PART NO.	KIT PART NO.
ITR DISCHARGE LOGIC CONTROL	1157861	1157702

Electrical Safety Requirements

General Electrical Requirements

WARNING

- All electrical controls must be installed, wired, and connected by a licensed electrician only.
- All motor controls and wiring must conform to the National Electrical Code as published by the National Fire Protection Association and approved by the American National Standards Institute, Inc. Since specific electrical codes vary from one area to another, be sure to check with proper authorities before starting.

The electrical voltage of motorized rollers will be stamped on a metal name plate affixed to one end of the roller. This voltage should be checked to see that it matches the output voltage of your power supply. Consult the appropriate MHS Conveyor wiring diagram for the proper connections. If a single speed three phase motorized roller runs the wrong direction, two leads must be switched to reverse rotation.

WARNING

- Do not connect the driver card to any other voltage than the one listed on its name plate.

NOTE

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

WARNING

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

Conveyor Controls - Safety Guidelines

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

START-UP WARNING HORN - If all conveyors being started cannot be seen from the start pushbutton location, then an audible warning device is required. It could be a horn, buzzer, or bell. 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 pushbutton is pushed, prior to the conveyor starting. Any auxiliary equipment such as vertical lifts, turntables, etc. must be included in the warning circuitry.

START PUSHBUTTON - Start pushbutton should 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 PUSHBUTTON - Stop pushbutton 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.

EMERGENCY STOPS - All locations where high voltage motors are used and an operator is working must be protected by an emergency stop.

Emergency stop devices should also protect high pedestrian areas where high voltage motors are used. Actuating an emergency stop must dropout the start circuit and all electrical power, requiring restarting the system using the start pushbutton provided.

All locations where low voltage motors are used (under 50 volts) and an operator is working all require an emergency stop circuit. This requirement also applies to high pedestrian areas.

Preventive Maintenance

General

Preventive maintenance will save expensive downtime, wasted energy costs, and increase life of components. An accurate record keeping system will track component servicing history.

Periodic maintenance intervals may vary with load, speed, hours of operation, ambient temperature, humidity, etc. Intervals can be established by fairly frequent maintenance at first, and then lengthens the intervals as justified by observation of need based on history. The following schedule is based on 5 days per week, 8 hours per day operation 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 loose bolts or parts.
- Listen for air leaks.

Weekly

- Check for proper PSI on air regulators.
- Check air filter bowls for accumulated water.

⚠ WARNING

- Prohibit walking or riding on conveyor by anyone.
- Care should be taken when servicing any conveyor to prevent accidental injury.
- All moving parts are potentially dangerous.

Air Systems

The best preventive maintenance for any air operated device is clean air. Dirty air will make pneumatic devices sticky, and they will not operate properly. To ensure the continued performance of filters, monitor filter / regulator bowl drain every week. To manually drain the bowl, push the push button at the bottom of the bowl. Let all accumulated liquid drain until you hear air escaping.

WARNING	
	• Do not perform maintenance on the conveyor until the start-up controls, including motor safety switches, are locked out and cannot be turned by any person other than the one performing the maintenance. • If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device. • Check the loosened parts have been retightened and all guards reinstalled. • Make sure personnel are clear of all conveyor equipment before restarting the system.

IntelliROL Troubleshooting Guide

IntelliROL Troubleshooting Guide			
#	Problem	Possible Cause	Remedy
1	Power Roller does not turn	ITR roller not properly installed	Check that the Power Moller is properly inserted into the frame. Adjust as necessary
			Check the tube and end caps are not contacting the frame, side rails or other parts. Power Moller should be allowed to move freely
		Too many slave rollers connected to drive roller	Inspect MDR zone to ensure proper number of idlers is adequate related to the Powered Roller. Refer to IOM Manual for additional information
		Power Cable extensively twisted	Inspect cable for kinks or cracks in wiring.
		Check that the Power Moller's shafts are properly mounted with the applicable bracket(s). Proper mounting is required for tube rotation.	For FE series motors one bracket securing the cable side shaft.
			For FS / FP / FH series motors two brackets securing both cable side and spring loaded shafts
		When slave driving idler rollers check that the number of idlers driven is adequate for the particular model of Power Moller being used.	Check air pressure on take up assembly. Make sure belt tension is proper.
		Check that the power cable is in good condition, with no twisting or severe kinks in the cable that would indicate broken wires. Also check for any cuts in the power cable or wires near the connector end.	Locate and correct interference
			Install belt properly
2	LED status	Red LED OFF,	Check that the power supply is on.
		Green LED OFF,	Check that the card is correctly wired. Reference IOM manual.
		Orange LED OFF	Measure the voltage, stable 24V DC is required.
		Red LED ON,	Check that the motor connector is properly plugged into the card then cycle the run / sensor signal.
		Green LED ON,	
		Orange LED ON	
		If sensor is blocked	Thermal protection active – motor or card reached thermal limit, motor will not operate until one minute after the card or motor has cooled down below thermal limit. Consider possible causes of why the Power Moller is reaching thermal limit; cycle times, ambient temperature, load changes, roller not turning freely, etc. Do not remove power to the card to reset the error, damage may occur
		Red LED OFF,	Check that the sensor is properly wired in the correct position and is the proper voltage. Reference IOM manual.
		Green LED ON,	If the run signal is coming from a device on a separate power supply check that the 0V lines are connected between the device's power supply and the driver cards power supply.
		Orange LED ON	If using a run signal check the wiring to CN2 is in the correct position and wired correctly, see page 4 of the manual. Also check that dip switch 2-8 is ON for run.
		If sensor is blocked	If card is set to zone begin, dip switch 2-6 ON and the downstream zone is stopped and occupied then the roller will not run. If card is set to zone end, dip switch 2-6 OFF, zone will accumulate product at the sensor. Reference IOM manual.
			Replace roller

IntelliROL Troubleshooting Guide Continued

IntelliROL Troubleshooting Guide			
#	Problem	Possible Cause	Remedy
3	Flashing LED	Many options	Refer to IOM Manual for detailed information OR refer to appropriate ITOH Denki driver card manuals for additional options.
4	Rollers "dancing" or spinning uncontrollably	Too many zones on one ITR control circuit	Set direction blocking dip switch setting. Refer to IOM Manual for additional information.
		Power Supply not centered within the string of zones	Locate and Adjust Power Supply to correct current supply issue
		Supply of power not equally distributed	Set card to Basic Accumulation. Refer to IOM Manual for additional information.
		Mixture of driver cards	Within the ITR transportation product line you can only use FP or FN cards within a string. Reference IOM Manual for additional information
		Power Supply Issue	If power supply is not purchased from TGW, please consult manufactures operation directions.
		Multiple connected Power Supply units	0V line of all power supplies connected within a conveyor "unit" need to be connected. Reference IOM for additional detailed information
5	Infeed zone not activating or running	Need input signal	Install TGW start eye kit, or provide 24V run signal
		Loose connection between driver cards	Inspect, and adjust, connection cables as necessary
6	Discharge zone not releasing	Down flow sending not providing "release" signal	Make sure photo eye and reflector are in alignment
		No "release" signal being provided	Use PLC connection, or Photo Eye & Reflector to provide zone with discharge open signal.
7	One Zone not turning	Loose wire connection	Check all stranded wires to ensure they are inserted properly
		Loose connector cable	Check all quick connection within power harness to ensure they are properly connected.
8	Driver Card continuously faulting	Poor supply of power	Inspect to see if power supply is transmitting correct voltage
		Power Supply unit not wired correctly to the 24V supply line	Inspect termination points to ensure proper wiring. Adjust accordingly. Reference IOM Manual for additional information.
		Bad bearing in wheel bracket or slave roller	Replace worn out component to relieve the extra stress on ITR roller.
9	Rollers are turning slowly	Too many zones are connected to the Power Supply unit	Consult IOM Manual to ensure the proper configuration between Driver Cards and Power Supply unit.
		Wrong dip switch setting on driver card	Check dip switch setting of 1-6 is properly set to OFF for internal speed (rotary switch control) Refer to IOM Manual for additional settings.
10	Driver cards faulting regularly in UBT	Programming issue. Transfer belt rollers running 24/7	ITR rollers driving the transfer bands only need to run when signal is provided to UBT to divert product.
11	Thermal Limit reached	Driver Card or Roller are over heating	Check the ambient temperature. Consult IOM Manual for acceptable temperature ranges
		Back plate of driver card not touching conveyor frame	Inspect mounting plate/conveyor surface to ensure complete surface connection for maximum heat dissipation.
		Excess friction or drag on motorized roller	Inspect area around roller to ensure nothing is rubber or lodged by the roller causing extra friction.

Replacement Parts Identification

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

Parts which specifically pertain to IntelliROL are included with illustrations.

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

If you are unable to locate this document another may be obtained by contacting the MHS Conveyor Lifetime Services at 231-798-4547 or Fax 231-798-4549.

ITOH FE60 Motorized Roller Standard Assemblies

REPLACEMENT PARTS for ITOH FE-60 MOTORIZED ROLLER STANDARD ASSEMBLIES				
Item #	**Description**	**1) FIXING BRKT HEX AXLE-UP**	**Replacement Rollers**	**Description**
1126586	ROLLER, ITR SPUR 2G ITOH	FLAT	-----	------
1139544	ROLLER, ASY ITR 13.25BF 2G	FLAT	1139545	ROLLER, ITR 13.25BF 2G
1138727	ROLLER, ASY ITR 16BF 2G	FLAT	1138722	ROLLER, ITR 16BF 2G
1143630	ROLLER, ASY ITR 16BF 2G	POINT	1138722	ROLLER, ITR 16BF 2G
1140370	ROLLER, ASY ITR 16BF 2G CTD	FLAT	1140375	ROLLER, ITR 16BF 2G CTD
1140600	ROLLER, ASY ITR 16BF 2G CTD	FLAT	1140375	ROLLER, ITR 16BF 2G CTD
1138728	ROLLER, ASY ITR 22BF 2G	FLAT	1138723	ROLLER, ITR 22BF 2G
1142531	ROLLER, ASY ITR 22BF 2G	POINT	1138723	ROLLER, ITR 22BF 2G
1140371	ROLLER, ASY ITR 22BF 2G CTD	FLAT	1140376	ROLLER, ITR 22BF 2G CTD
1138729	ROLLER, ASY ITR 28BF 2G	FLAT	1138724	ROLLER, ITR 28BF 2G
1140372	ROLLER, ASY ITR 28BF 2G CTD	FLAT	1140377	ROLLER, ITR 28BF 2G CTD
1138730	ROLLER, ASY ITR 34BF 2G	FLAT	1138725	ROLLER, ITR 34BF 2G
1144662	ROLLER, ASY ITR 34BF 2G	POINT	1138725	ROLLER, ITR 34BF 2G
1140373	ROLLER, ASY ITR 34BF 2G CTD	FLAT	1140378	ROLLER, ITR 34BF 2G CTD

Reference DWG. 130S001a

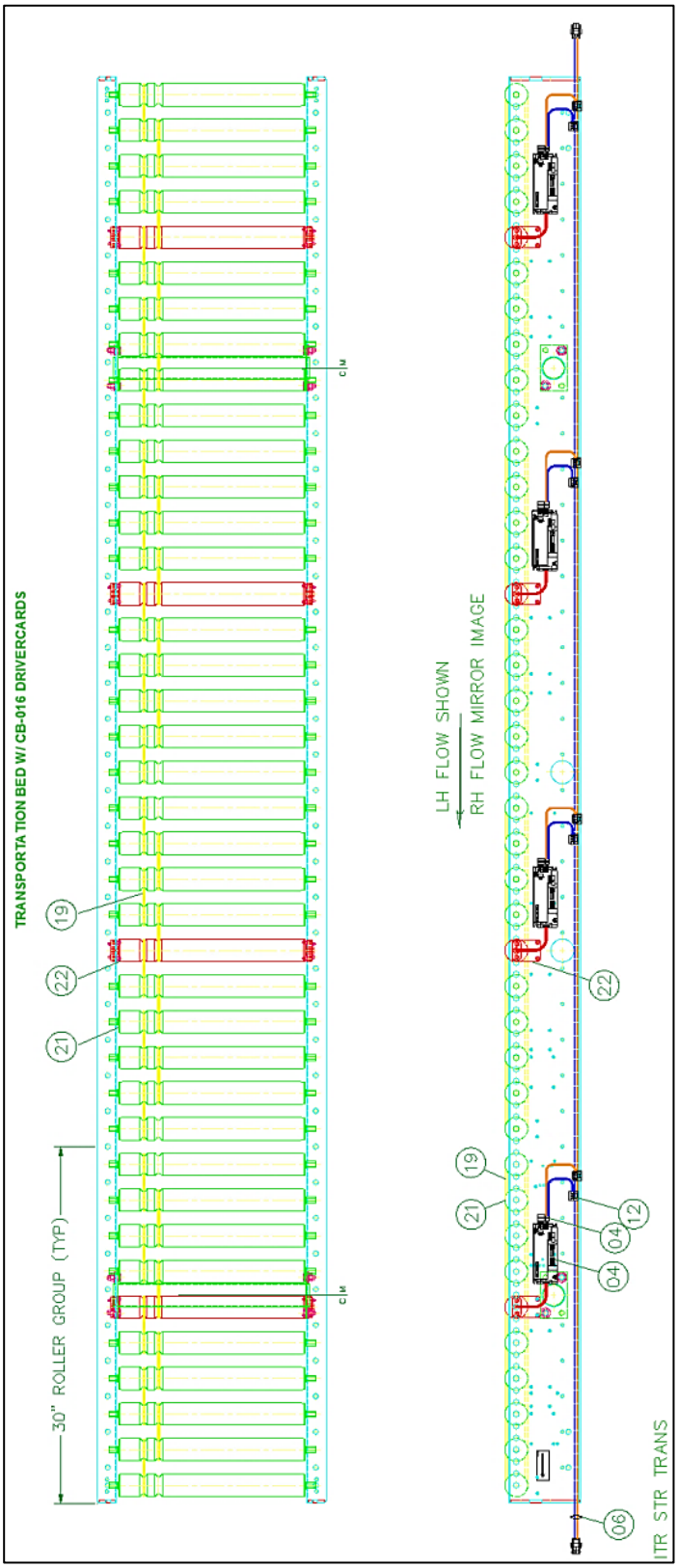
ITHO Drivercard Standard Assemblies

REPLACEMENT PARTS for ITOH DRIVERCARD STANDARD ASSEMBLIES	
Replacement Drivercard	**Description**
CB-02	DRIVERCARD, ITOH PM486 SERIES
1116036	DRIVERCARD, ITOH CB-016P7
1143591	DRIVERCARD, ITOH CB-016BP7
1153054	DRIVERCARD, ITOH CB-016N7
1153930	DRIVERCARD, ITOH CBM-105FP
1157157	DRIVERCARD, ITOH CBM-105FN
1101261	DRIVERCARD, ITOH HB-510P
1108863	DRIVERCARD, ITOH HB-510BP
1101261	DRIVERCARD, ITOH HB-510P
1131443	DCM, 4-ZONE CONTROLLER
1131443	DCM, 4-ZONE CONTROLLER
1131443	DCM, 4-ZONE CONTROLLER

Drive and Slave O-rings

Replacement parts for Drive and Slave O-rings			
Item #	**Description**	**Roller Centers**	**Application**
E0005536	ORING, 3/16" DIA X 9.5” HT BLUE	3	Straight Slave
D0601626	ORINGS, 3/16" DIA X 7-3/4” HT BLUE	2	Straight Slave
1127703	ORING, 3/16" DIA X 11” HT BLUE	4	Straight Slave
1103665	ORING, 3/16" DIA X 13” HT BLUE	N/A	Spur (Clockwise Twist)
1102845	ORING, .210" DIA. X 11.5" HT RED MARKED WITH BLACK STRIP	N/A	Curve Drive
1102748	ORING, .210" DIA X 9.4" HT RED	3	Curve Slave
1133173	ORING, 88A .218" DIA X 20-1/2" BLACK	N/A	UBT (Clockwise Twist)

