# Installation, Operation, Maintenance Manual

MHS CONVEYOR

## IntelliROL®
## Motorized Roller Conveyor

IOM Part Number: 90480001
Revision Date: September 13, 2024

Para la OIM española Seleccione Aquí

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# 1 IOM INTRODUCTION

IOM 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 conveyors.

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

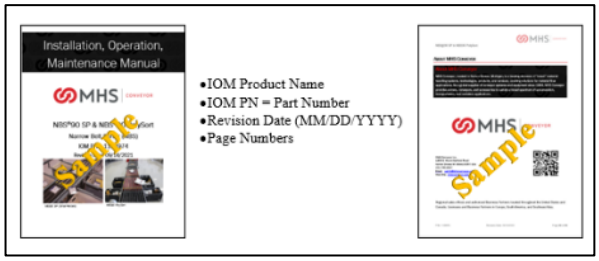
This service manual is intended for use by personnel who are knowledgeable of installation and safe working practices on conveyor systems.

Not all applications and conditions can be covered; therefore, this manual is to be used ONLY as a guide. Proper training of operating and maintenance personnel is required by the owner/operator of the equipment.

If additional copies of this manual are needed or if you have any question concerning the conveyor, please contact your MHS Distributor or MHS Lifetime Services at 231-798-4547 or visit MHS at mhs-conveyor.com for maintenance videos and other application information.

Manual Structure

You should receive 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).




**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!

# 2 MHS CONVEYOR POLICIES

### 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 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 of running use, 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.

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 08/12/2021

### MHS Environment Standards

MHS Conveyor equipment is designed to be installed in a clean, dry warehouse environment. Exposure to extreme humidity, 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 proximity of curing concrete, proper ventilation must be used to direct the curing agent fumes away from the conveyor.

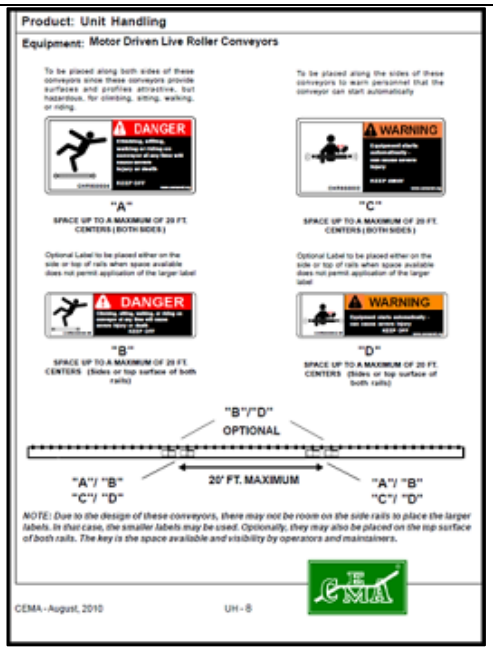
Failure to comply with these guidelines will void the MHS warranty on any failed components that result from these environment issues.

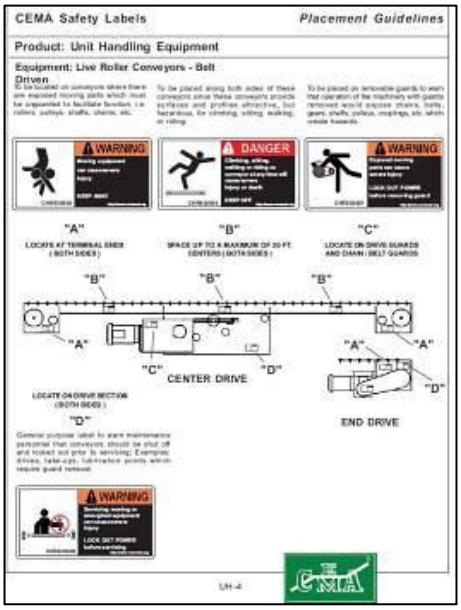
08/12/2021

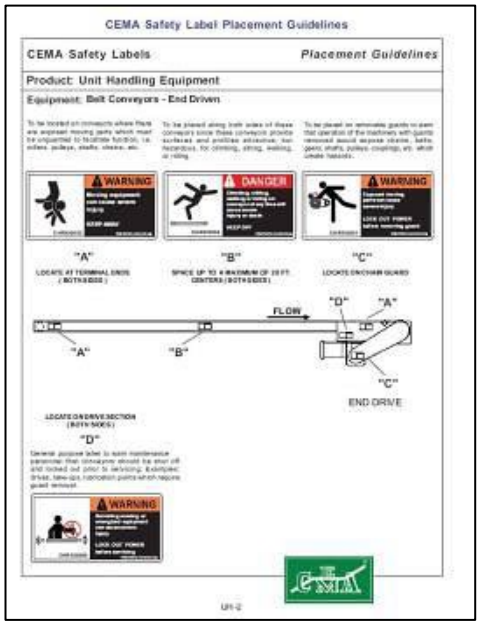
| WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• Safety: Always lock out power source and follow recommended safety procedures. https://www.osha.gov/ |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

## 2.1 MHS RECOMMENDS PROPER LABELS FOR CONVEYOR TYPES

Shown below are some samples of labels applicable to conveyor standards.


Reference https://cemanet.org/ for safety label guidelines.

# 3 WARNINGS AND SAFETY INSTRUCTIONS

### *3.1.1 Symbols Used Throughout the Manual*

Failure to follow the instructions and cautions throughout this manual and warning label 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 made to the following areas of this manual. Listed below are some symbols used throughout the manual to emphasize information of significant importance.

| **DANGER** | |
|---|---|
|  | Indicates a high level potentially hazardous situation which, if not avoided, will result in death or serious injury. |

| **WARNING** | |
|---|---|
|  | Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. |

| **CAUTION** | |
|---|---|
|  | Indicates a low level potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices or for the protection of the equipment. |

| ***NOTICE*** | |
|---|---|
|  | Failure to follow these instructions can result in property damage or equipment damage. |

### *3.1.2 Obligations*

## The workers MUST DO!

- **Must Do,** carry out maintenance operations with the conveyor equipment switched off. Do not lubricate moving parts.
- **Must Do,** parts over 18kg should be lifted by two people.
- **Must Do,** step ladder must be used when performing maintenance or cleaning on items that cannot be reached from floor level.
- **Must Do,** tie up long hair or long beards, avoid wearing scarves or other clothes that may get trapped in the moving parts of the partly completed machine. All loose clothing, long hair, long beards, and jewelry must be kept away from moving equipment.
- **Must Do,** remove jewelry such as bracelets, rings or necklaces that may get trapped in moving parts, thus creating a risk for the operator.
- **Must Do,** always perform interventions on the electrical system components in the absence of voltage (main switch off).
- **Must Do,** make sure that no-one is standing in the danger zones during the start-up and operation of the partly completed machine.
- **Must Do,** use extreme caution to avoid injury or property damage during use of the conveyor machine.
- **Must Do,** know the location and operation of the stopping device.
- **Must Do,** comply with instructions and provisions given by the employer, managers, or supervisors, to ensure personal and collective safety.
- **Must Do,** make proper use of equipment, tools, substances, and dangerous products, means of transport and other working machinery, as well as safety devices.
- **Must Do,** make correct use of all personal protective equipment they have been provided with
- **Must Do,** after maintenance, must REPLACE guards immediately.
- **Must Do,** keep ALL warning labels clean and clear of any obstructions.
- **Must Do,** must be trained to never remove, deface, or paint over symbols or labels of any kind. Any damaged label can be replaced by MHS CONVEYOR by contacting Lifetime Services.
- **Must Do,** it is very important to instruct personnel in proper conveyor use, including the location and function of all controls.
- **Must Do,** special emphasis must be given to emergency stop procedures.
- **Must Do,** it is important to establish work procedures and access areas, which do not require any part of a person to be under the conveyor.
- **Must Do,** after the power source is turned off and locked out trained maintenance technician are to remove blockage or jams from the conveyor equipment.
- **Must Do,** maintain enough clearance on each side of all conveyor units for safe adjustment and maintenance of all components
- **Must Do,** provide crossovers or gates at sufficient intervals where needed to eliminate the temptation for personnel to climb over or under any conveyor.
- **Must Do,** use the conveyor equipment within the approved environmental conditions.

## The workers MUST DO!

- **Must Do, 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.
- **Must Do,** if more than one crew member is working on the conveyor, **EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCKOUT.**
- **Must Do,** maintain enough clearance on each side of all conveyor units for safe adjustment and maintenance of all components.
- **Must Do,** all pneumatic devices must be de-energized, and air removed to prevent accidental cycling of the device while performing general maintenance.
- **Must Do,** make sure all personnel are clear of all conveyor equipment before restarting the system.

- **Must Do,** watch for nip points or pinch points. A pinch point hazard is a common class of mechanical hazard where injury or damage may be done by one or more objects moving towards each other, crushing, or shearing whatever comes between them. A nip point is a type of pinch point involving rotating objects, such as gears and pulleys.
- **Must Do, BEFORE** restarting a conveyor, which has been stopped because of an emergency, an inspection of the conveyor must be made, and the cause of the stoppage determined. The starting device must be locked out before any attempt is made to correct the cause of stoppage.

- **Must Do,** make correct use of all personal protective equipment that they have been provided with.
- **Must Do,** know the workplace and traffic routes, and all required protections/guarding of nearby hazardous equipment.
- **Must Do,** know IntelliROL equipment starts and stops without warning and can cause severe injury.

- **Must Do,** employees that come in contact with the equipment must be warned of the dangers of an unexpected start.
- **Must Do,** hands can be crushed between products or products and channels.
- **Must Do,** the user shall be careful to ensure a regular feed, avoiding overloading.

- **Must Do,** all loading and working places, passageways, shall be kept clear.
- **Must Do, BEFORE** servicing or performing any work in the motor control panel, disconnect and padlock out air and the main incoming service. If ONLY the panel disconnect is off, the incoming side will still be hot.

- **Must Do,** all safety rules must be observed when working with, on or at the conveyor system in whatever way. This includes reading all installation, operation, maintenance, or technical manuals.

- **Must Do,** know that motor rollers can become hot!
- **Must Do,** know workplace and traffic routes may require additional protections/guarding if nearby hazardous equipment.

## The workers MUST DO!

- **Must Do,** know IntelliROL equipment starts and stops without warning.


- Employees that come in contact with the equipment must be warned of the dangers of unexpected start. Hands can be crushed between products or products and channels.


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


- Safety WARNING Label Lock Out Power

Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury.

Mandatory action symbols are used to draw attention to a supplementary sign for a specified mandatory action.

The mandatory action symbol is used to identify particularly important information inside the manual. The information also regards the safety of personnel involved use of the partly completed machine.

### *3.1.3 Prohibitions*

Listed are prohibitions and are mandatory **Must Not Do** to avoid the hazard!

| | THE WORKER MUST NOT! |
|---|---|
|  | • **Must Not,** use the conveyor equipment improperly, i.e., for uses other than those indicated in the "Intended use" paragraph.<br>• **Must Not,** remove or modify the safety or signaling devices without authorization.<br>• **Must Not,** remove, deface, or paint over symbols or labels of any kind. Any damaged label can be replaced by MHS CONVEYOR by contacting Lifetime Services. |
|  | • **Must Not,** convey hazardous materials.<br>• **Must Not,** Walking or riding on a conveyor equipment /moving conveyor must be prohibited. No person shall ride, sit, or stand on a conveyor under any circumstances.<br>• **MUST Not,** remove or install heavy parts whilst anyone is working on the floor level below the parts to be moved. This will help stop accidental falling of heavy parts onto people.<br>• **Must Not,** carry out, upon their own initiative, operations or maneuvers they are not in charge of and that can jeopardize their own safety and that of other workers.<br>• **Must Not,** wear bracelets, rings or necklaces that may get trapped in moving parts, thus creating a risk for the operator.<br>• **Must Not,** modification of the design or configuration of the equipment may lead to new hazards or higher risk that are not reduced adequately by the risk reduction measures of the manufacturer.<br>• **Must Not,** replace or modify the speed of the conveyor equipment components without being authorized by a manager.<br>• **Must Not,** modify the conveyor equipment operating cycle.<br>• **Must Not,** modify the connections to exclude the internal safety devices. |
|  | • **Must Not,** use the conveyor equipment if not properly incorporated within the final line, according to current regulations.<br>• **Must Not,** use the conveyor equipment or its components as point of support even if not operational (risk of falls and/or risk of damaging the components themselves).<br>• **Must Not,** use the conveyor equipment outside of the admitted environmental conditions. |
|  | • **Must Not,** touch Motor rollers as they can become **hot!**<br>• **Must Not,** touch any type of Motor as the motor may be **hot!**<br>• **Must Not,** clear jams while the equipment is running.<br>• **Must Not,** do not pull-on equipment parts, such as belts, pulleys, or shafts, to assist slow starting equipment. |
| Indicates a high level potentially hazardous situation which, if not avoided, will result in death or serious injury.<br>Symbol used to identify operations that must not be performed or behaviors that must not be adopted as they could cause injury to personnel or damage to the partly completed machine. | |

## 3.2 MHS CONVEYOR CONTROLS SAFETY GUIDELINES

The following basic conveyor control safety guidelines are recommended by MHS Conveyor even though Business Partner may or may not purchase conveyor controls from MHS Conveyor. The items listed deal with applications of controls equipment. **The actual installation of the equipment must always follow the National Electric Code and all other local codes.**

### Start-up Warning Horn

Ideally, all conveyors should be within sight of the conveyor start pushbutton. This allows the operator to verify that no one is touching the conveyor or would be in danger if the conveyor were to start up.
If it is not possible to see the entire conveyor being started from the start pushbutton location, then some form of audible warning device is required. It could be a horn, buzzer, bell, or anything unique to that conveyor for that location. It should be loud enough to be heard at any point on the conveyor system. It should sound for approximately five seconds after the start pushbutton is pushed, prior to the actual running of conveyor. Any auxiliary equipment such as vertical lifts, turntables, etc., should also be included in the warning circuitry.
Conveyors that stop and restart under automatic control could also require a horn warning prior to restarting. If it is not easy to distinguish the difference between a fully stopped conveyor system and a momentarily stopped conveyor section, then it is advisable to add a warning horn. All conveyor sections that stop and restart automatically should be marked with appropriate signs or labels.

### Start Pushbuttons

Start pushbuttons should be the flush type or guarded such that inadvertently leaning against them will not actuate the conveyor. They should be provided with a legend plate clearly defining which conveyors will be started.

### Stop Pushbuttons

Stop pushbuttons should be the extended type such that any contact with it is sufficient to stop the conveyor. They would also be provided with a legend plate clearly defining which conveyors will be stopped.

### Operator Controls

Additional operator controls should be designed into the system with the same guidelines that go into start and stop pushbuttons, depending upon their function. Devices which are repeated on multiple control stations, such as emergency stops, should be located at the same relative location on each station (such as lower right corner).

### Emergency Stops

All locations where an operator must work directly at the conveyor may be subject to local safety codes requiring e-stops. It is the responsibility of the integrator to check with state and local authorities on the need and application of e-stops.
Emergency stops can be of the pushbutton or cable operated switch type. The pushbutton type should be a red, mushroom-head maintained pushbutton which requires resetting after it is actuated. Cable operated switches should trip by pulling the cable and require resetting at the switch.
Actuating an emergency stop must drop-out the start circuit, requiring restarting the system using the start pushbuttons provided.
An emergency stop should normally stop all conveyors in the system. Very large systems may involve dividing a system into zones of control based on proximity of personnel, safety hazards, walls obstacles, etc.

### Controls Logic

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

### Safety Switches

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

### Special Devices

Special devices and equipment such as vertical lifts, turntables, high speed conveyors, etc., all have unique design and safety requirements. These should be looked at in each case to determine what the requirements might be.

Rev 04/06/2023

# 4 INTELLIROL INTRODUCTION

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 products through the developed tangential force at the conveyor roller surface. The relationship between tangential forces, product weight and product characteristics has 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 shorter than the zone length.

Feature/Benefits

| Features | 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" top of roller (TOR) 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**

**Hazard to Equipment**

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

Indicates a low level potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices or for the protection of the equipment.

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.

## 4.1 INTELLIROL APPLICATION OPTIONS

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 degree, 30 or 45 degree 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 cart
- 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.

## 4.2 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 photo-eye.

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)

# 5 INTELLIROL RECEIVING AND 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 | |
|---|---|
| ⚠ | **Hazard to Equipment**<br>**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. |
| Indicates a low level potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices or for the protection 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.

## 5.1 PARTS INVENTORY AND 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 Response) Label
    - Scan Code for IOM Manual


Scan the QR code to retrieve the IOM Manual, if nothing happens; check your scanner settings and make sure the QR Label setting is enabled.

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 weight-counted and packaged by size and type.

| ⚠WARNING | |
|---|---|
| | **Hazard to Equipment or Personnel**<br>• 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.<br>• Before restarting a conveyor, which has been stopped because of an emergency, an inspection of the conveyor must be made, and the cause of the stoppage determined. The starting device must be locked out before any attempt is made to correct the cause of stoppage. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

# 6 INTELLIROL INSTALLATION

## 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' (both) or 12' (24" zones only). 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.

### Shrouds

Translucent PVC shrouds are available in 5' lengths to enclose the CRUZchannel or C6-channel to cover and protect the CRUZcontrol® components. Mounting brackets for the C6 shrouds are installed in the field. Shrouds and mounting kits are shipped loose for field installation.

Field modification is required to the shrouds if they are used with adjustable channel guardrail. Optional jackets mounted to bottom flange of conveyor can be used as an alternate mount.

### Note:

When installing conveyor shrouds, every fourth shroud requires safety label information and in addition, every 4th or 5th section requires a MHS Conveyor label. Alternate labels so they are not on the same shroud.

### Drive / Slave Belt Break-in

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

### 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.

## 6.1 ENVIRONMENT

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.

Temperature range (ambient):
**Temperature range (ambient)**

- IntelliROL without belts +35F(+1°C) to +100F(+38°C).
- IntelliROL incline, decline, full width belts (FWB) +50F(+10°C) to +100F(+38°C).

For applications that exceed this temperature range, please consult Applications Engineering.

Grounding:
Equipment should be properly grounded before operation.

Cleaning O-Rings
Manufacturer suggested for cleaning O-rings is to use a cloth with a de-natured alcohol when cleaning the O-ring. This cleaning product would also work for cleaning the rollers.

Note:
Do NOT immerse the O-rings or any component in a container of this cleaning product.

## 6.2 SUPPORTS AND CONNECTIONS

Roll Formed (RF) supports replace all existing MHS Conveyor floor supports.

For details on Supports and Connections, see Support & Connections (IOM# 1200485) at: mhs-conveyor.com

## 6.3 GAP FILLER BED

Application

- The application of Gap Filler Beds is for transportation conveyor.
- When using a Gap Filler Bed between two transportation conveyors, use a roller spacing the same as the beds adjacent to the filler bed.

Features/Benefits

Gap Filler Beds aid the modularity of conveyors. Filler beds fit between straight sections of transportation to add length to the conveyor layout. The following is a list features and their benefit.

- Modular design - Easy to reconfigure.
- C6 and CRUZ channel beds available in both 2” and 3” roller spacing.
- No scheduled maintenance - Lower operating cost.
- Simple installation - Lower cost.
- Few moving parts -Reduced maintenance cost and less noise.

## 6.4 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.

## 6.5 INTELLIROL BASIC INSTALLATION

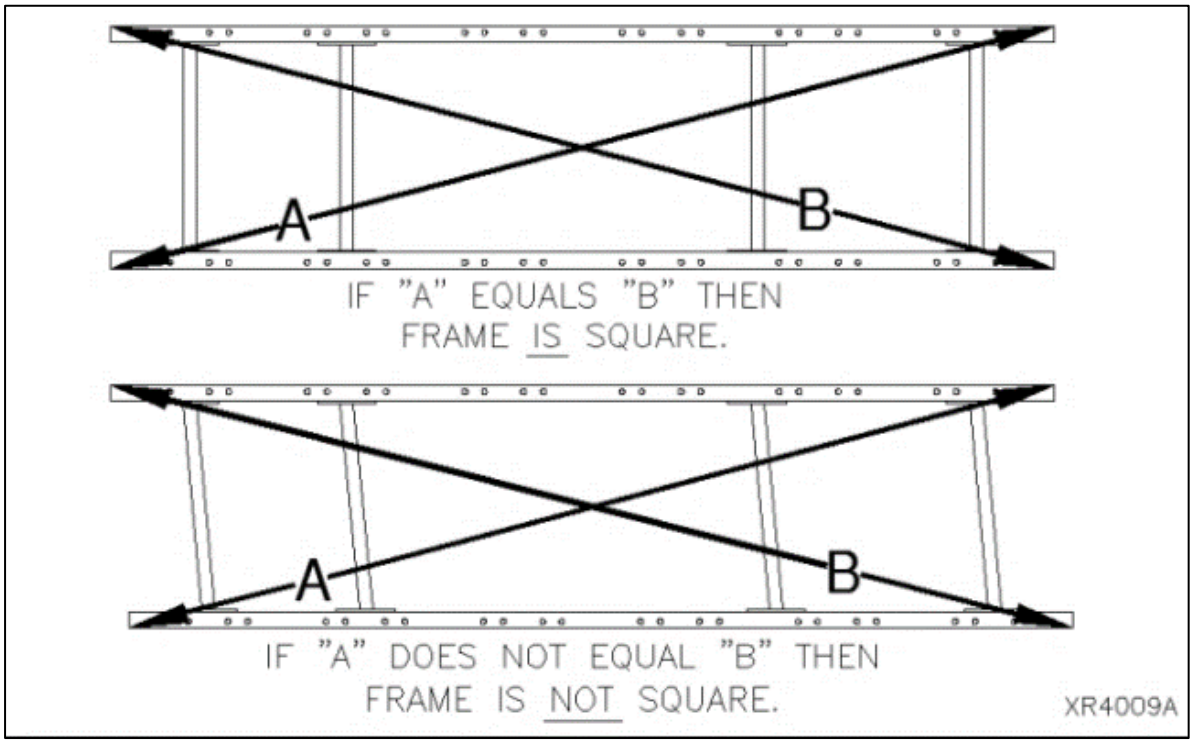
Basic Installation

IntelliROL conveyor may be installed using any of the supporting arrangements described under Support & Connections chapter of 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".



## 6.6 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.

| **⚠WARNING** | |
|---|---|
| ⚠ | **Hazard to Equipment or Personnel**<br>Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building if any conveyor section is ceiling hung. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### 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.

# 7 INTELLIROL APPLICATIONS

## 7.1 ITR APPLICATION STANDARD

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

- Itoh Denki motorized rollers and driver cards (CBM-105, HB-510 or IB-E03) 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.

## 7.2 ITR – 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.

## 7.3 ITR – 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 photo-eyes.
- 24” and 30” zones with 3” centers are standard.
- A start signal can be used to activate the conveyor when using run on demand.

## 7.4 ITR – IB-E03 (PROGRAMMABLE)

- Standard product offered in Core Technologies.
- Conveyor based on the Itoh IB-E03 drivercard and FE-60 motorized roller.
- Programmable drivercard (Programming by customer).
- CRUZchannel with welded butt bolt bed connectors and integrated photo-eyes.
- Accumulation or transportation depending on customer needs.
- A signal can be sent from central PLC to activate the conveyor through the cards LAN line, or the card can activate the conveyor with internal programming logic using the cards inputs.

## 7.5 ITR 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 driver cards in every zone.

## 7.6 ITR FULL WIDTH BELT BED CONSTRUCTION

- Horizontal, Decline, Incline, Noseover and Noseunder Beds
- Standard driver card for accumulation.
- ZPA conveyor based on the Itoh HB-510 or IB-E03 driver card and FE-60 motorized roller.
- Can be a stand-alone conveyor. It does not require an input from a control panel, etc. to operate.
- CRUZ®channel with welded butt bolt bed connectors and integrated photo-eyes.
- 24" and 30" zones
- A start signal can be used to activate the conveyor when using run on demand.
- Each driver card is wired to power using a power harness with a male connector at the charge end and a female connector at the discharge end.

## 7.7 ITR SKEW BED CONSTRUCTION

- Straight bed – CRUZ®channel.
- CZ channel standard has 1.625” flanges.
- 2.25"RC installed at the factory.
- Transportation conveyor based on the Itoh CBM-105 cards and FE-60 motorized roller.
- All channels come with a welded bed connector.

## 7.8 CURVE CONSTRUCTION

- 36” standard inside curve radius with CRUZ® side channel.
- Curve channels are notched with welded 10ga backers.
- No straight tangents, full straight section arc only.
- All channels come with a welded bed connector.
- CBM-105, HB-510, and / or IB-E03 cards located on the outer channel with an adapter plate (CBM-105 Plate: E0006531, HB-510 Plate: E0006532, IB-E03 Plate: 1165192).
- Sensor location is 6” from the end of the zone.

## 7.9 UBT PNEUMATIC CONSTRUCTION

- 3’-4” OAL standard for 6 strand, 3'0" standard for 5 strand.
- C6 channels are 10ga construction with welded butt bolt bed connectors.
- UBT transfers use 1.9" diameter carrier rollers.
- UBT transfer belts on 4” center standard.
- UBT’s with sensors, PE’s (ZL) & reflectors are available as a standard option.
- UBT's are universal LH/RH. The power harness is installed for LH flow, but can be reversed by moving a female gender adapter to the other end of the harness.

## 7.10 UBT ELECTRIC CONSTRUCTION

- 3’-4” OAL standard for 6 strand, 3'0" standard for 5 strand.
- C6 channels are 10ga construction with welded butt bolt bed connectors.
- UBT transfers require 1.9" diameter carrier rollers.
- UBT transfer belts on 4” center standard.
- UBT’s with sensors, PE’s (ZL) & reflectors are available as a standard option.
- UBT's are universal LH/RH. The power harness is installed for LH flow, but can be repowered by moving a female gender adapter to the other end of the harness.
- ITRIBE is the only version of a standard electric lift UBT (transportation only).
- (2) 24VDC Lifting Gearmotors standard.

## 7.11 MERGE BEDS

- Single bed that does not come with a spur bed, but it is designed to have a spur mounted to it.
- Must use designated bracket kit. MHS Conveyor P/N: 1208351
- Merge is available in ITRCB or IB-E03 version.
- Works with standard spur beds. Spur beds are 30 and 45 degrees, RH/LH.
- Photo-eyes by others.

## 7.12 WHEEL DIVERT PNEUMATIC CONSTRUCTION

- Standard wheel diverter available in ITRCB or IB-E03 version (Transportation only).
- Standard spur angle is 30 degrees RH/LH beds.
- Standard diverter has 4-wheel rows divided into two groups. Two solenoids standard, each solenoid operates two rows.
- Optional:
    - 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 standard. 120VAC or 24VDC available.
- Photo-eyes by others.
- Wheel diverts include drop out tubs. Maintain at least 10" clearance below divert for removal.

## 7.13 WHEEL DIVERT ELECTRIC CONSTRUCTION

- ITRIBE is the only version of a standard electric lift wheel diverter (transportation only).
- Standard spur angle is 30 degrees RH/LH beds.
- Diverter has 4 acting rows. (2) Divert wheel rows are controlled by separate 24VDC Gearmotors.
- (2) 24VDC Lifting Gearmotors standard.
- Photo-eyes by others.
- Wheel diverts include drop out tubs. Maintain at least 10" clearance below divert for removal.

## 7.14 SPUR CONSTRUCTION

- Standard spur available in ITRCB or IB-E03 version (Transportation only).
- Standard spur angles are created for 30 and 45 degrees, Right Hand or Left Hand (RH/LH).
- Each spur has a conversion cable to allow for proper power and control signal flow.
- Each spur includes a wheeled guardrail to direct packages.

## 7.15 ITR GATE

- Standard driver card for transportation.
- Transportation conveyor based on the Itoh CBM-105 and IB-E03 driver card and FE-60 motorized roller.
- Each driver card is wired to power using a power harness with a male connector at the charge end and a female connector at the discharge end.
- C6 channel with welded bed connectors.
- 30" roller groups.
- ITR CB or IBE Electrical Components
- A limit switch is included with the gate.

# 8 DESCRIPTION OF OPERATION

## 8.1 INTELLIROL ELECTRIC UBT (URETHANE BELT TRANSFER)

Note: Ref I/O chart below (dwg 130E467), description of operation based on default LH flow.

| 4DCM I/O | | | |
|---|---|---|---|
| **OUTPUTS** | **DESCRIPTIONS** | **INPUTS** | **DESCRIPTION** |
| MOTOR A | MOTOR A4 – LIFT | 0-10V INPUT | |
| | | SPEED OUT | |
| | | ERROR OUT | |
| | | REVERSE IN | |
| | | RUN A IN | |
| | | RUN B IN | RUN SIGNAL LIFT |
| | | COMMON | |
| **3DCM I/O** | | | |
| **OUTPUTS** | **DESCRIPTIONS** | **INPUTS** | **DESCRIPTION** |
| MOTOR A | MOTOR 3A – LIFT | 0 – 10V INPUT | |
| | | SPEED OUT | |
| | | ERROR OUT | |
| | | REVERSE IN | |
| | | RUN A IN | |
| | | RUN B OUT | RUN SIGNAL LIFT |
| | | COMMON | |
| **2DCM I/O** | | | |
| **OUTPUTS** | **DESCRIPTIONS** | **INPUTS** | **DESCRIPTION** |
| MOTOR A | MOTOR 2A - ROLLERS | SENSOR A – SEN | |
| MOTOR B | | SENSOR A – ALM | |
| OUT 1 | | SENSOR B – SEN | RAISE |
| OUT 2 | | SENSOR B – ALM | LOWER |
| OUT 3 | | IN 1 | |
| OUT 4 | | IN 2 | |
| OUT 5 | | IN 3 | |
| **1DCM I/O** | | | |
| **OUTPUTS** | **DESCRIPTIONS** | **INPUTS** | **DESCRIPTION** |
| MOTOR A | MOTOR 1A – BELTS | SENSOR A – SEN | PRE – 3 |
| MOTOR B | MOTOR 1B – BELTS | SENSOR A – ALM | PRE – 4 |
| OUT 1 | RUN SIGNAL - LIFT | SENSOR B – SEN | PRE – 1 |
| OUT 2 | | SENSOR B – ALM | PRE – 2 |
| OUT 3 | | IN 1 | |
| OUT 4 | | IN 2 | |
| OUT 5 | | IN 3 | |

When the system is first started, the following conditions should exist:

- Upstream conveyor running
- Downstream conveyors running
- UBT transfer rollers running (Motor 2A)
- UBT transfer in down position (Prox Lower)

As packages travel along the upstream conveyor, the PLC programming is used to determine what to do with each package at the decision point of the UBT. Specifically, the decisions needed at the UBT are as follows:

- Whether or not to divert the package.
- If the package is to be transferred, which direction to divert the package.

Once the package has completely entered the transfer, and needs to be diverted, as detected by PE-1 sensing the trailing edge of the package, a specified delay will turn off motor 2A. If the package is to be diverted two things will occur:

1. Motor 3A and 4A will raise the transfer, Prox Raise when detected will stop transfer in the raised position.
2. Motor 1A and 1B will run the transfer belts in the required divert direction.

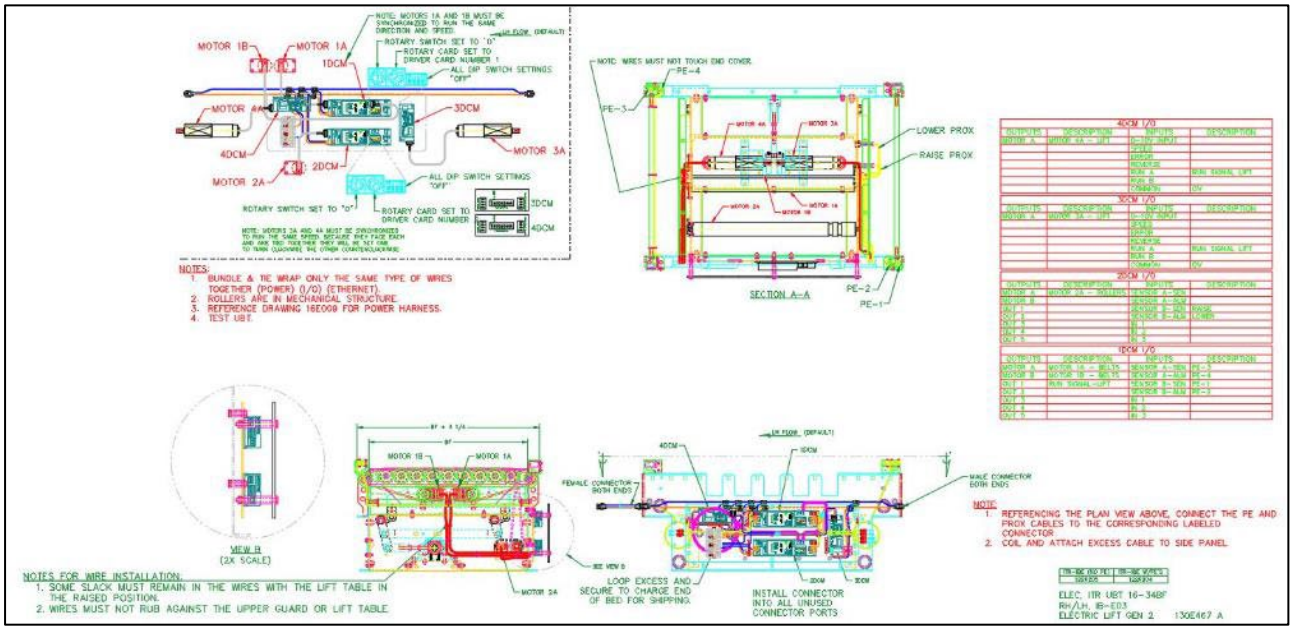
If the package is diverted right, when the trailing edge of the package leaves the UBT and is detected by PE-4, Motors 1A and 1B will shut down, motor 2A will start the UBT rollers, and motor 3A and 4A will lower the transfer, Prox Lower when detected will stop the transfer in the lowered position.

If the package is diverted left, when the trailing edge of the package is detected by PE-2, Motors 1A and 1B will shut down, motor 2A will start the UBT rollers, and motor 3A and 4A will lower the transfer, Prox Lower when detected will stop the transfer in the lowered position.

If the package is to be passed through the UBT, Motor 2A will continue to run. When the trailing edge of the package is detected by PE-3 the unit is ready to receive another package.

Again, these decisions are based upon the data associated with the position of the package in the system or the barcode on the package.

If desired, if the UBT does not sense any product for a period of time, the system can be stopped. When product begins entering the UBT, as detected by PE-1, the system can be restarted and function as described above.




*Reference drawing 130E467*

## 8.2 INTELLIROL ELECTRIC WHEEL DIVERTER

Note: Ref I/O chart below (dwg 130E469).

| INPUTS | | | | |
|---|---|---|---|---|
| **DEVICE TAG** | **CARD#** | **TERMINAL** | **DESCRIPTION** | **WIRED AT:** |
| 100PX | 4 | ALM A | WHEEL DIVERT ROW 1 & 2 LOWERED | BENCH |
| 101PX | 4 | IN 1 | WHEEL DIVERT ROW 1 & 2 RAISED | BENCH |
| 102PX | 4 | IN 2 | WHEEL DIVERT ROW 1 & 2 LOWERED | BENCH |
| 103PX | 4 | IN 3 | WHEEL DIVERT ROW 1 & 2 RAISED | BENCH |
| | 4 | SEN A | OPEN | |
| | 4 | ALM B | OPEN | |
| | 4 | SEN B | OPEN | |

| OUTPUTS | | | | |
|---|---|---|---|---|
| **DEVICE TAG** | **CARD#** | **TERMINAL** | **DESCRIPTION** | **WIRED AT:** |
| 000M | 4 | OUT 1 | WHEEL LIFT MOTOR ROW 1 & 2 | BENCH |
| 001M | 4 | OUT 2 | WHEEL LIFT MOTOR ROW 3 & 4 | BENCH |
| | 4 | OUT 3 | OPEN | |
| | 4 | OUT 4 | OPEN | |
| | 4 | OUT 5 | OPEN | |

When the system is first started, the following conditions should exist:

| 16BF and 22BF Units | 28BF and 34BF Units |
|---|---|
| Upstream induct conveyor running | Upstream induct conveyor running |
| Downstream conveyor running (Motor 3A) | Downstream conveyor running (Motor 3A & 3B) |
| Spur rollers running (Motors 1A & 1B) | Spur rollers running (Motors 1A, 1B & 2A) |
| Wheel diverter rollers running (Motors 4A & 4B) | Wheel diverter rollers running (Motors 4A & 4B) |
| Wheel divert in down position (I00PX & I02PX) | Wheel divert in down position (I00PX & I02PX) |

As packages travel along the upstream conveyor, the PLC programming is used to determine what to do with each package at the decision point of the wheel diverter.

Specifically, the decision needed at the wheel diverter is:

- Whether or not to divert the package

As the next package upstream is about to enter the diverter area, all motors from the chart above will continue to run. If the package is to be diverted, the following will occur:

3. All motors will continue to run.
4. 000M and 001M will raise the transfer wheels, I01PX & I03PX when detected will stop the transfer wheels in the raised position.
5. The package will divert on to the spur.

Once the package is present on the spur bed, the following will occur:

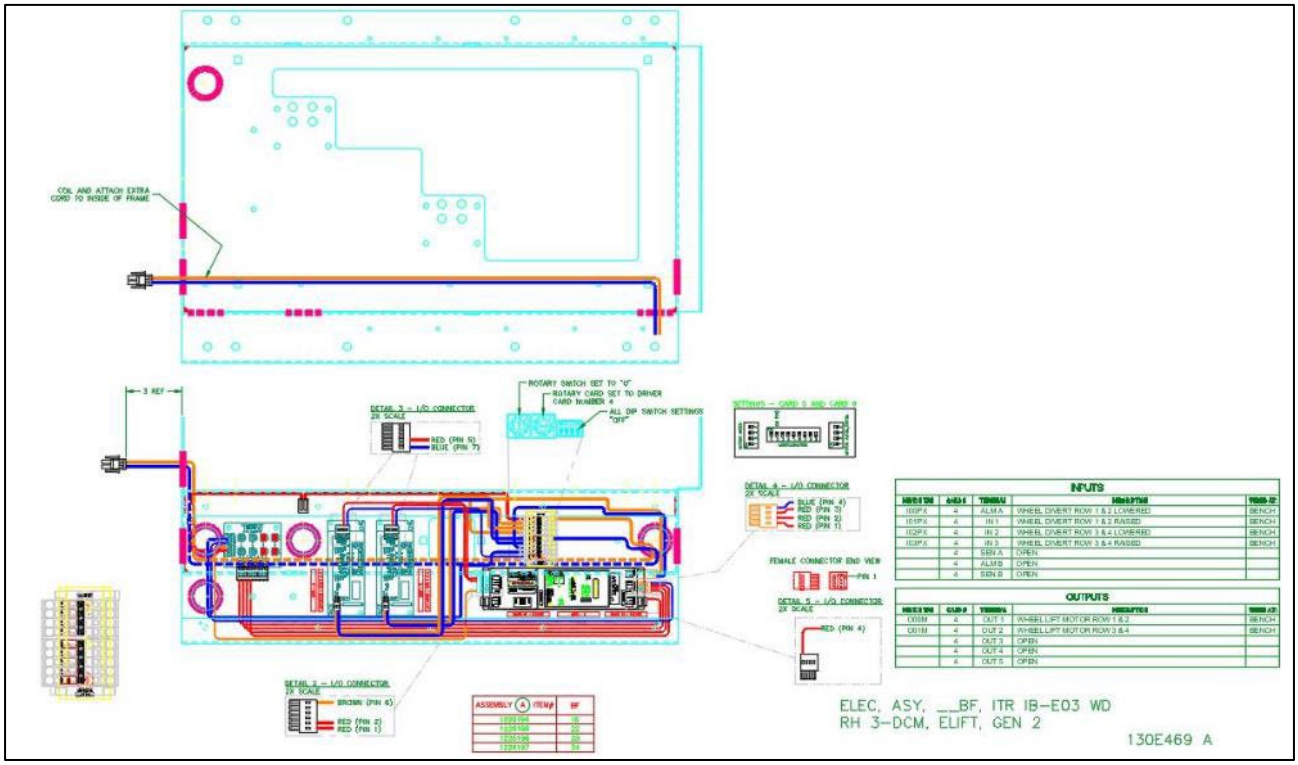
1. All motors will continue to run.
2. 000M and 001M will lower the transfer wheels, I00PX & I02PX when detected will stop the transfer wheels in the lowered position.

As the next package upstream is about to enter the diverter area, and the package does not need to be diverted, the following will occur:

1. All motors continue to run, and the diverter will stay in the lowered position.

Again, these decisions are based upon the data associated with the position of the package in the system or the barcode on the package.

Note:
The electric lift wheel diverter is not intended to be left in the raised position for prolonged periods of time. It is intended to raise only as needed then returned to the lowered position when the package is cleared.



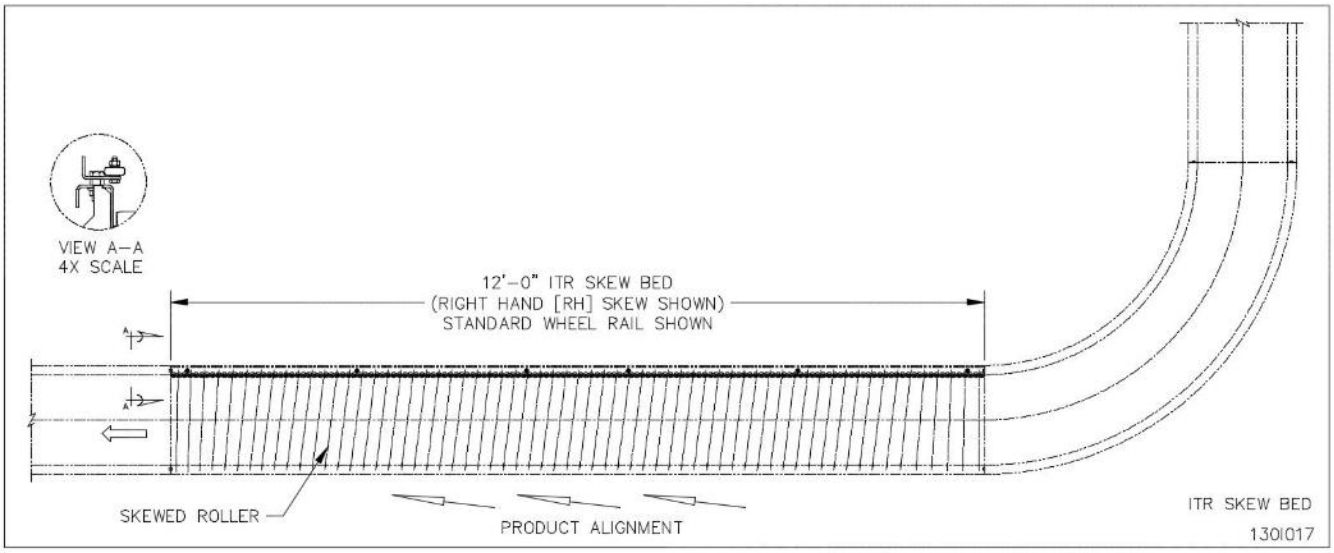

*Reference drawing 130E469*

# 9 ITR SKEWING BED ROLLERS

Skewing rollers is recommended on ITR conveyor if the between frame (BF) dimension of conveyor is double the width of the smallest product. The normal method of skewing is to install a factory skew bed at the charge end of your conveyor. If your conveyor line is over 100' long and you have small product on it, you may want to add a shorter maintenance skew bed midway down the conveyor to preserve the product alignment.

## 9.1 FACTORY SKEW SECTION

Standard 12', 10', or 5' skew beds are available with factory skewed rollers at 7 degrees. These beds are available in left hand or right hand factory installed wheel guard rail is standard. The skewed bed will move products across the conveyor approximately 16" over the 12' length. This side movement is dependent on the bottom condition of the product.

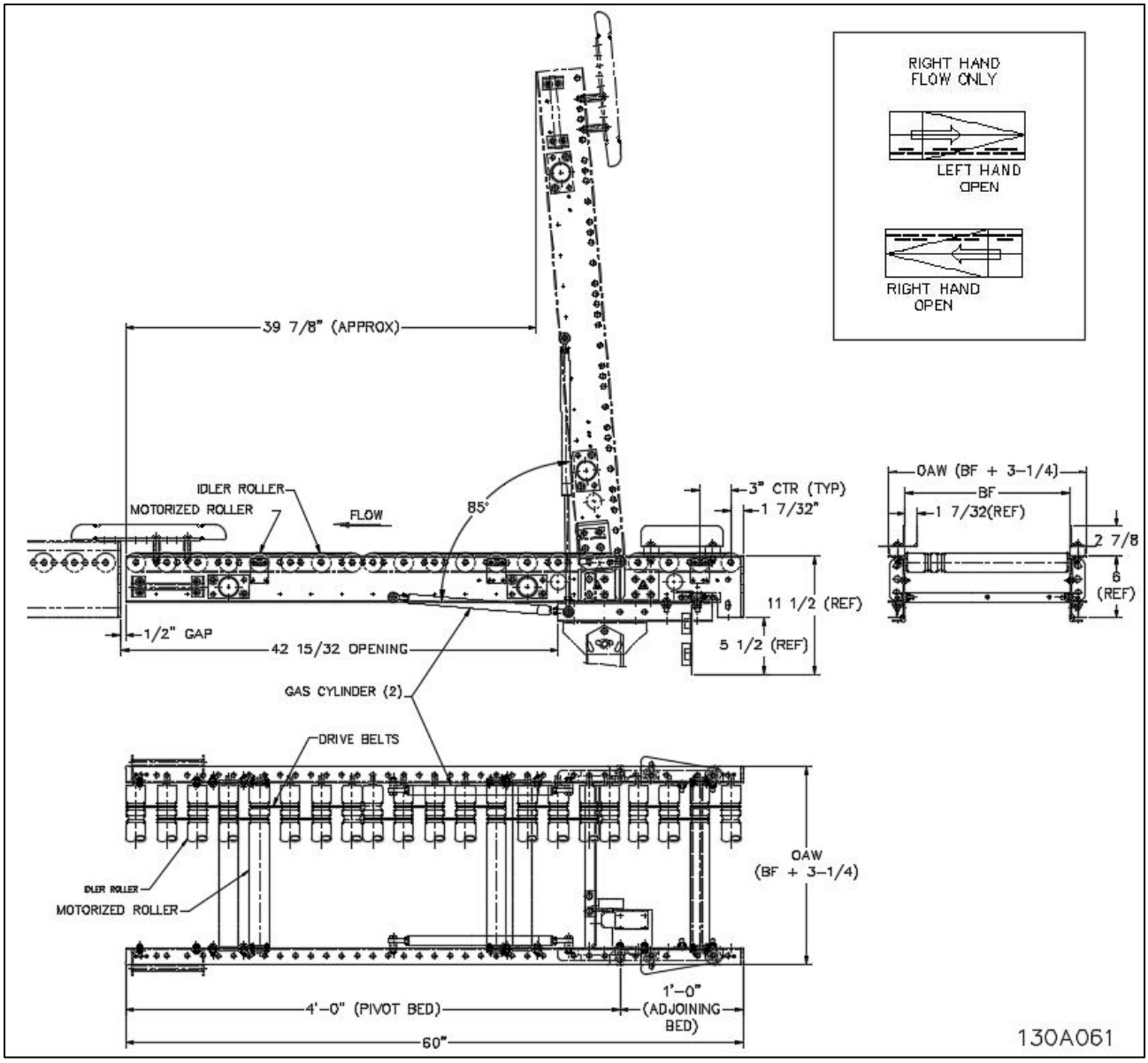



## 9.2 SKEW BED INSTALLATION

MHS Conveyor dedicated skew beds are typically installed as the first bed section in an ITR conveyor line starting from the charge end. The rollers are factory skewed to the requested side and the installation is the same as any other ITR transportation bed section.

A wheeled guard rail is standard to prevent the stalling of product as it is forced against the side channel by the skewed rollers. The wheeled rail is shipped installed at our factory.

# 10 ITR GATE




The gate provides a break in the conveyor line for pedestrian traffic. The power source must be from the charge side. The gate consists of a 4' pivoting bed and a 1' adjoining bed. Gates are available in right hand and left-hand lifts.

The gate requires a ½" gap between the discharge end of the lift gate section and the downstream conveyor for clearance.

## 10.1 LIFT GATE MAXIMUM CYCLES:

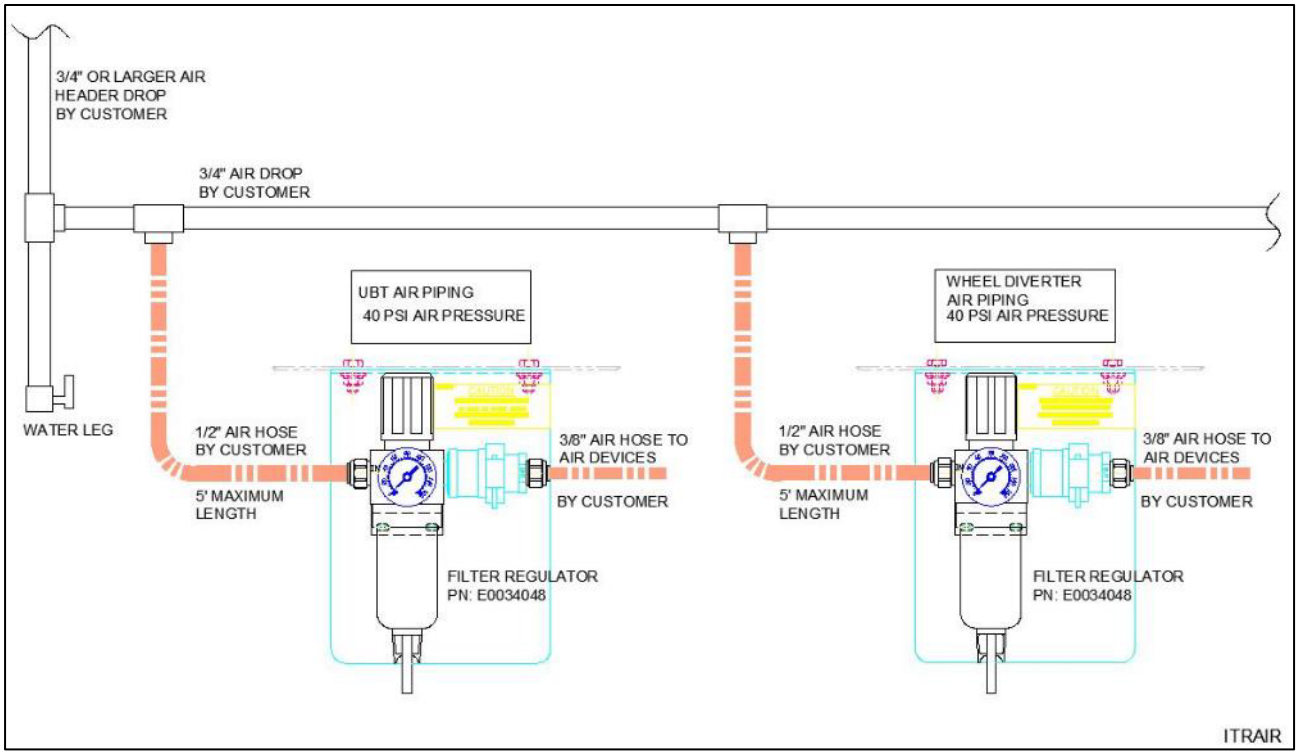
Zones are not used in the gate in an accumulation system. When a gate is used in transportation, controls must be in place to stop product when the gate is in the “up” position. The gate must be free of product before rising for pedestrian use. The conveyor **must stop** when the gate is open.

The lift gate operates with two gas springs that are used for counterbalance when the gate is raised and lowered. The gas springs are attached to the inside of each gate side channel.

The powered lift gate is used for limited access to the opposite side of the conveyor. The lift gate is rated for a maximum of (30) cycles per 8 hour shift or 150 cycles over a (7) day period.

Exceeding the maximum cycles as stated above will cause damage to the gas springs and gate which will void the warranty.

# 11 INTELLIROL 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.

## 11.1 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 40 PSI, the conveyor system should shut off.

## 11.2 PNEUMATIC REQUIREMENTS

- Maximum conveyor length each way from the regulator is 100'. Locate regulator in center of conveyor.
- **Recommended operating pressure set at**: 40 - 45 PSI
  - **Low Pressure Switch** set below operating pressure of 40 PSI (Typical range: 35-39 PSI)
  - **Pressure Relief Valve** set above 45 PSI (Typical range: 46-50 PSI).
- In high humidity or low temperature, use an air dryer.
- Use 5-micron filter.
- Lockout/shutoff valve, to be provided by the air system installer.

| **⚠WARNING** | |
|---|---|
|  | **Hazard to Personnel**<br>• Whip restraints must be installed on flexible hosing.<br>• Cable ties removed from pneumatic hosing must be replaced. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

# 12 INTELLIROL POWER SUPPLY STANDARDS

## 12.1 ITR POWER SUPPLY STANDARD

*Standard IntelliROL Power Supply with Puls power supply*

The IntelliROL product line includes power supplies that convert various AC power sources to 24VDC power sources. These power supplies are used to supply power to the motorized roller components included in our IntelliROL product line. Power supplies are available for most standard input voltages. Available output currents include 10, 20, 40, and 80 amperes. IntelliROL power supplies are available with internal branch circuit protection. If branch circuit protection is already provided upstream by others, IntelliROL power supplies are available without internal branch circuit protection at a lower cost. All IntelliROL power supplies are designed and built to UL508A standards.

The 40-amp power supply has (2) 20-amp circuits and the 80-amp power supply has (4) 20 amp circuits. Each 20-amp circuit will support up to 9 motorized rollers. These supplies require either 120 or 240 VAC single-phase or 480 VAC three-phase (480 VAC 10A requires two-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 except 80 amps include a 10.5' power harness (1102286) to connect to bed 24VDC power harness. All standard 80-amp power supplies include 33' power harness (1138166) to connect to bed 24VDC power harness. All power supplies also include a common ground (1161502) and splice connector kit (1207178).

For more Power Supply details, See ITR Power Supply Application Control Guidelines (IOM # 1176718): mhs-conveyor.com

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

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

| 24VDC STANDARD POWER SUPPLIES WITH BRANCH CURCUIT PROTECTION FOR INTELLIROL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MHS Item Number | Drawing Number | Input Voltage | Power Supply Size | Input Current | Output Current | Number of MDR | Enclosure Type | UL Listed | Enclosure Dimensions (H x W x D) |
| 1176603 | 130E233 | 480VAC/3PH/60HZ | 80A | 2.8A | **80A** | 36 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160913 | 130E115 | 480VAC/3PH/60HZ | 40A | 1.4A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160948 | 130E117 | 240VAC/1PH/60HZ | 40A | 4.5A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160950 | 130E119 | 120VAC/1PH/60HZ | 40A | 8.6A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160915 | 130E116 | 480VAC/3PH/60HZ | 20A | 0.65A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160949 | 130E118 | 240VAC/1PH/60HZ | 20A | 2.23A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160951 | 130E120 | 120VAC/1PH/60HZ | 20A | 4.64A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166694 | 130E174 | 480VAC/3PH/60HZ | 10A | 0.6A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166695 | 130E175 | 240VAC/1PH/60HZ | 10A | 1.13A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166696 | 130E176 | 120VAC/1PH/60HZ | 10A | 2.15A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |

| 24VDC STANDARD POWER SUPPLIES WITHOUT BRANCH CURCUIT PROTECTION FOR INTELLIROL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MHS Item Number | Drawing Number | Input Voltage | Power Supply Size | Input Current | Output Current | Number of MDR | Enclosure Type | UL Listed | Enclosure Dimensions (H x W x D) |
| 1176628 | 130E234 | 480VAC/3PH/60HZ | 80A | 2.8A | **80A** | 36 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1159645 | 130E121 | 480VAC/3PH/60HZ | 40A | 1.4A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160953 | 130E123 | 240VAC/1PH/60HZ | 40A | 4.5A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160955 | 130E125 | 120VAC/1PH/60HZ | 40A | 8.6A | **40A** | 18 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1159647 | 130E122 | 480VAC/3PH/60HZ | 20A | 0.65A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160954 | 130E124 | 240VAC/1PH/60HZ | 20A | 2.23A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160956 | 130E126 | 120VAC/1PH/60HZ | 20A | 4.64A | **20A** | 9 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166697 | 130E177 | 480VAC/3PH/60HZ | 10A | 0.6A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166698 | 130E178 | 240VAC/1PH/60HZ | 10A | 1.13A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166699 | 130E179 | 120VAC/1PH/60HZ | 10A | 2.15A | **10A** | 3 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |

## 12.2 ITR AND CRUZCONTROL POWER SUPPLY COMBINATION

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 tapped 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 WITH BRANCH CURCUIT PROTECTION FOR INTELLIROL AND CRUZCONTROL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MHS Item Number | Drawing Number | Input Voltage | Power Supply Size | Input Current | Output Current | | Number of MDR | Enclosure Type | UL Listed | Enclosure Dimensions (H x W x D) |
| | | | | | ITR | CRUZ | | | | |
| 1160917 | 130E103 | 480VAC/3PH/60HZ | 40A | 1.4A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160919 | 130E105 | 240VAC/1PH/60HZ | 40A | 4.5A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160921 | 130E107 | 120VAC/1PH/60HZ | 40A | 8.6A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160918 | 130E104 | 480VAC/3PH/60HZ | 20A | 0.65A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160920 | 130E106 | 240VAC/1PH/60HZ | 20A | 2.23A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160922 | 130E108 | 120VAC/1PH/60HZ | 20A | 4.64A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166700 | 130E180 | 480VAC/3PH/60HZ | 10A | 0.6A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166701 | 130E181 | 240VAC/1PH/60HZ | 10A | 1.13A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166702 | 130E182 | 120VAC/1PH/60HZ | 10A | 2.15A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |

| 24VDC COMBINATION POWER SUPPLIES WITHOUT BRANCH CURCUIT PROTECTION FOR INTELLIROL AND CRUZCONTROL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MHS Item Number | Drawing Number | Input Voltage | Power Supply Size | Input Current | Output Current | | Number of MDR | Enclosure Type | UL Listed | Enclosure Dimensions (H x W x D) |
| | | | | | ITR | CRUZ | | | | |
| 1160923 | 130E109 | 480VAC/3PH/60HZ | 40A | 1.4A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160925 | 130E111 | 240VAC/1PH/60HZ | 40A | 4.5A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160927 | 130E113 | 120VAC/1PH/60HZ | 40A | 8.6A | 36 | 4 | 17 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160924 | 130E110 | 480VAC/3PH/60HZ | 20A | 0.65A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160926 | 130E112 | 240VAC/1PH/60HZ | 20A | 2.23A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1160928 | 130E114 | 120VAC/1PH/60HZ | 20A | 4.64A | 16 | 4 | 8 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166703 | 130E183 | 480VAC/3PH/60HZ | 10A | 0.6A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166704 | 130E184 | 240VAC/1PH/60HZ | 10A | 1.13A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |
| 1166705 | 130E185 | 120VAC/1PH/60HZ | 10A | 2.15A | 6 | 4 | 2 | Type 12 | Yes | 15-3/4" X 15-3/4" X 7-7/8" |

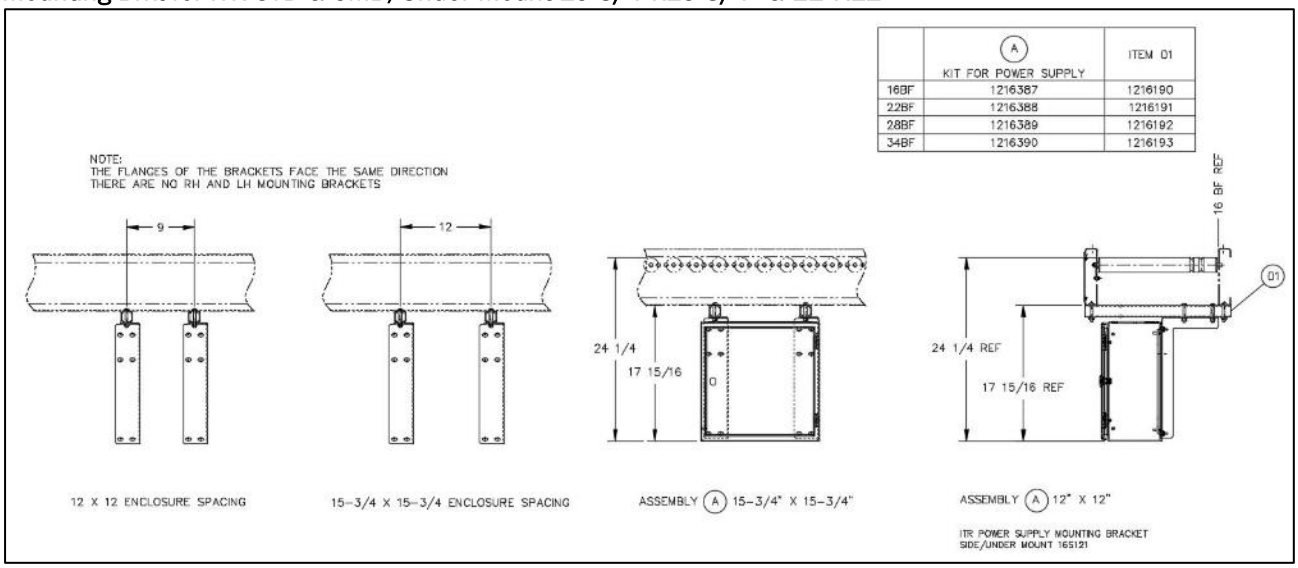
## 12.3 ITR POWER SUPPLY MOTOR CONTROL

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.

| MOTOR CONTROL 24VDC POWER SUPPLIES FOR INTELLIROL (USED ONLY WITH MOTORS W/O VFD) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MHS Item Number | Drawing Number | Input Voltage | Power Supply Size | Input Current | Output Current | Number of MDR | Enclosure Type | UL Listed | Enclosure Dimensions (H x W x D) |
| 1145930 | 130E042 | 480VAC/3PH/60HZ | 10A | 0.6A | 10A | 3 | Type 12 | Yes | 12"X 12" X 8" |
| 1145931 | 130E043 | 480VAC/3PH/60HZ | 20A | 0.65A | 20A | 9 | Type 12 | Yes | 12"X 12" X 8" |

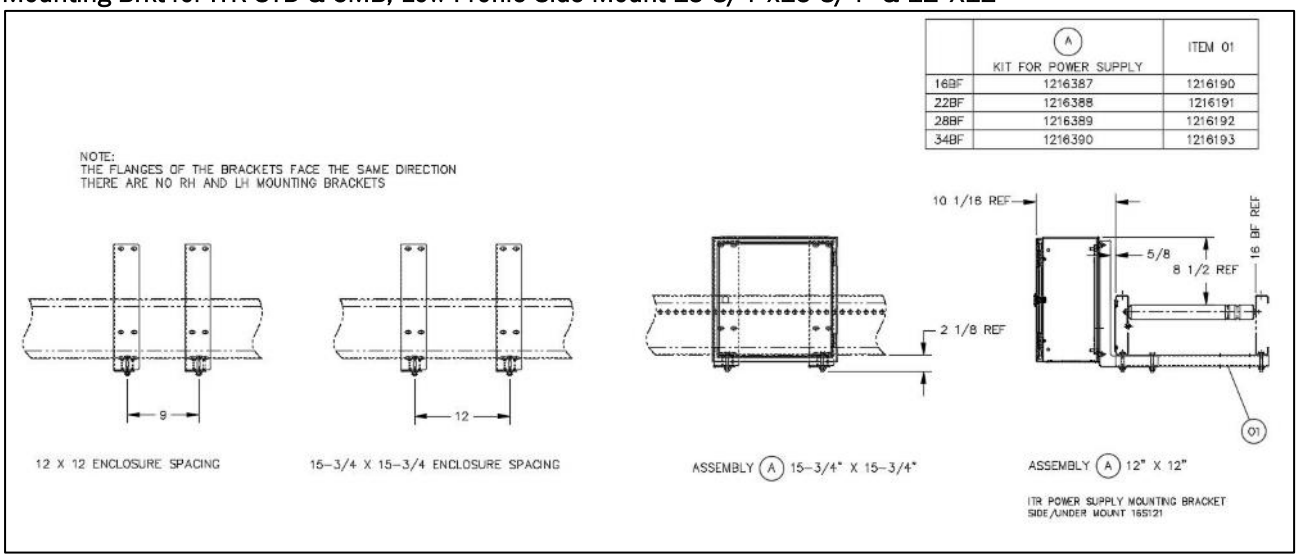
## 12.4 ITR POWER SUPPLY MOUNTING BRACKET KITS

Mounting Brkt for ITR STD & CMB, Under Mount 15-3/4"x15-3/4" & 12"X12"




| | A KIT FOR POWER SUPPLY | ITEM 01 |
|---|---|---|
| 16BF | 1216387 | 1216190 |
| 22BF | 1216388 | 1216191 |
| 28BF | 1216389 | 1216192 |
| 34BF | 1216390 | 1216193 |

Mounting Brkt for ITR STD & CMB, Low Profile Side Mount 15-3/4"x15-3/4" & 12"X12"




| | A KIT FOR POWER SUPPLY | ITEM 01 |
|---|---|---|
| 16BF | 1216387 | 1216190 |
| 22BF | 1216388 | 1216191 |
| 28BF | 1216389 | 1216192 |
| 34BF | 1216390 | 1216193 |

# 13 GENERAL ELECTRICAL REQUIREMENTS

| ⚠WARNING | |
|---|---|
|  | **Electrical Hazard**<br>• All electrical controls must be installed, wired, and connected by a licensed electrician only.<br>• 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. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

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 | |
|---|---|
|  | **Electrical Hazard**<br>• Do not connect the driver card to any other voltage than the one listed on its name plate.<br>• All safety devices, including wiring of electrical safety devices, shall be arranged to operate in a “fail safe” manner. That is, if a power failure or failure of the device itself would occur, a hazardous condition must not result.<br>• Before restarting a conveyor, which has been stopped because of an emergency, an inspection of the conveyor must be made, and the cause of the stoppage determined. The starting device must be locked out before any attempt is made to correct the cause of stoppage. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