Transportation Straight Bed

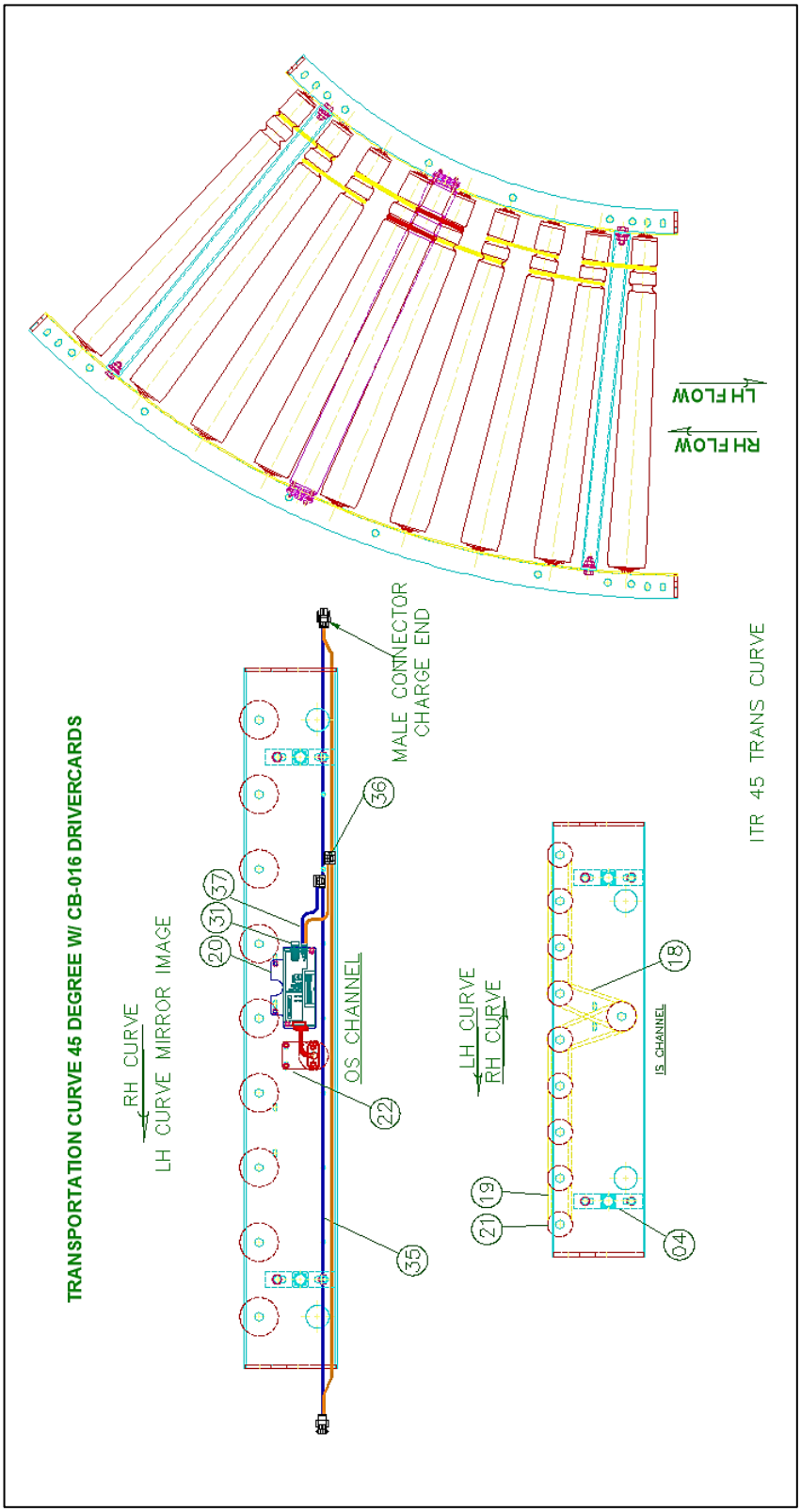


Replacement Parts for Transportation Straight Bed

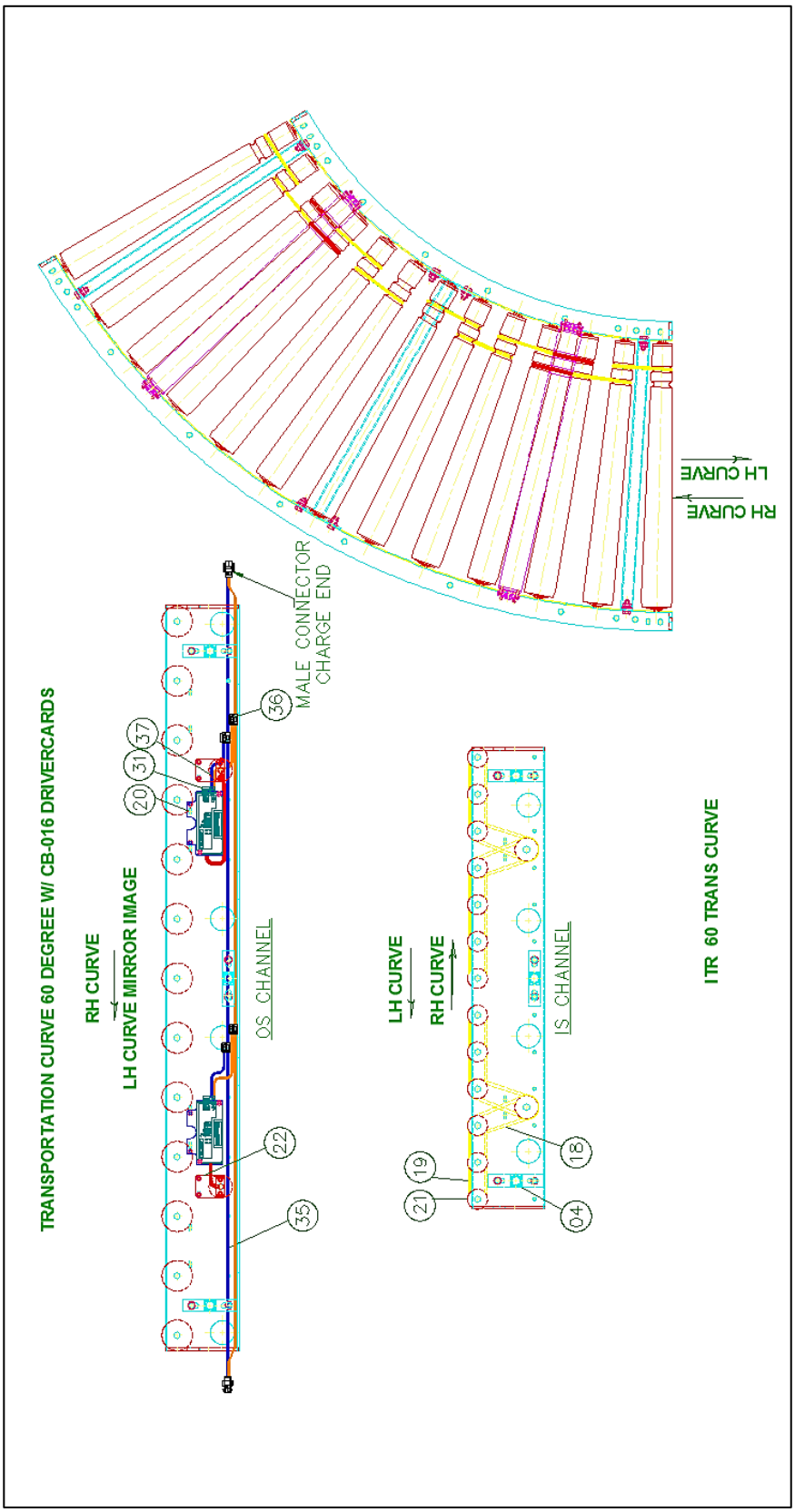
REPLACEMENT PARTS for TRANSPORTATION STRAIGHT BEDS (2" & 3" Roller Centers)					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD, ITOH CBM-105FP	1153930			
06	HARNESS, POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L	5'-6" L	8'-0" L	10'-6" L
		1102289	1102288	1102287	1102286
---	CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG	REFERENCE MOTOR EXTENSION CABLE TABLE			
12	CONNECTOR, IDC SCOTCHLOK 567 (Brown) 10-12AWG RUN 14-18AWG TAP	3M567			
19	ORING, 3/16DIA X 9.5" HT BLUE **(3" CTRS)**	E0005536			
19	ORING, 3/16DIA X 7-3/4" HT BLUE **(2"CTRS)**	1142656			
21	ROLLER, ITR 1.9" DIA PLTD PRBG	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR BF 2G ITOH	1138722	1138723	1138724	1138725
					Reference Dwg. ITR STR Trans

Transportation Curves

45 Degree with CB-016 Drivercards



60 Degree with CB-016 Drivercards



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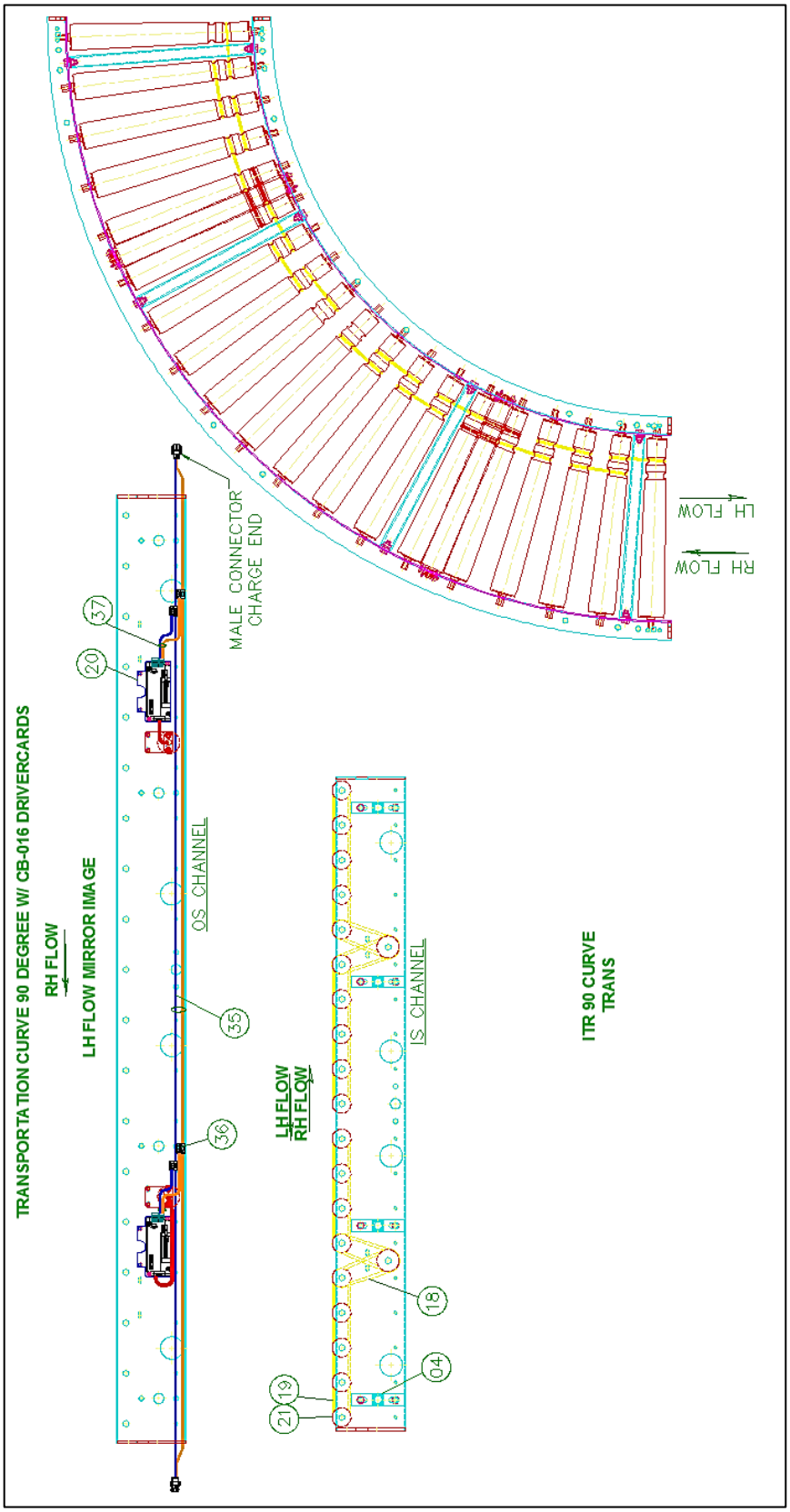
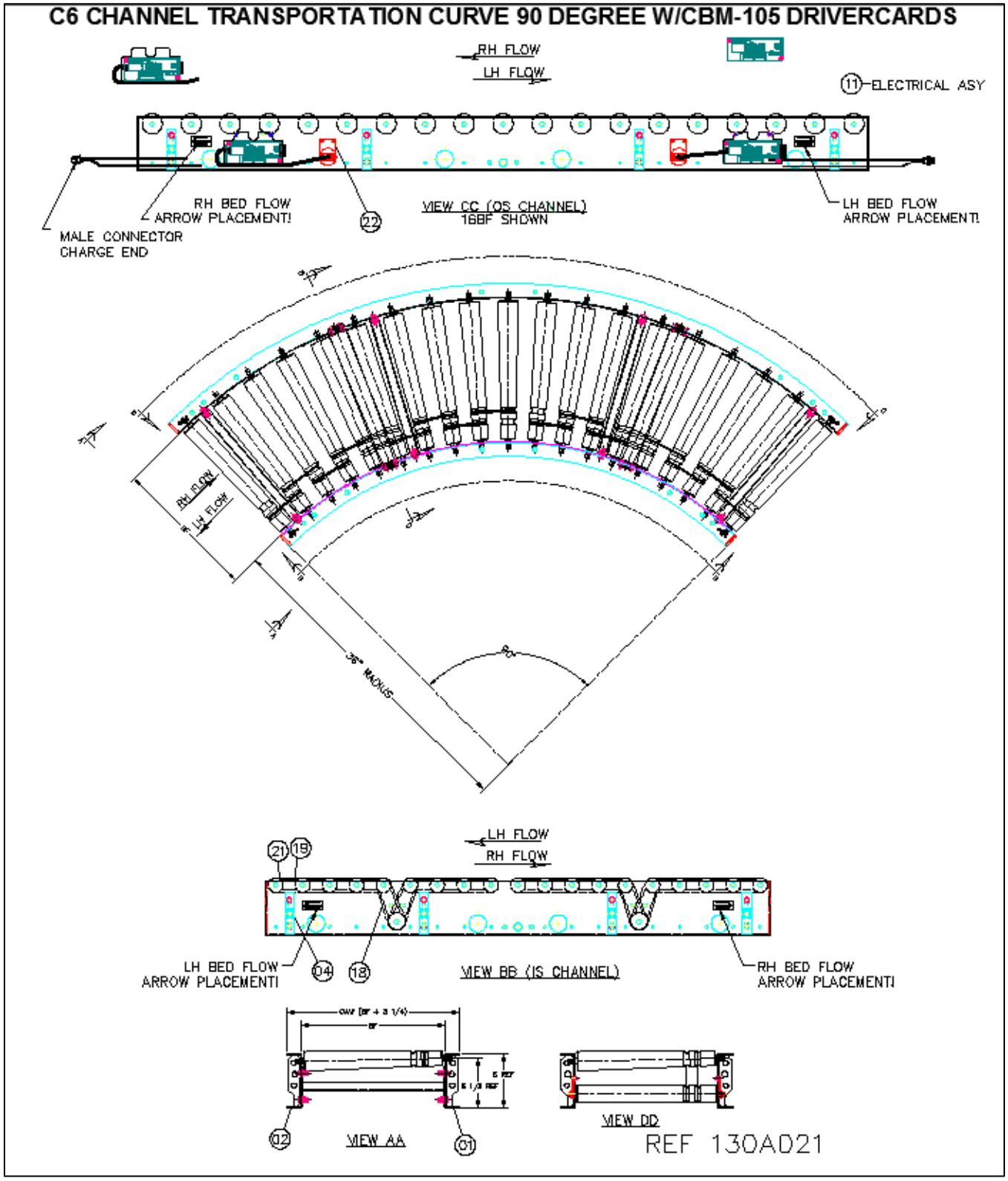
90 Degree with CB-016 Drivercards



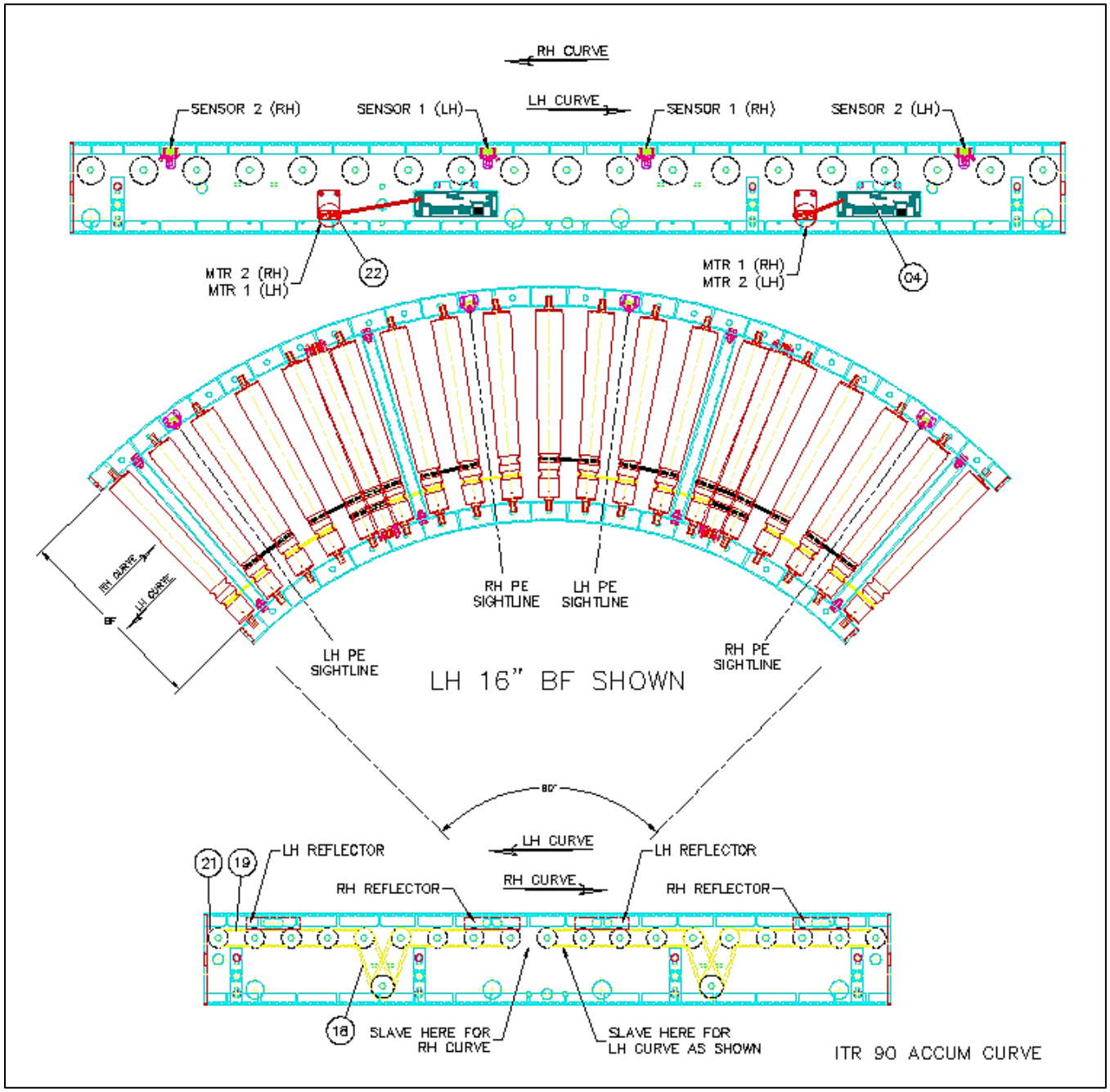
C6 Channel Transportation 90° Curves



Standard Transportation ITR Curves

REPLACEMENT PARTS for STANDARD TRANSPORTATION ITR CURVES					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
18	ORING, .210" DIA. X 11.5" HT RED MARKED WITH 1 BLACK STRIPE	1102845			
19	ORING, .210" DIA X 9.4" HT RED (DURA-BELT)	1102748			
20	DRIVERCARD, ITOH CB-016P7 **(Early)**	1116036			
20	DRIVERCARD, ITOH CBM-105FP **(Late)**	1153930			
21	ROLLER, _ _ W TT ITR 2GRV PRBG	E0009900	E0009901	E0009902	E0009903
22	ROLLER, ITR _ _ BF 2G ITOH	1138722	1138723	1138724	1138725
35	HARNESS, POWER BROWN & BLUE 14 AWG W/MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L 1102289	5'-6" L 1102288	8'-0" L 1102287	10'-6" L 1102286
36	CONNECTOR,IDC SCOTCHLOK 567 (BROWN) 10-12AWG RUN 14-18AWG TAP	3M567			
37	CABLE, POWER CB-016/HB-510 14GA ITR	1139543			
					Reference Dwg: Trans Curve

Cruz Channel Accumulating Curves



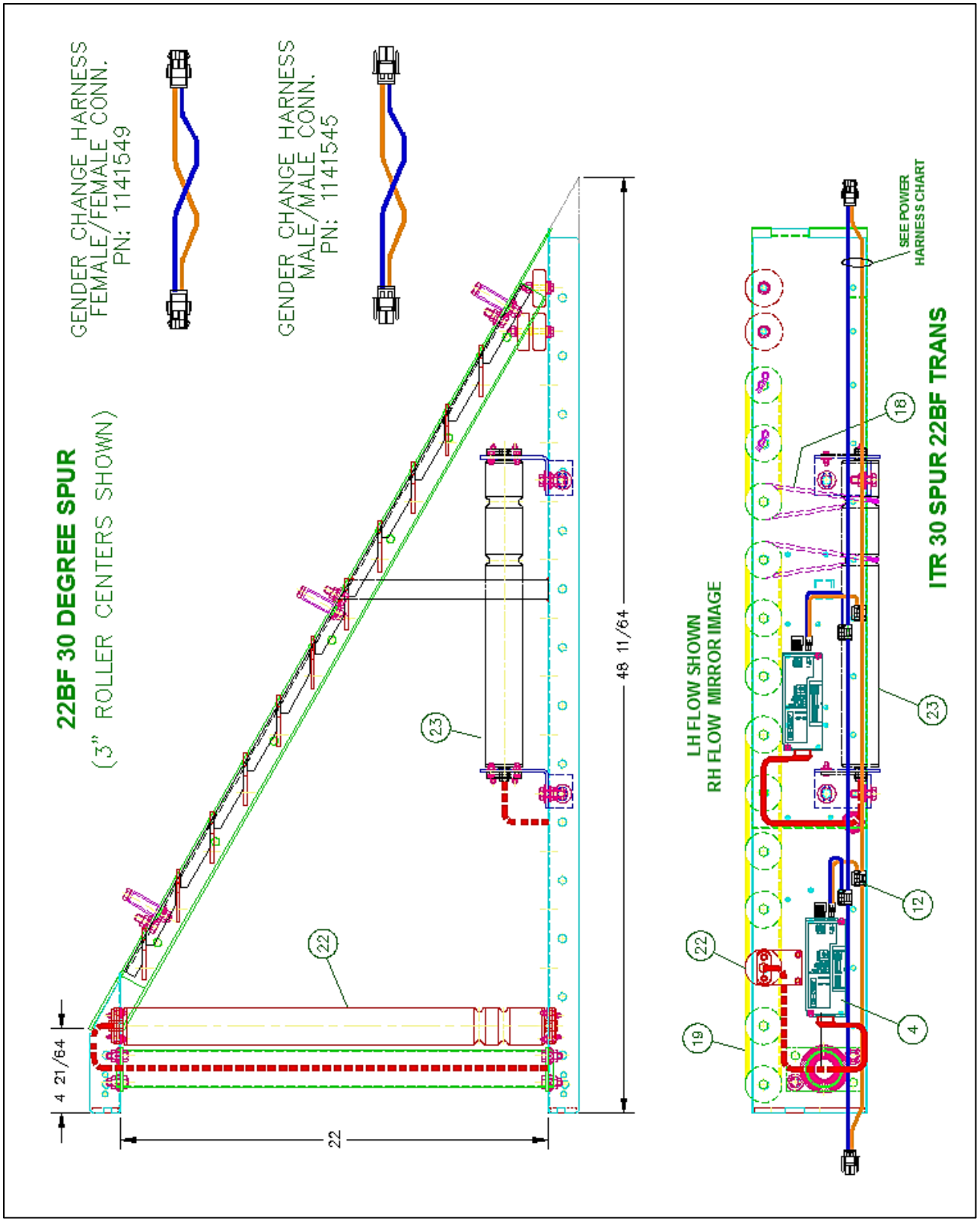
Replacement Parts Accumulation with HB-510 Driver Cards

REPLACEMENT PARTS for ACCUMULATION CURVES (HB-510 DRIVERCARD)					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD, ITOH HB-510	1116036			
---	HARNESS, POWER BROWN & BLUE 14 AWG W/MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L	5'-6" L	8'-0" L	10'-6" L
		1102289	1102288	1102287	1102286
---	CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG	REFERENCE MOTOR EXTENSION CABLE TABLE			
---	CABLE, CAT5E _ FT GRAY	REFERENCE COMMUNICATION CABLE TABLE			
12	CONNECTOR, IDC SCOTCHLOK 567 (BROWN) 10-12 AWG RUN 14-18 AWG TAP	3M567			
19	ORING, .210" DIA X 9.4" HT RED	1102748			
18	ORING, .210" DIA. X 11.5" HT RED MARKED W/BLACK STRIPE	1102845			
21	ROLLER, W TT ITR 2GRV PRBG	E0009900	E0009901	E0009902	E0009903
22	ROLLER, ITR BF 2G ITOH	1138722	1138723	1138724	1138725