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

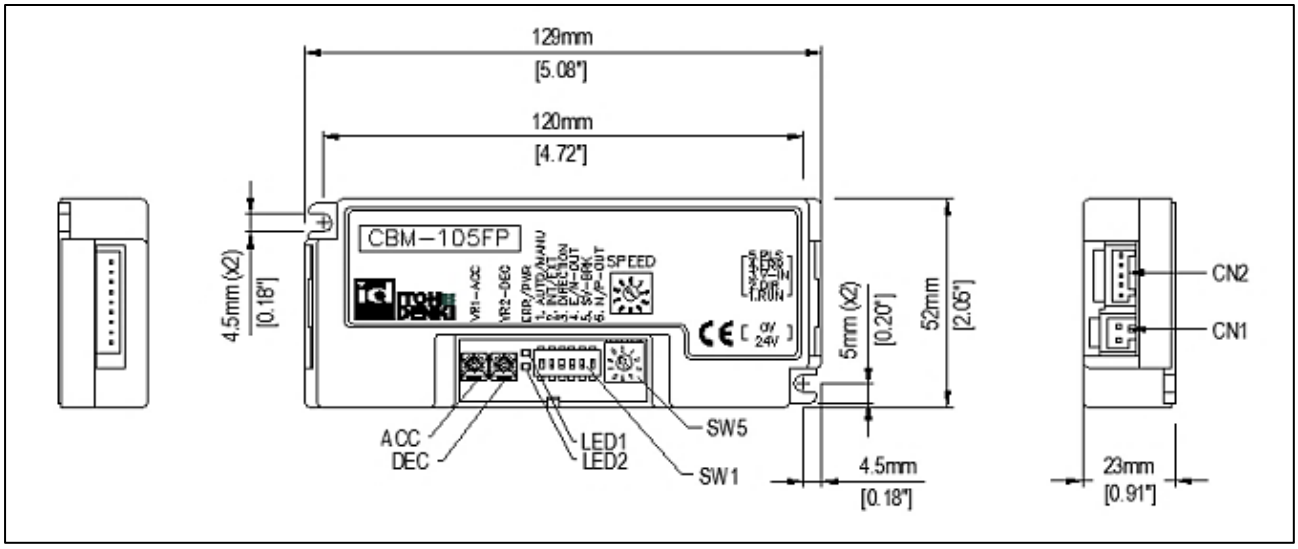
## 13.1 CRUZCONTROL TECHNICAL DATA

CRUZcontrol Power Supply Specification

| Technical Data | PN 1117431 | PN 1117432 |
|---|---|---|
| **Input Parameters** | | |
| Input Voltage Range V AC (nominal) | 100…120/220…240 V | 380…480 V (2 phase) |
| Input Voltage Range V AC (continuous) | 85…132/1184…264 V | 323…552 V (2 phase) |
| Input Frequency | 47…63 Hz | 47…63 Hz |
| Phase | 1 | 2 |
| Input Voltage Range V DC (see derating requirements) | 220…375 V | consult factory |
| Input Rated Current | < 2.0 A (100 V AC) | < 0.42 A (400 V AC) |
| | < 0.95 A (196 V AC) | < 0.36 A (480 V AC) |
| Transient Immunity Over Entire Load Range | | Consult factory |
| **Output Parameters** | | |
| Output Voltage | 24…28 V DC | 24…28 V DC |
| Output Voltage Preset | 24.5 V DC ±0.5% | 24.5 V DC ± 0.5% |
| Ripple/Noise @ 20 MHz, 50 Ohm | < 50 m Vpp | < 50 m Vpp |
| Output Voltage Regulation Accuracy | 0.5% Vout static | ± 200 mV static |
| | ±1.5% Vout dynamic | Dynamic not available |
| Output Rated Current | 3.9 A (at 24 V) | 3.75 A (at 24 V) |
| | 3.2 A (at 28 V) | 3.2 A (at 28 V) |
| Hold Up Time | > 20 ms (196 V AC, 24.5V/3.9 A) | Typ. 52 ms (at 400 V) |
| | > 20 ms (100 V AC, 24.5 V/3.9A) | Typ. 93 ms (at 480 V) |
| **General Device Parameters** | | |
| Operating Temperature Range (Tamb) - Full Load | 14…140°F (-10…60 C) | 14…140°F (-10…60 C) |
| Operating Temperature Range (Tamb) - Derated | 122…140°F (50…60 C) | 122…140°F (50…60 C) |
| Storage Temperature | -13…185°F (-25…85 C) | -13…185°F (-25…85 C) |
| Humidity (Do not energize when condensation is present) | < 93% | < 95% |
| Input Cable Access | 3/4 or 1/2 in. hole for conduit | |
| AC Connection Wires | | |
| Stranded cable | 0.3…2.5 mm2 / AWG 28-12 | ≥ 2,5 mm2 , AWG 26-12 |
| Solid cable | 0.3…4 mm2 / AWG 28-12 | ≥ 2,5 mm2 , AWG 26-12 |
| Stripping at wire end | 6 mm | 6 mm |
| *Note: secure wires from strain* | | |
| AC External Protection/Fusing | 20A Max | 30A Max |
| Output Connector Cables | M12 4-pin "T" cable | M12 4-pin "T" cable |
| Efficiency | 90% (typical at 230 V AC, 3.9A) | 89.5% (at 400 V) |
| | | 89.0% (at 480 V) |
| Protection Class - Type 1 Enclosure | IP 20 (DIN/IEC 60 529) | IP 20 (DIN/IEC 60 529) |
| MTBF | 500,000 h @ 40C SN 29500 | 1.5 Mio h @ 40C SN 29500 |
| | Not tested at MIL 217 GP40 | 482,000 h @ MIL 217 GP40 |
| Dimensions | 9.25 x 5.67 x 5.13 | 9.25 x 5.67 x 5.13 |
| | (235 x 144 x 130.4 mm) | (235 x 144 x 130.4 mm) |
| Weight | 3.9 lbs (1.8 kg) | 4.4 lbs (2.0 kg) |
| Cover Screw Torque Rating (in-lb) | 4±1 | 4±1 |
| Mounting | Vertical mounting only. AC input enters from the bottom | |
| Clearance | Keep 4 in. clearance from ventilating slots in cover | |
| **Applicable Standards** | | |
| EN 60 950-1, IEC 60 950 | Yes | Yes |
| EN 60 204-1, EN 50 178 | Yes | Yes |
| **Third Party Approvals** | | |
| UL 508 Listing (US and Canada) | Multiple Listing | Multiple Listing |
| UL 60 950-1 Recognition (US and Canada) | Multiple Listing | Multiple Listing |
| NEC Class 2 According to UL 1310 | Multiple Listing | Multiple Listing |

For more CRUZcontrol (IOM# 1118211) details visit [mhs-conveyor.com](mhs-conveyor.com)

# 14 ITOH DENKI CBM-105 & CB-016 DRIVER CARD




## 14.1 CBM-105 & CB-016 DRIVER CARD 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 driver cards and bed-to-bed plug-in connections.
  - Driver card – 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 flow direction, speed, and proper plug-in connections.

## 14.2 CBM-105 & CB-016 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

## 14.3 CBM-105 & CB-016 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

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

### *14.3.1 CBM-105 & CB-016 Connections*

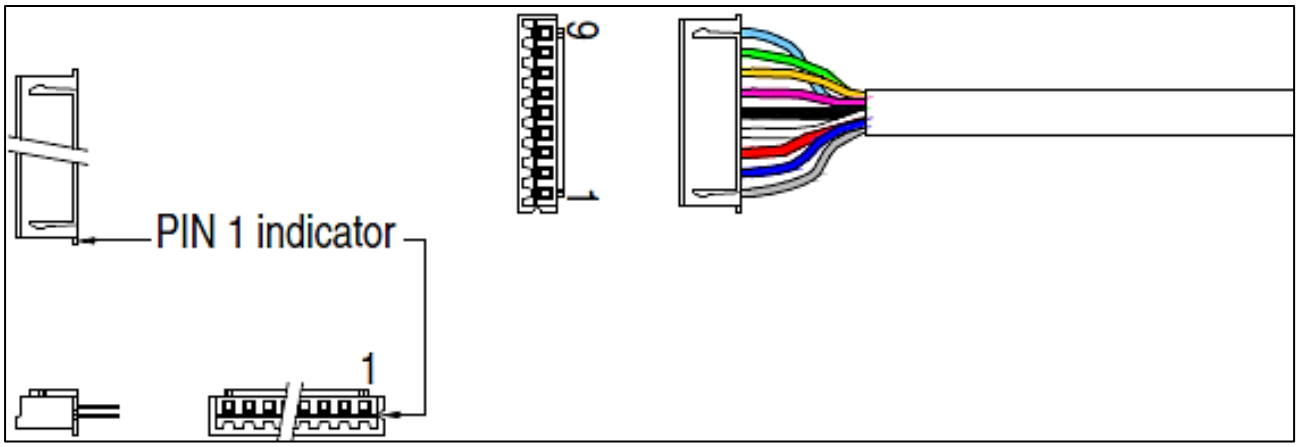
| CN1 – 2 PIN connector for Power | Male Connector on Card WAGO #734-162 | Female Connector for Wiring WAGO #734-102 TGW PN:1104417 & 18 |
|---|---|---|

| 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 TGW 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:<br>28-22AWG<br>& 24-22AWG motor phases<br><br>Terminal pins:<br>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 | |



### *14.3.2 CBM-105& CB-016 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 |

### *14.3.3 CBM-105 & CB-016 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<br>FE – CW | FS/FP – CW<br>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

### *14.3.4 CBM-105& CB-016 LED's and Error Indications*

| Status | LED1 (green) | LED2 (red) | ERR Output (DIP-SW4 setting) | | Error Condition* | Result | Solution |
|---|---|---|---|---|---|---|---|
| | | | 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 |

### *14.3.5 CBM-105 & CB-016 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.

### *14.3.6 ITR CBM-105 & CB-016 Electrical Components*

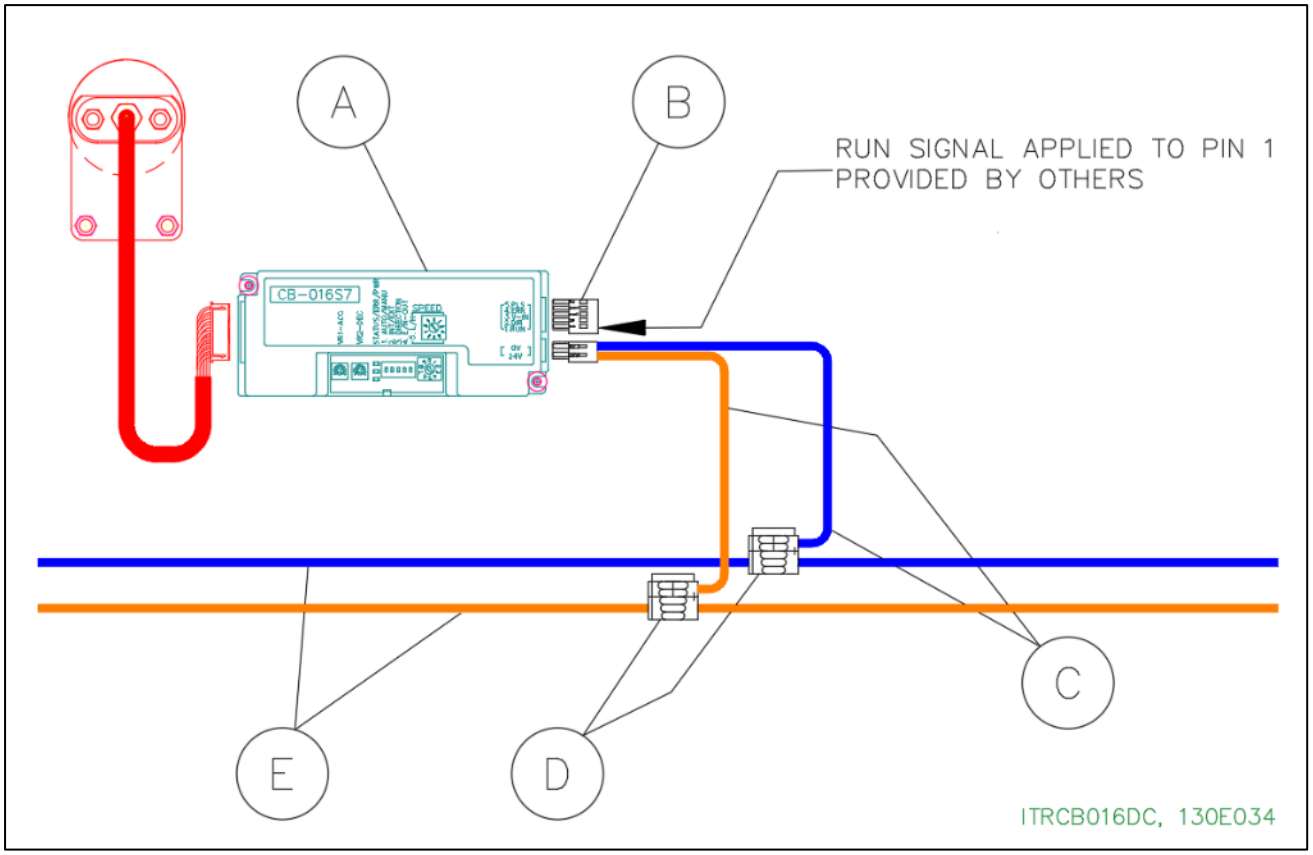



*Figure 1 –CBM-105 Driver Card and CB-016*

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

*Table1: Power Harness*

| Item No. | Description |
|---|---|
| 1129502 | HARNESS,ITR-POWER-10AWG-12.5' |
| 1102286 | HARNESS,ITR-POWER-10AWG-10.5' |
| 1102287 | HARNESS,ITR-POWER-10AWG-8' |
| 1102288 | HARNESS,ITR-POWER-10AWG-5.5' |
| 1102289 | HARNESS,ITR-POWER-10AWG-3' |

## *14.3.7 CBM-105 Driver Card Speed Chart*

**CBM-105 DRIVERCARD / FE- _ _ _ ROLLER**

| ROLLER: FE-17 | | | ROLLER: FE-60 | | | ROLLER: FE-100 | | | ROLLER: FE-140 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS 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 | |

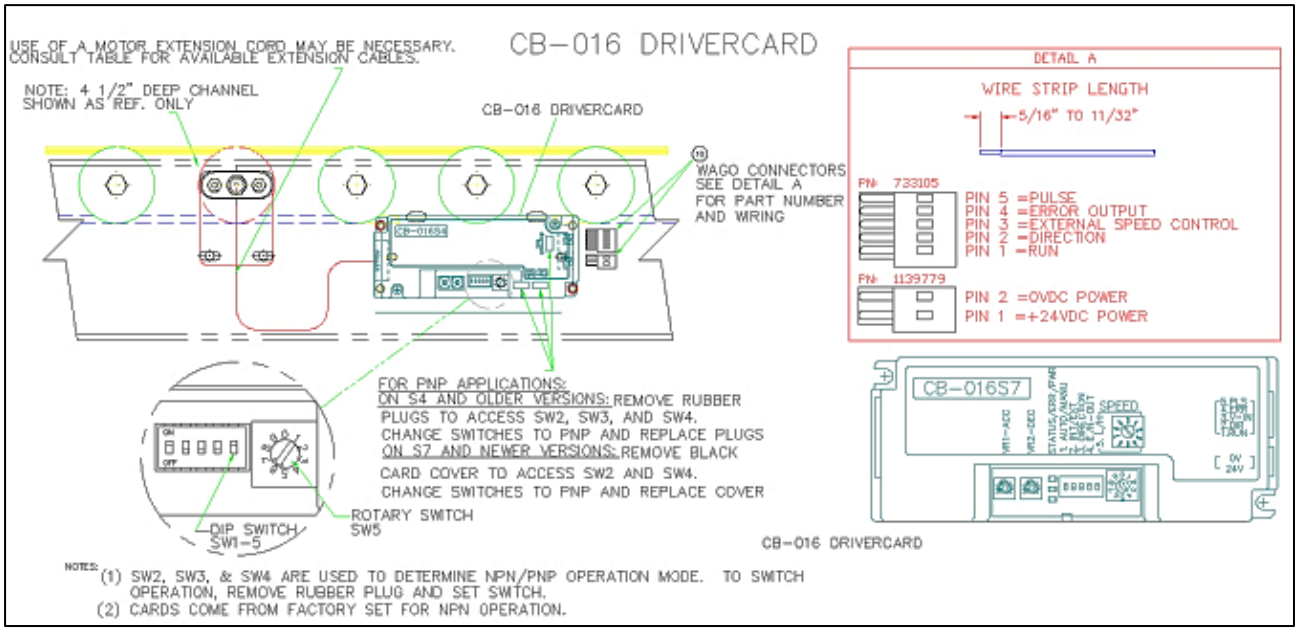
**Note: Speed with two numbers are " NO-LOAD / RATED". Rated numbers are what the roller is capable of doing under a continuous duty full load condition.**

**CBM-105 DRIVERCARD / FP- _ _ _ ROLLER**

| ROLLER: FP-55 | | | ROLLER: FP-100 | | | ROLLER: FP-140 | | |
|---|---|---|---|---|---|---|---|---|
| MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS 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.**

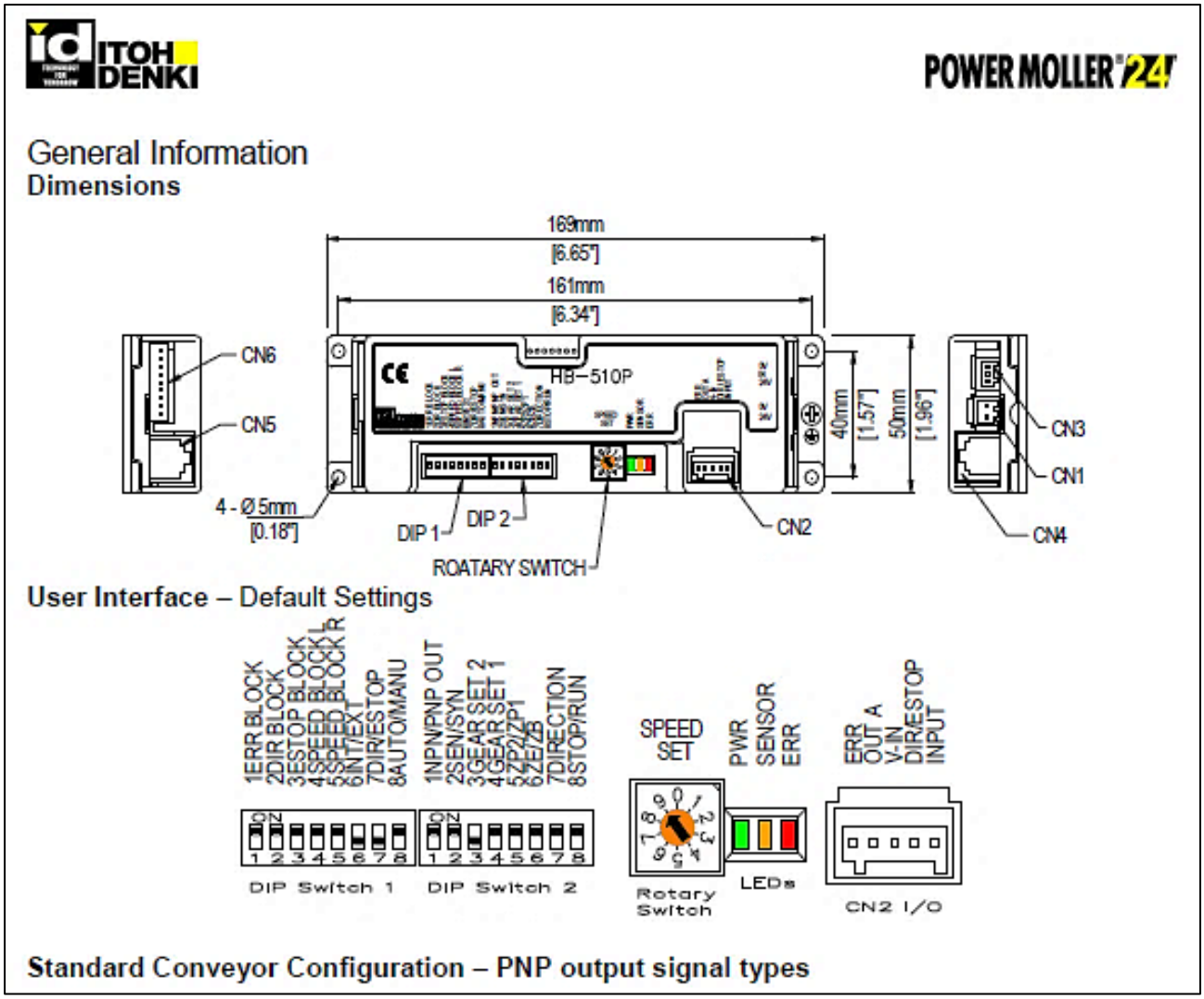
## *14.3.8 CB-016 Driver Card Speed Chart*




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 |

# 15 ITOH DENKI HB-510 DRIVER CARD




## 15.1 HB-510 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 (ITRHB) 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.
  - Driver card – 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.

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

## 15.2 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 Cat5E 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

## 15.3 ITR HB-510 ELECTRICAL COMPONENTS

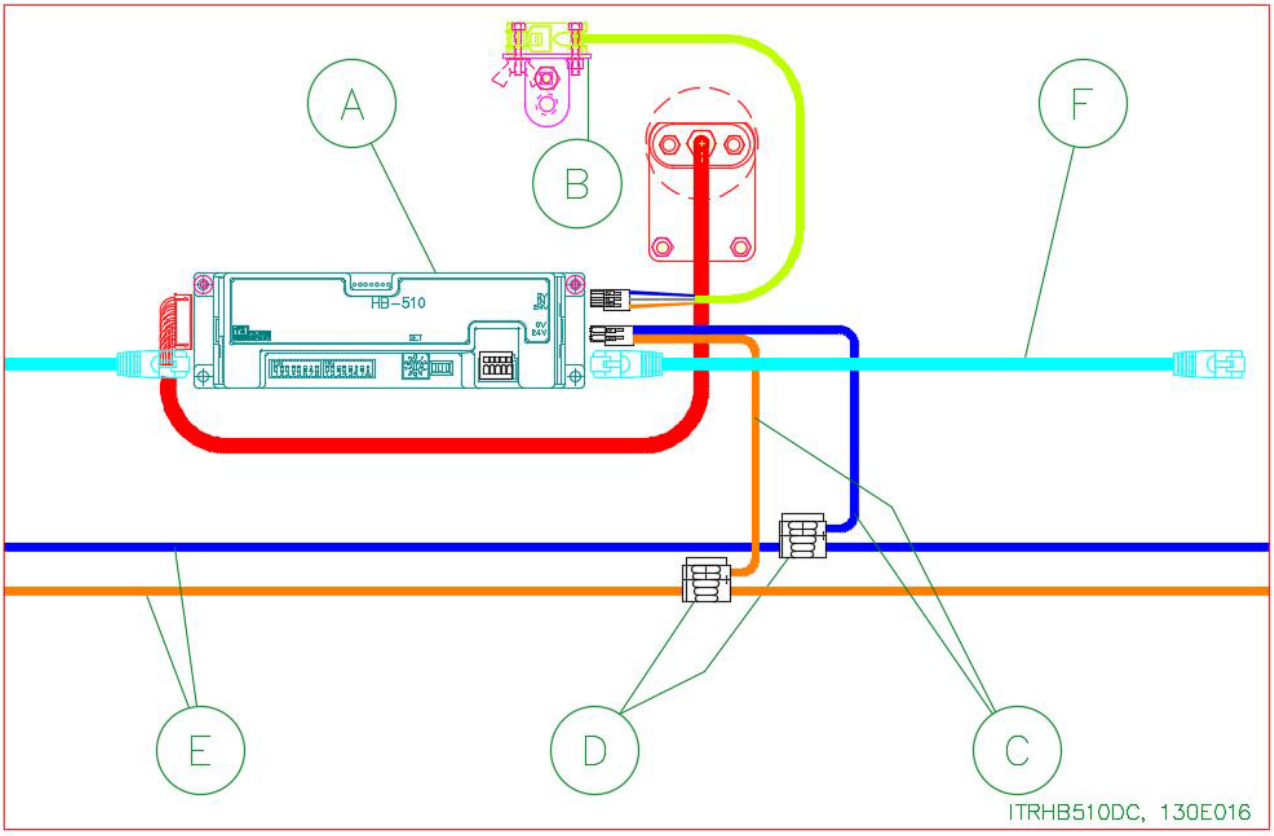



*Figure 2 – HB-510 Driver Card*

A. HB-510 item (includes hardware and 5-pin connector): P/N 1137754
B. Photo-eye (ZL eye with 3-pin connector mounted to bracket with reflector in bag): P/N 1137686
C. Power tap cables (for short distances < 6”): P/N 1139543
D. Scotchlok connectors (connect power tap to power harness): P/N 3M567
E. Power harness: See table 1 below
F. Cat5E communication cable: See table 2 below.

*Table 1: Replacement Parts –Power Harness*

| Item No. | Description |
|---|---|
| 1129502 | HARNESS,ITR-POWER-10AWG-12.5' |
| 1102286 | HARNESS,ITR-POWER-10AWG-10.5' |
| 1102287 | HARNESS,ITR-POWER-10AWG-8' |
| 1102288 | HARNESS,ITR-POWER-10AWG-5.5' |
| 1102289 | HARNESS,ITR-POWER-10AWG-3' |

*Table 2: Communication Cables*

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

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 diagrams below:

*Figure 3 – HB 510 Communication Cable LH Flow*

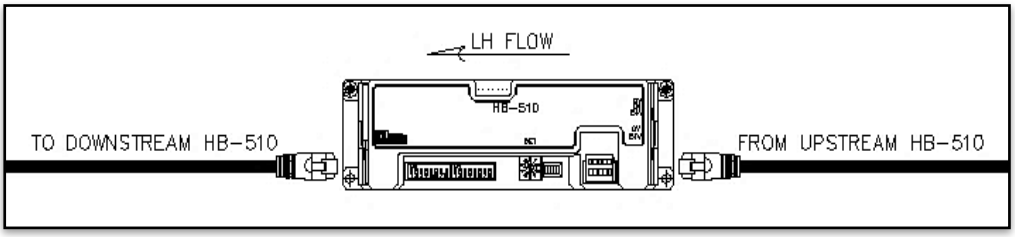
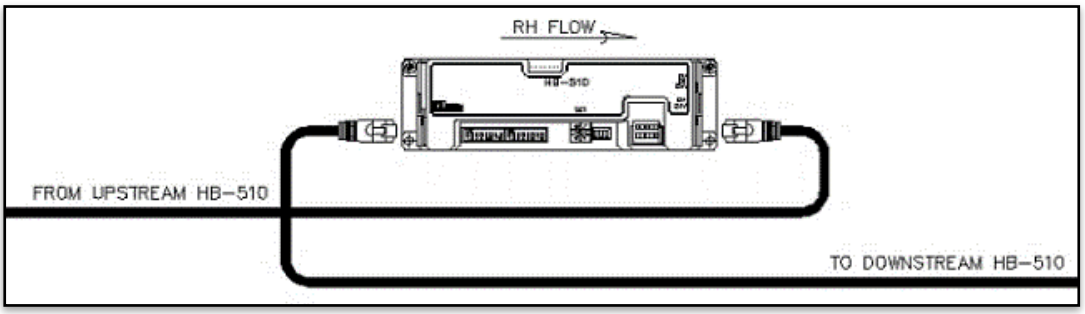



*Figure 4 – HB-510 Communication Cable RH Flow*



### *15.3.1 HB-510 Specifications*

**Operation:**

- Cycle: 1 second ON; 1 second 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

### *15.3.2 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) | |

| CN2 – (Included with Card)<br>5 PIN connector for external control | Male Connector on Card<br>WAGO #733-335 | Female Connector for Wiring<br>WAGO #733-105 |
|---|---|---|

| PIN | Description | |
|---|---|---|
| 1 | +24V DC (Input) – Release, Force Run, or Force Zone Stop | Wire Size:<br>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) | |

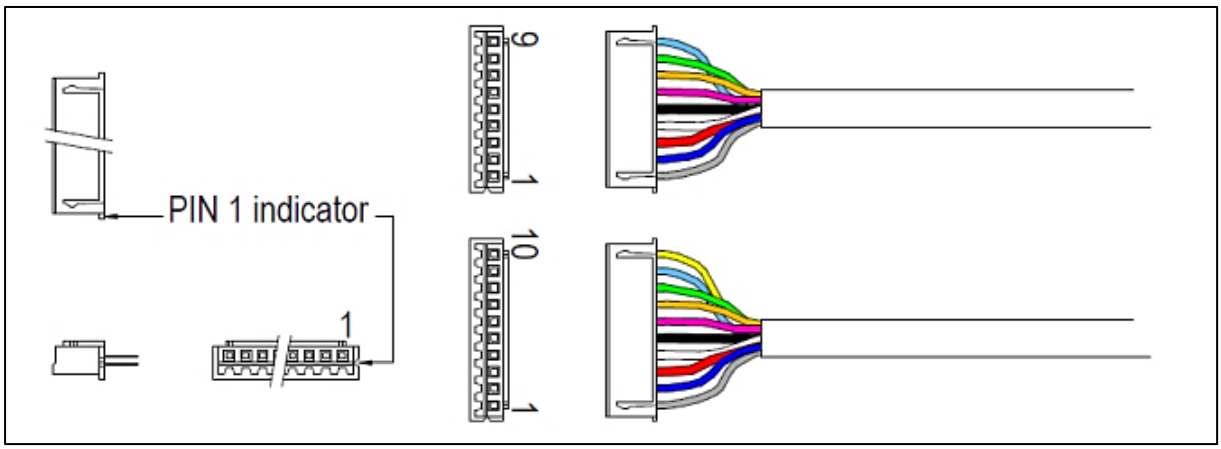
| CN3 – 3 PIN connector<br>for Sensor | Male Connector on Card<br>WAGO #733-363 | Female Connector for Wiring<br>WAGO #733-103 |
|---|---|---|

| PIN | Description | |
|---|---|---|
| 1 | +24V DC (Power supply to Sensor) | Wire Size:<br>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<br>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 | |



### *15.3.3 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:<br><br>DIP Switch 1-1: OFF<br><br>DIP Switch 1-2: OFF<br><br>DIP Switch 1-3: OFF<br><br>*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. |

### *15.3.4 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<br>Train/Slug release | | ZP2<br>Singulated release | | **ON** |
| 2-6 | Last zone mode | ZB<br>Standard zone | | ZE<br>Last (discharge) zone | | **ON** |
| 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.

### *15.3.5 HB-510 LED's and Error Indicat(ions*

| Status | LED1 (green) | LED2 (orange) | LED3 (red) | ERR Signal (CN2-5) | Error Condition | Result | Solution* |
|---|---|---|---|---|---|---|---|
| **Normal** | ● (ON) | ● (ON) When sensor signal is ON | ○ (OFF) | ● (ON) | n/a | n/a | n/a |
| | Blinks (1Hz) ●○ while running | | | | | | |
| **Thermal overload** | ● (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

### *15.3.6 HB-510 Driver Card speed chart*

**HB-510 DRIVERCARD / FP- _ _ _ ROLLER**

| ROLLER: FE-17 | | | ROLLER: FE-60 | | | ROLLER: FE-100 | | | ROLLER: FE-140 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS 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**

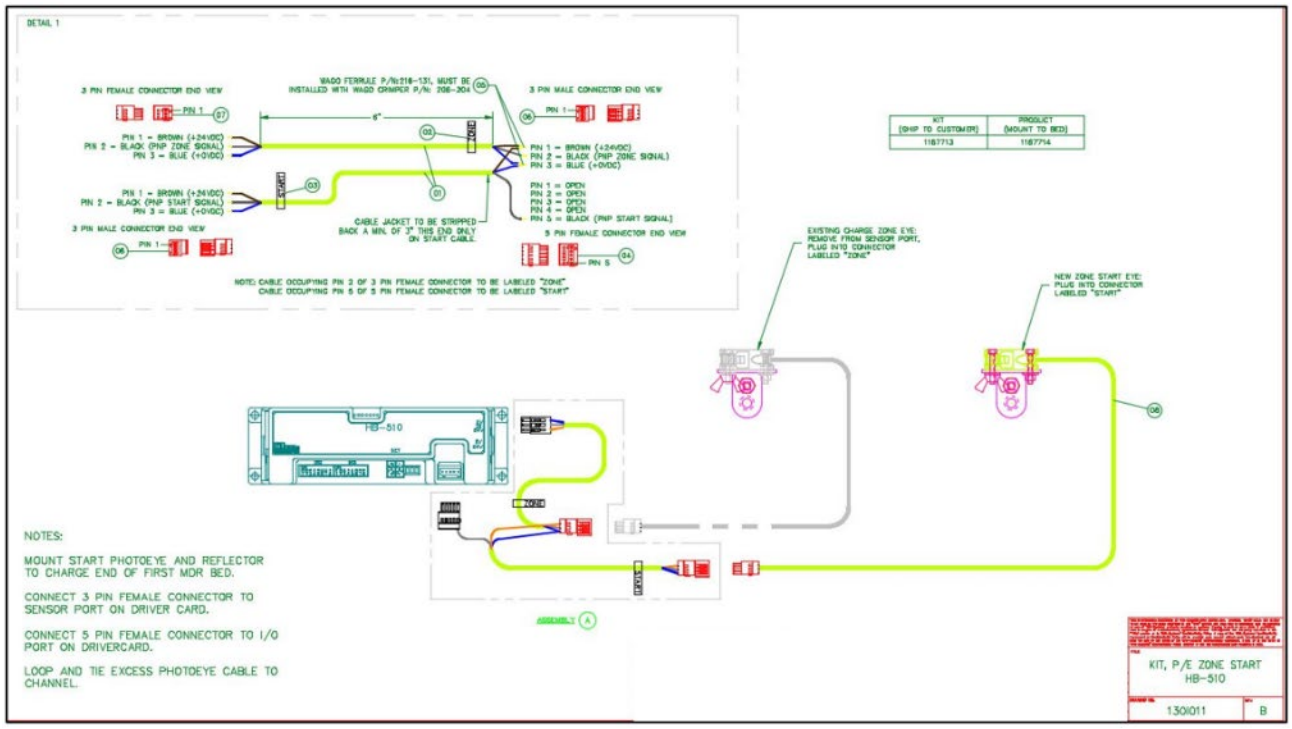
| ROLLER: FP-55 | | | ROLLER: FP-100 | | | ROLLER: FP-140 | | |
|---|---|---|---|---|---|---|---|---|
| MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) | MHS NOMINAL SPEED | ROTARY SWITCH | ACTUAL SPEED ± 5% (fpm) |
| **50** | 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/

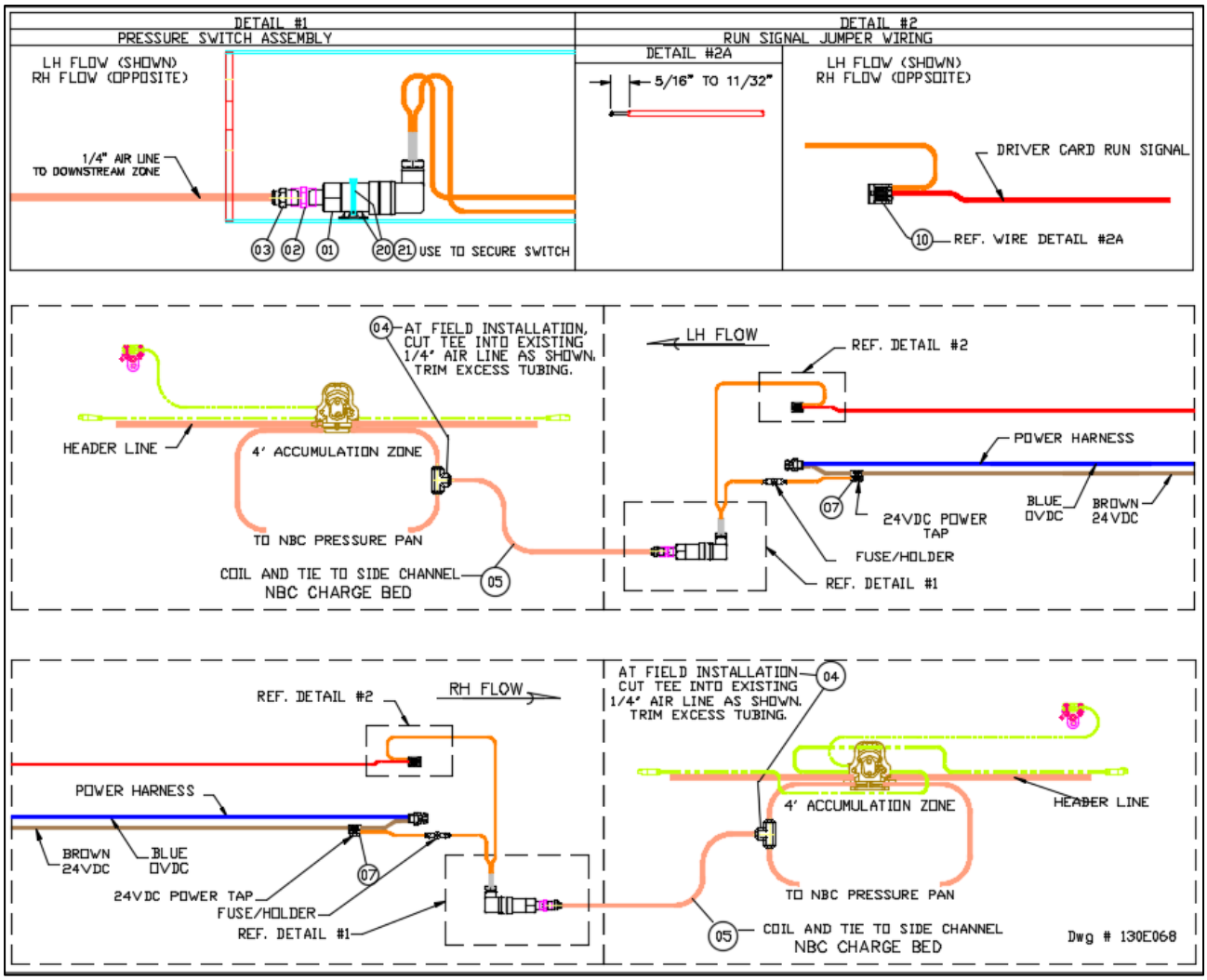
### *15.3.7 HB-510 Start Kit*




#### *15.3.7.1 Replacement Parts - HB-510 Photo-eye Kit*

| General Photoeye Cables & Kit | | | | |
|---|---|---|---|---|
| **Balloon** | **Item #** | **Description** | **Mounted** | **DWG #** |
| 1 - 8 | 1167713 | KIT,P/E ZONE START **HB-510** | FIELD MOUNTED | 130I011 |

## 15.4 ACCUMULATION CHARGE ZONE PRESSURE SWITCH ASSEMBLY

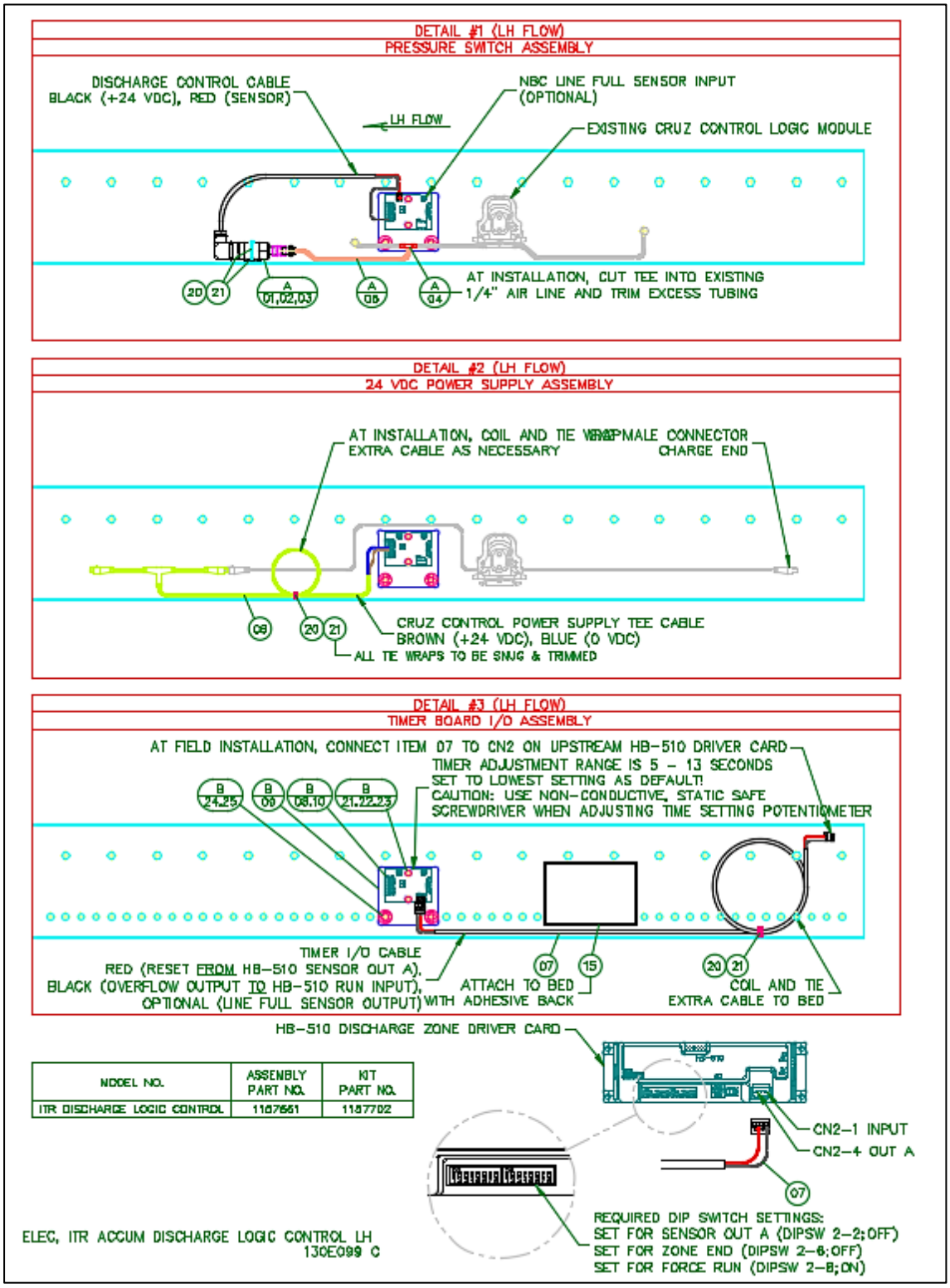



### *15.4.1 Replacement Part - Pressure Kit, CB to NBC*

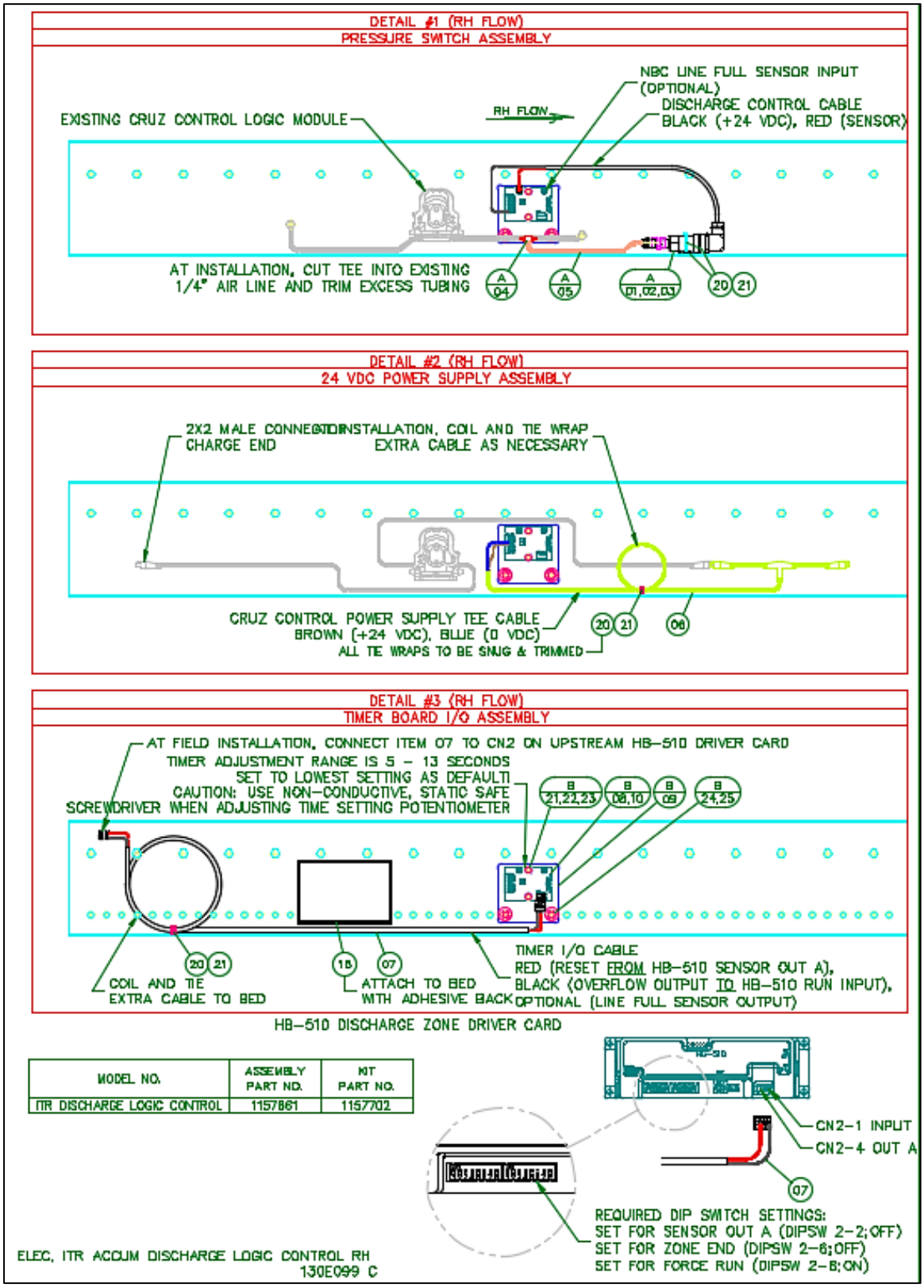
| Pressure Switch Kit,CB to NBC | | | | |
|---|---|---|---|---|
| **Balloon** | **Item #** | **Description** | **Mounted** | **DWG #** |
| ALL | 1152711 | KIT,ITR-PRSS SWTCH-**CB TO NBC** | FIELD MOUNTED | 130E068 |

## 15.6 DISCHARGE LOGIC CTRL PRESSURE SWITCH KITS

### *15.6.1 Discharge Logic Control Left Hand*



## *15.6.2 Discharge Logic Control Right Hand*

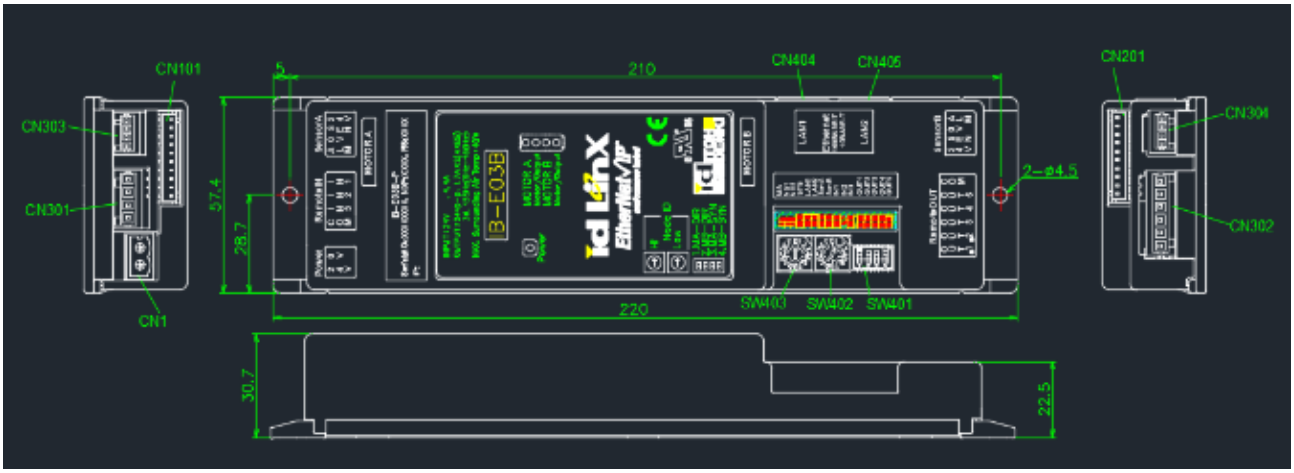



| MODEL NO. | ASSEMBLY PART NO. | KIT PART NO. |
|---|---|---|
| ITR DISCHARGE LOGIC CONTROL | 1157861 | 1157702 |

*15.6.2.1 Replacement Part - Pressure Switch Kits, HB to NBC*

| Accumulation Discharge Logic Control LH / RH<br>Pressure Switch Kit,HB to NBC | | | | |
|---|---|---|---|---|
| **Balloon** | **Item #** | **Description** | **Mounted** | **DWG #** |
| All | 1157702 | KIT,ITR-PRSS SWTCH-**HB TO NBC** | FIELD MOUNTED | 130E099 |

# 16 ITOH DENKI IB-E03 DRIVER CARD




## 16.1 IB-E03 GENERAL NOTES:

The IB-E03 is a dual 24V brushless DC motor driver module that is compact, network-ready, configurable, and programmable.

## 16.2 IB-E03 FEATURES

- For transportation and accumulation conveyor segments
- Two brushless DC motor drivers
- IB-E03B: 4A max per driver
- Built-in motor overload protections
- Two powered connections for sensors
- Three isolated auxiliary inputs
- Five isolated auxiliary outputs, two at 1A (max) each
- Motor lifetime data
- DLR (device level ring) applicable
- 2-port built-in Ethernet switch (based on RA switch technology)
- All beds factory tested for flow direction, speed, and proper plug-in connections.

See Itoh-Denki IB-E03 and ICE Manual for additional information: http://itohdenki.com/

## 16.3 IB-E03 OPERATING ENVIRONMENT

| Conditions | | Notes |
|---|---|---|
| Ambient temperature | -20 to 40°C<br>(-4 to 104°F) | No condensation, water, frost, or ice |
| Humidity | ≤ 90% Relative Humidity | |
| Atmosphere | No corrosive gas | |
| Vibration | ≤ 1.0G | |
| Installation | Indoor | |
| Pollution level | 2 | Conforming to IEC60640-1 and UL840 |
| Overvoltage category | 2 | |

## 16.4 IB-E03 POWER REQUIREMENTS

| Item | Specification |
|---|---|
| Input Power | 24V DC (+/- 5%) |
| Typical Loaded Current Draw Per Motor* for IB-E01 and IB-E03B | 2 ~ 3A – Motor A 2 ~ 3A – Motor B |
| Maximum Current Draw Per Motor For IB-E01 and IB-E03B | 4A – Motor A 4A – Motor B |
| Typical Loaded Current Draw Per Motor* for IB-E04F | 3 ~ 4A – Motor A 3 ~ 4A – Motor B |
| Maximum Current Draw Per Motor for IB-E04F | 7A – Motor A 7A – Motor B |
| Maximum Current Draw Per Remote (Auxiliary) Output | 1A – Remote output 1 1A – Remote output 2 20mA – Remote output 3 20mA – Remote output 4 20mA – Remote output 5 |

** Actual current draw is dependent on load (size and weight) and motorized roller model used.*

**Note:** The Remote (Auxiliary) Outputs are isolated from the IB-E power. Therefore, a separate 24V DC power source may be used. If not, the Remote Output current draw should be factored into the IB-E's overall current draw when used.

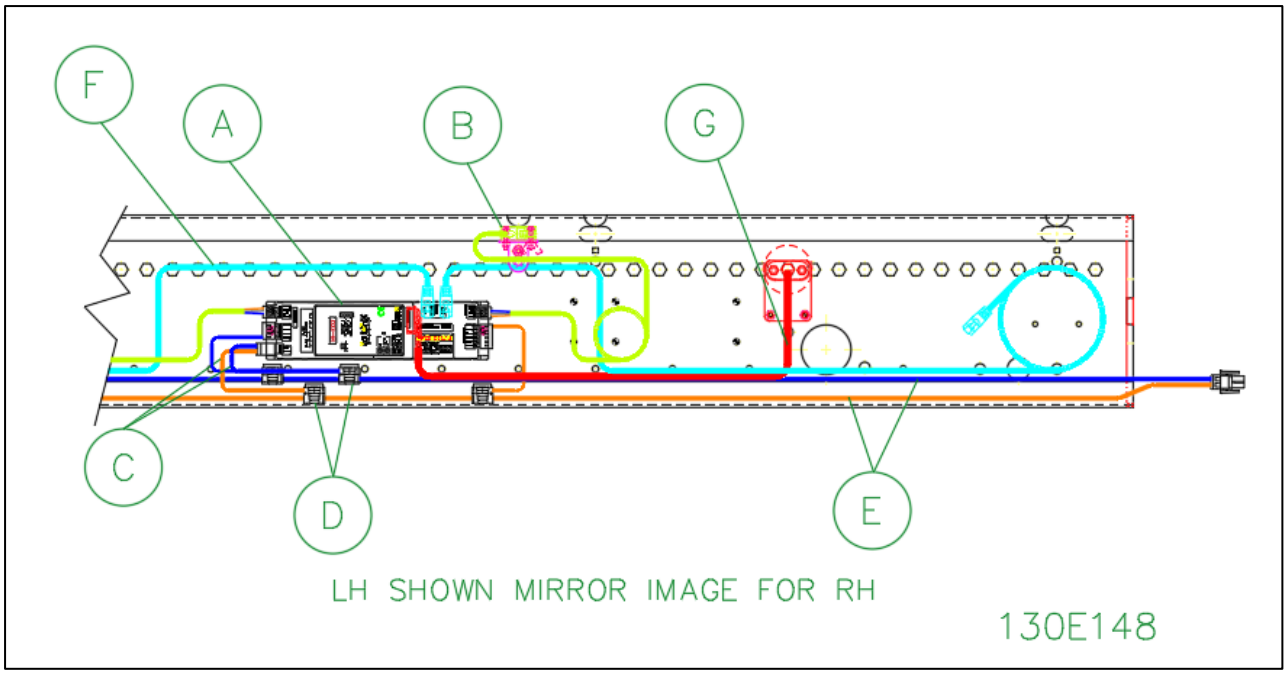
## 16.5 IB-E03 APPLICABLE POWER ROLLERS (MOTORIZED ROLLERS)

IB-E01 and IB-E03B

| Standard* | With Brake Option |
|---|---|
| PM486FE | PM486FE-BR |
| PM486FS | PM486FS-BR |
| PM486FP | PM486FP-BR |
| PM570FE | PM570FE-BR |
| PM605FE | PM605FE-BR |
| PM635FS | PM635FS-BR |

* IB-E01 and IB-E03 are designed to work with both our standard models and brake models. The (mechanical) brake option requires a 10th pin for the brake coil. Therefore, standard model rollers will need to have either a 10-pin connector on the motor cable or a 9-to-10-pin extension cable.

## 16.6 IB-E03 ELECTRICAL COMPONENTS




A. IB-E03 driver card (includes hardware, no connectors): P/N 1166288
B. Photo-eye (ZL PNP light op-2000mm lead w/733-104 w/reflector & tape): P/N 1164882
C. Cable, Power IB-E03 (for short distances < 6"): P/N 1165236
D. Scotchlok Connectors (connect power tap to power harness): P/N 3M567
E. Power Harness: See Table 1.
F. Cat5E Communication Cable: See Table 2.
G. Cable, Motor Extension: See Table 3.

*Table 1 IB-E03 Power Harness*

| Item No. | Description |
|---|---|
| 1129502 | HARNESS,ITR-POWER-10AWG-12.5' |
| 1102286 | HARNESS,ITR-POWER-10AWG-10.5' |
| 1102287 | HARNESS,ITR-POWER-10AWG-8' |
| 1102288 | HARNESS,ITR-POWER-10AWG-5.5' |
| 1102289 | HARNESS,ITR-POWER-10AWG-3' |

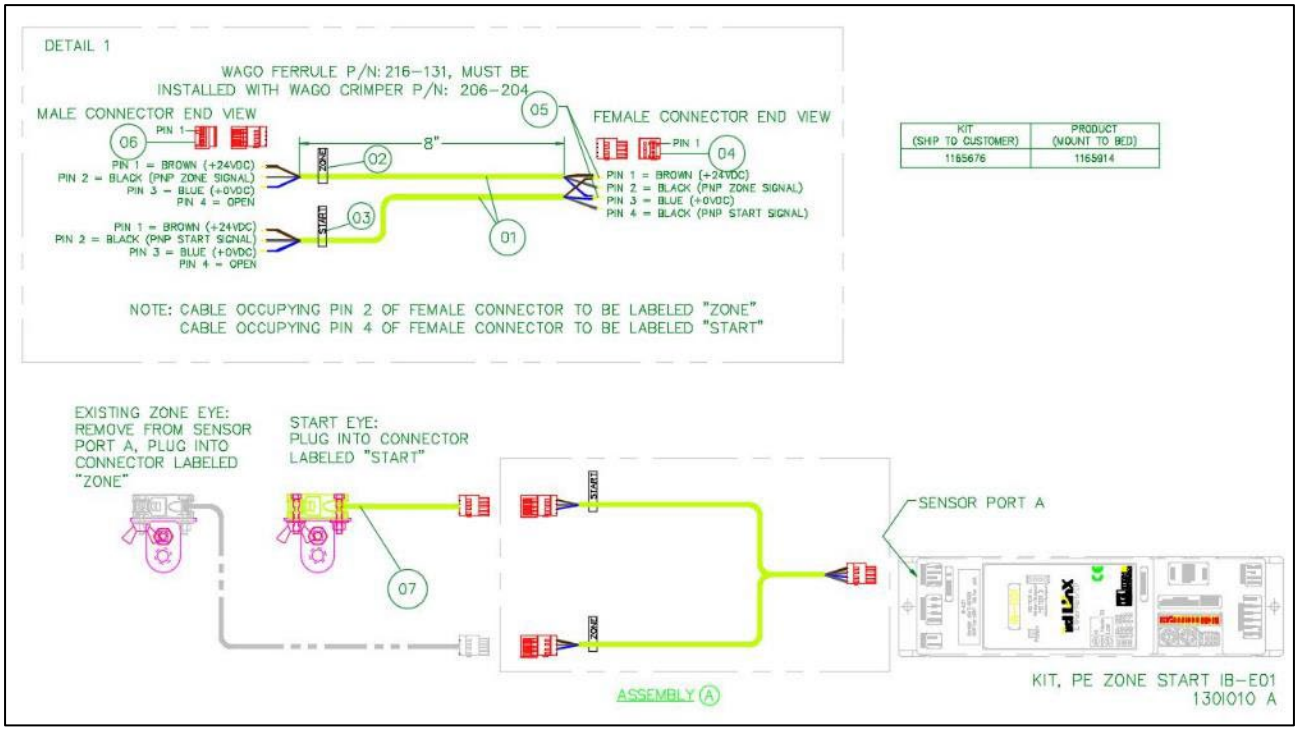
*Table 2 Communication Cables*

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

*Table 3 – Cable Motor Extensions*

| CABLE, MOTOR EXTENSION USED WITH IB-E03 OR WWL CS1004 | | |
|---|---|---|
| Item No. | Description | Application |
| 1135339 | CABLE,MOTOR EXTENSION,600MM ITOH M-F-EXT-10PIN-600, **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1135340 | CABLE,MOTOR EXTENSION,1200MM ITOH M-F-EXT-10PIN-1200, **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1135341 | CABLE,MOTOR EXTENSION,2700MM ITOH M-F-EXT-10PIN-2700, **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |

### *16.6.1 IBE Photo-eye Cable Kit*

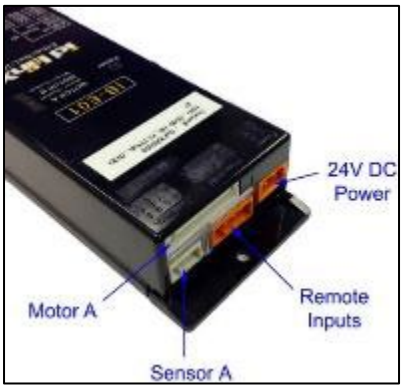



### *16.6.2 Replacement Parts – IB-E03 Photo-eye Kit*

| General Photoeye Cables & Kit | | | | |
|---|---|---|---|---|
| **Balloon** | **Item #** | **Description** | **Mounted** | **DWG #** |
| 1 - 6 | 1165676 | KIT,CTRLS-PE ZONE START-**IBE** | FIELD MOUNTED | 130I010 |

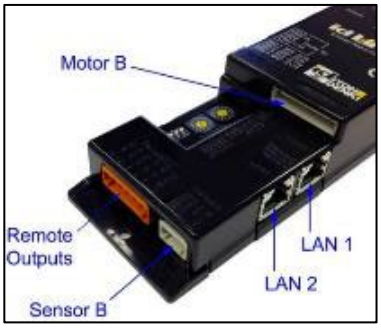
## 16.7 IB-E03 HARDWARE CONNECTIONS

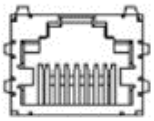
Left ("A") Side



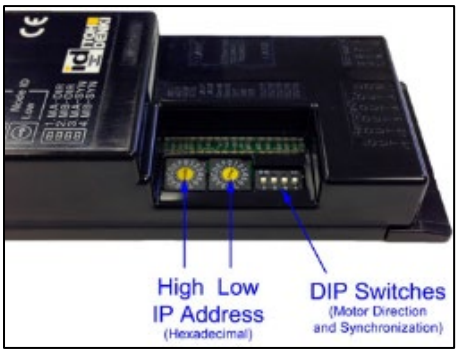

| Connection | Pin Outs | Description |
|---|---|---|
| Motor A |  1 10 | Brushless DC Driver<br>When configured as a discrete output (**NPN**, sinking, only):<br>3 – Discrete output U (IB-E04F pins 3 & 4)<br>4 – Discrete output V (IB-E04F pins 5 & 6)<br>5 – Discrete output W (IB-E04F pins 7 & 8)<br>See "Precaution: Motor Port Discrete Output Wiring" below.<br><br>Connector for wiring: **JST XHP-10** (IB-E04F XHP-12)<br>Included with motorized roller |
| Sensor A |  1 4 | 1 – 24V DC (550mA max)<br>2 – Sensor input (35mA max)<br>3 – 0V<br>4 – Sensor alarm input (35mA max)<br><br>IB-E01: Inputs are auto-sensing, responding to either PNP (+24V DC) or NPN (0V) signals. In the normal state, the input pins have a **+12V DC reference**.<br><br>**IB-E03B and IB-E04F**: Signal types are set as PNP or NPN from factory. Noted as a "-P" or "-N", respectively (e.g. IB-E03B-P)<br><br>Connector for wiring: **WAGO 733-104** |
| Remote Inputs (Auxiliary) |  1 4 | 1 – Remote input 1<br>2 – Remote input 2<br>3 – Remote input 3<br>4 – Common (24V DC for NPN or 0V for PNP)<br><br>Connector for wiring: **WAGO 734-204** |
| 24V DC Power |  1 2 | Input Power<br>1 – 0V<br>2 – 24V DC<br><br>Connector for wiring: **WAGO 231-302/026-000** |

Right ("B") Side




| Connection | Pin Outs | Description |
|---|---|---|
| Motor B |  1 10 | Brushless DC Driver<br>When configured as a discrete output (**NPN**, sinking, only):<br>3 – Discrete output U (IB-E04F pins 3 & 4)<br>4 – Discrete output V (IB-E04F pins 5 & 6)<br>5 – Discrete output W (IB-E04F pins 7 & 8)<br>See "Precaution: Motor Port Discrete Output Wiring" below.<br><br>Connector for wiring: **JST XHP-10** (IB-E04F XHP-12)<br>Included with motorized roller |
| Sensor B |  1 4 | 1 – 24V DC (550mA max)<br>2 – Sensor input (35mA max)<br>3 – 0V<br>4 – Sensor alarm input (35mA max)<br><br>IB-E01: Inputs are auto-sensing, responding to either PNP (+24V DC) or NPN (0V) signals. In the normal state, the input pins have a **+12V DC reference**.<br><br>**IB-E03B and IB-E04F**: Signal types are set as PNP or NPN from factory. Noted as a "-P" or "-N", respectively (e.g. IB-E03B-P)<br><br>Connector for wiring: **WAGO 733-104** |
| Remote Outputs (Auxiliary) |  1 6 | 1 – Remote output 1, 1A max<br>2 – Remote output 2, 1A max<br>3 – Remote output 3, 20mA max<br>4 – Remote output 4, 20mA max<br>5 – Remote output 5, 20mA max<br>6 – Common (24V DC for PNP or 0V for NPN)<br><br>Connector for wiring: **WAGO 734-206** |
| LAN (1 & 2) |  8 1 | 1 – Tx +<br>2 – Tx -<br>3 – Rx +<br>4 – n/a<br>5 – n/a<br>6 – Rx -<br>7 – n/a<br>8 – n/a<br><br>Connector for wiring: **RJ-45** |

## 16.8 IB-E03 ROTARY SWITCHES AND DIP SWITCHES




| Switch | Position | Description |
|---|---|---|
| IP Address High Byte | 0 ~ F | Hexadecimal setting of IP address' last octet. 192.168.1.xxx<br><br>Example 1:<br>High Byte: "0"<br>Low Byte: "1"<br>Hexadecimal value "01" = 1 (decimal)<br>IP Address: 192.168.1.1<br>Example 2: High Byte: "A" Low Byte: "7"<br>Hexadecimal value "A7" = 167 (decimal)<br>IP Address: 192.168.1.167 |
| IP Address Low Byte | 0 ~ F | |
| DIP 1 | OFF | Default |
| | ON | Motor A's direction is opposite of configuration, reversed |
| DIP 2 | OFF | Default |
| | ON | Motor B's direction is opposite of configuration, reversed |
| DIP 3 | OFF | Default |
| | ON* | Motor A operates when Motor B operates, synchronized |
| DIP 4 | OFF | Default |
| | ON* | Motor B operates when Motor A operates, synchronized |

* If both DIP switch 3 and 4 are ON, the IB-E is set to factory reset mode. Refer to troubleshooting section for more information.