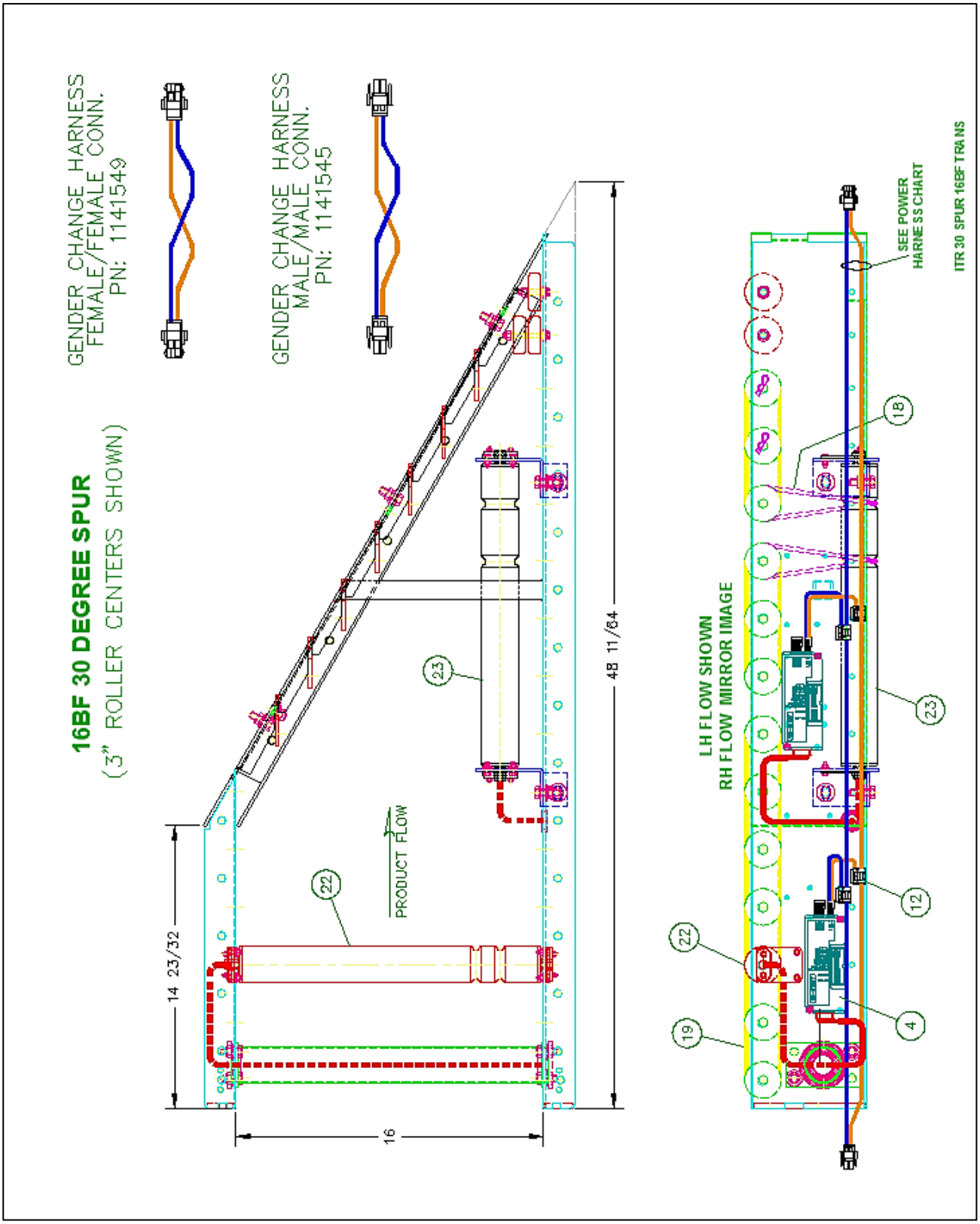
Reference Dwg: Trans Curve

Spur 30 Degree

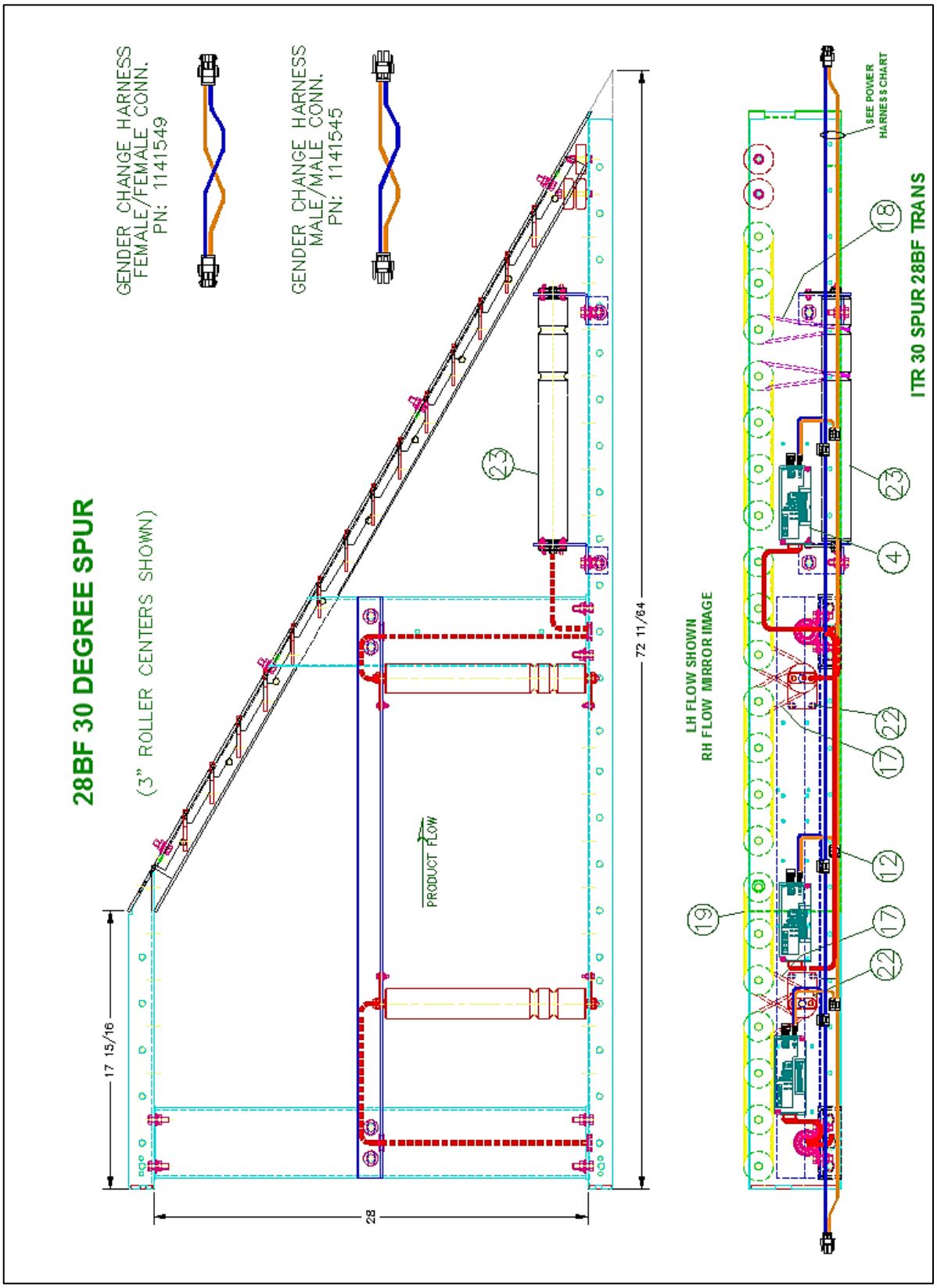
22BF 30°



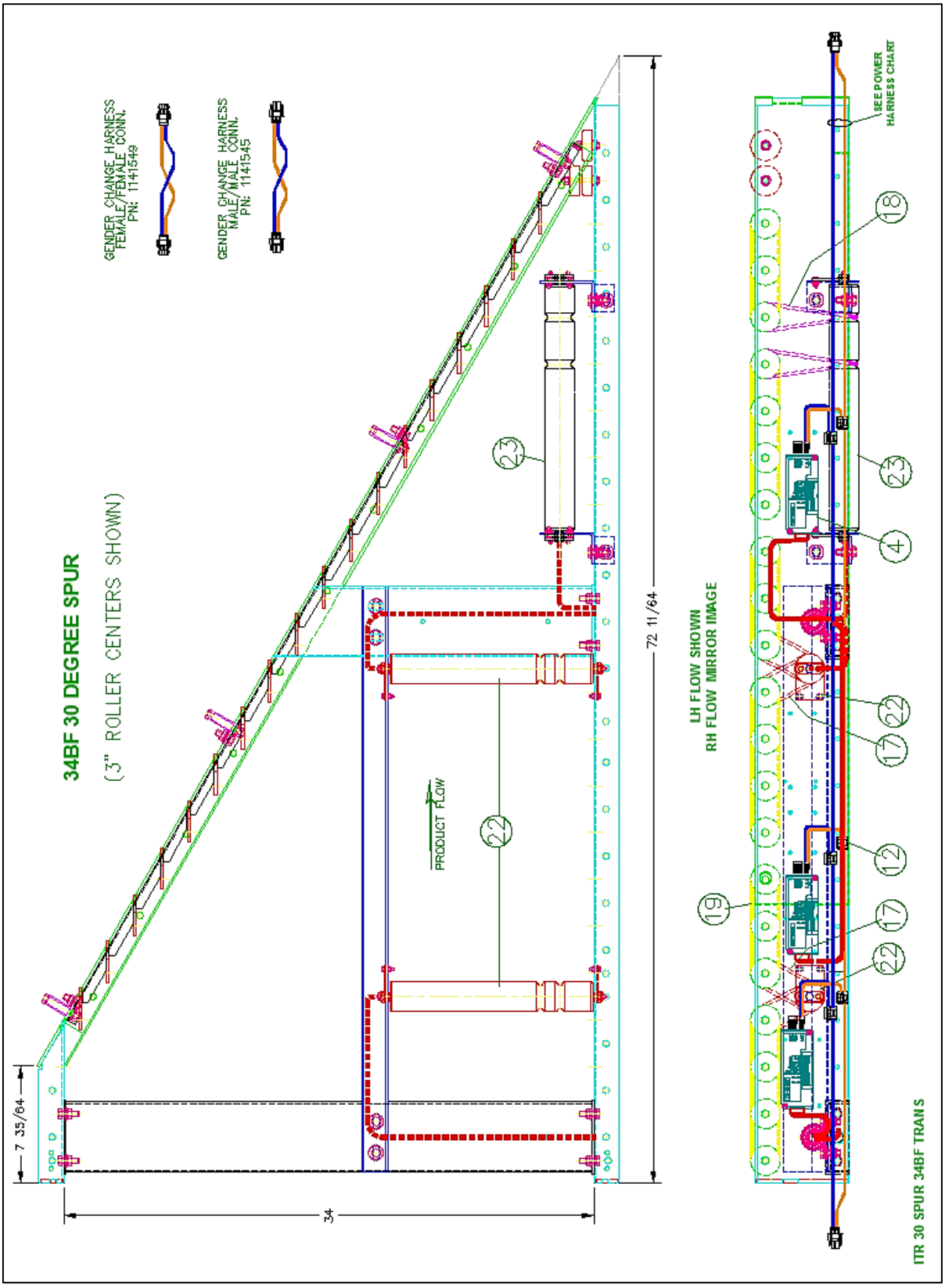
16BF 30°


16BF 30 DEGREE SPUR
(3" ROLLER CENTERS SHOWN)
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
PRODUCT FLOW
14 23/32
16
48 11/64
LH FLOW SHOWN
RH FLOW MIRROR IMAGE
SEE POWER
HARNESS CHART
ITR 30 SPUR 16BF TRANS

28BF 30°


28BF 30 DEGREE SPUR
(3" ROLLER CENTERS SHOWN)
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
PRODUCT FLOW
17 15/16
72 11/64
28
ITR 30 SPUR 28BF TRANS
SEE POWER
HARNESS CHART
LH FLOW SHOWN
RH FLOW MIRROR IMAGE
18
23
4
22
17
12
19

34BF 30°


34BF 30 DEGREE SPUR
(3" ROLLER CENTERS SHOWN)
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
PRODUCT FLOW
7 35/64
34
72 11/64
LH FLOW SHOWN
RH FLOW MIRROR IMAGE
SEE POWER HARNESS CHART
ITR 30 SPUR 34BF TRANS

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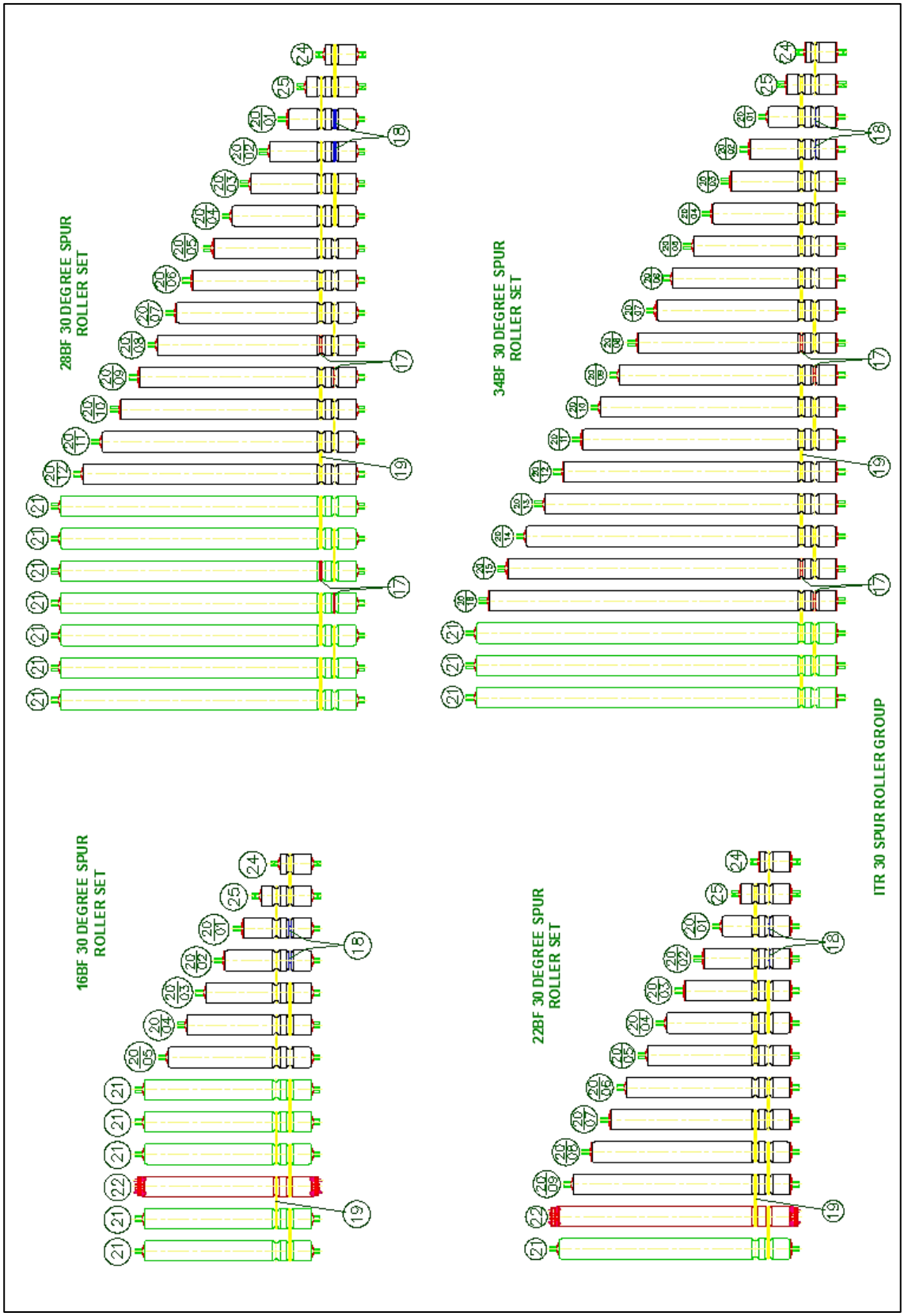
30° Spur Roller Set



30° 3” Spur Replacement Parts

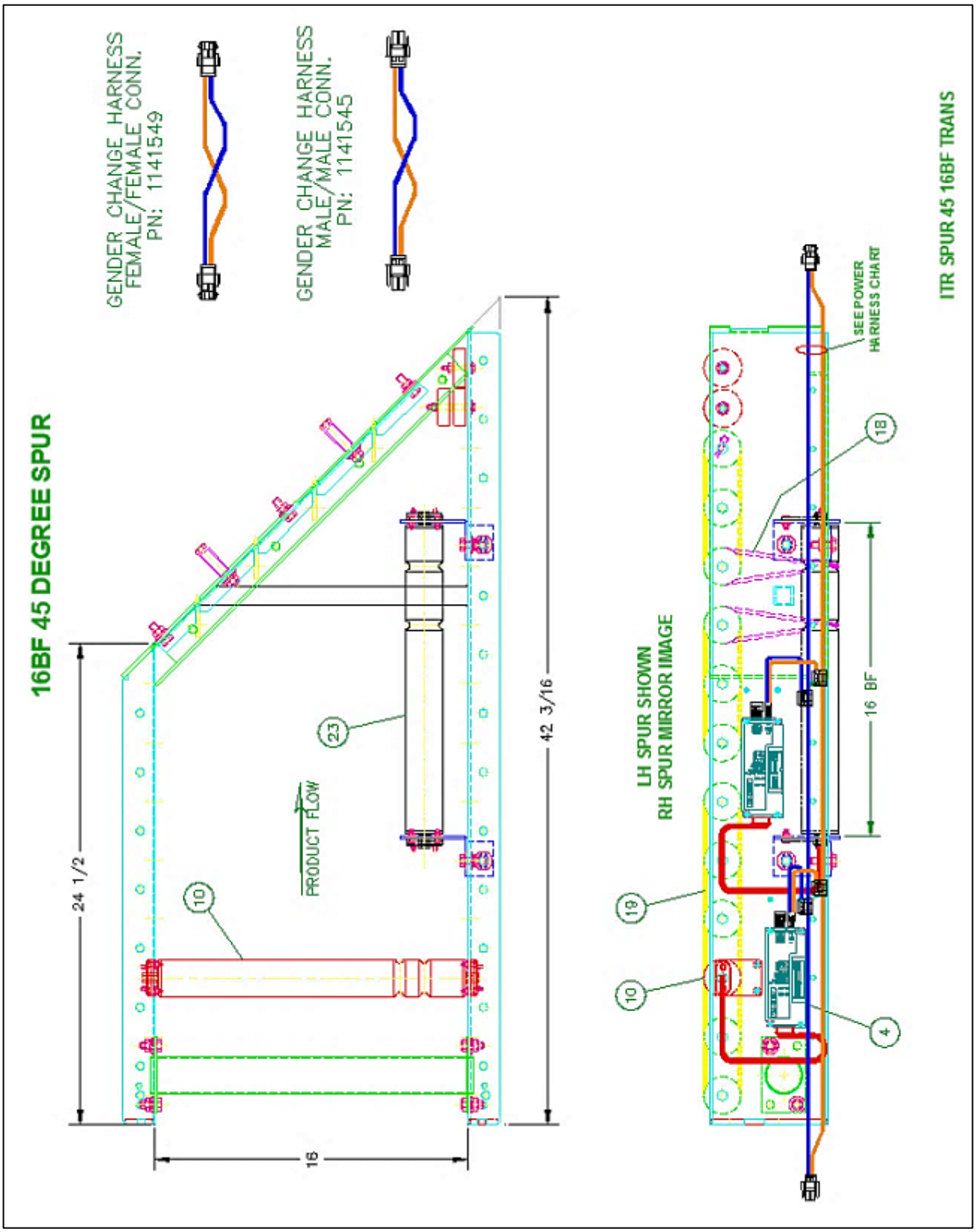
REPLACEMENT PARTS for 30 DEGREE 3" ROLLER CTRS SPUR					
		Width & Item #			
Balloon	Description	16 BF	22 BF	28 BF	34 BF
04	DRIVERCARD,ITOH CB-016P7 **(Early)**	1116036			
04	DRIVERCARD,ITOH CBM-105FP **(Late)**	1153930			
12	CONNECTOR, IDC SCOTCHLOK 567 BROWN 10-12AWG RUN & 14-18AWG TAP	3M567			
18	ORING, 3/16" DIA X 13" HT BLUE ITR (Early)	1103665			
18	ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS 20% STRETCH (Late)	1167247			
19	ORING, 3/16" DIA X 9.5" HT BLUE, ITR 3"CTR	E0005536			
20-01	ROLLER, 6-27/32" BF ITR 1.9" DIA PLTD PRBG	1131620			
20-02	ROLLER, 8-9/16" BF" ITR 1.9" DIA PLTD PRBG	1131621			
20-03	ROLLER, 10-5/16" BF ITR 1.9" DIA PLTD PRBG	1143250			
20-04	ROLLER, 12-1/32" BF ITR 1.9" DIA PLTD PRBG	1131622			
20-05	ROLLER, 13-25/32" BF ITR 1.9" DIA PLTD PRBG	1131623			
20-06	ROLLER, 15-1/2" BF ITR 1.9" DIA PLTD PRBG	-----	1131624		
20-07	ROLLER, 17-1/4" BF ITR 1.9" DIA PLTD PRBG	-----	1143251		
20-08	ROLLER, 18-31/32" BF ITR 1.9" DIA PLTD PRBG	-----	1131625		
20-09	ROLLER, 20-11/16" BF ITR 1.9" DIA PLTD PRBG	-----	1143252		
20-10	ROLLER, 22-7/16" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1131627	
20-11	ROLLER, 24-5/32" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1131628	
20-12	ROLLER, 25-29/32" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1131629	
20-13	ROLLER, 27-5/8" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1143252
20-14	ROLLER, 29-3/8" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1131627
20-15	ROLLER, 31-3/32" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1131628
20-16	ROLLER, 32-13/16" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1131629
21	ROLLER, ITR 1.9" DIA PLTD	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR 22 BF 2G ITOH	1138722	1138723	1138724	1139545
23	ROLLER, 16 BF ITR SPUR 2G ITOH	1126586			
24	ROLLER, ITR 3-3/8" BF PRBG (NO AXLE)	1143249			
25	ROLLER, ITR 5-1/8" BF PRBG, (NO AXLE)	1130836			
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM	1138704			
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-1200MM	1138705			
----	CONN, 3-COND W/LEVERS (28 - 14 AWG)	1102816			
----	CONNECTOR, IDC SCOTCHLOK 558 RED 16-22AWG RUN & TAP	1120174			
					Reference Dwg: 30 DEG SPUR