## 16.9 IB-E03 IP ADDRESS SUBNET

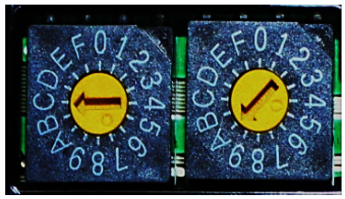
Default: 192.168.1.xxx
If a different subnet for the IP address is needed, different from the default 192.168.1.xxx, it can be changed using the Itoh Configurator for EtherNet/IP (ICE).

IP Address Setting (Last Octet)
The rotary switches set the last octet of the IB-E's IP address. There are 16 positions (hexadecimal base) for each rotary switch.

The following table is available to assist in determining the decimal equivalent of the hexadecimal rotary switch positions.

| High Byte | | | Low Byte | |
|---|---|---|---|---|
| Position | Base Decimal Value | | Position | Base Decimal Value |
| 0 | 0 | | 0 | 0 |
| 1 | 16 | | 1 | 1 |
| 2 | 32 | | 2 | 2 |
| 3 | 48 | | 3 | 3 |
| 4 | 64 | | 4 | 4 |
| 5 | 80 | + | 5 | 5 |
| 6 | 96 | | 6 | 6 |
| 7 | 112 | | 7 | 7 |
| 8 | 128 | | 8 | 8 |
| 9 | 144 | | 9 | 9 |
| A | 160 | | A | 10 |
| B | 176 | | B | 11 |
| C | 192 | | C | 12 |
| D | 208 | | D | 13 |
| E | 224 | | E | 14 |
| F | 240 | | F | 15 |

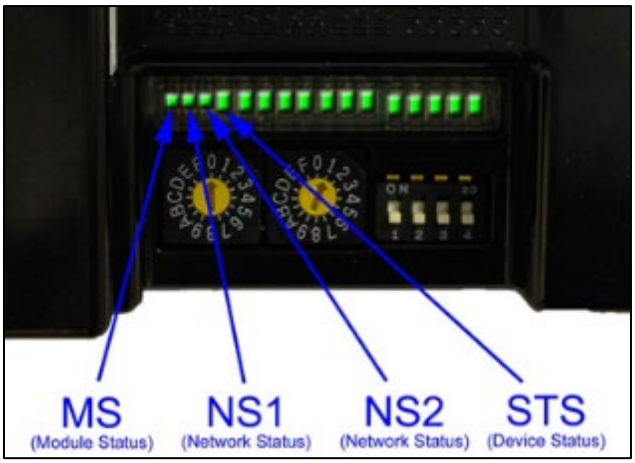
Using the decimal values, the last octet can be calculated.



| Base | High Byte | | Low Byte | | Last Octet |
|---|---|---|---|---|---|
| Hexadecimal | C | + | A | = | CA |
| Decimal | 192 | | 10 | | 202 |

LED Indicators
See troubleshooting.

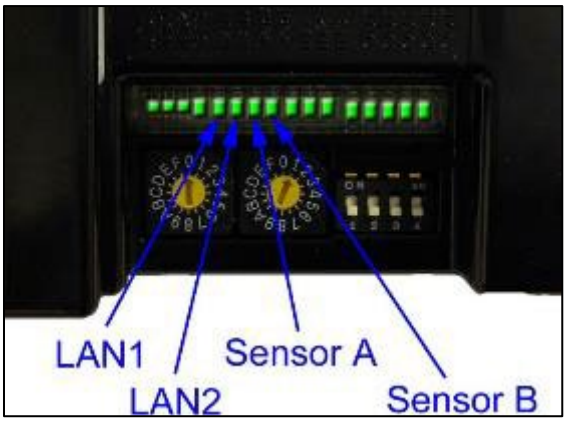
## 16.10 IB-E03 MODULE STATUS INDICATORS




| LED | LED indication pattern | | Description |
|---|---|---|---|
| | Green | Red | |
| MS | OFF | OFF | No network power |
| | ON | OFF | Normal operation |
| | ON | Flash (1Hz) | No setting on device |
| | OFF | Flash (1Hz) | Network error at LAN 1 or LAN 2 |
| | OFF | ON | Network error at LAN 1 and LAN 2 |
| | Flash (1Hz) | Flash (1Hz) | Boot up sequence |
| NS1 & NS2* | OFF | OFF | No communication |
| | Flash (1Hz) | OFF | Normal operation |
| | ON | OFF | I/O connection |
| | OFF | Flash (1Hz) | I/O connection timeout error |
| | OFF | ON | Duplicate IP address error |
| | Flash (1Hz) | Flash (1Hz) | Boot up sequence |
| STS | ON | - | Power ON Network PCB |
| | Flash (6Hz) | - | Low voltage (< 20V DC) error |
| | Flash (1Hz) | - | Firmware updating |
| | OFF | - | No power on network PCB |

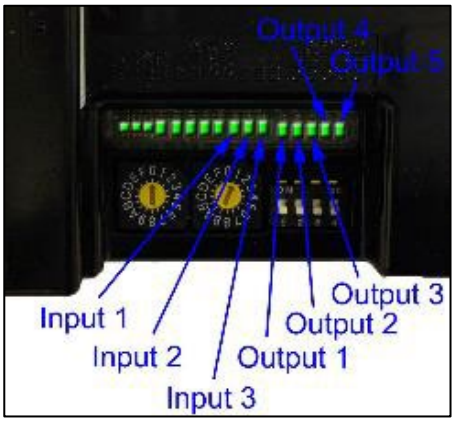
** NS2 is only on the IB-E01*

## 16.11 IB-E03 LAN AND SENSOR STATUS INDICATORS




| LED | LED indication pattern | | Description |
|---|---|---|---|
| | Green | Red | |
| LAN1 & LAN2 | Flash | - | Active LAN communication |
| | OFF | - | No LAN communication |
| SenA & SenB | ON | - | Sensor input is active |
| | OFF | - | No sensor input |

## 16.12 IB-E03 REMOTE (AUXILIARY) I/O STATUS INDICATORS




| LED | LED indication pattern | | Description |
|---|---|---|---|
| | Green | Red | |
| IN1 ~ IN3 | ON | - | Remote input is active |
| | OFF | - | No remote input |
| OUT1 ~ OUT5 | ON | - | Remote output is active |
| | OFF | - | No remote output |

## 16.13 IB-E03 MOTOR ACTIVITY AND FUNCTION INDICATORS


| LED | LED indication pattern | | Description |
|---|---|---|---|
| | Green | Red | |
| Power | ON | - | Normal, power is on |
| | OFF | - | No power to device |
| Motor/Output | ON | - | 24V brushless DC driver |
| | OFF | - | Discrete outputs |
| MOTOR A & MOTOR B | OFF | OFF | Motor is not running |
| | Flash (1Hz) | OFF | Motor is running, CW |
| | ON | OFF | Motor is running, CCW |
| | OFF | Flash (6Hz) | Low voltage error |
| | OFF | Flash (1Hz) | Motor unplugged error |
| | ON | Flash (1Hz) | Motor lock error |
| | OFF | ON | Thermal error |
| | ON | 2 x Flash (0.6Hz) | Back EMF error |
| | Alternating (1Hz) | | JAM error* |
| | Alternating (6Hz) | | Sensor Timer error* |

* These errors are triggered by outputs from the internal logic.

# 17 IB-E03 TROUBLESHOOTING – MOTOR DRIVER

| Error Type | Priority | Suspected Cause | Suggested Solution | Reset Method | IB-E Logic | Motor |
|---|---|---|---|---|---|---|
| Low Voltage | 1 | Supply voltage < 20V DC | Maintain supply voltage ≥ 20V DC | Automatic | Stop | |

| Error Type | Priority | Suspected Cause | Suggested Solution | Reset Method | IB-E Logic | Motor |
|---|---|---|---|---|---|---|
| Fuse blown | | Fuse is blown | Replace IB-E | - | Run | Stop |
| Motor Disconnected | 2 | Motor is not connected | Connect motor | Automatic or Manual | | |
| Motor Stalled | 3 | Motor does not turn (stalled) | Clear the issue which prevents the motorized roller from turning | Automatic* or Manual | | |
| PCB Thermal | 4 | High temperature on circuit board | Allow circuit board to cool | Automatic or Manual | | |
| Motor Thermal | 5 | High temperature in motor | Allow motor to cool | Automatic or Manual | | |
| Back EMF (Over-speeding) | 6 | Generated voltage from motor ≥ 60V DC, at least 0.1 second or ≥ 40V DC, at least 2 seconds | Remove the cause of over speeding, then reset the error from the controller or by cycling 24V DC power | Manual | | |
| Motor port (discrete output) current limit | | ≥ 4A, at least 0.1 second | Remove the cause for the high current draw | Manual | | |
| Jam | 7 | ICE logic element output is active | Remove the cause of error or review ICE logic for output conditions | Based on logic conditions | | Based on logic conditions |
| Sensor Timer | 8 | | | | | |
| Sensor Alarm | 9 | Occurs when the (sensor) Alarm signal is active | Check the sensor or wiring of the sensor connection | Automatic | | |

*"Automatic" reset from a motor stalled error requires the motorized roller to be turned by hand (manually).*

Error Reset - Refer to - Error Information to reset error status using ICE.

## 17.1 IB-E03 PHYSICAL BEHAVIOR

The motorized roller is not running at the set (linear/surface) speed.

- Check the "Motor" tab under properties for the following:
  - Gear Reduction setting matches the correct motorized roller model
  - Speed setting is for the correct time base
  - Roller Diameter is set correctly for millimeters

- Roller Speed(s) are set correctly, and that the logic is using the correct speed setting output
- Check input power (refer to – Power Requirements)
- Make sure the motorized roller is mounted properly

The motorized roller is running in the wrong direction.

- Check "Motor" tab under properties for the following:
  - Motor Type setting matches the correct roller model
  - Direction is set for the correct default motor direction
- Check DIP switch 1 and/or 2 (refer to – Rotary Switches and DIP Switches)
- Check that the logic is using (or not using) the motor direction output

The motorized roller does not run.

- Make sure "Motor Port Setting" in the "Motor" tab under properties is set as "Motor"
- Check that the logic is using the correct motor output
- Check the status LEDs on the IB-E (refer to – LED Indicators)
- Check DIP switch 3 and/or 4 (refer to – Rotary Switches and DIP Switches)
- Make sure the motorized roller is mounted properly

There is no response to the sensor input.

- Make sure the sensor is powered
- Make sure the sensor is wired correctly (refer to Chapter 1 – Hardware connections)
- Check the status LEDs on the IB-E (refer to – LED Indicators)
- Check the logic for the correct sensor input

There is no response to the remote (auxiliary) input.

Make sure the input (device) and common are wired correctly (refer to – Hardware connections and – General Wiring and Precautions)

- Check the status LEDs on the IB-E (refer to – LED Indicators)
- Check the logic for the correct remote input

The remote (auxiliary) output does not turn on.

- Make sure the output (device) and common are wired correctly (refer to – Hardware connections and – General Wiring and Precautions)
- Check the status LEDs on the IB-E (refer to – LED Indicators)
- Check the logic for the correct remote output

The Discrete Output from the motor port does not work.

- Make sure "Motor Port Setting" in the "Motor" tab under properties is set as "Port(Nch)"
- Make sure the output is wired correctly (refer to – Hardware connections and – General Wiring and Precautions)
- Check the status LEDs on the IB-E (refer to – LED Indicators)
- Check the logic for the correct discrete motor port output

## 17.2 IB-E03 SOFTWARE ISSUES

Read/write (configuration or logic) failure

- Check the IP address settings on the IB-E (refer to – Rotary Switches and DIP Switches)
- Check the IP address setting in ICE (refer to – Project Tree)
- Check the PC's IP address (refer to – Property Setting)
- Check the PC's firewall settings (refer to – Windows Firewall)
- Make sure the IB-E has had enough time to reboot between consecutive writes/downloads.

Monitor not responding to status changes

- Check the IP address settings on the IB-E (refer to – Rotary Switches and DIP Switches)
- Check the IP address setting in ICE (refer to – Project Tree)
- Check the PC's IP address (refer to – Property Setting)
- Check the PC's firewall settings (refer to – Windows Firewall)
- Make sure the IB-E has had enough time to reboot between consecutive writes/downloads.

## 17.3 IB-E03 MODULE RESET

The module can be reset to factory defaults. Normally, this is not necessary.

Power OFF the IB-E, set both rotary switches to “0”, set DIP switches 1 and 2 to the OFF position, and set DIP switches 3 and 4 to the ON position.


Power ON the IB-E and wait for the central LED indicators to light up.


Power OFF the IB-E and set the rotary switches and the DIP switches to the previous (or other operational) settings.
Power ON the IB and use as normal.

See Itoh-Denki IB-E and ICE Manual for additional information: http://itohdenki.com/

# 18 ITR MAINTENANCE & TROUBLESHOOTING

General Preventive Maintenance

Preventive maintenance will reduce the cost of downtime, wasted energy costs, and increase the 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.

## 18.1 GENERAL MAINTENANCE OBLIGATION

ISO Mandatory Action Labels feature a blue circle and a white symbol. They specify an action that is required to safeguard your health and/or to avoid the risk of personal injury.

| General Maintenance Obligations |
|---|
| • **Must Do,** Continuous handling equipment shall be kept in proper working condition and maintained in accordance with the manufacturer's instructions. |
| • **Must Do,** Inspection, adjustment, maintenance and cleaning of moving parts shall be carried out regularly in a safe manner according to the manufacturer's instructions. |
| • **Must Do,** if possible, inspection and adjustment of continuous mechanical handling equipment, in motion or in use, shall only be carried out with guards in position. |
| • **Must Do,** Displacing or removal of a guard and/or neutralization of a safety device shall be carried out in accordance with Title 29 of the CFR, Part 1910 “Occupational Safety and Health Standards” concerning: o Walking-Working Surfaces, General Environmental Controls, Machinery and Machine Guarding, and Electrical. |
| • **Must Do,** Repairs and removal of protective enclosures or panels shall only be carried out after stopping the equipment and starting devices have been rendered inoperative by qualified persons. |
| • **Must Do,** carry out maintenance operations with the conveyor equipment switched off. Do not lubricate moving parts. |
| • **Must Do, 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 |

## 18.2 SAFETY WARNINGS

| ⚠WARNING |
|---|
|  <br>**Hazard to Equipment or Personnel**<br>• Care should be taken when servicing any conveyor to prevent accidental injury.<br>• All moving parts are potentially dangerous.<br>• The maintenance operations must be carried out by qualified and authorized maintenance personnel.<br>• Maintenance of the conveyor equipment includes modifications (inspection, adjustment, and replacement) that become necessary following normal usage. |
| **Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury.** |

| ⚠WARNING |
|---|
|  <br>**Hazard to Equipment or Personnel**<br>For proper maintenance operations:<br>• Use only authentic spare parts and tools that are suitable and in good condition.<br>• Respect the frequency of intervention provided in the IOM manual for scheduled maintenance (preventive and regular maintenance).<br>• The distance (indicated in time or in working cycles) between operations must be understood as the maximum acceptable, so it must not be exceeded, however, it can be reduced.<br>• Constantly supervise the conveyor equipment and promptly verify the cause of potential problems such as excessive noise, overheating, fluid leaks, etc. repair them; the prompt removal of any cause of malfunction or failure prevents further damage to equipment and safeguards operators' safety.<br>• The conveyor equipment maintenance personnel must be well trained and have an in-depth knowledge of safety regulations; unauthorized personnel must remain outside of the work area during operation.<br>• Cleaning and adjustment activities must also be carried out only during the maintenance phase and with the conveyor equipment stopped and de-energized and the electrical panel disconnected.<br>  <br>• Prohibit walking, sitting, or riding on conveyor by anyone.<br>• Care should be taken when servicing any conveyor to prevent accidental injury.<br>• All moving parts are potentially dangerous.<br>• Before starting any maintenance operation on the conveyor equipment, isolate, and padlock all energy sources. Follow lock/out tag/out procedures.<br>• When the conveyor equipment is being serviced, to stop it from accidentally being started up, press the emergency mushroom button.<br>• Must wear all protective equipment such as gloves, goggles, boots, and clothing as required to the operation. |

| ⚠WARNING | |
|---|---|
|  | • During maintenance operations, unauthorized personnel must remain in the vicinity of the operating area. If the operation involves removing protections, set barriers around the area and display signs forbidding access to anyone who is not directly involved in the maintenance task.<br>• Perform only the tasks within your competence (Mechanical, Electrical, Hydraulic) for which you are permitted to intervene. Utilize the most suitable instruments and the most suitable for troubleshooting and maintenance.<br>• The need to place the conveyor equipment in operating conditions and/or with protections disabled, requires an adequate competence and knowledge and extreme caution by the maintenance engineer who must be adequately trained on the possible and present risks.<br>• The safety precautions contained in the IOM manual must always be strictly observed during the maintenance of the conveyor equipment, to avoid injuries to personnel and damage to the equipment.<br>• In case of doubt, it is forbidden to operate. Contact the manufacturer (https://mhs-conveyor.com) for the necessary clarification. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

## 18.3 SCHEDULED MAINTENANCE

### *18.3.1 Daily Inspection*

| Daily (Visual & Listen Inspection) | Action |
|---|---|
| Listen to everything for unusual noises or vibration. | Isolate noise or vibration and repair as needed. |
| Visually inspect to see that conveyor sections are clear and free of debris. | Remove any build-up. |
| Check to see that all safety guards, covers or netting are in place. | Reinstall any missing safety guards, covers or netting. |
| Check for loose bolts or parts. | Tighten any loose hardware. |
| Listen for air leaks. | Repair or replace air leaks. |
| Visually inspect for loose or hanging wires. | Reconnect or remount wires. |
| Visually inspect O-rings. | Replace as needed. |
| Full inspection of equipment, parts, and proper operations. | Full inspection of equipment. |

### 18.3.2 Weekly Inspection

| Weekly Inspection | Action |
|---|---|
| Check for proper pressure on air regulators. | Reset air to correct setting. |
| Check air filter bowls for accumulated water. | Remove accumulated water from the system.<br>Check main air supply system for root cause. |
| Rollers are properly working. | Replace roller. |

### *18.3.3 Curves*

| ⚠WARNING | |
|---|---|
|  | **Hazard to Equipment or Personnel**<br>• Be very careful when tightening the M8 screws on the welded pins into the curves, they must be tightened to a maximum of 20 Nm, and no more, as this could damage the weld. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### ***18.3.4** 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.

### *18.3.5 Yearly Inspection*

| Yearly Inspection | Action |
|---|---|
| Full inspection of equipment, parts, and proper operations. With system running and off. | Full inspection of equipment. Repair, replace or service equipment. |

## 18.4 INSPECTION SHEET SAMPLE

| ADD COMPANY LOGO | | IntelliROL Conveyor Inspection Sheet | | |
|---|---|---|---|---|
| Customer: | | Installation Foreman: | | |
| Project #: | | Site PM: | | |
| City & State: | | Date: | | |
| Conveyor # | | | | |
| # | DESCRIPTION | OK | CODE | COMMENTS |
| | MOTORIZED ROLLERS | | | |
| 1 | DRIVE ORINGS | | | |
| 2 | ROLLERS & BRACKET HARDWARE | | | |
| 3 | LISTEN FOR EXCESSIVE NOISE | | | |
| | PNEUMATICS | | | |
| 1 | CHECK AIR PRESSURE | | | |
| 2 | LISTEN FOR AIR LEAKS | | | |
| 3 | INSPECT REGULATOR | | | |
| | ELECTRICAL | | | |
| 1 | DRIVER CARDS | | | |
| 2 | WIRES /CABLES | | | |
| 3 | PHOTO EYES | | | |
| | MISCELLANEOUS | | | |
| 1 | GUARDS | | | |
| 2 | CARRIER ROLLERS | | | |
| 3 | O-RINGS | | | |
| 4 | CONVEYOR SPEEDS | | | |
| 5 | CONVEYOR STRAIGHT AND LEVEL | | | |
| 6 | BED JOINT CONNECTIONS | | | |
| 7 | CLEAN OF DEBRIS | | | |
| 8 | CHECK FOR LOOSE HARDWARE | | | |
| COMMENTS: | | | | |
| | | | | |
| | | | | |

| CODE REFERENCE NUMBER | | | |
|---|---|---|---|
| 1 - LOOSE | 7 - BENT AND/OR DENTED | 13 - LEAKING | |
| 2 - BROKEN | 8 - WRONG SIZE | 14 - RUNNING HOT | |
| 3 - MISSING | 9- OUT OF ALIGNMENT | 15 - INCORRECT | |
| 4 - WORN | 10 - LOW OR EMPTY | 16 - SLIPPAGE | |
| 5 - DIRTY AND/OR DRY | 11 - EXCESSIVE NOISE | 17 - VIBRATION | |
| 6 - EXCESSIVE TENSION | 12 - REPLACE | | |
| | | 18 - OTHER | *COMMENTS:* |
| | | | |
| | | | |

# 19 MAINTENANCE SERVICE & REPAIRS

## 19.1 INTELLIROL (ITR) REPLACE THE MOUNT BRACKET AND O-RINGS ON ITR SPUR

### *19.1.1 Safety*

| ⚠WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• 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.<br>• If more than one member of a crew is working on the conveyor, **EACH CREW MEMBER MUST HAVE A PADLOCK 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.<br>• Check the loosened parts have been retightened and all guards reinstalled.<br>• Make sure personnel are clear of all conveyor equipment before restarting the system.<br>• Where applicable, allow sufficent time for brake resistor to cool before working on motor. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### *19.1.2 PPE & Tools*

| Direction - IntelliROL (ITR) replace the mount bracket and O-rings on ITR spur | |
|---|---|
| **No of required operators** | One Maintenance Engineer |
| **PPE required** |  |
| **Tools to be used** | 1. 3/8-inch wrench<br>2. 5/16-inch socket with ratchet.<br>3. 5/16-inch torque wrench 2.2 ft/lb ± 10%<br>4. 9/16-inch wrench and socket with ratchet<br>5. Vice grips<br>6. Wire cutters<br>7. Optional putty knife |

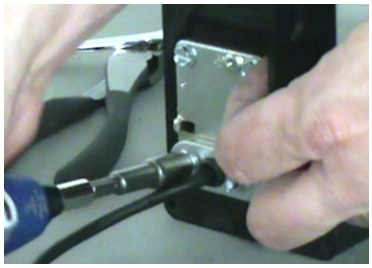
**Maintenance video is available:** https://mhs-conveyor.com

IntelliROL (ITR) replace the mount bracket and O-rings on ITR spur

Old Design Mount Bracket

New Design Mount Bracket

| Step | Description |
|---|---|
| 1 | Remove the two rollers that are driven by the ITR motorized roller. Remove rollers free from the ITR O-rings. |
| 2 | **Note:** This illustration is shown on a **Left-Hand** ITR Spur bed.<br>Disconnect the power cable from the driver card or extension cable.<br>The cable may be tied down with zip ties, cut and remove zip ties as necessary.<br>Replace the zip ties when reinstalling.<br>  |
| 3 | Loosen the four ITR mount bracket hex screws.<br>Hold on to the ITR roller and mount bracket. Remove the two hex screws and nuts by the cable end of the ITR roller.<br>Slide the assembly to the side and remove.<br>  |
| 4 | Remove the other end of the old mount bracket.<br>Cut and remove the zip ties.<br>  |
| 5 | Remove bracket from ITR cable. |
| 6 | Remove the old mount bracket. |

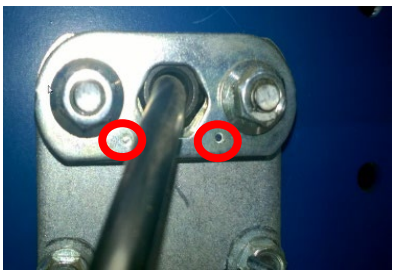
| Step | Description | |
|---|---|---|
| 7 | Install the ITR cable through the new mount bracket and slide the new O-rings over the roller. Push the axle in and install the roller. Adjust the O-rings into the ITR roller grooves. | |
| 8 | Install the ITR bracket and tighten the hex screws and flange nuts. Torque the two flange hex nuts to 2.2 ft/lb. ± 10%. ` |   |

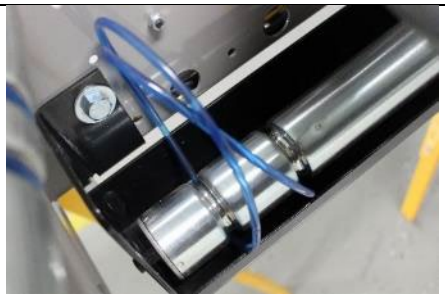
**NOTICE**

**Note!**

- When reinstalling the fixing bracket, make sure the top dots are at the top of the bracket and align to each other.
- When reinstalling the fixing bracket, avoid overtightening and stripping the hex nuts by using a 2.2 Ft/Lb. ±10% torque wrench on the top two hex nuts.

**Failure to follow these instructions can result in property damage or equipment damage.**

| MAGE #1 | IMAGE #2 |
|---|---|
|   Dots are in the **wrong** position! |   Dots are in the **correct** position! |

| | | |
|---|---|---|
| 9 | Install the new mount bracket assembly on the ITR Spur. Reinstall the four mount bracket hex screws and nuts. |  |
| 10 | Reinstall rollers by twisting the bottom O-ring **clockwise** (on a Left-Hand spur), and then place the roller through the O-ring. Push the axle in to install the axle in the hex hole.<br>**Note:** On the **Right-Hand** ITR Spur, the O-rings have a **counterclockwise twist.** |  <br>  |
| 11 | Install zip ties and reconnect the ITR cable. |  |

Maintenance video is available at: https://mhs-conveyor.com

## 19.2 HOW TO REPLACE INTELLIROL MOTORIZED ROLLER.

### *19.2.1 Safety*

| ⚠WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• 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.<br>• If more than one member of a crew is working on the conveyor, **EACH CREW MEMBER MUST HAVE A PADLOCK 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.<br>• Check the loosened parts have been retightened and all guards reinstalled.<br>• Make sure personnel are clear of all conveyor equipment before restarting the system.<br>• Where applicable, allow sufficent time for brake resistor to cool before working on motor. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### *19.2.2 PPE & Tools*

| Direction - How to Replace IntelliROL Motorized Roller. | |
|---|---|
| **No of required operators** | *No. 1 Maintenance Engineer* |
| **PPE required** |  |
| **Tools to be used** | 1. 3/8-inch wrench<br>2. 5/16-inch socket with ratchet and extension<br>3. Needle nose pliers<br>4. Putty knife<br>5. Torque wrench 2.2 ft/lb ± 10%<br>6. Vice-grips |

| Steps | Directions | |
|---|---|---|
| 1 | Disconnect the IntelliROL Motorized wire from the driver card. |  |
| 2 | Remove the IntelliROL Motorized Roller bracket. |  |
| 3 | Remove one roller on each side of the IntelliROL Motorized Roller and release the rollers from the O-rings. |  |
| 4 | Remove the IntelliROL Motorized Roller and the O-rings. Pull the IntelliROL Motorized Roller wire free from the side channel. |  |

| Steps | Directions | |
|---|---|---|
| 5 | In reverse order, replace the O-rings on the new IntelliROL Motorized Roller and reinstall.<br>Use a putty knife to shift the roller and to protect the finish until the axle springs into the hex hole. |  |
| 6 | Reinstall the two side rollers by placing the rollers back through the O-rings on the IntelliROL Motorized Roller and the O-rings on the corresponding side rollers.<br>Use a putty knife to shift the roller and to protect the finish, until the axle springs into the hex hole. |  |
| 7 | Reinstall the IntelliROL Motorized Roller bracket. |  |

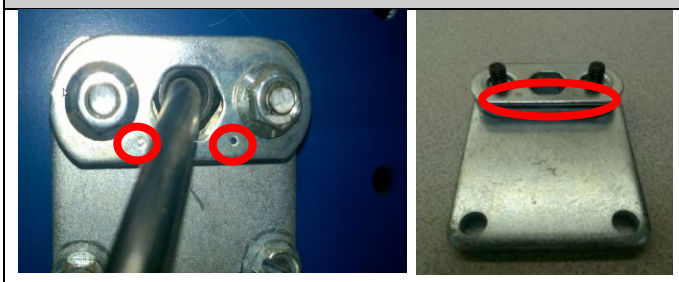
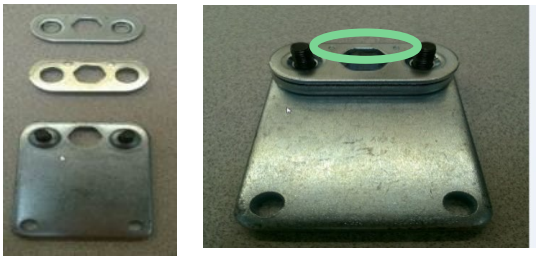
| Steps | Directions | |
|---|---|---|
| 8 | Torque the two hex nuts to 2.2 ft/lb ± 10%. |  |

**NOTICE**

**Note!**

- When reinstalling the fixing bracket, make sure the top dots are at the top of the bracket and align to each other.
- When reinstalling the fixing bracket, avoid overtightening and stripping the hex nuts by using a 2.2 Ft/Lb. ±10% torque wrench on the top two hex nuts.

**Failure to follow these instructions can result in property damage or equipment damage.**

| MAGE #1 | IMAGE #2 |
|---|---|
|  Dots are in the **wrong** position! |  Dots are in the **correct** position! |

| | | |
|---|---|---|
| 9 | Reconnect the driver card wire. |  |

Maintenance video is available: https://mhs-conveyor.com

## 19.3 How To Replace a Carrier Belt (Traction Belt) On a Belted ITR Decline.

### *19.3.1 Safety*

| ⚠WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• 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.<br>• If more than one member of a crew is working on the conveyor, **EACH CREW MEMBER MUST HAVE A PADLOCK 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.<br>• Check the loosened parts have been retightened and all guards reinstalled.<br>• Make sure personnel are clear of all conveyor equipment before restarting the system.<br>• Where applicable, allow sufficent time for brake resistor to cool before working on motor. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### *19.3.2 PPE & Tools*

| Direction – IntelliROL Replace a Carrier Belt | |
|---|---|
| **No of required operators** | One Maintenance Engineer or Two Maintenance Engineer if not using option tool #1186633 |
| **PPE required** |  |
| **Tools to be used** | 1. MHS Conveyor IntelliROL (ITR) Full Width Belt Installation Tool (P/N 1186633)<br>2. Vice-grips or pliers<br>3. Needle-nose pliers<br>4. 7/16-inch socket and ratchet with extension<br>5. 5/16-inch socket and ratchet with extension<br>6. 3/8-inch wrench<br>7. Torque wrench 2.2 Ft/Lb.<br>8. Putty knife or similar<br>9. Large screwdrivers or similar<br>10. Plastic Hammer |

How To Replace a Carrier Belt (Traction Belt) On a Belted ITR Decline.

| Steps | Directions |
|---|---|
| 1 | At the Charge End of the zone remove the end roller and all the Gravity rollers in that zone. Push the axle through the frame. Do not lose the black O-ring that is between the roller and the frame (around the axle). Make sure to reinstall these black O-rings. |
| 2 | Remove all the gravity rollers, push or pull the axle through the frame of the conveyor. |
| 3 | Remove any finger guards that may be on the conveyor, use a 7/16” socket to do this. |
| 4 | Remove the other end roller, push the axle through the frame. Do not lose the black O-ring that is between the roller and the frame (around the axle). Make sure to reinstall these O-rings. |
| 5 | Loosen the fixing bracket on the MDR roller. Make sure the fixing bracket is loose. Use a 5/16” socket and 3/8” wrench to loosen the fixing bracket. |
| 6 | Lift the MDR roller and remove and replace the V-belt and carrier belt. Make sure the new Poly-V belt is aligned in the grooves. |
| 7 | Reinstall the finger guard. Verify the finger guard is not interfering with the Poly-V belt. |
| 8 | Reinstall the IntelliROL roller bracket and torque bracket hex nuts to 2.2 Ft/Lb. ±10%. Connect the driver card. |

**NOTICE**

- When reinstalling the fixing bracket, make sure the top dots are at the top of the bracket and align to each other.
- When reinstalling the fixing bracket, avoid overtightening and stripping the hex nuts by using a 2.2 Ft/Lb. ±10% torque wrench on the top two hex nuts.