30° 2” Spur Replacement Parts

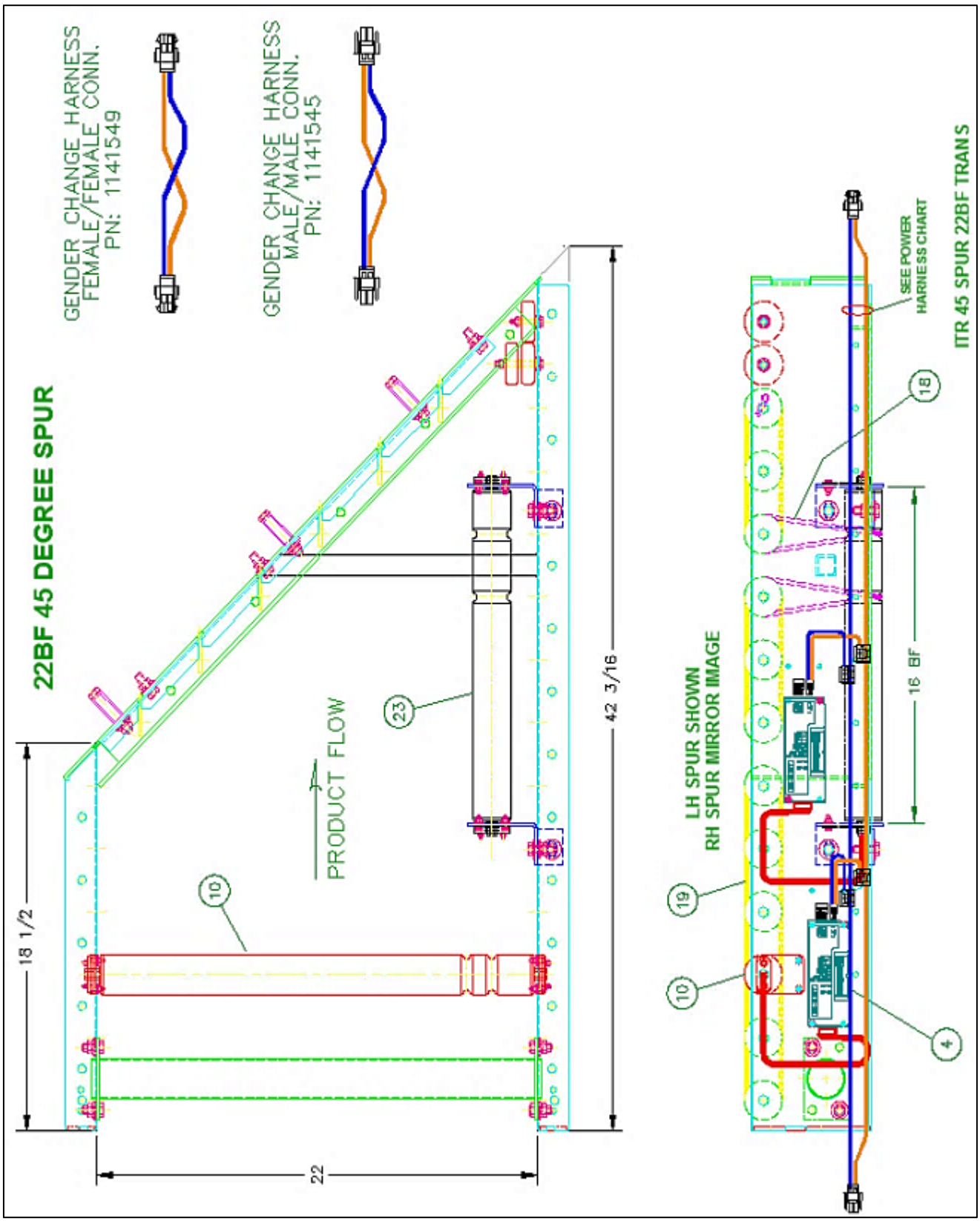
REPLACEMENT PARTS for 30 DEGREE 2" ROLLER CTRS SPUR					
		Width & Item #			
Balloon	Description	16 BF	22 BF	28 BF	34 BF
04	DRIVERCARD, ITOH CB-016S7 **(Early)**			1116036	
04	DRIVERCARD, ITOH CBM-105FP **(Late)**			1153930	
12	CONNECTOR, IDC SCOTCHLOK 567 BROWN 10-12AWG RUN & 14-18AWG TAP			3M567	
18	ORING, 3/16" DIA X 9.5" HT BLUE ITR **(Early)**			E0005536	
18	ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS 20% STRETCH **(Late)**			1167247	
19	ORING, 3/16" DIA X 7-3/4" HT BLUE, ITR 2"CTR			1142656	
20-01	ROLLER, ITR 3-11/16" BF PRBG ((NO AXLE)) 1 GROOVE			1152360	
20-02	ROLLER, ITR 4-3/4" BF PRBG ((NO AXLE))			E0003268	
20-03	ROLLER, 6" BF ITR 1.9" DIA PLTD PRBG			1152260	
20-04	ROLLER, 7-1/8" BF ITR 1.9" DIA PLTD PRBG		1152261	1152261	1152261
20-05	ROLLER, 8-5/19" BF ITR 1.9" DIA PLTD PRBG		1152262	1152262	1152262
20-06	ROLLER, 9-7/16" BF ITR 1.9" DIA PLTD PRBG		1152263	1152263	1152263
20-07	ROLLER, 10-5/8" BF ITR 1.9" DIA PLTD PRBG		1152264	1152264	1152264
20-08	ROLLER, 11-3/4" BF ITR 1.9" DIA PLTD PRBG		1152265	1152265	1152265
20-09	ROLLER, 12-15/16" BF ITR 1.9" DIA PLTD PRBG		1152266	1152266	1152266
20-10	ROLLER, 14-1/16" BF ITR 1.9" DIA PLTD PRBG		1152268	1152268	1152268
20-11	ROLLER, 15-3/16" BF ITR 1.9" DIA PLTD PRBG		1152269	1152269	1152269
20-12	ROLLER, 16-3/8" BF ITR 1.9" DIA PLTD PRBG		1155254	1155254	1155254
20-13	ROLLER, 17-1/2" BF ITR 1.9" DIA PLTD PRBG		1133722	1133722	1133722
20-14	ROLLER, 18-3/4" BF ITR 1.9" DIA PLTD PRBG		1154742	1154742	1154742
20-15	ROLLER, 19-3/4" BF ITR 1.9" DIA PLTD PRBG		1144374	1144374	1144374
20-16	ROLLER, 21" BF ITR 1.9" DIA PLTD PRBG		1133723	1133723	1133723
20-17	ROLLER, 22-3/16" BF ITR 1.9" DIA PLTD PRBG		-----	1155255	1155255
20-18	ROLLER, 23-1/4" BF ITR 1.9" DIA PLTD PRBG		-----	1131992	1131992
20-19	ROLLER, 24-7/16" BF ITR 1.9" DIA PLTD PRBG		-----	1133724	1133724
20-20	ROLLER, 25-5/8" BF ITR 1.9" DIA PLTD PRBG		-----	1155256	1155256
20-21	ROLLER, 26-3/4" BF ITR 1.9" DIA PLTD PRBG		-----	1154745	1154745
20-22	ROLLER, 27-15/16" BF ITR 1.9" DIA PLTD PRBG		-----	-----	1133726
20-23	ROLLER, 29-1/16" BF ITR 1.9" DIA PLTD PRBG		-----	-----	1133527
20-24	ROLLER, 30-1/4" BF ITR 1.9" DIA PLTD PRBG		-----	-----	1155258
20-25	ROLLER, 31-3/8" BF ITR 1.9" DIA PLTD PRBG		-----	-----	1133728
20-26	ROLLER, 32-1/2" BF ITR 1.9" DIA PLTD PRBG		-----	-----	1155259
21	ROLLER, ITR __ 1.9" DIA PLTD		E0002413	E0002414	E0006220
22	ROLLER, ITR 22 BF 2G ITOH		1138723	1138724	1139545
23	ROLLER, 15 BF ITR SPUR 2G ITOH			1152362	
24	ROLLER, ITR 3-3/8" BF PRBG (NO AXLE)			1143249	
25	ROLLER, ITR 5-1/8" BF PRBG, (NO AXLE)			1130836	
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM			1138704	
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-1200MM			1138705	
----	CONN, 3-COND W/LEVERS (28 - 14 AWG)			1102816	
----	CONNECTOR, IDC SCOTCHLOK 558 RED 16-22AWG RUN & TAP			1120174	

Reference Dwg: 30 DEG SPUR

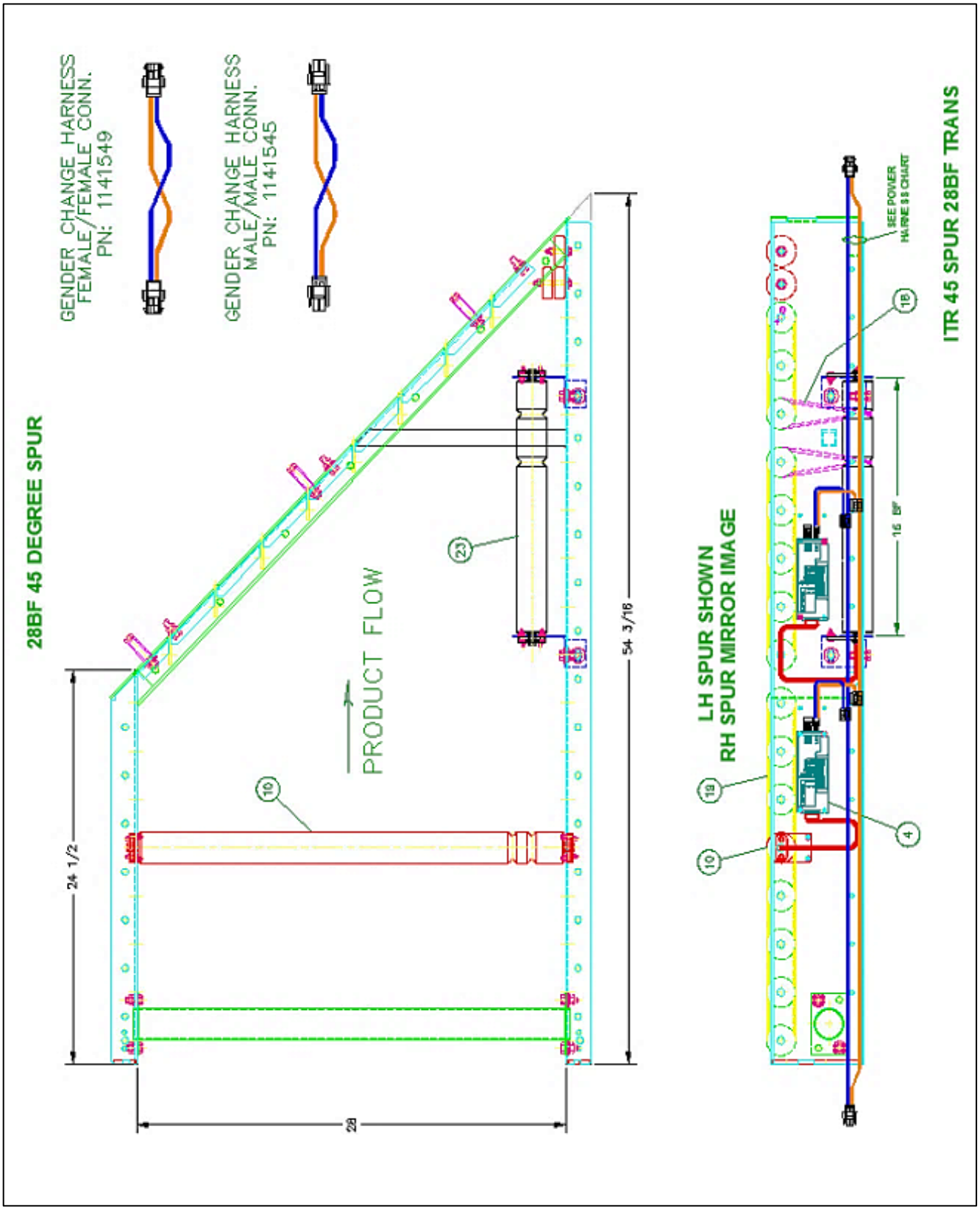
16BF 45° Spur


16BF 45 DEGREE SPUR
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
24 1/2
42 3/16
16
PRODUCT FLOW
10
23
LH SPUR SHOWN
RH SPUR MIRROR IMAGE
SEE POWER
HARNESS CHART
18
16 BF
19
10
4
ITR SPUR 45 16BF TRANS

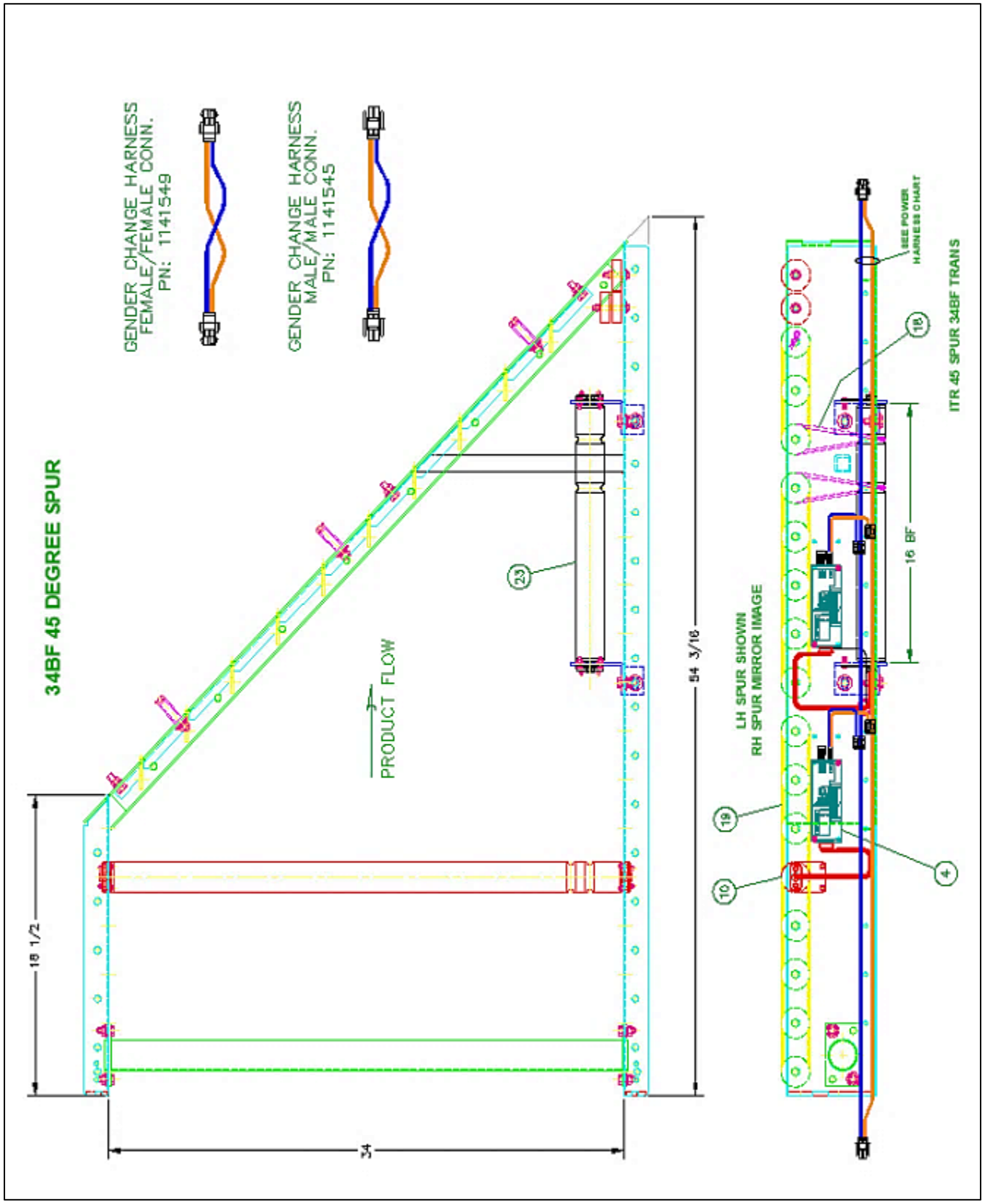
22BF 45° Spur


22BF 45 DEGREE SPUR
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
PRODUCT FLOW
18 1/2
22
42 3/16
23
10
LH SPUR SHOWN
RH SPUR MIRROR IMAGE
SEE POWER
HARNESS CHART
ITR 45 SPUR 22BF TRANS
16 BF
18
19
10
4

28BF 45° Spur


GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
28BF 45 DEGREE SPUR
PRODUCT FLOW
24 1/2
54 3/16
29
ITR 45 SPUR 28BF TRANS
LH SPUR SHOWN
RH SPUR MIRROR IMAGE
SEE POWER HARNESS CHART
16 5/8"

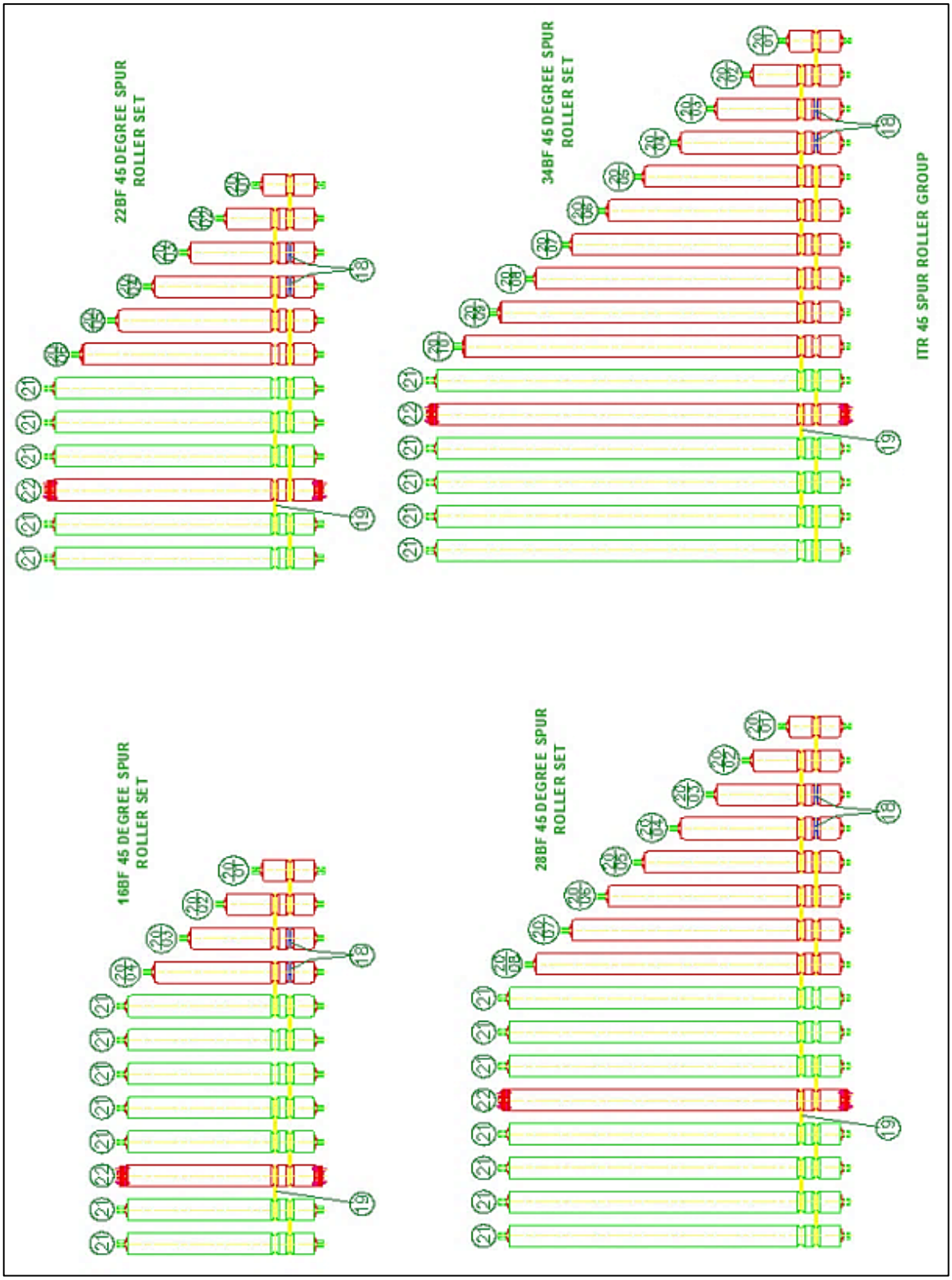
34BF 45° Spur


34BF 45 DEGREE SPUR
GENDER CHANGE HARNESS
FEMALE/FEMALE CONN.
PN: 1141549
GENDER CHANGE HARNESS
MALE/MALE CONN.
PN: 1141545
PRODUCT FLOW
18 1/2
34
54 3/16
23
ITR 45 SPUR 34BF TRANS
SEE POWER HARNESS CHART
18
16 BF
LH SPUR SHOWN
RH SPUR MIRROR IMAGE
19
10
4

Blank Page for Placement

45° Spurs

45 ° Spur Roller Set



45° 3” Spur Replacement Parts

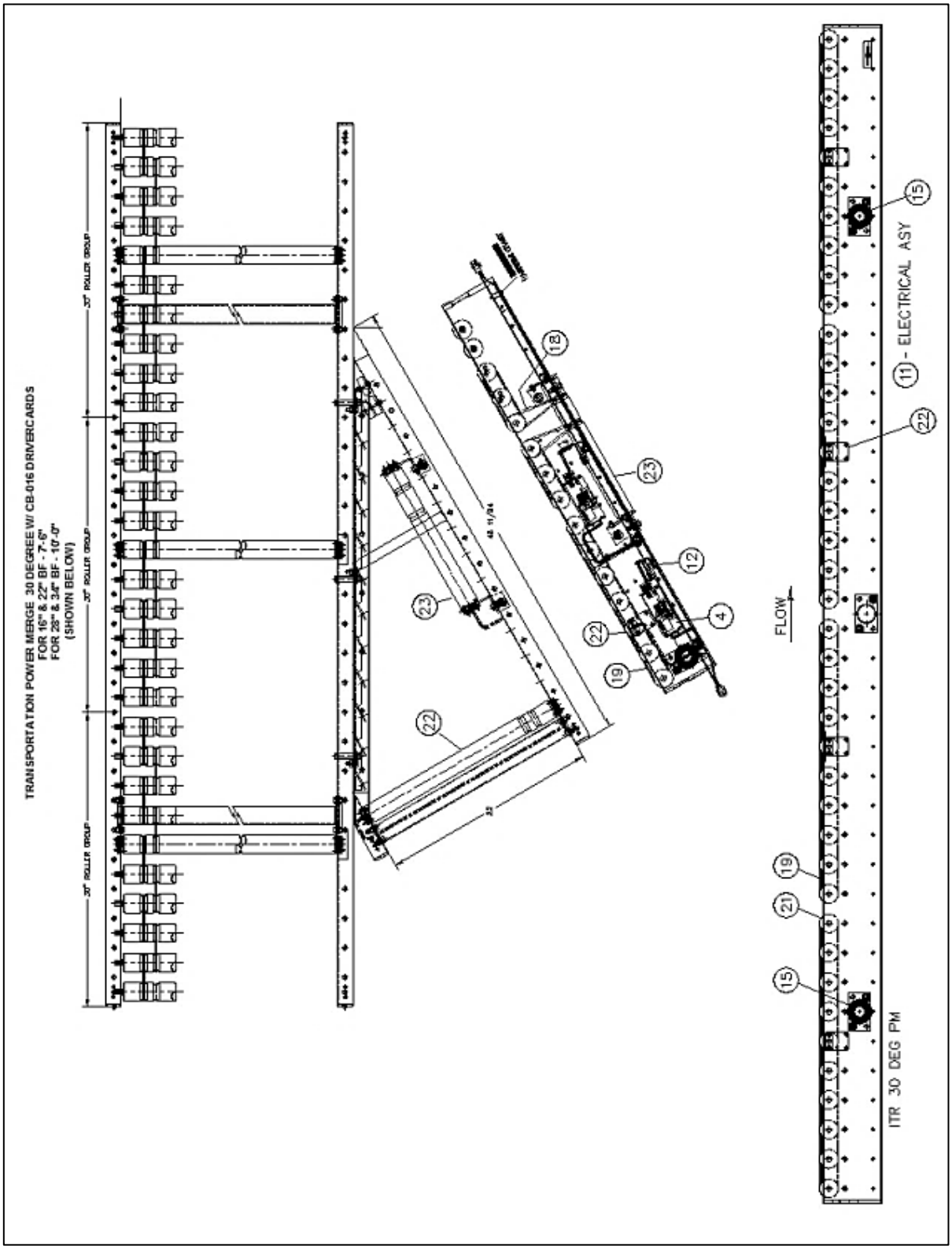
REPLACEMENT PARTS for 45 DEGREE 3" ROLLER CTRS SPUR					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD, ITOH CB-016S7 **(Early)**	1116036			
04	DRIVERCARD, ITOH CBM-105FP **(Late)**	1153930			
12	CONNECTOR, IDC SCOTCHLOK 567 BROWN 10-12AWG RUN & 14-18AWG TAP	3M567			
18	ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS 20% STRETCH **(Current Design)**	1167247			
19	ORING, 3/16" DIA X 9.5" HT BLUE	E0005536			
20-01	ROLLER, ITR 4-3/4" BF PRBG (NO AXLE)	E0003268			
20-02	ROLLER, 7-3/4" BF ITR 1.9" DIA PLTD PRBG	1144370	114370	114370	114370
20-03	ROLLER, 10-3/4" BF ITR 1.9" DIA PLTD PRBG	1144371	1144371	1144371	1144371
20-04	ROLLER, 13-3/4" BF ITR 1.9" DIA PLTD PRBG	1144372	1144372	1144372	1144372
20-05	ROLLER, 16-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	1144373	1144373	1144373
20-06	ROLLER, 19-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	1144374	1144374	1144374
20-07	ROLLER, 22-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1144375	1144375
20-08	ROLLER, 25-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1144376	1144376
20-09	ROLLER, 28-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1144377
20-10	ROLLER, 31-3/4" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1144378
21	ROLLER, ITR _ _ BF 1.9" DIA PLTD	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR _ _ BF 2G ITOH	1138722	1138723	1138724	1138725
23	ROLLER, ITR SPUR 2G ITOH	1126586			
----	CABLE ,MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM	1138704			
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-2700MM	1138706			
----	CONN, 3-COND W/LEVERS (28 - 14 AWG)	1102816			
----	CONNECTOR, IDC SCOTCHLOK 558 RED 16-22AWG RUN & TAP	1120174			
					Reference Dwg: 45 DEG SPUR

45° 2” Spur Replacement Parts

REPLACEMENT PARTS for 45 DEGREE 2" ROLLER CTRS SPUR					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD,ITOH CB-016S7 **(Early)**	1116036		1116036	
04	DRIVERCARD,ITOH CBM-105FP **(Late)**	1153930		1153930	
12	CONNECTOR,IDC SCOTCHLOK 567 BROWN 10-12AWG RUN & 14-18AWG TAP	3M567		3M567	
17	ORING,3/16" DIA X 8-1/4" HT BLUE	E0034023		E0034023	
18	ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS 20% STRETCH **(Current Design)**	1167247		1167247	
19	ORING, 3/16" DIA X 7-3/4" HT BLUE, ITR 2"CTR	1142656		1142656	
20-01	ROLLER, ITR 4-3/4" BF PRBG (NO AXLE)	E0003268		E0003268	
20-02	ROLLER, 6-3/4" BF ITR 1.9" DIA PLTD PRBG	1154738		1154738	
20-03	ROLLER, 8-3/4" BF ITR 1.9" DIA PLTD PRBG	1154739		1154739	
20-04	ROLLER, 10-3/4" BF ITR 1.9" DIA PLTD PRBG	1144371		1144371	
20-05	ROLLER, 12-3/4" BF ITR 1.9" DIA PLTD PRBG	1154740		1154740	
20-06	ROLLER, 14-3/4" BF ITR 1.9" DIA PLTD PRBG	1154741		1154741	
20-07	ROLLER, 16-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1144373	
20-08	ROLLER, 18-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1154742	
20-09	ROLLER, 20-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1154743	
20-10	ROLLER, 22-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1144375	
20-11	ROLLER, 24-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1154744	
20-12	ROLLER, 26-3/4" BF ITR 1.9" DIA PLTD PRBG	-----		1154745	
21	ROLLER, 30" ITR 1.9" DIA PLTD PRBG (28" BF)	E0002412		E0002414	
22	ROLLER, ITR 28 BF 2G ITOH	1138722		1138724	
23	ROLLER, BF ITR SPUR 2G ITOH	1152362		1152362	
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM	1138704		1138704	
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-2700MM	1138706		1138706	
----	CONN, 3-COND W/LEVERS (28 - 14 AWG)	1102816		1102816	
----	CONNECTOR, IDC SCOTCHLOK 558 RED 16-22AWG RUN & TAP	1120174		1120174	

Reference Dwg: 45 DEG SPUR

Power Merge w/30° Spur

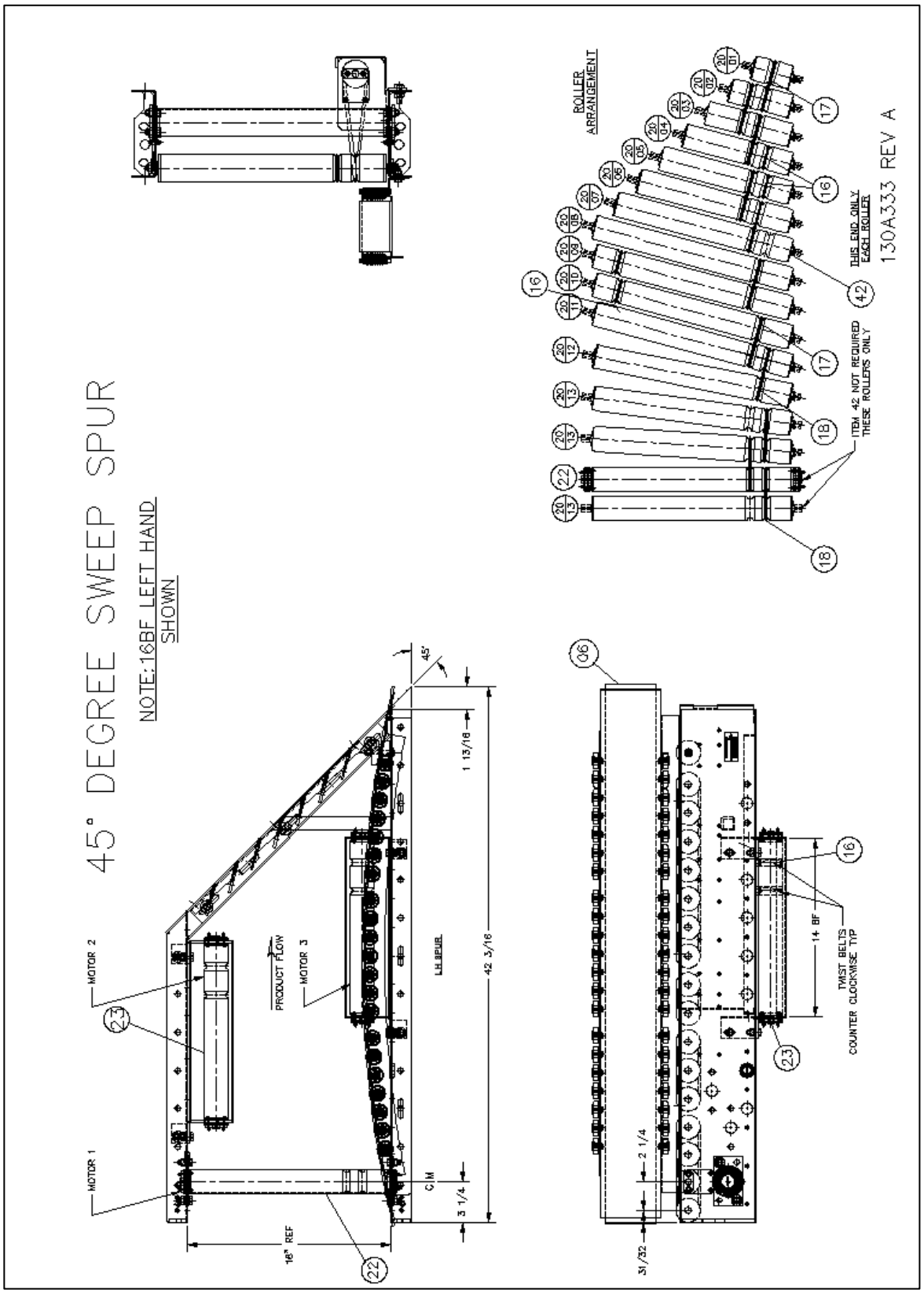


Replacement Parts Power Merge W/30° Spur

REPLACEMENT PARTS for POWER MERGE W/ 30 DEGREE SPUR					
		Width & Item #			
Balloon	Description	16 BF	22 BF	28 BF	34 BF
04	DRIVERCARD, ITOH CB-016S7	1116036			
---	HARNESS, POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L	5'-6" L	8'-0" L	10'-6" L
		1102289	1102288	1102287	1102286
-----	CONN, ITOH CB-016 WAGO & HDWE 2-PIN + 5-PIN PAIR	1104417			
12	CONNECTOR, IDC SCOTCHLOK 567 (BROWN) 10-12 AWG RUN 14-18 AWG TAP	3M567			
17	ORING, 3 /16" DIA X 7-3/4" HT BLUE	1142656			
18	ORING, 3 /16" DIA X 13" HT BLUE	1103665			
19	ORING, 3/16" DIA X 9.5" HT BLUE, ITR 3"CTR	E0005536			
20-01	ROLLER, 6-27/32" BF ITR 1.9" DIA PLTD PRBG	1131620			
20-02	ROLLER, 8-9/16" BF ITR 1.9" DIA PLTD PRBG	1131621			
20-03	ROLLER, 10-5/16" BF ITR 1.9" DIA PLTD PRBG	1143250			
20-04	ROLLER, 12-1/32" BF ITR 1.9" DIA PLTD PRBG	1131622			
20-05	ROLLER, 13-25/32" BF ITR 1.9" DIA PLTD PRBG	1131623			
20-06	ROLLER, 15-1/2" BF ITR 1.9" DIA PLTD PRBG	-----	1131624		
20-07	ROLLER, 17-1/4" BF ITR 1.9" DIA PLTD PRBG	-----	1143251		
20-08	ROLLER, 18-31/32" BF ITR 1.9" DIA PLTD PRBG	-----	1131625		
20-09	ROLLER, 20-11/16" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1143252	
20-10	ROLLER, 22-7/16" BF ITR 1.9" DIA PLTD PRBG	-----	-----	1131627	
20-11	ROLLER, 24-5/32" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1131628
20-12	ROLLER, 25-29/32" BF ITR 1.9" DIA PLTD PRBG	-----	-----	-----	1131629
21	ROLLER, ITR 1.9" DIA PLTD PRBG	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR 16 BF 2G ITOH FE 60	1138722	1138723	1138724	1138725
23	ROLLER, 16 BF 2G ITOH FE 60	1126586			
24	ROLLER, ITR 3-3/8" BF PRBG, (NO AXLE)	1143248			
25	ROLLER, ITR 5-1/8" BF PRBG, (NO AXLE)	1130834			
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM	1138704			
-----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-1200MM	1138705			
-----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-2700MM	1138706			