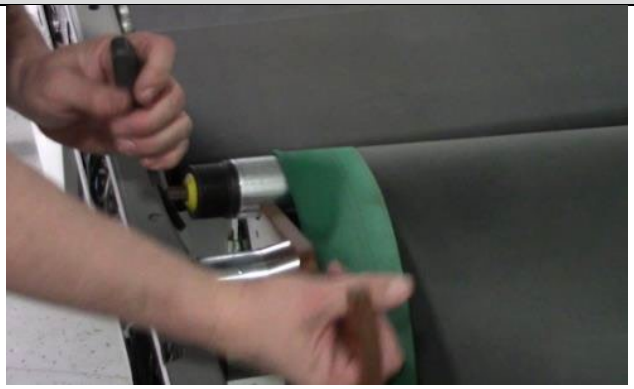
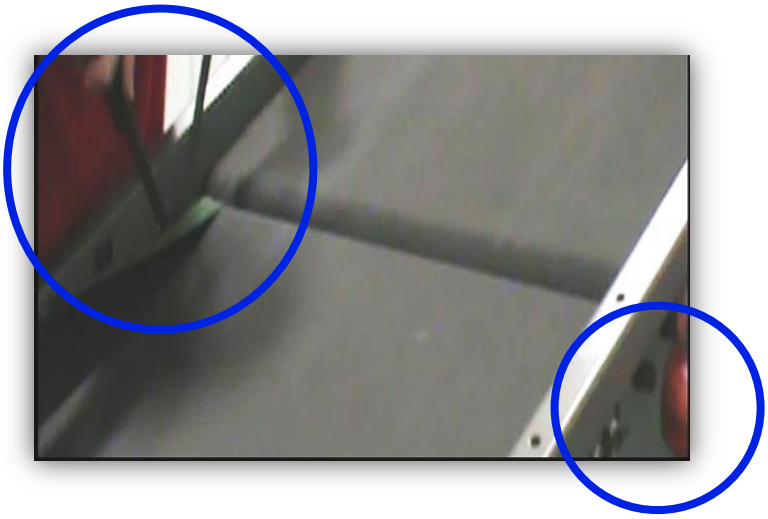
**Failure to follow these instructions can result in property damage or equipment damage.**

| | |
|---|---|
| 9 | Re-install the Gravity rollers. Use a putty knife to shift the roller and to protect the frame finish until the axle springs pop into the hex hole. |
| | |

Install the last roller **with** the belted ITR Tool #1186633

**(One maintenance person are required)**

| | |
|---|---|
| 10 | If using the belted ITR tool #1186633 to install the last end roller. Place the tool between the rollers and turn the tool and move the tool upwards to re-install the roller. Using your other hand. |

| Steps | Directions |
|---|---|
| |  |
| 11 | Use a putty knife to shift the roller and to protect the frame finish until the axle springs into the hex hole. |
| Install the last roller **without** the belted ITR Tool #1186633<br>(Two maintenance people are required) | |
| 12 | The first person will use two large screwdrivers to pry the end roller over and align the axle to the hex hole in the channel. |
| 13 | On the other side of the conveyor, the second person will tap the axle with a dead blow hammer until the first person can see the axle project through the hex hole in the channel.<br>  |
| 14 | Check the edges of the belt to make sure the Carrier belt is not pinched or folded |

## 19.4 How to Replace Transfer Belt on an IntelliROL Pick Zone Module.

### *19.4.1 Safety*

| ⚠WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• 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.<br>• If more than one member of a crew is working on the conveyor, **EACH CREW MEMBER MUST HAVE A PADLOCK 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.<br>• Check the loosened parts have been retightened and all guards reinstalled.<br>• Make sure personnel are clear of all conveyor equipment before restarting the system.<br>• Where applicable, allow sufficent time for brake resistor to cool before working on motor. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

### *19.4.2 PPE & Tools*

| Direction – How to Replace Transfer Belt on an IntelliROL Pick Zone Module | |
|---|---|
| **No of required operators** | One Maintenance Engineer |
| **PPE required** |  |
| **Tools to be used** | 1. Channellock or pliers<br>2. Optional putty knife<br>3. 9/16in socket and long extension |

Maintenance video is available: https://mhs-conveyor.com

How to Replace Transfer Belt on an IntelliROL Pick Zone Module

| Steps | Directions |
|---|---|
| 1 | Remove the carrier rollers on each side of the wheel bracket that is to be replaced. |
| 2 | Push or pull the axle through the frame to remove the rollers. Make sure to **twist the O-rings clockwise when reinstalling** the rollers. |
| 3 | Loosen and remove the flange nuts holding the wheel bracket down. Use a 9/16" socket and long extension to do this. |
| 4 | Remove & replace the wheel bracket or replace the UBT belt with a new one. |
| 5 | When replacing the UBT belt make sure to rout the belt properly according to your wheel bracket structure. |
| 6 | **NOTICE**<br>Important!<br>• Different wheel bracket transfer belts are routed differently.<br>• Make sure the wheel bracket transfer belt is properly routed as seen in the pictures below.<br>Failure to follow these instructions can result in property damage or equipment damage. |

Rout the belt according to your style of wheel bracket.

| *WHEEL BRACKET PICTURE 1 (Shown with 2 bottom wheels)* | *WHEEL BRACKET PICTURE 2 (Shown with 4 bottom wheels)* |
|---|---|
|  |  |

| | |
|---|---|
| 7 | Pull the transfer belt over the wheels. |
| 8 | Follow these steps in reverse to install the wheel bracket. |

## 19.5 ADJUST THE AIR ON AN ITR WHEEL DIVERT CYLINDERS

### *19.5.1 Safety*

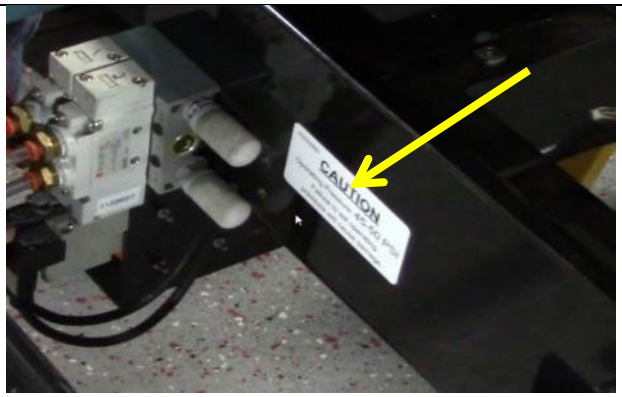
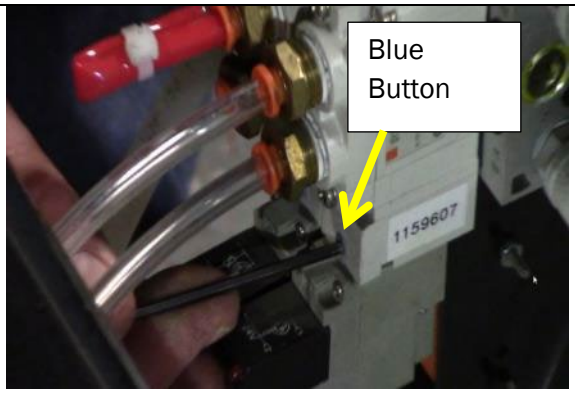
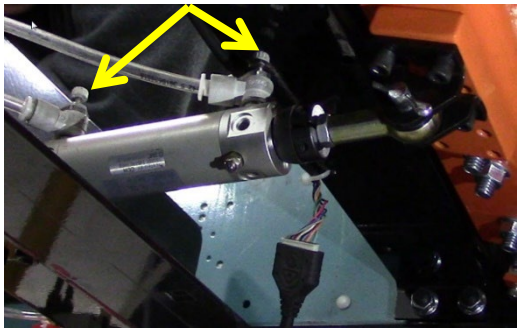
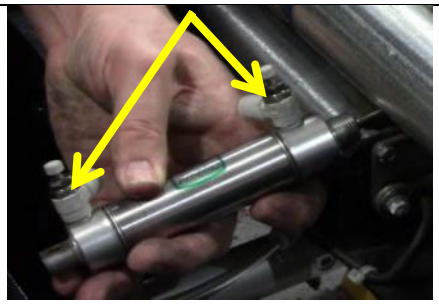
| ⚠WARNING | |
|---|---|
|  | **Hazard to Personnel**<br>• Do not perform maintenance on the conveyor until the start-up controls, including motor safety switches, are locked out and cannot be turned by any person other than the one performing the maintenance.<br>• If more than one member of a crew is working on the conveyor, **EACH CREW MEMBER MUST HAVE A PADLOCK 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.<br>• Check the loosened parts have been retightened and all guards reinstalled.<br>• Make sure personnel are clear of all conveyor equipment before restarting the system.<br>• Where applicable, allow sufficent time for brake resistor to cool before working on motor. |
| Indicates a medium level potentially hazardous situation that, if not avoided, could result in death or serious injury. | |

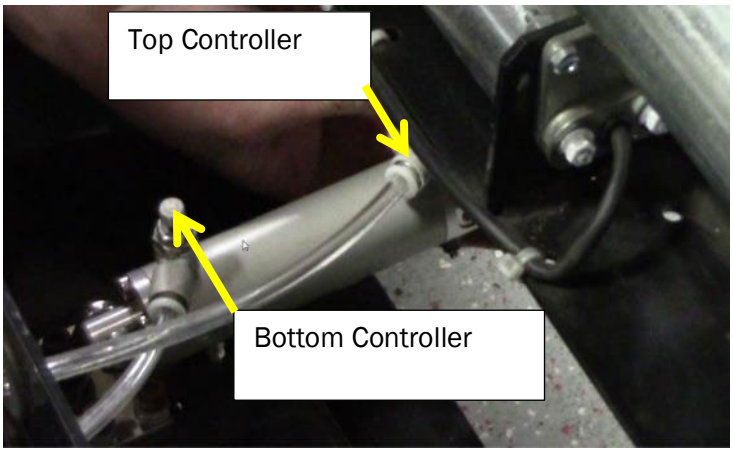
### *19.5.2 PPE & Tools*

| Direction - Adjust the Air on an ITR Wheel Diverter | |
|---|---|
| **No of required operators** | One Maintenance Engineer |
| **PPE required** |  |
| **Tools to be used** | 1. Channellock or pliers<br>2. 9/16-Inch Socket and ratchet with long extension<br>3. Flat head screwdriver<br>4. Optional putty knife |

Maintenance video is available:[https://mhs-conveyor.com](https://mhs-conveyor.com)

**Adjust the Air on an ITR Wheel Diverter**

| Steps | Directions |
|---|---|
| 1 | After the ITR Wheel Diverter is installed, it's important to adjust the flow controllers on the cylinders. |
| 2 | Make sure the air pressure is set to 45 - 50 psi.   |
| 3 | Cycle the wheel bracket by pushing the blue button on the solenoid. If the cylinder is "slamming" up or down, you will need to adjust the flow controls.   |
| 4 | Locate the flow controls on the cylinders.   |
| 5 | Loosen the jam nuts on both of the flow controllers. (**Note**, this cylinder is removed for clarity)  |

| Steps | Directions |
|---|---|
| 6 | The top flow controller controls the “up stroke” and the bottom controller controls the “down stroke”. Adjust the controllers accordingly so the wheel bracket is **not** “slamming” up or down.<br>  <br> |
| 7 | After the proper adjustments are made, tighten the jam nuts on the flow controllers. Do not over tighten. |

# 20 ITR TROUBLESHOOTING GUIDE

| No. | Problem | Possible Cause | Remedy |
|---|---|---|---|
| 1. | Power Roller does not turn | ITR roller not properly installed | Check that the Power Roller 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 Roller 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 Roller'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 Roller 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,<br>Green LED OFF,<br>Orange LED OFF | Check that the power supply is on. |
| | | | Check that the card is correctly wired. Reference IOM manual. |
| | | | Measure the voltage, stable 24V DC is required. |
| | | Red LED ON,<br>Green LED ON,<br>Orange LED ON<br>if sensor is blocked | Check that the motor connector is properly plugged into the card then cycle the run / sensor signal. |
| | | | 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 Roller is reaching thermal limit; cycle |

| No. | Problem | Possible Cause | Remedy |
|---|---|---|---|
| | | | 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,<br>Green LED ON,<br>Orange LED ON<br>if sensor is blocked | Check that the sensor is properly wired in the correct position and is the proper voltage. Reference IOM manual. |
| | | | 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. |
| | | | 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 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 |
| 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. | Roller's "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 MHS, 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 MHS Conveyor start eye kit, or provide 24V run signal |
| | | Loose connection between driver cards | Inspect, and adjust, connection cables as necessary |

| No. | Problem | Possible Cause | Remedy |
|---|---|---|---|
| 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. |
| 12 | Electric Lift | Lift not working | Check switch to motors are properly set<br>Check EZ-Qube card settings. |

# 21 INTELLIROL REPLACEMENT PARTS

## 21.1 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 MHS Conveyor conveyors, are included with illustrations. A "Recommended Spare Parts List" is published for all conveyor orders of $20,000. 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.

## 21.2 SPARE PARTS PRIORITY LEVEL EXPLANATIONS

Level #1

Failure of a priority level #1 spare part (“A” level part) may cause major disruption of system performance.
Priority level 1 spare parts must be on-hand, and available to be replaced in the event of a component failure that could shut down the critical function of a conveyor system.

Priority level 1 spare parts include motors, gear reducers, gearmotor, motorized rollers, air solenoid valves, and related components. The majority of these parts are purchased from MHS Conveyor vendors and carry their own warranties through these vendors. For more warranty information, see MHS Conveyor Equipment Warranty.

Level #2

Failure of a priority level #2 spare parts (“B” level part) usually is gradual and should not cause a major system disruption.
Priority level 2 spare parts are parts required for smooth system operation and preventative or regular mechanical maintenance.

Priority level 2 spare parts include roller chain, sprockets, belt pulleys, rollers, air cylinders, and other related parts whose failure should not stop a conveyor system suddenly. These parts tend to wear out gradually and are not known to fail suddenly.

Level #3

Priority level #3 parts (“C” level part) rarely fails and are easily obtainable.
Priority level 3 spare parts are parts that rarely fail or may be optionally used by the customer.

## 21.3 REPLACEMENT PARTS - ITOH FE60 MDR

| REPLACEMENT PARTS for ITOH FE-60 MOTORIZED ROLLER STANDARD ASSEMBLIES | | | | |
|---|---|---|---|---|
| Item # | Description | (1) Fixing Brkt Hex Axle-Up | Replacement Rollers | Description |
| 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 |
| 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 130S001 | | | | |

## 21.4 REPLACEMENT PARTS - ITOH DRIVER CARDS

| REPLACEMENT PARTS for ITOH DRIVERCARD STANDARD ASSEMBLIES | |
|---|---|
| Replacement Driver Card | 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, BRAKE CONTROL |
| 1166286 | DRIVERCARD, ITOH IB-E03 |
| 1131443 | DCM,4-ZONE CONTROLLER |

## 21.5 DRIVE AND SLAVE O-RINGS

| REPLACEMENT PARTS - DRIVE AND SLAVE O-RINGS | | | |
|---|---|---|---|
| Item # | Description | Roller Centers | Application |
| E0005536 | ORING,3/16DIA X 9.5" HT BLUE ITR **3"CTR** | 3" | STRAIGHT SLAVE |
| 1142656 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR **2"CTR** | 2" | STRAIGHT SLAVE |
| 1137420 | ORING,3/16 DIA X 8.688 HT BLUE | 2.50" | STRAIGHT SLAVE |
| 1127703 | ORING,3/16 DIA X 11" HT BLUE ITR **4"CTR** | 4" | STRAIGHT SLAVE |
| 1102748 | ORING,.210" DIA X 9.4" HT RED | 3" | CURVE SLAVE |
| 1102845 | ORING,.210" DIA. X 11.5" HT RED | 4.27" | CURVE DRIVE |
| 1103665 | ORING,3/16" DIA X 13" HT BLUE | N/A | SPUR (Clockwise Twist) |
| 1133173 | ORING,88A .218" DIA X 20-1/2" BLACK | N/A | UBT (Clockwise Twist) |

## 21.6 RUN SIGNALS FOR CB-016 DRIVER CARD

| RUN SIGNAL HARNESS FOR CB-016 DRIVER CARD | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1144782 | ELEC, ITR ACCUMULATION CURVE,1 MR, **CB-016** PRESSURE SWITCH, LH/RH | USED TO POWER (1) ITR ROLLER FROM DOWNSTREAM NBC |
| 1144783 | ELEC, ITR ACCUMULATION CURVE,2 MR, **CB-016** PRESSURE SWITCH, LH/RH | USED TO POWER (2) ITR ROLLER FROM DOWNSTREAM NBC |
| 1146833 | ELEC, ITR ACCUMULATION CURVE,3 MR, **CB-016** PRESSURE SWITCH, LH/RH | USED TO POWER (3) ITR ROLLER FROM DOWNSTREAM NBC |
| 1146832 | ELEC, ITR ACCUMULATION CURVE,4 MR, **CB-016** PRESSURE SWITCH, LH/RH | USED TO POWER (4) ITR ROLLER FROM DOWNSTREAM NBC |

## 21.7 GENERAL CABLES, CONNECTORS, & KITS

| GENERAL CABLES, CONNECTOR, & KITS | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1167713 | KIT, CTRLS-PE ZONE START-**HB**-FIELD MOUNT | USED TO START HB-510 DOWNSTREAM ZONE |
| 1167714 | ASY, CTRLS-PE ZONE START-**HB**-FACTORY MOUNT | USED TO START HB-510 DOWNSTREAM ZONE |
| 1125371 | KIT, ACC-CH TRANSITION-**C6:CZ**-BOTH SIDES | CH TRANSITION C6 TO CRUZ |
| 1152538 | ASY, CTRLS-PRSS SWTCH-**CB TO NBC-FACTORY MOUNT** TO ITR CURVE | USED FOR CURVES TO INTERFACE WITH NBC CHARGE END |
| 1157661 | ASY, CTRLS-PRSS SWTCH-**HB TO NBC-FACTORY MOUNT** TO NBC CHG BED | USED FOR CURVES TO INTERFACE WITH NBC DISCHARGE END |
| 1207178 | ELEC, CPART-ITR-POWER SUPPLY-SPLICE INSTALLATION | USED FOR SPLICE INSTALLATION |
| 1120174 | CONNECTOR, SIGNAL SPLICE | USED WITH RED RELEASE SIGNAL HARNESS |

## 21.8 STANDARD ITR 24VDC POWER HARNESS

| INTELLIROL 24VDC POWER HARNESS | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1129502 | HARNESS, ITR-POWER-10AWG-12.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1102286 | HARNESS, ITR-POWER-10AWG-10.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1102287 | HARNESS, ITR-POWER-10AWG-8' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1102288 | HARNESS, ITR-POWER-10AWG-5.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1102289 | HARNESS, ITR-POWER-10AWG-3' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1143291 | HARNESS, ITR-POWER-10AWG-10'-MALE-PIGTAIL | POWER CABLE W/ MALE CONNECT ONLY |
| 1145665 | HARNESS, ITR-POWER-10AWG-10'-FEMALE-PIGTAIL | POWER CABLE W/ FEMALE CONNECT ONLY |
| 1161502 | HARNESS, ITR-PWR INTRPT-10AWG-4"-COMMON CONDUCTOR | USED BETWEEN POWER SUPPLIES TO CONNECT COMMONS |
| 1138166 | HARNESS, ITR-POWER-10AWG-33'-(10 METER) | 24VDC POWER CABLE TO DRIVER CARDS |
| 3M567 | CONNECTOR, POWER SPLICE 10 AWG | ---- |
| **MALE/MALE POWER HARNESS** | | |
| 1141545 | HARNESS, ITR-POWER-10AWG-4"-MALE/MALE CONN | USE TO CHANGE POWER FLOW |
| 1134347 | HARNESS, ITR-POWER-10AWG-1'-MALE/MALE CONN | USE TO CHANGE POWER FLOW |
| 1134348 | HARNESS, ITR-POWER-10AWG-3'-MALE/MALE CONN | USE TO CHANGE POWER FLOW |
| 1134349 | HARNESS, ITR-POWER-10AWG-5.5'-MALE/MALE CONN | USE TO CHANGE POWER FLOW |
| **FEMALE/FEMALE POWER HARNESS** | | |
| 1141549 | HARNESS, ITR-POWER-10AWG-4"-FEMALE/FEMALE CONN | USE TO CHANGE POWER FLOW |
| 1134344 | HARNESS, ITR-POWER-10AWG-1'-FEMALE/FEMALE CONN | USE TO CHANGE POWER FLOW |
| 1134345 | HARNESS, ITR-POWER-10AWG-3'-FEMALE/FEMALE CONN | USE TO CHANGE POWER FLOW |
| 1134346 | HARNESS, ITR-POWER-10AWG-5.5'-FEMALE/FEMALE CONN | USE TO CHANGE POWER FLOW |

## 21.9 CAT5 COMMUNICATION CABLES

| DRIVER CARD - Cat5E COMMUNICATION CABLE | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| E0034025 | CABLE, CTRLS-CAT5E-3'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |
| E0034026 | CABLE, CTRLS-CAT5E-5'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |
| E0034027 | CABLE, CTRLS-CAT5E-7'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |
| E0030796 | CABLE, CTRLS-CAT5E-10'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |
| E0009905 | CABLE, CTRLS-CAT5E-14'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |
| E0009904 | CABLE, CTRLS-CAT5E-25'-GRAY | COMM. CABLE BETWEEN DRIVER CARDS |

## 21.10 RUN SIGNAL HARNESS FOR CB-016 DRIVER CARD

| RUN SIGNAL HARNESS FOR CB-016 DRIVER CARD | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1144782 | ELEC, ITR ACCUMULATION CURVE, 1 MR, CB-016 PRESSURE SWITCH, LH/RH | USED TO POWER (1) ITR ROLLER FROM DOWNSTREAM NBC |
| 1144783 | ELEC, ITR ACCUMULATION CURVE, 2 MR, CB-016 PRESSURE SWITCH, LH/RH | USED TO POWER (2) ITR ROLLER FROM DOWNSTREAM NBC |
| 1146833 | ELEC, ITR ACCUMULATION CURVE, 3 MR, CB-016 PRESSURE SWITCH, LH/RH | USED TO POWER (3) ITR ROLLER FROM DOWNSTREAM NBC |
| 1146832 | ELEC, ITR ACCUMULATION CURVE, 4 MR, CB-016 PRESSURE SWITCH, LH/RH | USED TO POWER (4) ITR ROLLER FROM DOWNSTREAM NBC |

## 21.11 CABLE, MOTOR EXTENSION USED WITH CBM-105, CB-016 OR HB-510

| CABLE, MOTOR EXTENSION USED WITH CBM-105, CB-016 OR HB-510 | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1138704 | CABLE, MOTOR EXTENSION,600MM ITOH M-F-EXT-9PIN-600<br>**USED W/ CBM-105, CB-016 & HB-510** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1138705 | CABLE, MOTOR EXTENSION,1200MM ITOH M-F-EXT-9PIN-1200<br>**USED W/ CBM-105, CB-016 & HB-510** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1138706 | CABLE, MOTOR EXTENSION,2700MM ITOH M-F-EXT-9PIN-2700<br>**USED W/ CBM-105, CB-016 & HB-510** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |

## 21.12 CABLE, MOTOR EXTENSION USED WITH IB-E03

| CABLE, MOTOR EXTENSION USED WITH IB-E03 OR WWL CS1004 | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1135339 | CABLE, MOTOR EXTENSION,600MM ITOH M-F-EXT-10PIN-600,<br>**USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1135340 | CABLE, MOTOR EXTENSION,1200MM ITOH M-F-EXT-10PIN-1200,<br>**USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |
| 1135341 | CABLE, MOTOR EXTENSION,2700MM ITOH M-F-EXT-10PIN-2700,<br>**USE W/ IB-N03/IB-E/HBM-604/BRAKE** | EXTEND DISTANCE BETWEEN DRIVER CARDS & ROLLER |

## 21.13 COATED ROLLERS

| COATED ROLLERS | |
|---|---|
| **Item No.** | **Description** |
| **Non-Motorized Roller** | |
| 1134693 | ROLLER,18ITR 1.9CTD PRBG-1/8"BLK URE SLV (16BF) |
| 1132204 | ROLLER,24ITR 1.9CTD PRBG-1/8"BLK URE SLV (22BF) |
| 1131724 | ROLLER,30ITR 1.9CTD PRBG-1/8"BLK URE SLV (28BF) |
| 1140369 | ROLLER,36ITR 1.9CTD PRBG-1/8"BLK URE SLV (34BF) |
| **Motorized Roller** | |
| 1140375 | ROLLER, ITR 16BF 2G CTD ITOH-PM486FE-60-391-D-24-P2-KF-1/8"BLK URE SLV |
| 1140376 | ROLLER, ITR 22BF 2G CTD ITOH-PM486FE-60-544-D-24-P2-KF-1/8"BLK URE SLV |
| 1140377 | ROLLER, ITR 28BF 2G CTD ITOH-PM486FE-60-696-D-24-P2-KF-1/8"BLK URE SLV |
| 1140378 | ROLLER, ITR 34BF 2G CTD ITOH-PM486FE-60-849-D-24-P2-KF-1/8"BLK URE SLV |

## 21.14 ITR ADDITIONAL POWER HARNESS

| INTELLIROL 24VDC POWER HARNESS - INCLINE & DECLINE<br>INCLINE BED, POWER HARNESS 24" & 30" ZONES, IBE | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1175354 | HARNESS, POWER,10AWG, W/DROPS-LH, (1) 24Z, IBE,2.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1175353 | HARNESS, POWER,10AWG, W/DROPS-LH, (2) 24Z, IBE,4.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1175352 | HARNESS, POWER,10AWG, W/DROPS-LH, (3) 24Z, IBE,6.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1175351 | HARNESS, POWER,10AWG, W/DROPS-LH, (4) 24Z, IBE,8.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1175350 | HARNESS, POWER,10AWG, W/DROPS-LH, (5) 24Z, IBE,10.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1175349 | HARNESS, POWER,10AWG, W/DROPS-LH, (6) 24Z, IBE,12.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180800 | HARNESS, POWER,10AWG, W/DROPS-RH, (1) 24Z, IBE,2.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180799 | HARNESS, POWER,10AWG, W/DROPS-RH, (2) 24Z, IBE,4.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180798 | HARNESS, POWER,10AWG, W/DROPS-RH, (3) 24Z, IBE,6.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180797 | HARNESS, POWER,10AWG, W/DROPS-RH, (4) 24Z, IBE,8.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180796 | HARNESS, POWER,10AWG, W/DROPS-RH, (5) 24Z, IBE,10.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1180795 | HARNESS, POWER,10AWG, W/DROPS-RH, (6) 24Z, IBE,12.5'-BELTED 2MR PER ZONE | 24VDC POWER CABLE TO DRIVER CARDS |

| HARNESS, HB-510 RUN SLAVE (DWG 130E090) | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1155865 | HARNESS, ITR, RUN SLAVE, HB-510 L=24" | 24VDC POWER CABLE TO DRIVER CARDS |

| HARNESS, POWER, 10AWG WITH DROPS TO CB/HB/CS1004 12", 24", AND 30" ZONES | | |
|---|---|---|
| Item No. | Description | Application |
| 1154912 | HARNESS, POWER,10AWG, W/DROPS (1)24"Z,2.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1149781 | HARNESS, POWER,10AWG, W/DROPS (2)24"Z,4.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1149780 | HARNESS, POWER,10AWG, W/DROPS (3)24"Z,6.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1149779 | HARNESS, POWER,10AWG, W/DROPS (4)24"Z,8.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1149778 | HARNESS, POWER,10AWG, W/DROPS (5)24"Z,10.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1149777 | HARNESS, POWER,10AWG, W/DROPS (6)24"Z,12.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1155918 | HARNESS, POWER,10AWG, W/DROPS HB-510 SLAVE, (1)24"Z,2.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1155917 | HARNESS, POWER,10AWG, W/DROPS HB-510 SLAVE, (2)24"Z,4.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1155916 | HARNESS, POWER,10AWG, W/DROPS HB-510 SLAVE, (3)24"Z,6.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1155915 | HARNESS, POWER,10AWG, W/DROPS HB-510 SLAVE, (4)24"Z,8.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1155914 | HARNESS, POWER,10AWG, W/DROPS HB-510 SLAVE, (5)24"Z,10.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1158808 | HARNESS, POWER,10AWG, W/DROPS (1)30"Z,3' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1158807 | HARNESS, POWER,10AWG, W/DROPS (2)30"Z,5.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1158806 | HARNESS, POWER,10AWG, W/DROPS (3)30"Z,8' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1158805 | HARNESS, POWER,10AWG, W/DROPS (4)30"Z,10.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1160080 | HARNESS, POWER,10AWG, W/DROPS (2)30"Z,3' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1160079 | HARNESS, POWER,10AWG, W/DROPS (4)30"Z,5.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1160078 | HARNESS, POWER,10AWG, W/DROPS (6)30"Z,8' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1160077 | HARNESS, POWER,10AWG, W/DROPS (8)30"Z,10.5' | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176465 | HARNESS, POWER,10AWG, W/DROPS-(1)24"Z,2.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176464 | HARNESS, POWER,10AWG, W/DROPS-(2)24"Z,4.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176463 | HARNESS, POWER,10AWG, W/DROPS-(3)24"Z,6.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176462 | HARNESS, POWER,10AWG, W/DROPS-(4)24"Z,8.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176461 | HARNESS, POWER,10AWG, W/DROPS-(5)24"Z,10.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176469 | HARNESS, POWER,10AWG, W/DROPS-(1)30"Z,3' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176468 | HARNESS, POWER,10AWG, W/DROPS-(2)30"Z,5.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176467 | HARNESS, POWER,10AWG, W/DROPS-(3)30"Z,8' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1176466 | HARNESS, POWER,10AWG, W/DROPS-(4)30"Z,10.5' DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |

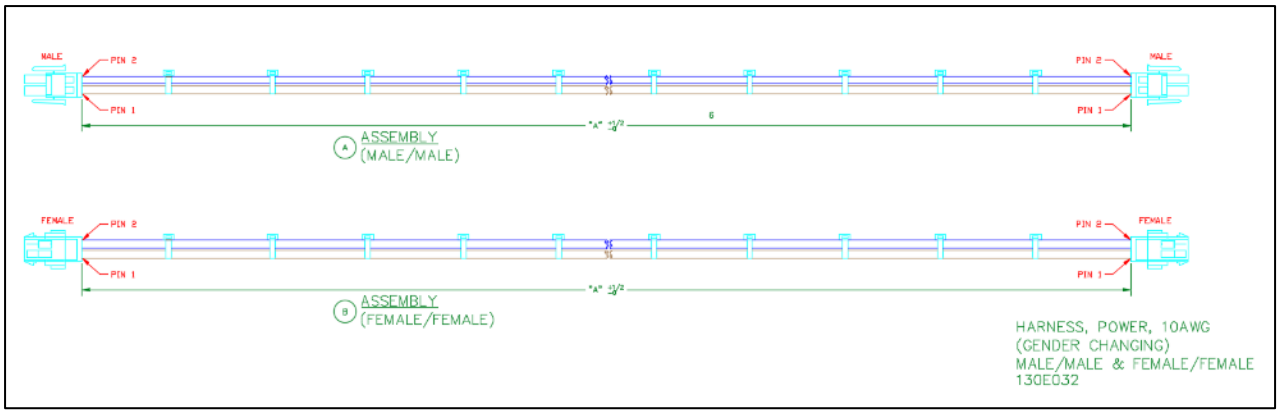
| HARNESS POWER, LH 10AWG, W/DROPS TO IB-E01 BELTED DECLINE 24", & 30" ZONES | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1165498 | HARNESS, POWER,10AWG, W/DROPS LH, (1) 24Z, IB-E01,2.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165497 | HARNESS, POWER,10AWG, W/DROPS LH, (2) 24Z, IB-E01,4.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165496 | HARNESS, POWER,10AWG, W/DROPS LH, (3) 24Z, IB-E01,6.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165495 | HARNESS, POWER,10AWG, W/DROPS LH, (4) 24Z, IB-E01,8.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165494 | HARNESS, POWER,10AWG, W/DROPS LH, (5) 24Z, IB-E01,10.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165493 | HARNESS, POWER,10AWG, W/DROPS LH, (6) 24Z, IB-E01,12.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165601 | HARNESS, POWER,10AWG, W/DROPS LH, (1) 30Z, IB-E01,3' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165600 | HARNESS, POWER,10AWG, W/DROPS LH, (2) 30Z, IB-E01,5.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165599 | HARNESS, POWER,10AWG, W/DROPS LH, (3) 30Z, IB-E01,8' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165598 | HARNESS, POWER,10AWG, W/DROPS LH, (3) 30Z, IB-E01,8' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |

| HARNESS POWER, RH 10AWG, W/DROPS TO IB-E01 BELTED DECLINE 24", & 30" ZONES | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1165504 | HARNESS, POWER,10AWG, W/DROPS RH, (1) 24Z, IB-E01,2.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165503 | HARNESS, POWER,10AWG, W/DROPS RH, (2) 24Z, IB-E01,4.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165502 | HARNESS, POWER,10AWG, W/DROPS RH, (3) 24Z, IB-E01,6.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165501 | HARNESS, POWER,10AWG, W/DROPS RH, (4) 24Z, IB-E01,8.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165500 | HARNESS, POWER,10AWG, W/DROPS RH, (5) 24Z, IB-E01,10.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165499 | HARNESS, POWER,10AWG, W/DROPS RH, (6) 24Z, IB-E01,12.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165605 | HARNESS, POWER,10AWG, W/DROPS RH, (1) 30Z, IB-E01,3' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165604 | HARNESS, POWER,10AWG, W/DROPS RH, (2) 30Z, IB-E01,5.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165603 | HARNESS, POWER,10AWG, W/DROPS RH, (3) 30Z, IB-E01,8' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |
| 1165602 | HARNESS, POWER,10AWG, W/DROPS RH, (4) 30Z, IB-E01,10.5' BELTED DECLINE | 24VDC POWER CABLE TO DRIVER CARDS |

| HARNESS POWER, LH or RH 10AWG, W/DROPS TO IB-E01 BELTED HORIZONTAL | | |
|---|---|---|
| **Item No.** | **Description** | **Application** |
| 1166181 | HARNESS, POWER,10AWG, W/DROPS LH, (1) 30Z, IB-E03,3' | BELTED HORIZONTAL |
| 1166180 | HARNESS, POWER,10AWG, W/DROPS LH, (2) 30Z, IB-E03,5.5' | BELTED HORIZONTAL |
| 1166179 | HARNESS, POWER,10AWG, W/DROPS LH, (3) 30Z, IB-E03,8' | BELTED HORIZONTAL |
| 1166178 | HARNESS, POWER,10AWG, W/DROPS LH, (4) 30Z, IB-E03,10.5' | BELTED HORIZONTAL |
| 1166185 | HARNESS, POWER,10AWG, W/DROPS RH, (1) 30Z, IB-E03,3' | BELTED HORIZONTAL |
| 1166184 | HARNESS, POWER,10AWG, W/DROPS RH, (2) 30Z, IB-E03,5.5' | BELTED HORIZONTAL |
| 1166183 | HARNESS, POWER,10AWG, W/DROPS RH, (3) 30Z, IB-E03,8' | BELTED HORIZONTAL |
| 1166182 | HARNESS, POWER,10AWG, W/DROPS RH, (4) 30Z, IB-E03,10.5' | BELTED HORIZONTAL |

Contact MHS Conveyor Lifetime Services for additional power harness.