Reference Dwg: POWER MERG W/30 DEG SPUR

Sweep Spur 45 Degree

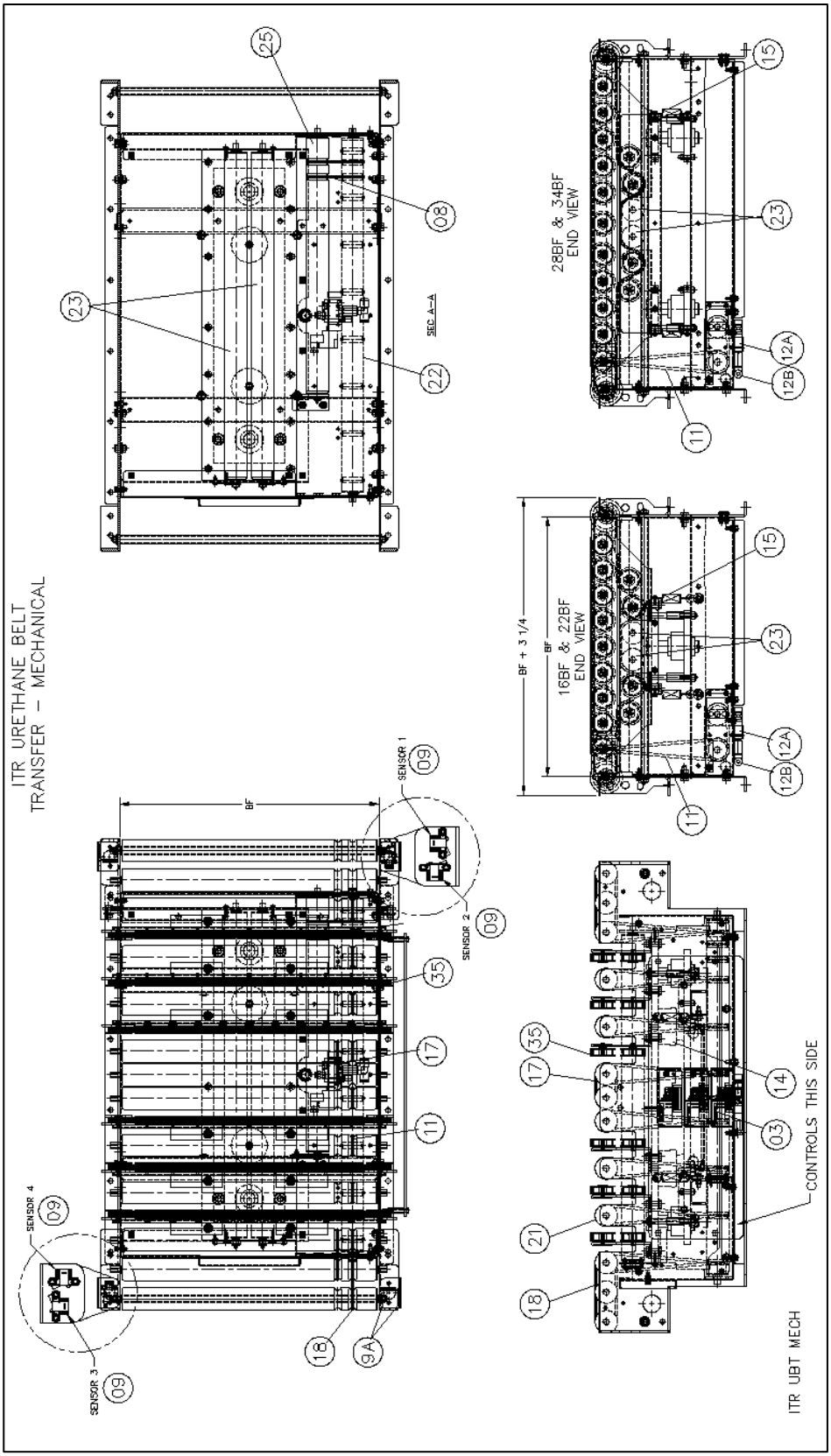


Sweep Spur 45° Replacement Parts

REPLACEMENT PARTS FOR SWEEP SPUR 45 DEGREE					
		Width & Item #			
Balloon	Description	16 BF	22 BF	28 BF	34 BF
06	SKATEWHEEL, ASY 6002 WITH ADAPTER	1138618			
15	ORING, 3/16" DIA X 13" HT BLUE	-----	1103665		
16	ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS 20% STRETCH (Late)	1167247			
17	ORING, 3/16" DIA X 8" HT BLUE FOR ITR 2.188" CTRS 20% STRETCH	1142395			
18	ORING, 3/16" DIA X 8-1/4" HT BLUE	E0034023			
19	ORING, 3/16" DIA X 8.688" HT BLUE	-----	-----	1137420	
20-01	ROLLER, 3-1/2" BF SWEEP SKEW ROLLER **(NO AXLE)**	1168005			
20-02	ROLLER, 5-3/8" BF SWEEP SKEW ROLLER GROOVE E & F	1168006			
20-03	ROLLER, 7-1/4" BF SWEEP SKEW ROLLER GROOVE E & F	1168007			
20-04	ROLLER, 9-1/16" BF SWEEP SKEW ROLLER GROOVE E & F	1168008			
20-05	ROLLER, 10-15/16" BF SWEEP SKEW ROLLER GROOVE E & F	1168009			
20-06	ROLLER, 12-3/4" BF SWEEP SKEW ROLLER GROOVE E & F	1168010			
20-07	ROLLER, 14-9/16" BF SWEEP SKEW ROLLER GROOVE E & F	1168011			
20-08	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E (& F)	1168469	1168012		
20-09	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E (& F)	1168470	1168013		
20-10	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E & F	1168471	1168014		
20-11	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E & F (&G)	1168472	1168015		
20-12	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E (& F)	1168473	1168059	1168016	
20-13	ROLLER, 25-9/16" BF SWEEP SKEW ROLLER GROOVE E (& F)	-----	-----	1168017	
20-14	ROLLER, 27-7/16" BF SWEEP SKEW ROLLER GROOVE E (& F)	-----	-----	1168018	
20-15	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E (& F)	-----	-----	1168019	1168937
20-16	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E (& F)	-----	-----	1168020	1168938
20-17	ROLLER, _-_" BF SWEEP SKEW ROLLER GROOVE E	-----	-----	1168022	1168939
20-18	ROLLER, _" ITR 1.9" DIA PLTD	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR 16 BF 2G ITOH FE 60	1138722	1138723	1138724	1138725
	ROLLER, ITR 16 BF 2G ITOH FE 140	1168560	1134452	1142856	1155281
23	ROLLER, 14 BF 2G ITOH FE 60	1169219			
	ROLLER, 14 BF 2G ITOH FE 140	1168164			
42	ORING, 1/2" DIA ID (3/32" WALL)	90530050			
-----	DRIVERCARD,ITOH CB-016P7	1116036			
----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-600MM	1138704			
-----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-1200MM	1138705			
-----	CABLE, MOTOR EXTENSION ITOH M-F-EXT-9PIN-2700MM	1138706			
----	CONNECTOR, 3-COND W/LEVERS (28 - 14 AWG)	1102816			
----	CONNECTOR, IDC SCOTCHLOK 558 RED 16-22AWG RUN & TAP	1120174			
----	CONNECTOR, IDC SCOTCHLOK 567 BROWN 10-12AWG RUN & 14-18AWG TAP	3M567			

Reference Dwg: 130A333 REV A

UBT Mechanical

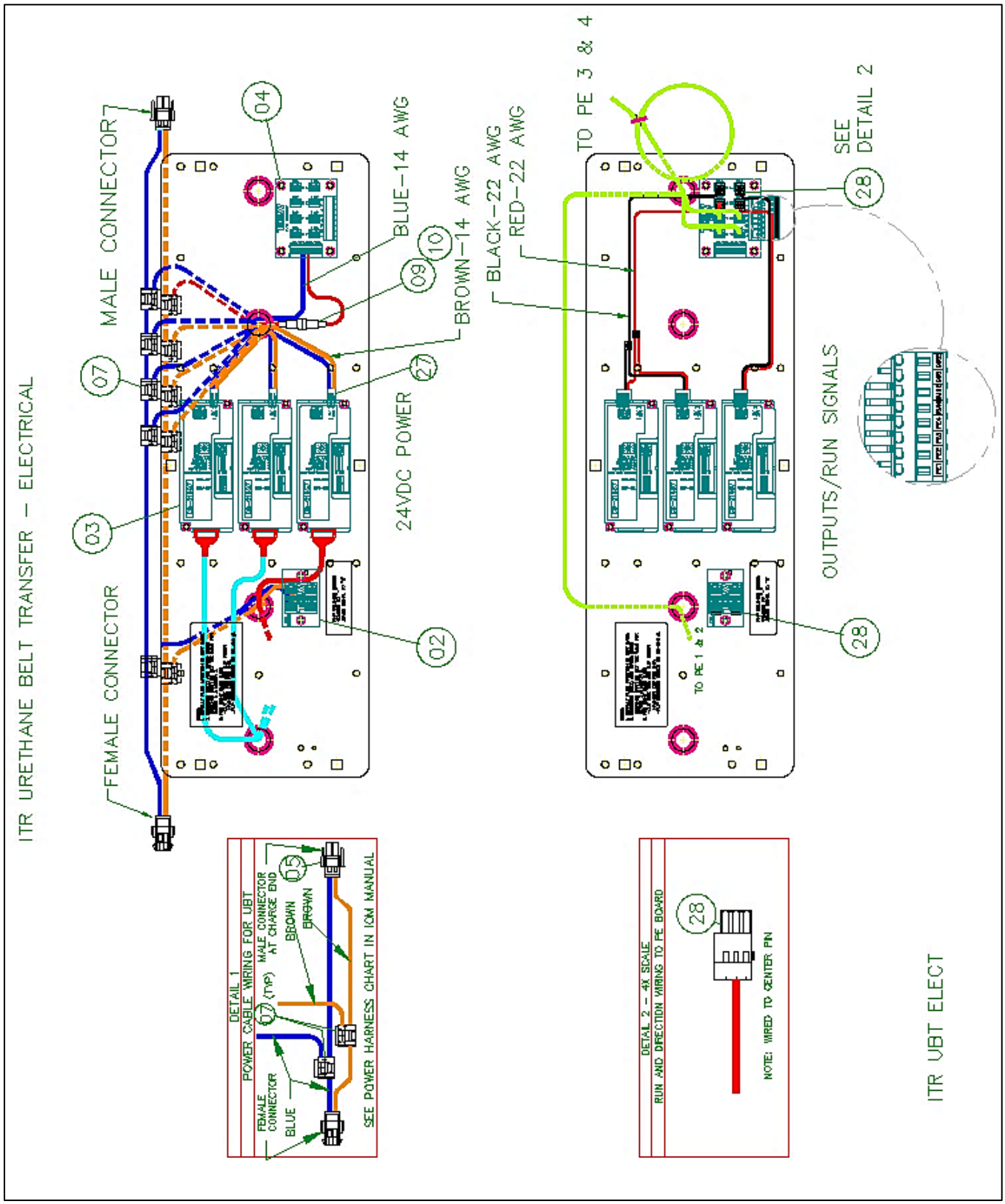


UBT Replacement Parts Mechanical

REPLACEMENT PARTS for UBT Mechanical						
			Width & Item #			
Balloon	**Description**	**QTY**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
03	DRIVERCARD, ITOH CB-016S7 **(Early)**	0	1116036			
03	DRIVERCARD, CBM-105FP **(LATE)**	1	1153930			
08	ORING, 1/4" DIA X 9.5" HT BLUE	2	1144848			
09	PE, REFLEX TYPE ZL2-P2465S12	2 or 4	1138113			
9A	PE,REFLECTOR 20MM X 30MM ADHESIVE BACKED REF MHS Conveyor #00203650	2 or 4	1136359			
11	ORING, 83A ST TRNS 3/16" X 21-3/8"	8	1149850			
12A	VALVE, 4WAY 24VDC **W/FITT's** & 3M CABLE ITR UBT/ERS	1	1139102			
12B	VALVE 4WAY 24VDC DIN CONN 24V **NO/FITT's**	1	1139436			
14	AIRBAG, FIRESTONE	2	90000025			
15	SPRING, EXT 3/4OD X 2"LG .075W LOOPS MUST BE INLINE +/- 20 DEGREES SHOT PEENEDZP MUSIC WIRE	4	90800263			
17	ORING, 3/16" DIA X 7-3/4" HT BLUE ITR 2"CTR	1	1142656			
18	ORING, 3/16" DIA X 8.688 HT BLUE FOR ITR 2.625CTRS 20% STRETCH	4	1137420			
21	ROLLER, ITR 1.9" DIA PLTD PRBG	13	E0002412	E0002413	E0002414	E0006220
22	ROLLER, CARRIER DRIVE ITR2 UBT 4"C		1154791-5s / 1132730-6s			
23	ROLLER, ITR BF NG ITOH	5s 6s	1154635 1138739	1138722 1138740	--- 1138741	--- 1138742
25	ROLLER, ITR BF 2G ITOH	1	1138722	1138723	1138724	1138725
-----	CABLE, MOTOR EXTENSION, 1200MM ITOH M-F-EXT-9PIN-1200 USE W/ CB-016 OR HB-510	1	1138705			
35	BELT, 83A .188 X .468 X ___", BF ITR2 UBT	1	1132754 35-1/2"	1132755 45-3/4"	1132756 56"	1132757 66"