## 21.15 HARNESS, GENDER CHANGING




### *21.15.1 Replacement Parts – Harness, Gender Changing*

| GENDER CHANGING POWER HARNESS | |
|---|---|
| **Item No.** | **Description** |
| **MALE/MALE POWER HARNESS** | |
| 1141545 | HARNESS, POWER, 10AWG, 0'4" |
| 1134347 | HARNESS, POWER, 10AWG, 1'-0" |
| 1134348 | HARNESS, POWER, 10AWG, 3'-0" |
| 1134349 | HARNESS, POWER, 10AWG, 5'-6" |
| **FEMALE/FEMALE POWER HARNESS** | |
| 1141549 | HARNESS, POWER, 10AWG, 0'4" |
| 1134344 | HARNESS, POWER, 10AWG, 1'-0" |
| 1134345 | HARNESS, POWER, 10AWG, 3'-0" |
| 1134346 | HARNESS, POWER, 10AWG, 5'-6" |
| | Ref Dwg, 130E032 |

## 21.16 REPLACEMENT PARTS — PHOTO-EYE AND PRESSURE SWITCH

| GENERAL PHOTOEYE CABLES & KIT | | | | |
|---|---|---|---|---|
| Balloon | Item # | Description | Mounted | DWG # |
| 1 - 8 | 1167713 | KIT, P/E ZONE START **HB-510** | FIELD MOUNTED | 130I011 |

| GENERAL PHOTOEYE CABLES & KIT | | | | |
|---|---|---|---|---|
| Balloon | Item # | Description | Mounted | DWG # |
| 1 - 6 | 1165676 | KIT, CTRLS-PE ZONE START-**IBE** | FIELD MOUNTED | 130I010 |

| PRESSURE SWITCH KIT, CB TO NBC | | | | |
|---|---|---|---|---|
| Balloon | Item # | Description | Mounted | DWG # |
| ALL | 1152711 | KIT, ITR-PRSS SWTCH-**CB TO NBC** | FIELD MOUNTED | 130E068 |

| ACCUMULATION DISCHARGE LOGIC CONTROL LH / RH<br>PRESSURE SWITCH KIT, HB TO NBC | | | | |
|---|---|---|---|---|
| Balloon | Item # | Description | Mounted | DWG # |
| ALL | 1157702 | KIT, ITR-PRSS SWTCH-**HB TO NBC** | FIELD MOUNTED | 130E099 |

| GENERAL PHOTOEYE CABLES & KIT | | | | |
|---|---|---|---|---|
| Balloon | Item # | Description | Mounted | DWG # |
| 1 - 10 | 1222886 | KIT, CTRLS-PE ZONE START-CS | FIELD MOUNTED | 130I044 |

## 21.17 REPLACEMENT PARTS — SHROUDS

| CRUZchannel SHROUD<br>5' Long (ONE SIDE) | | |
|---|---|---|
| **Part Number** | **Description** | **Approx. Weight (Lbs.)** |
| E0005540 | SHROUD, ACC-ITR-5'-W/WARNING LABEL-CZ CHANNEL | 2 |
| 1207829 | SHROUD, ACC-CZ-5'-W/MHS LABEL | 2 |
| 1118558 | SHROUD, ACC-CZ-5'-L/LABEL | 2 |

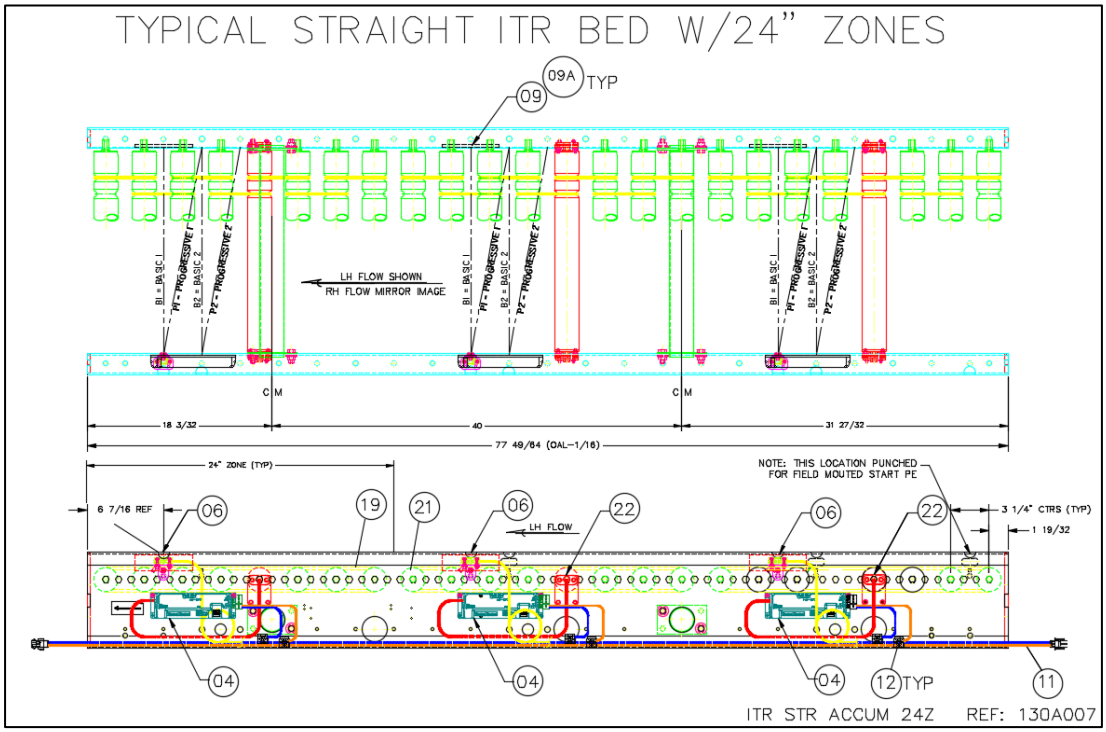
| C6 Channel SHROUD<br>5' Long (ONE SIDE) | | |
|---|---|---|
| **Part Number** | **Description** | **Approx. Weight (Lbs.)** |
| 1158487 | KIT, ACC-SHRD-C6-5'-W/WARNING LABEL | 2 |
| 1158488 | KIT, ACC-SHRD-C6-5'-L/LABEL | 2 |
| 1207889 | KIT, ACC-SHRD-C6-5'-W/MHS LABEL | 2 |

| ITR GATE SHROUD<br>(BOTH SIDES) | | |
|---|---|---|
| **Part Number** | **Description** | **Approx. Weight (Lbs.)** |
| 1218139 | SHROUD, ACC-ITR-5'-W/WARNING LABEL-CZ CHANNEL | 2 |

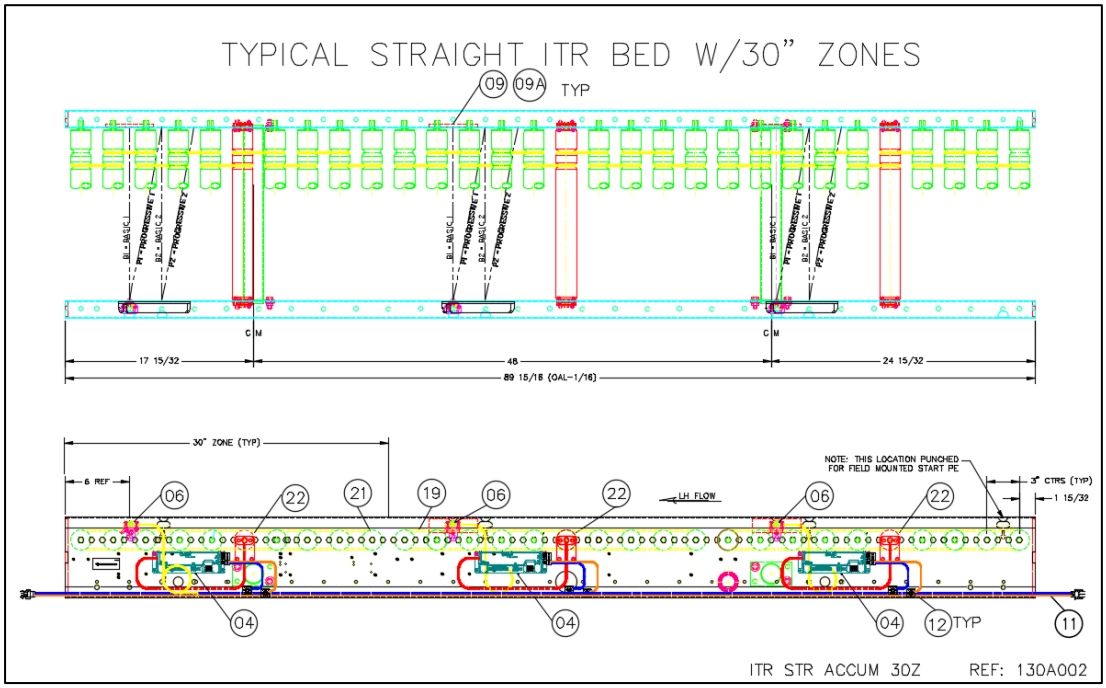
| ITR GATE SHROUD<br>(FOR EACH INDIVIDUAL SIDE) | | |
|---|---|---|
| **Part Number** | **Description** | **Approx. Weight (Lbs.)** |
| 1225270 | KIT, ACC-SHRD-ITR GATE-39" LH-W/WARNING LABEL | 2 |
| 1225271 | KIT, ACC-SHRD-ITR GATE-39" RH-W/WARNING LABEL | 2 |

## 21.18 ACCUMULATION STRAIGHT BED ZONE

### *21.18.1 Straight Bed 24" Zone*



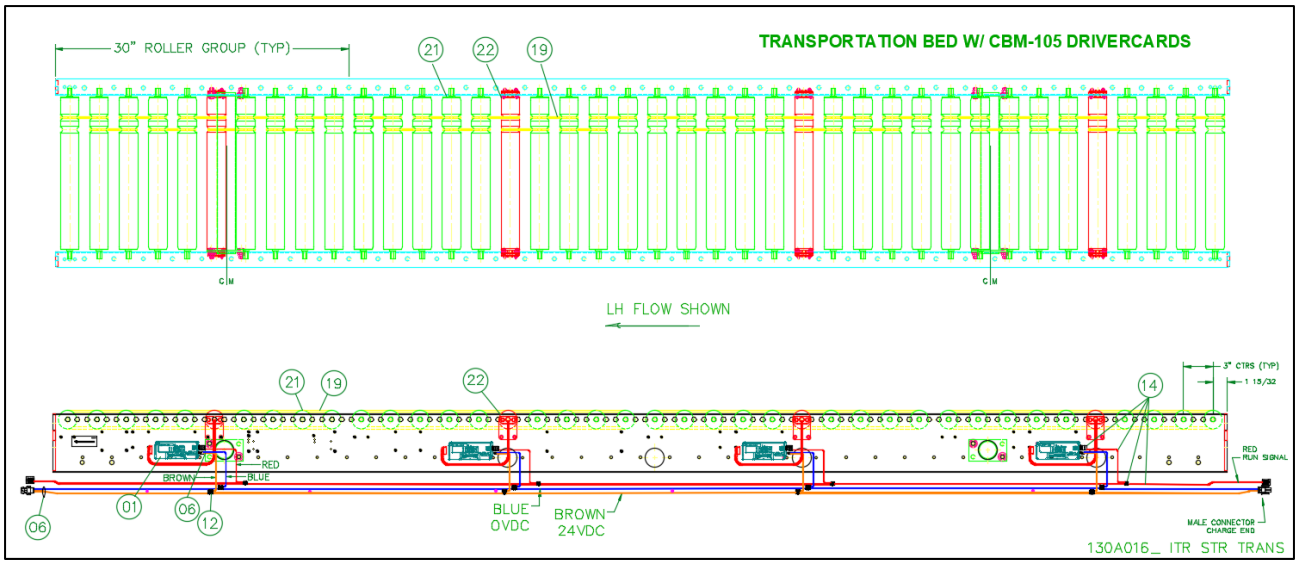

### *21.18.2 Straight Bed 30" Zone*



## *21.18.3 Replacement Parts — ITR Accumulation Straight Bed 24" & 30" Zone*

| REPLACEMENT PARTS - ITR ACCUMULATION STRAIGHT BED (24 & 30 Zone) | | | | | |
|---|---|---|---|---|---|
| BED, ITR-_ _BF (HB OR IBE), CZ, (3RC OR 2RC) (24Z OR 30Z), (LH OR RH), FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 04 | DRIVERCARD, ITOH **HB-510P** | 1101261 | 1101261 | 1101261 | 1101261 |
| 04 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| --- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| --- | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | | |
| ---- | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| 06 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB-510)** | 1137687 | 1137687 | 1137687 | 1137687 |
| 06 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IB-E03)** | 1163456 | 1163456 | 1163456 | 1163456 |
| 9A | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 | 400004 |
| 18 | ORING,3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING,3/16DIA X 7-3/4" HT BLUE ITR **2"CTR** | 1142656 | 1142656 | 1142656 | 1142656 |
| 19 | ORING,3/16 DIA X 9.5" HT BLUE ITR **3"CTR** | E0005536 | E0005536 | E0005536 | E0005536 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/HB-510)** | 1138722 | 1138723 | 1138724 | 1138725 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/ IBE)** | 1163471 | 1163472 | 1163473 | 1163474 |
| Reference Dwg 130A002 & 130A007 | | | | | |

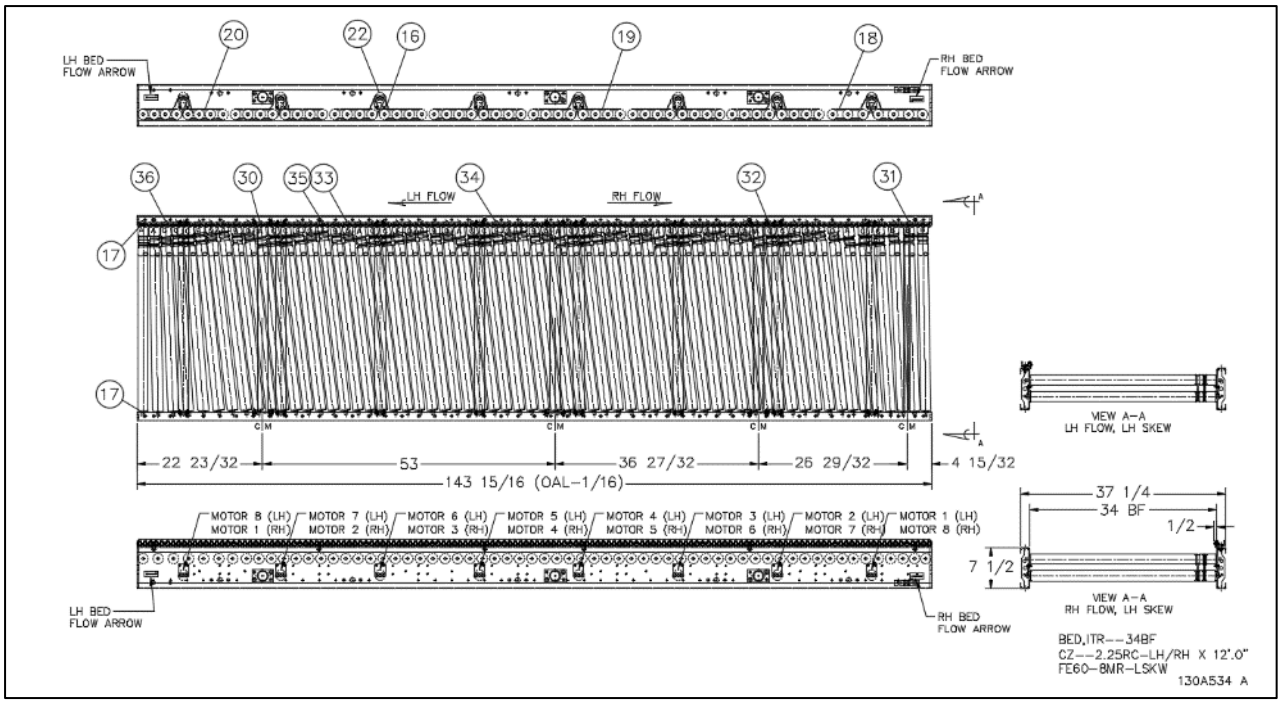
## 21.19 ITR TRANSPORTATION STRAIGHT BED




### *21.19.1 Replacement Parts — ITR Transportation Straight Bed*

| REPLACEMENT PARTS - ITR TRANSPORTATION STRAIGHT BEDS (2RC & 3RC) | | | | | |
|---|---|---|---|---|---|
| BED, ITR-_ _BF-CB-C6-(2RC OR 3RC)-30RG-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 1 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| 6 | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| 14 | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 19 | ORING,3/16 DIA X 9.5" HT BLUE ITR **3"CTR** | E0005536 | E0005536 | E0005536 | E0005536 |
| 19 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR **2"CTR** | 1142656 | 1142656 | 1142656 | 1142656 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD PRBG (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| Reference Dwg. 130A016 | | | | | |

## 21.20 ITR SKEW BED

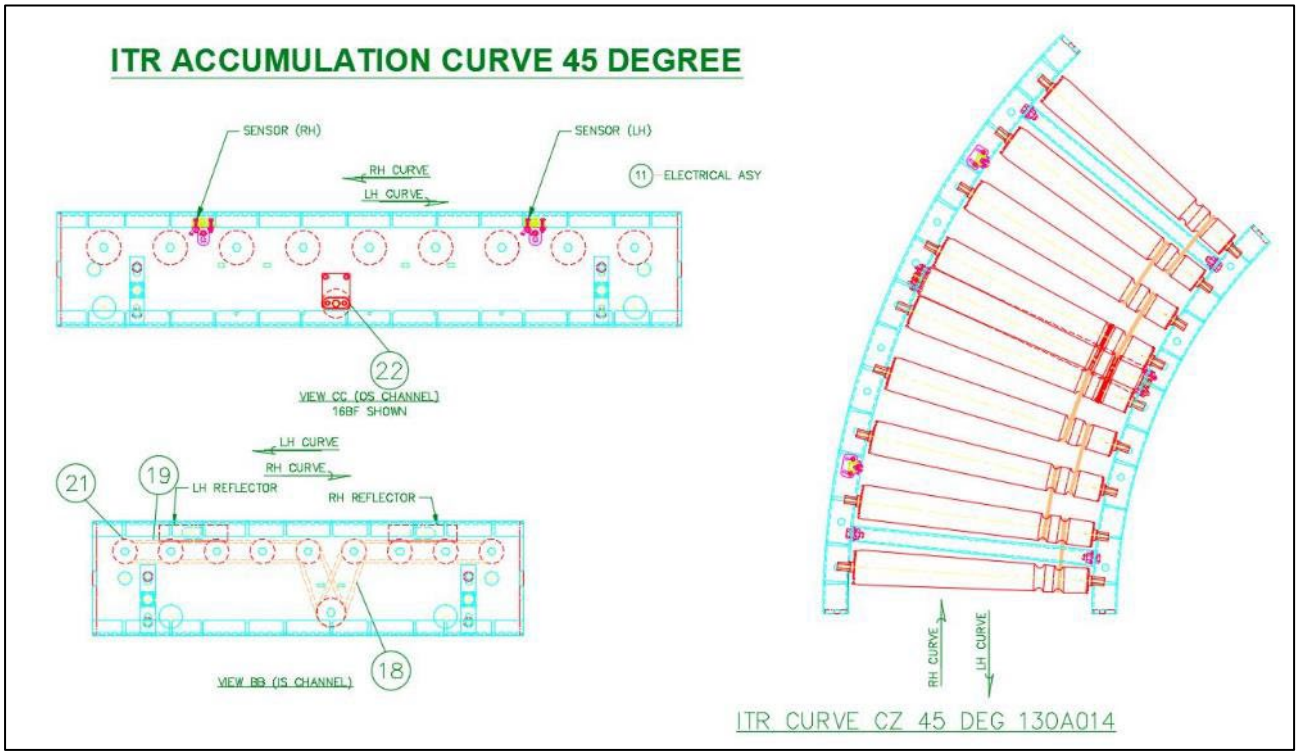


## *21.20.1 Replacement Parts — ITR Skew Bed*

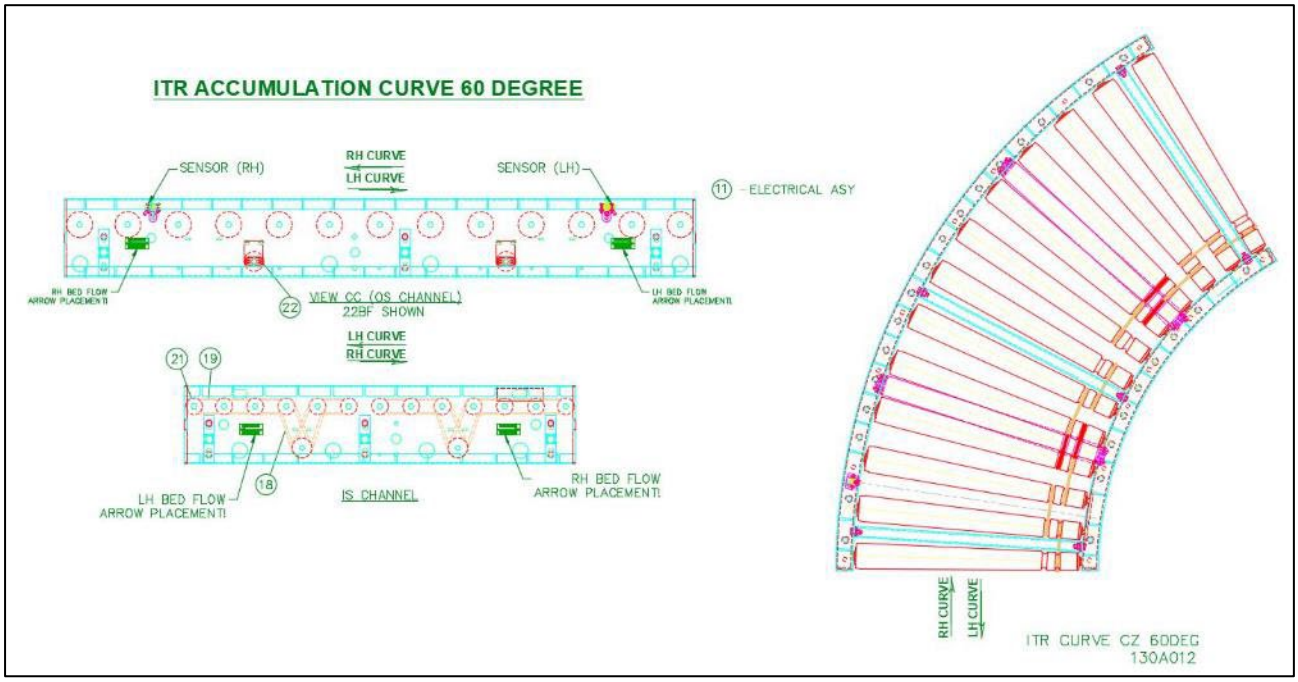
| REPLACEMENT PARTS - ITR SKEW BEDS, 2.25RC, FE60 | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 16 | ORING,.210 DIA X 10.0" HT RED | 1130498 | 11304982 | 11304983 | 11304984 |
| 17 | ORING,1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 | 90530050 |
| 18 | ORING,.210 DIA X 9-1/4" HT RED | 1142106 | 1142106 | 1142106 | 1142106 |
| 19 | ORING,.210 DIA X 8.5" HT RED | 1116838 | 1116838 | 1116838 | 1116838 |
| 20 | ORING,.210 DIA X 8.25" HT RED | 1194480 | 1194480 | 1194480 | 1194480 |
| 30 | ROLLER,16BF ITR SKEW, STYLE A | 1194116 | 1194123 | 1194130 | 1194137 |
| 31 | ROLLER,16BF ITR SKEW, STYLE B | 1194117 | 1194124 | 1194131 | 1194138 |
| 32 | ROLLER,16BF ITR SKEW, STYLE C | 1194118 | 1194125 | 1194132 | 1194139 |
| 33 | ROLLER,16BF ITR SKEW, STYLE D | 1194119 | 1194126 | 1194133 | 1194140 |
| 34 | ROLLER,16BF ITR SKEW, STYLE E | 1194120 | 1194127 | 1194134 | 1194141 |
| 35 | ROLLER,16BF ITR SKEW, STYLE F | 1194121 | 1194128 | 1194135 | 1194142 |
| 36 | ROLLER,16BF ITR SKEW, STYLE G | 1194122 | 1194129 | 1194136 | 1194143 |
| --- | WHEEL, SKATE 7/8DIA X 1/4BORE | E0031762 | E0031762 | E0031762 | E0031762 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| --- | DRIVERCARD, ASY ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | CABLE, MOTOR EXTENSION, 600MM, ITOH M-F-EXT-9PIN-600 | 1138704 | 1138704 | 1138704 | 1138704 |
| **ROLLER GROUP** | | | | | |
| **15RG** | HARNESS, POWER,10AWG, W/DROPS, (4),5.5', ITR SKEW | 1193743 | 1193743 | 1193743 | 1193743 |
| **15RG** | HARNESS, RUN SIGNAL, W/DROPS, (4),5.5', ITR SKEW | 1193747 | 1193747 | 1193747 | 1193747 |
| **17RG** | HARNESS, POWER,10AWG, W/DROPS, (7),10.5', ITR SKEW | 1193742 | 1193742 | 1193742 | 1193742 |
| **17RG** | HARNESS, RUN SIGNAL, W/DROPS, (7),10.5', ITR SKEW | 1193746 | 1193746 | 1193746 | 1193746 |
| **18RG** | HARNESS, POWER,10AWG, W/DROPS, (8),12.5', ITR SKEW | 1193741 | 1193741 | 1193741 | 1193741 |
| **18RG** | HARNESS, RUN SIGNAL, W/DROPS, (8),12.5', ITR SKEW | 1193745 | 1193745 | 1193745 | 1193745 |
| | | | | | Reference Dwg: 130A534 |

## 21.21 ITR ACCUMULATION CURVES

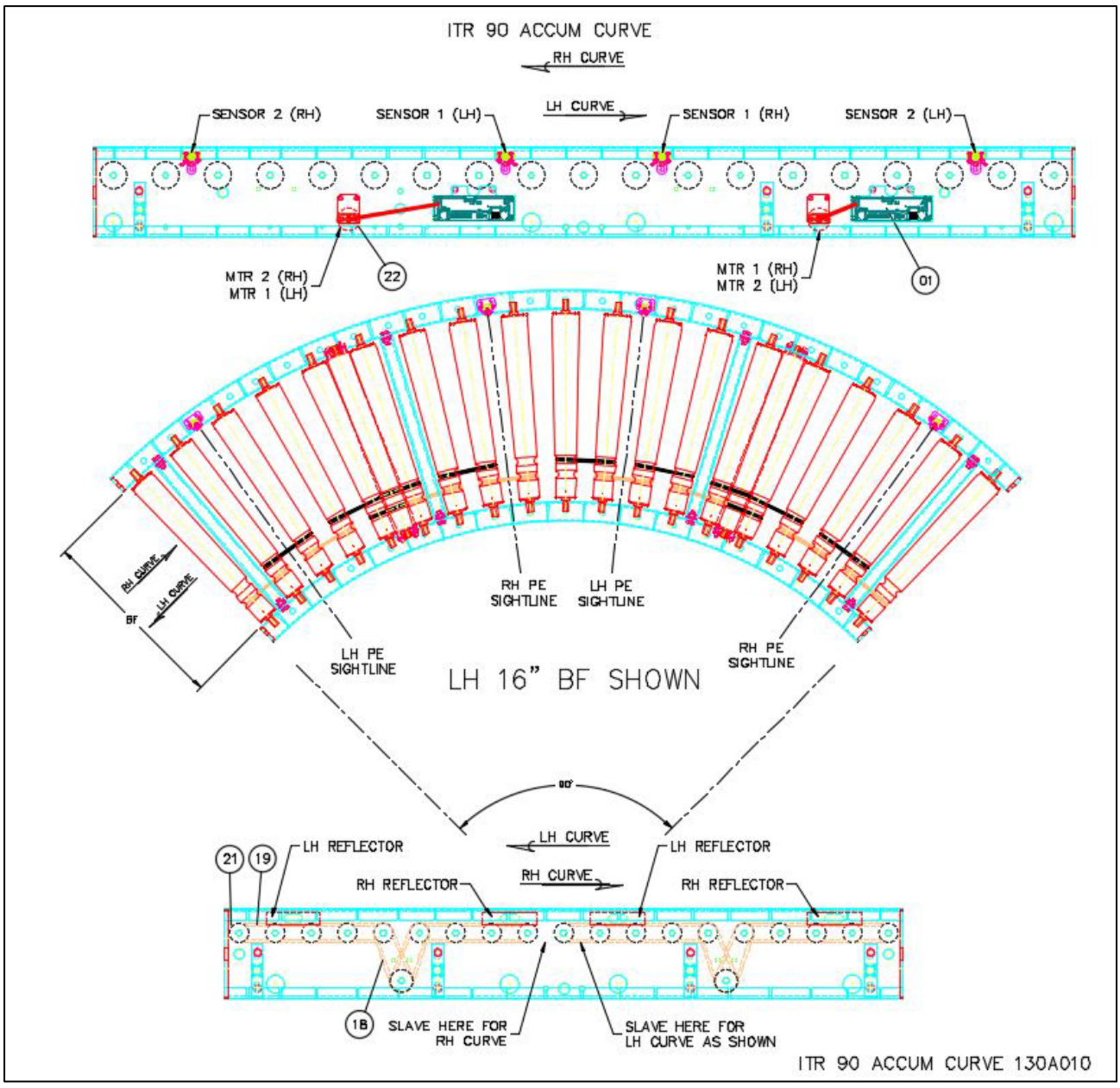
### *21.21.1 ITR Cruz Channel Accumulating 45 Degree Curve*




### *21.21.2 ITR Cruz Channel Accumulating 60 Degree Curve*



### *21.21.3 ITR Cruz Channel Accumulating 90 Degree Curve*



### *21.21.3.1 Replacement Parts — ITR Accumulation Curve, HB, CB, Standard & High-Density Roller (HDR)*

| REPLACEMENT PARTS - ITR ACCUMULATION CURVES, STANDARD & High Density Roller, HB, CB, 45, 60, & 90 DEGREES | | | | | |
|---|---|---|---|---|---|
| CURVE, ITR-_ _BF-(HB)-CZ-(STD)-_Z, _ _D-LH/RH-FE60-_MR | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 01 | DRIVERCARD, ITOH **HB-510P** | 1101261 | 1101261 | 1101261 | 1101261 |
| 01 | DRIVERCARD, ITOH **CBM-105FP (USED W/60 DEG)** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | PE, REFLEX TYPE ZL | 1137687 | 1137687 | 1137687 | 1137687 |
| ---- | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 | 400004 |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ---- | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 18 | ORING,.210" DIA. X 11.5" HT RED | 1102845 | 1102845 | 1102845 | 1102845 |
| 19 | ORING,.210" DIA X 9.4" HT RED | 1102748 | 1102748 | 1102748 | 1102748 |
| 21 | ROLLER, W TT ITR 2 GRV PRBG | E0009900 | E0009901 | E0009902 | E0009903 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| Reference Dwg: Accumulation Curve 130A014 & 130A012 & 130A010 | | | | | |