Reference Dwg: Urethane Belt Transfer - Mechanical

UBT Electrical

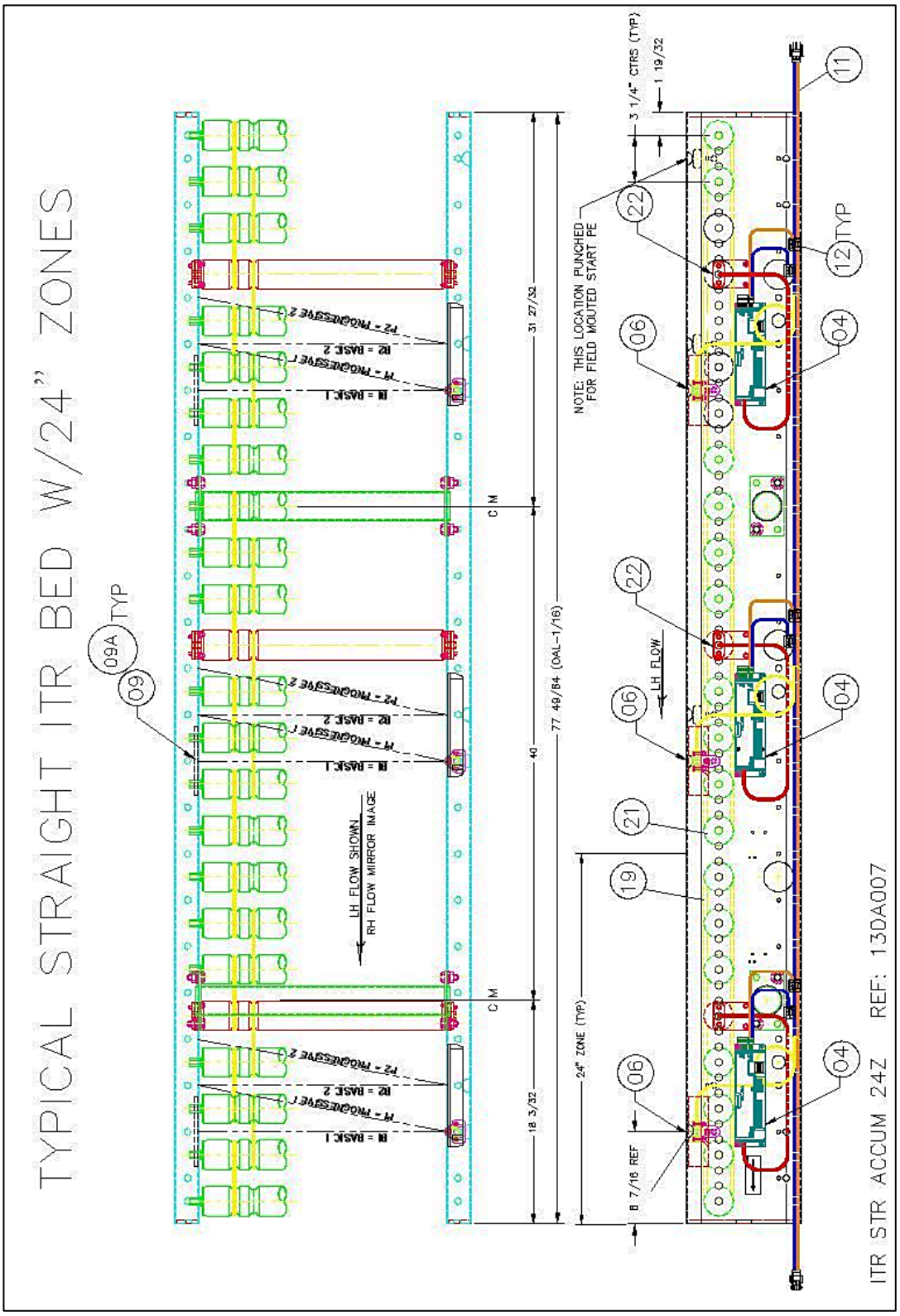


UBT Replacement Parts Electrical

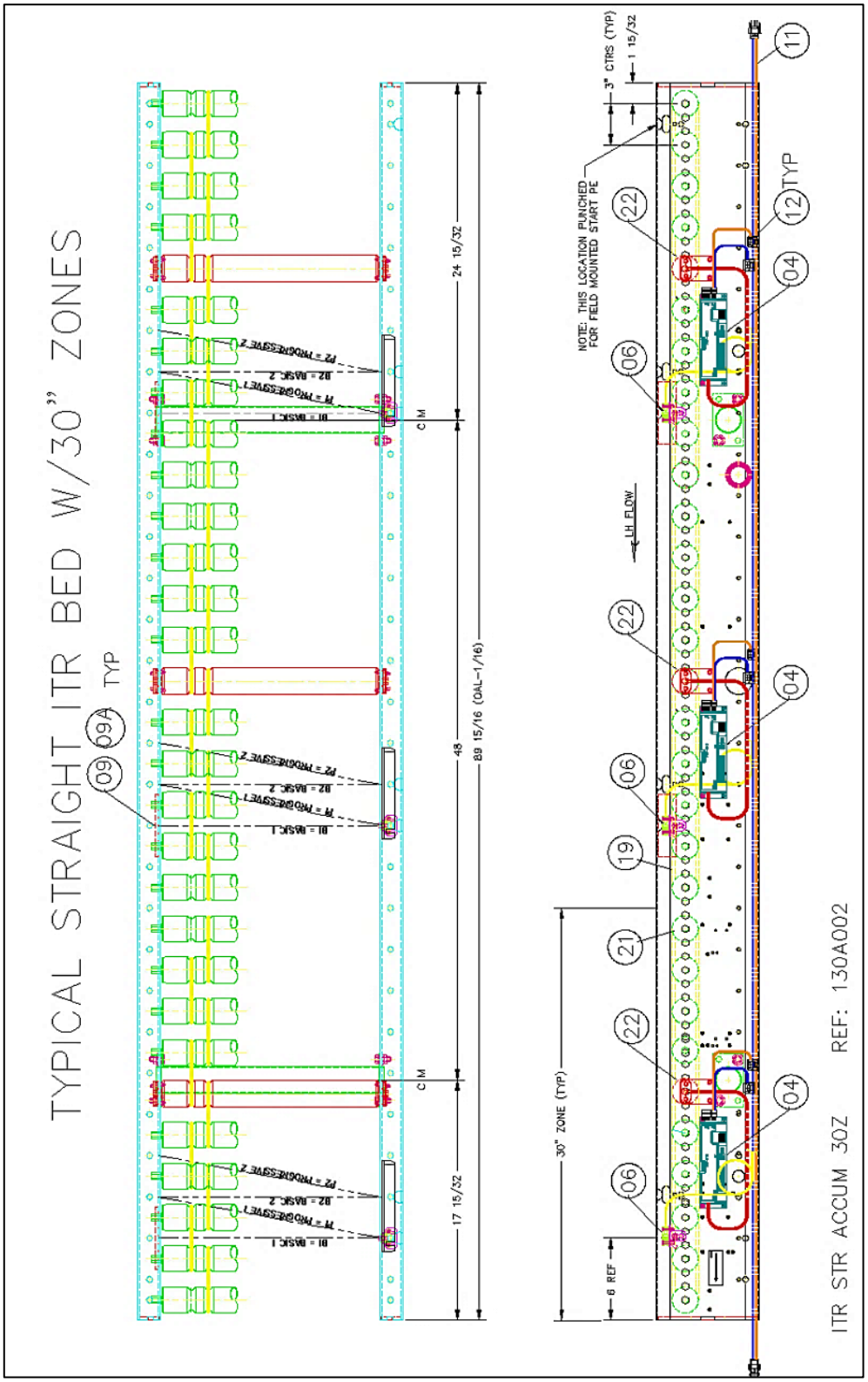
REPLACEMENT PARTS for UBT ELECTRICAL						
			Width & Item #			
Balloon	**Description**	**QTY**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
02	PCB, DB PE EXTENSION	1 or 2	1138198			
03	DRIVERCARD, ITOH CB-016S7 / CBM-105FP	1	1116036 / 1153930			
04	PCB, DB PE 4A 8 STATION	1	1138197			
05	HARNESS, POWER 10AWG 5.5'	1	1102288			
06	PE,REFLEX TYPE ZL2-P2465S12 PNP LIGHT OPERATE 2M CABLE W/733-103 CONNECTOR SICK #1054934	2 or 4	1138113			
07	CONNECTOR, IDC SCOTCHLOK 567 10-12AWG RUN 14-18AWG TAP 3M BROWN	8	3M567			
09	FUSE, HOLDER IN-LINE,CARTRIDGE 5X15MM AND 5X20MM FUSES HHT BUSSMANN HHT #16AWG LEADS	1	1102222			
10	FUSE, 4A, 125V, CARTRIDGE GMA 5 X 20MM BUSSMANN GMA-4A	1	1102221			
27	CONN, FEMALE 2 POLE PIN QUOTE # W14Q3892-A	1	1139779			
28	CONN, FEMALE 3 POLE PIN QUOTE # W14Q3892-A	1	1139780			
Reference Dwg: Urethane Belt Transfer - Mechanical						

Accumulation Straight Bed Zone

Bed 24” Zone



Straight Bed 30 Zone



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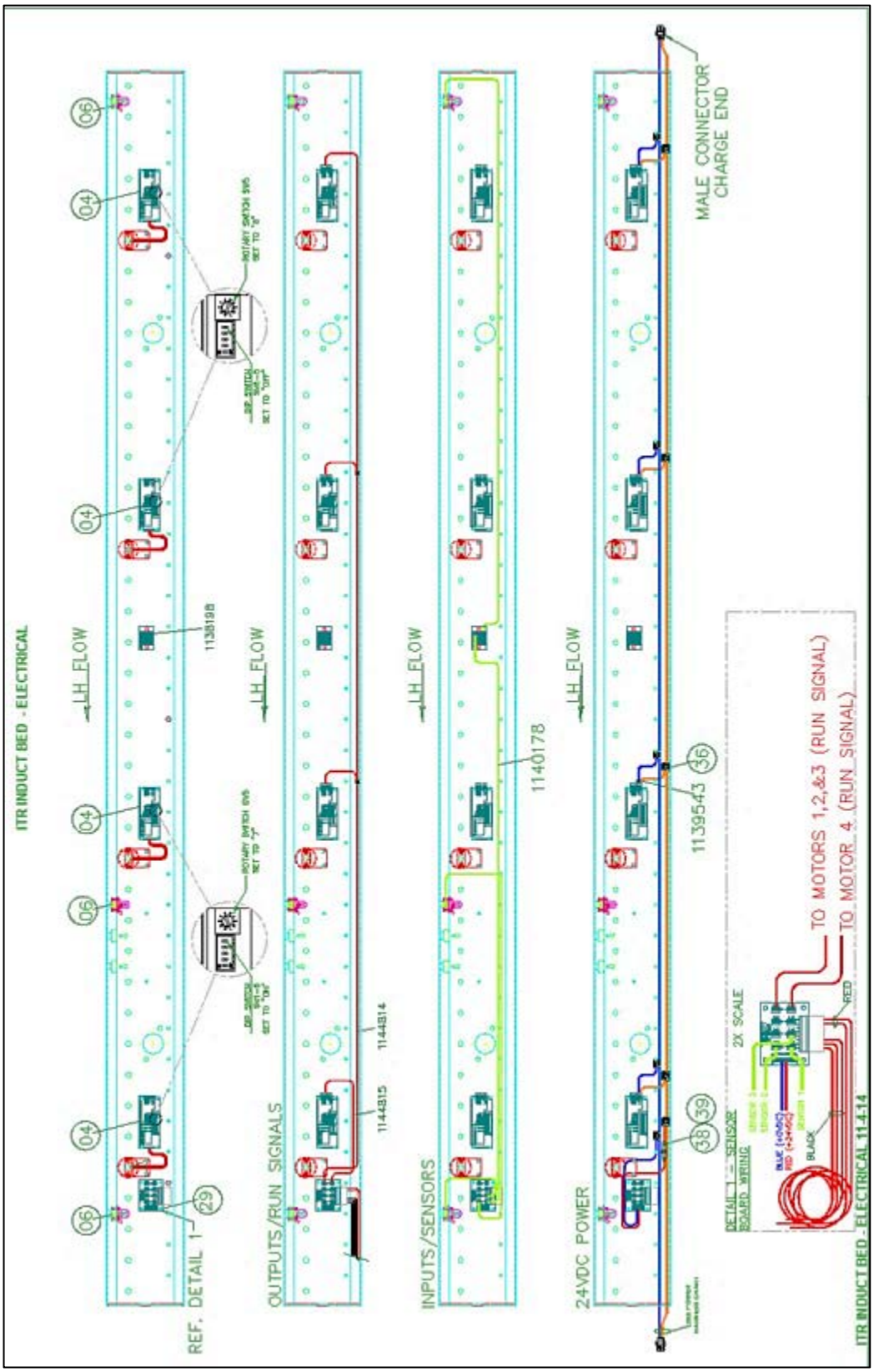
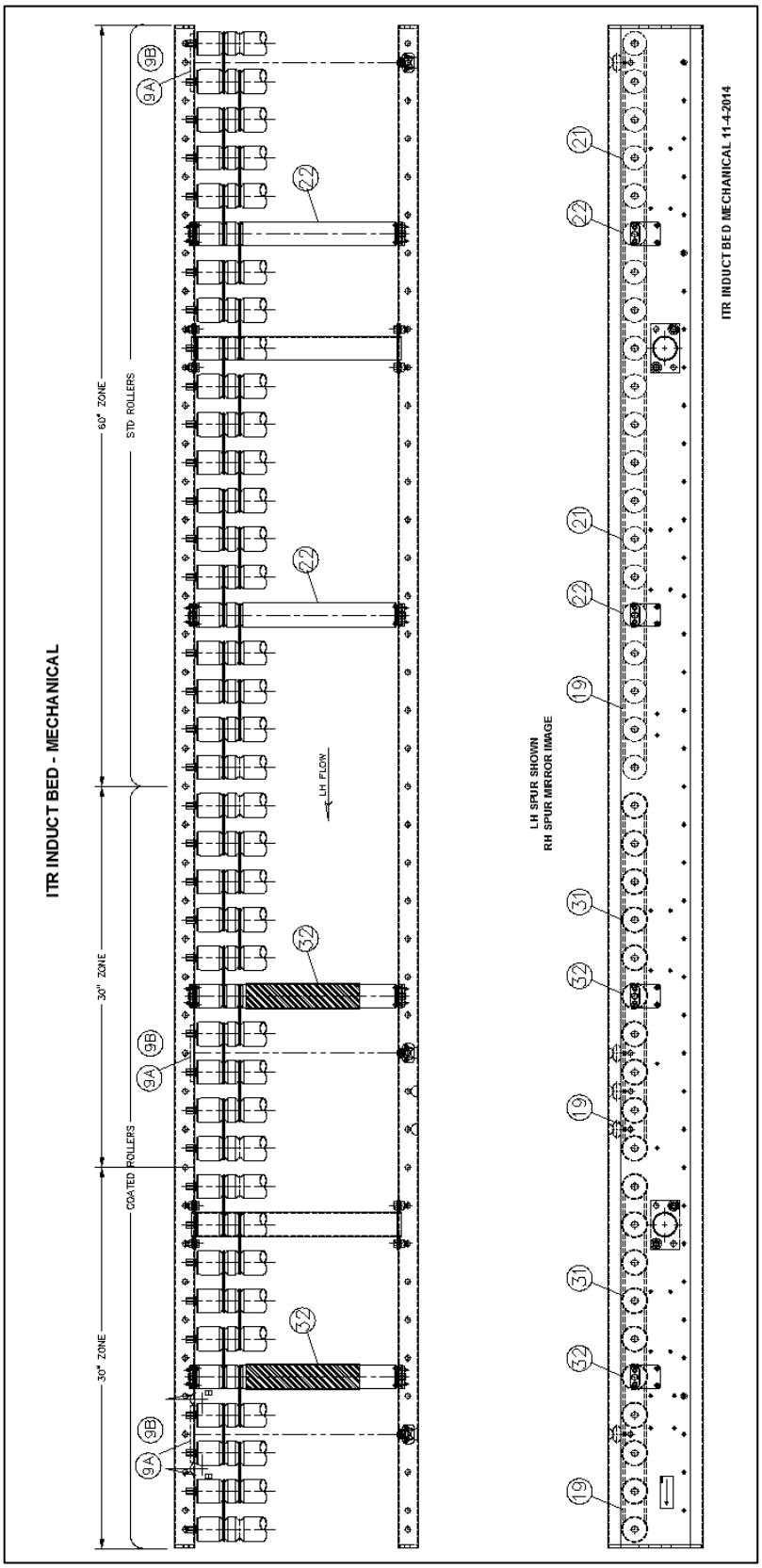
Accumulation Straight Bed Replacement Parts 24&30

REPLACEMENT PARTS for ACCUMULATION STRAIGHT BED (24 & 30 Zone)					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD, ITOH HB-510P	1101261			
---	CABLE,MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG	REFERENCE MOTOR EXTENSION CABLE TABLE			
06	PE, REFLEX TYPE ZL2-P2400S11 PNP DARK OPERATE 700MM CABLE	1137687			
9A	PE, REFLECTOR 4-3/8" X 1-1/8"	400004			
- - -	TAPE, FOAM DBL SIDED 1"SQUARE	E0005429			
11	HARNESS, POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L 1102289	5'-6" L 1102288	8'-0" L 1102287	10'-6" L 1102286
12	CONNECTOR,IDC SCOTCHLOK 567 (Brown), 10-12AWG RUN 14-18AWG TAP	3M567			
19	ORING, 3/16" DIA X 9.5" HT BLUE	E0005536			
21	ROLLER, ITR 1.9" DIA PLTD PRBG	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR BF 2G ITOH	1138722	1138723	1138729	1138725
					Reference Dwg: Accumulation Straight Bed 24 & 30 Zone

Induct Bed Electrical



Induct Bed Mechanical



Induct Bed Replacement Parts

REPLACEMENT PARTS for INDUCT BED					
		Width & Item #			
Balloon	**Description**	**16 BF**	**22 BF**	**28 BF**	**34 BF**
04	DRIVERCARD, ITOH CB-016S7	1116036			
---	HARNESS, POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L	5'-6" L	8'-0" L	10'-6" L
		1102289	1102288	1102287	1102286
---	CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG	REFERENCE MOTOR EXTENSION CABLE TABLE			
06	PE, REFLEX TYPE ZL2-P2465S12 PNP LIGHT OPERATE 2M CABLE	1138113			
9A	PE, REFLECTOR 4-3/8" X 1-1/8"	400004			
9B	TAPE, FOAM DBL SIDED 1" SQUARE	E0005429			
19	ORING, 3/16" DIA X 9.5" HT BLUE	E0005536			
21	ROLLER, ITR 1.9" DIA PLTD PRBG	E0002412	E0002413	E0002414	E0006220
22	ROLLER, ITR BF 2G ITOH	1138722	1138723	1138724	1138725
29	PCB DB PE 4Amp 8 STATION	1138197			
31	ROLLER, ITR 1.9" DIA CTD PRBG 1/16" PVC SLV	1134693	1132204	1131724	1140369
32	ROLLER, ITR BF 2G CTD ITOH	1140375	1140376	1140377	1140378
36	CONNECTOR, IDC SCOTCHLOK 567 (Brown) 10-12AWG RUN 14-18AWG TAP	3M567			
38	FUSE, HOLDER IN-LINE CARTRIDGE 5X15MM AND 5X20MM FUSES HHT	1102222			
39	FUSE, 4A,125V CARTRIDGE, GMA 5 X 20MM BUSSMANN GMA-4A	1102221			

Reference Dwg: Induct Bed Mechanical & Electrical

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IOM Revision / History

Author	Approved by	Rev. Date	Page	Comment
M. Davis, S. Kempke	T. Brower	6/09/2015	19	Add urethane belt caution.
M.Davis	T.Brower	11/1/2015	All	Logo Change

MHS Conveyor Information

Mission

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

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