### *21.21.3.2 Replacement Parts — ITR Accumulation Curve, HB, CB High-Density Roller (HDR)*

| REPLACEMENT PARTS - ITR ACCUMULATION CURVES, HIGH DENSITY ROLLER, HB, CB, 30, 45, 60, & 90 DEGREES | | | | | |
|---|---|---|---|---|---|
| CURVE, ITR-_ _BF-(HB)-CZ-(HDR)-_Z, _ _D-LH/RH-FE60-MR | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 01 | DRIVERCARD, ITOH **HB-510P** | 1101261 | 1101261 | 1101261 | 1101261 |
| 01 | DRIVERCARD, ITOH **CBM-105FP (USED W/45, 60, & 90 DEG)** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | PE, REFLEX TYPE ZL | 1137687 | 1137687 | 1137687 | 1137687 |
| ---- | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 | 400004 |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ---- | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 18 | ORING,.210 DIA X 11.13 HT RED | 1102711 | 1102711 | 1102711 | 1102711 |
| 19 | ORING,.210 DIA X 7.5 HT RED | 1185142 | 1185142 | 1185142 | 1185142 |
| 21 | ROLLER, W TT ITR 2 GRV PRBG | E0009900 | E0009901 | E0009902 | E0009903 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| Reference Dwg: Accumulation Curve 130A014 & 130A012 & 130A010 | | | | | |

### *21.21.3.3 Replacement Parts – ITR Accumulation Curve, IB-E03, Standard*

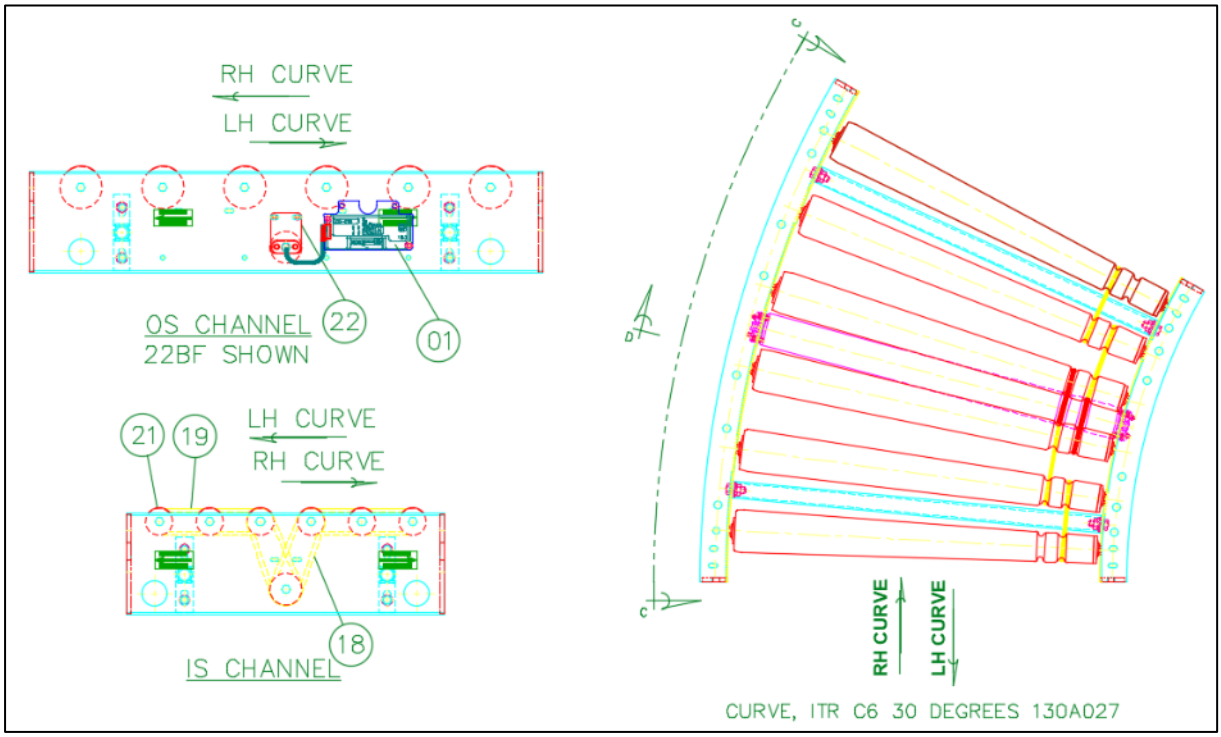
| REPLACEMENT PARTS - ITR ACCUMULATION CURVES, STANDARD, IBE, 45, 60, & 90 DEGREES | | | | | |
|---|---|---|---|---|---|
| CURVE, ITR-_ _BF-(IBE)-CZ-(STD)-_Z, _ _D-LH/RH-FE60-MR | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 01 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| ---- | PE, REFLEX TYPE ZL | 1163456 | 1163456 | 1163456 | 1163456 |
| ---- | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 | 400004 |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ---- | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ---- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 18 | ORING,.210" DIA. X 11.5" HT RED | 1102845 | 1102845 | 1102845 | 1102845 |
| 19 | ORING,.210" DIA X 9.4" HT RED | 1102748 | 1102748 | 1102748 | 1102748 |
| 21 | ROLLER,36W TT ITR 2GRV PRBG _ _BF | E0009900 | E0009901 | E0009902 | E0009903 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(Used W/IBE)** | 1163471 | 1163472 | 1163473 | 1163474 |
| Reference Dwg: Accumulation Curve 130A014 & 130A012 & 130A010 | | | | | |

### *21.21.3.4 Replacement Parts – ITR Accumulation Curve, IB-E03, High Density Roller (HDR)*

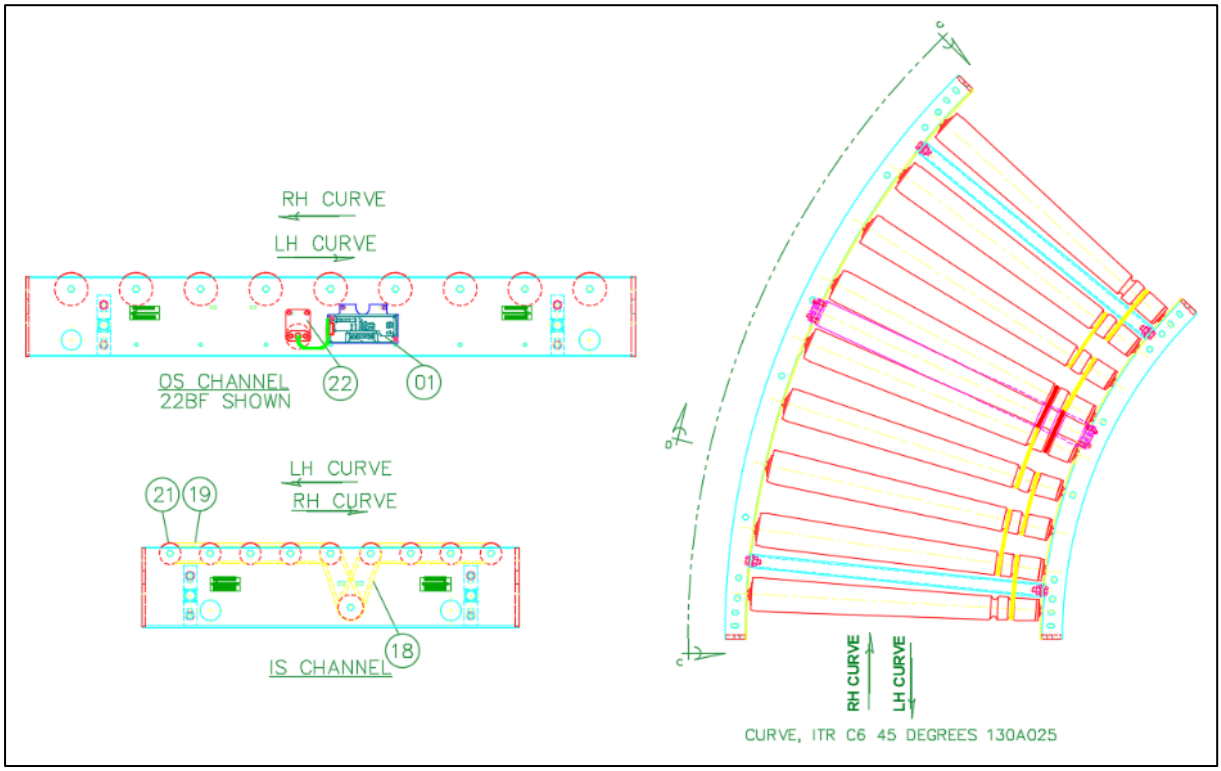
| REPLACEMENT PARTS - ITR ACCUMULATION CURVES, HIGH DENSITY ROLLER, IBE, 30, 45, 60, & 90 DEGREES | | | | | |
|---|---|---|---|---|---|
| **CURVE, ITR-_ _BF-(IBE)-CZ-(HDR)-_Z, _ _D-LH/RH-FE60-MR** | | **Width & Item #** | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 01 | DRIVERCARD, **ITOH IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| ---- | PE, REFLEX TYPE ZL | 1163456 | 1163456 | 1163456 | 1163456 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 | 400004 |
| ----- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ----- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ----- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ---- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 18 | ORING, .210 DIA X 11.13 HT RED | 1102711 | 1102711 | 1102711 | 1102711 |
| 19 | ORING, .210 DIA X 7.5 HT RED | 1185142 | 1185142 | 1185142 | 1185142 |
| 21 | ROLLER, 36W TT ITR 2 GRV PRBG | E0009900 | E0009901 | E0009902 | E0009903 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/IBE)** | 1163471 | 1163472 | 1163473 | 1163474 |
| Reference Dwg: Accumulation Curve 130A014 & 130A012 & 130A010 | | | | | |

## 21.22 ITR TRANSPORTATION CURVES

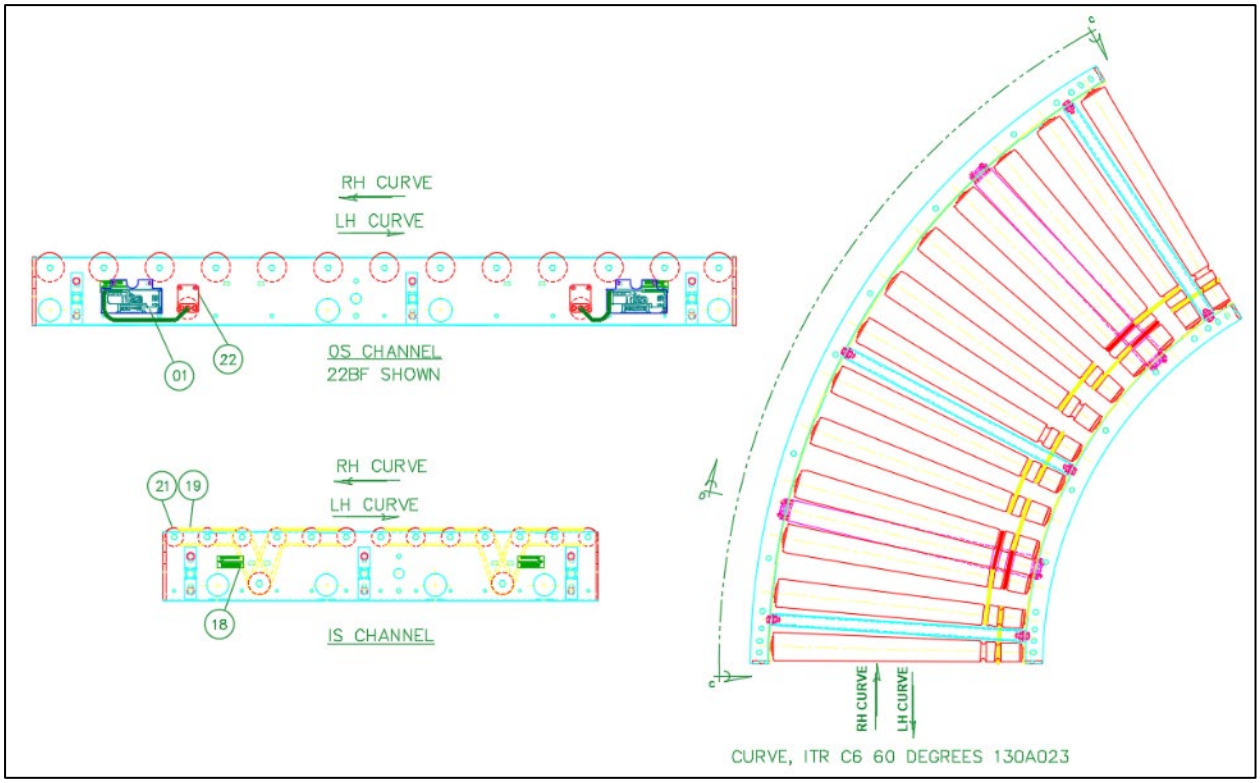
### *21.22.1 ITR Transportation Curve 30 Degree*



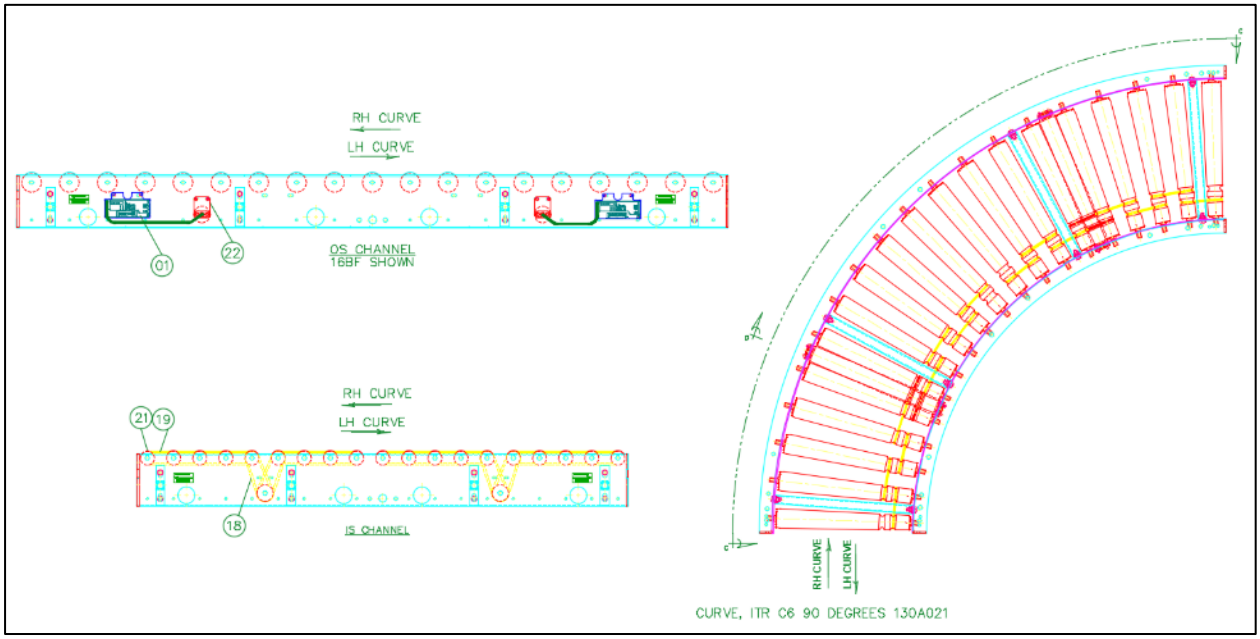

### *21.22.2 ITR Transportation Curve 45 Degree*



### *21.22.3 ITR Transportation Curve 60 Degree*



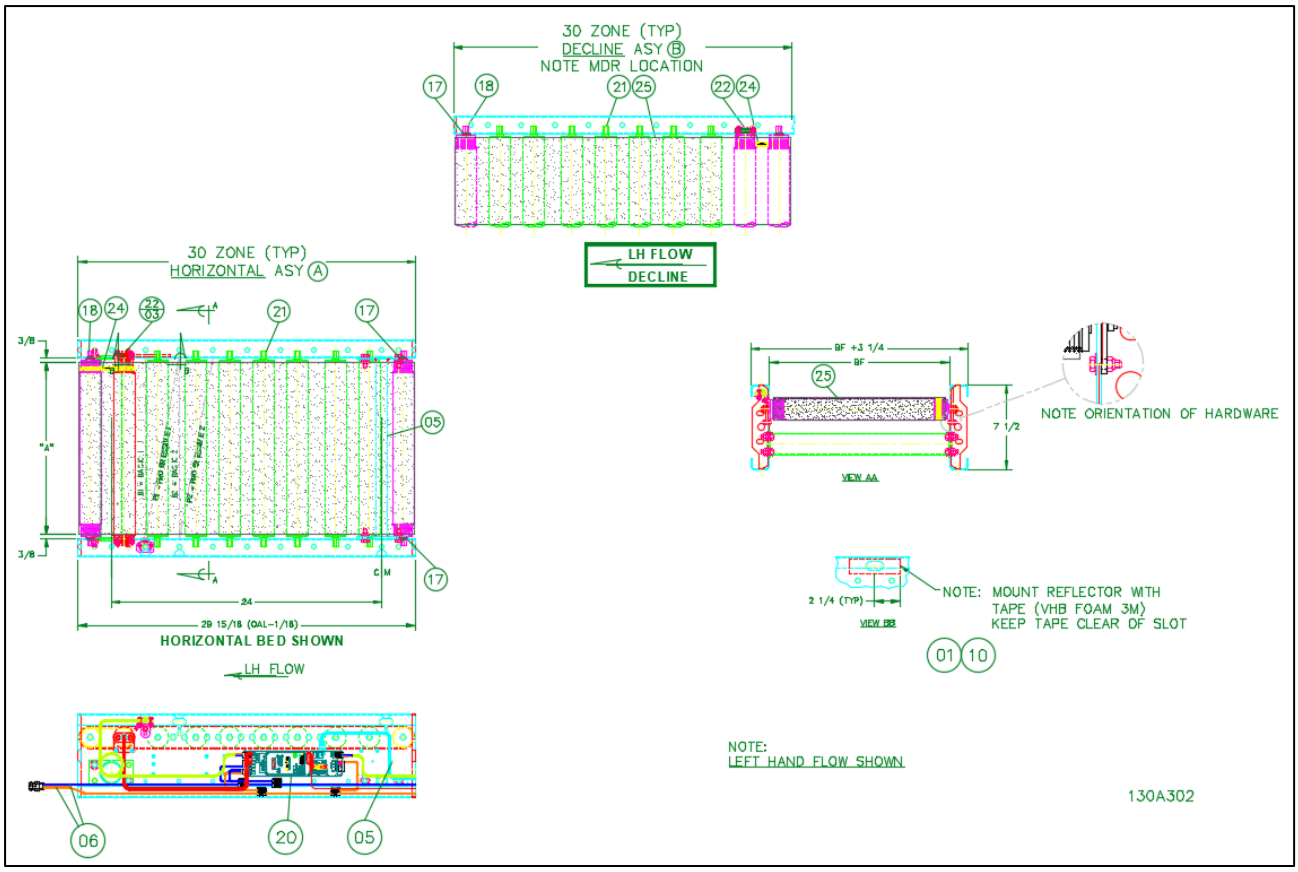

### *21.22.4 ITR Transportation Curve 90 Degree*



## *21.22.5 Replacement Parts — ITR Standard or High-Density Roller Transportation Curves*

| REPLACEMENT PARTS - ITR TRANSPORTATION CURVES, STANDARD OR HIGH-DENSITY ROLLER | | | | | |
|---|---|---|---|---|---|
| CURVE, ITR -_ _BF-(CB OR IBE)-C6-(STD OR HDR) -_ _D-LH/RH-FE60 -_MR | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 01 | DRIVERCARD, ITOH **CB-016P7** | 1116036 | 1116036 | 1116036 | 1116036 |
| 01 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-6" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ---- | CABLE, POWER CB-016/HB-510 14GA ITR | 1139543 | 1139543 | 1139543 | 1139543 |
| ---- | CONN, 3 COND, W/LEVERS 28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| ---- | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| — | **CURVE, TRANSPORTATION** | — | — | — | — |
| 18 | ORING, .210" DIA. X 11.5" HT RED **(USED WITH STD)** | 1102845 | 1102845 | 1102845 | 1102845 |
| 19 | ORING, .210" DIA X 9.4" HT RED (DURA-BELT) **(USED WITH STD)** | 1102748 | 1102748 | 1102748 | 1102748 |
| 18 | ORING, .210 DIA X 11.13 HT RED **(USED WITH HDR)** | 1102711 | 1102711 | 1102711 | 1102711 |
| 19 | ORING, .210 DIA X 7.5 HT RED **(USED WITH HDR)** | 1185142 | 1185142 | 1185142 | 1185142 |
| 21 | ROLLER, _ _ W TT ITR 2 GRV PRBG | E0009900 | E0009901 | E0009902 | E0009903 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486 FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-140 **(USED WITH CB-016)** | 1168560 | 1134452 | 1142856 | 1155281 |
| Reference Dwg: Trans Curve 130A027, 130A025, 130A023, & 130A021 | | | | | |

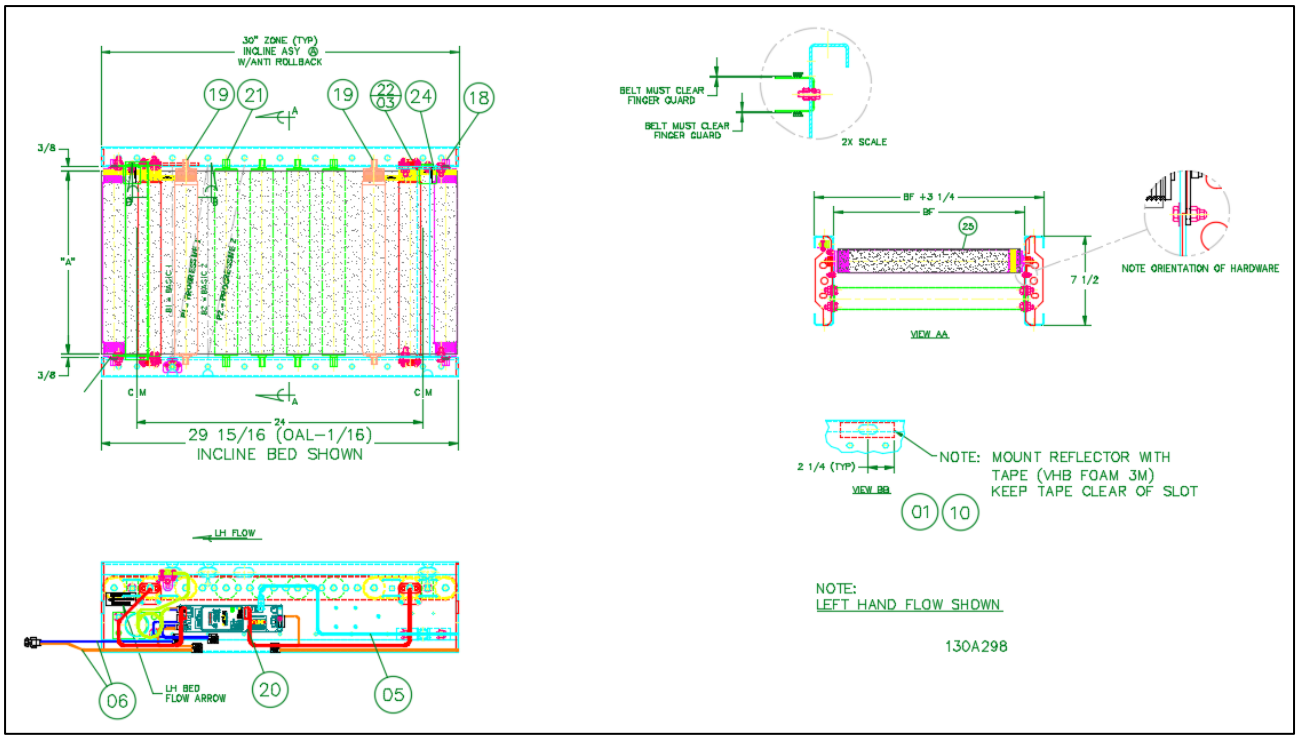
## 21.23 ITR FWB HORIZONTAL / DECLINE BED 24 OR 30 INCH ZONES



## *21.23.1 Replacement Parts — ITR FWB Horizontal / Decline Bed 24 & 30 Zones*

| ITR FULLL WIDTH BELT CZ HORIZONTAL / DECLINE BED, 24 or 30 ZONE | | | | |
|---|---|---|---|---|
| BED, ITR-_ _BF-HORZ / DECLINE-(IBE OR CB)-CZ-FWB-(24Z OR 30Z)-(RH OR LH) | | Width & Item # | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF |
| 20 | DRIVERCARD, **ITOH IB-E03** | 1166286 | 1166286 | 1166286 |
| 20 | DRIVERCARD, **ITOH HB-510P** | 1101261 | 1101261 | 1101261 |
| 20 | DRIVERCARD, **ITOH HB-510BP**, **BRAKE CONTROL** | 1108863 | 1108863 | 1108863 |
| 1 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| 1 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB)** | 1137687 | 1137687 | 1137687 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D W/DURA-BELT POLY-V END CAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH **(LESS BRAKE USED WITH IBE)** | 1165463 | 1165464 | 1165465 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE - USED WITH IBE)** | 1165467 | 1165468 | 1165469 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE USED WITH HB)** | 1153059 | 1153060 | 1153061 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH **(LESS BRAKE USED WITH HB)** | 1141751 | 1150242 | 1145796 |
| 24 | BELT, ITR 3"CTR POLY-V 4 RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .05"X_ _. __"X_ _. _ _", **24"ZONE** (21.75" ROLLER TO ROLLER) | 1222637 | 1221366 | 1221367 |
| 25 | BELT, TRAC .05"X_ _. _ _"X_ _. __", **30"ZONE** (27.75" ROLLER TO ROLLER) | 1221368 | 1221369 | 1221370 |
| Ref Dwg# 130A302 | | | | |

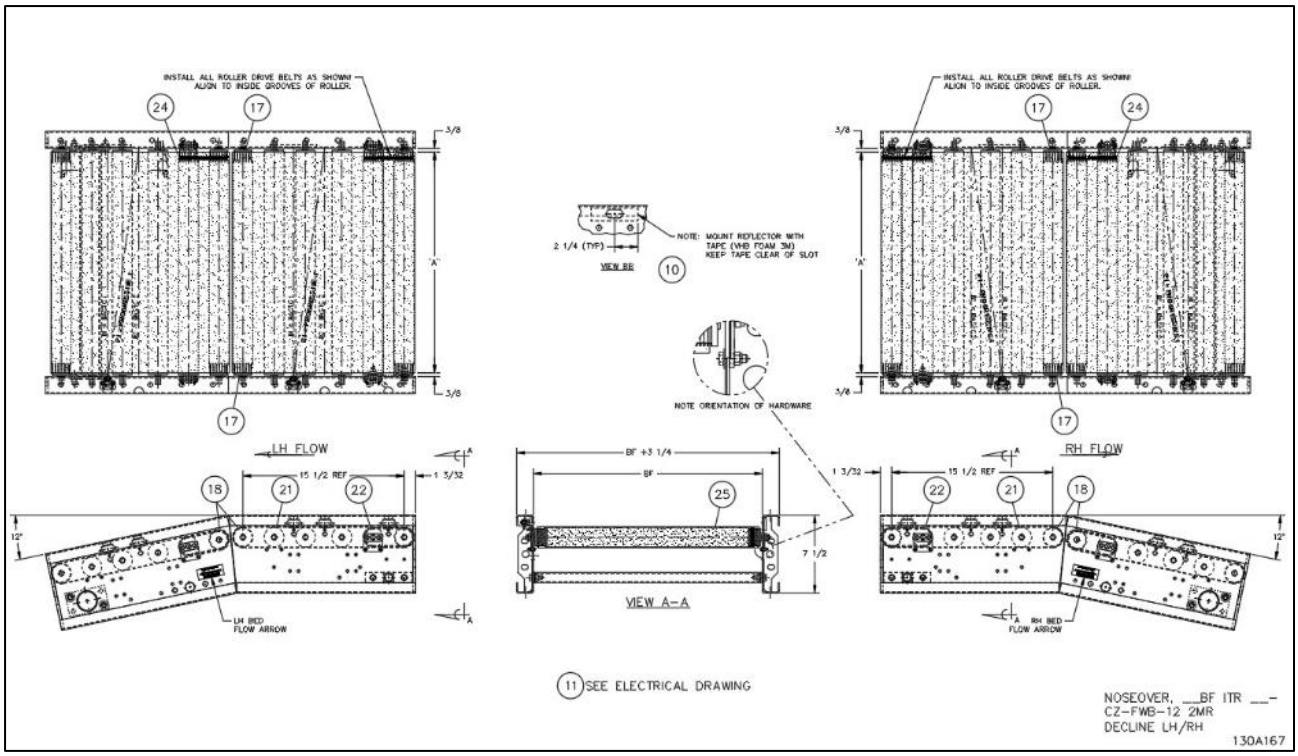
## 21.24 ITR FWB HORIZONTAL / INCLINE BED 24 OR 30 INCH ZONE



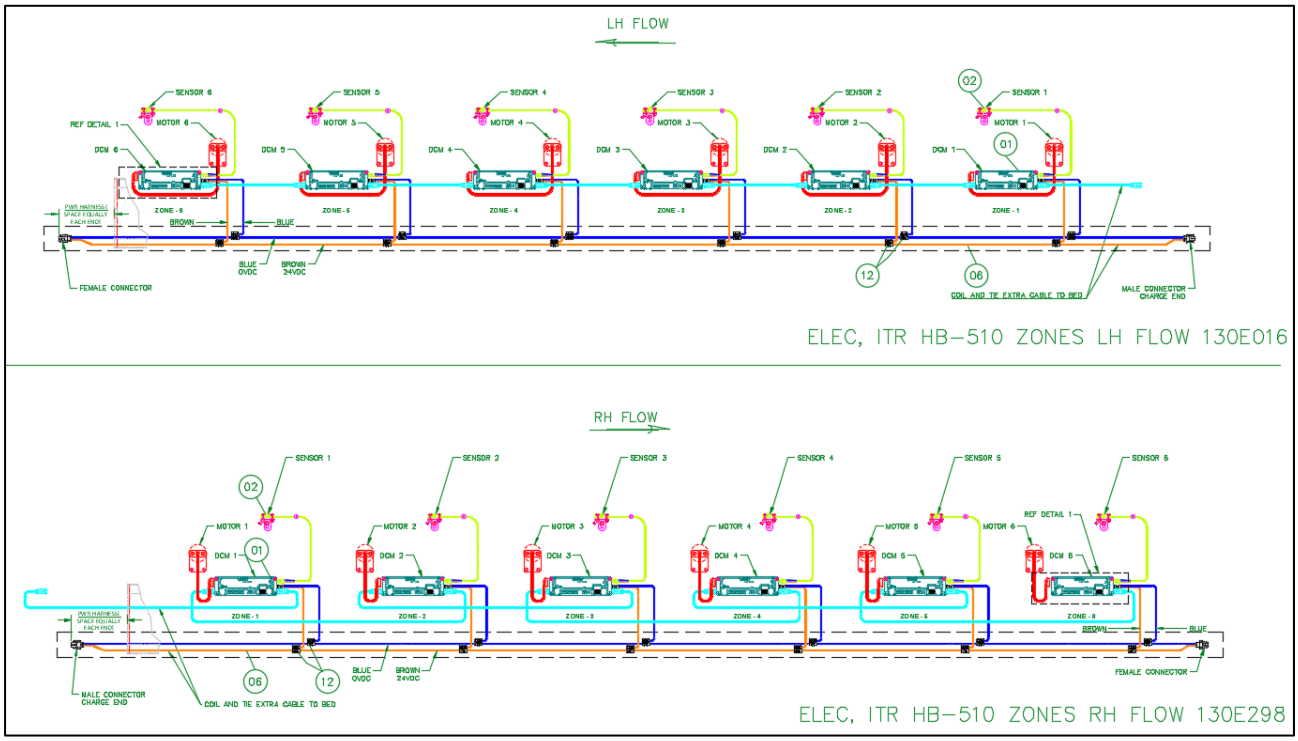
## *21.24.1 Replacement Parts — ITR FWB Incline Bed 24 & 30 Zone*

| ITR FULL WIDTH BELT CZ HORIZONTAL / INCLINE BED, 30 or 24 ZONE | | | | |
|---|---|---|---|---|
| BED, ITR-_ _BF-HORZ / INCLINE- (IBE OR HB)-CZ-FWB – (24Z OR 30Z) - (LH or RH) | | Width & Item # | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** |
| 20 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 |
| 20 | DRIVERCARD, ITOH **HB-510P** | 1101261 | 1101261 | 1101261 |
| 1 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| 1 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB)** | 1137687 | 1137687 | 1137687 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D, W/DURA-BELT POLY-V END CAPS | 1208809 | 1208810 | 1208811 |
| 19 | ROLLER, _ _BF ITR POLYV 1.9PLTD, PRBG ANTI-ROLLBACK CLOCKWISE ROT, **(USED WITH LH)** | 1152607 | 1152608 | 1152609 |
| 19 | ROLLER, _ _BF ITR POLYV 1.9PLTD, PRBG ANTI-ROLLBACK COUNTERCLOCKWISE ROT, **(USED WITH RH)** | 1152603 | 1152604 | 1152605 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF GV ITOH, **(USED WITH IBE)** | 1166259 | 1166260 | 1166261 |
| 22/03 | ROLLER, ITR _ _BF GV ITOH, **(USED WITH HB)** | 1153205 | 1153206 | 1153207 |
| 24 | BELT, ITR 3"CTR POLY-V 4 RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .05"X__. __"X48.13" (24"Z) | 1222637 | 1221366 | 1221367 |
| 25 | BELT, TRAC .05"X__. __"X59.81" (30"Z) | 1221368 | 1221369 | 1221370 |
| | | | | Ref Dwg# 130A298 |

## 21.25 NOSEOVER DECLINE (ACCUMULATION)



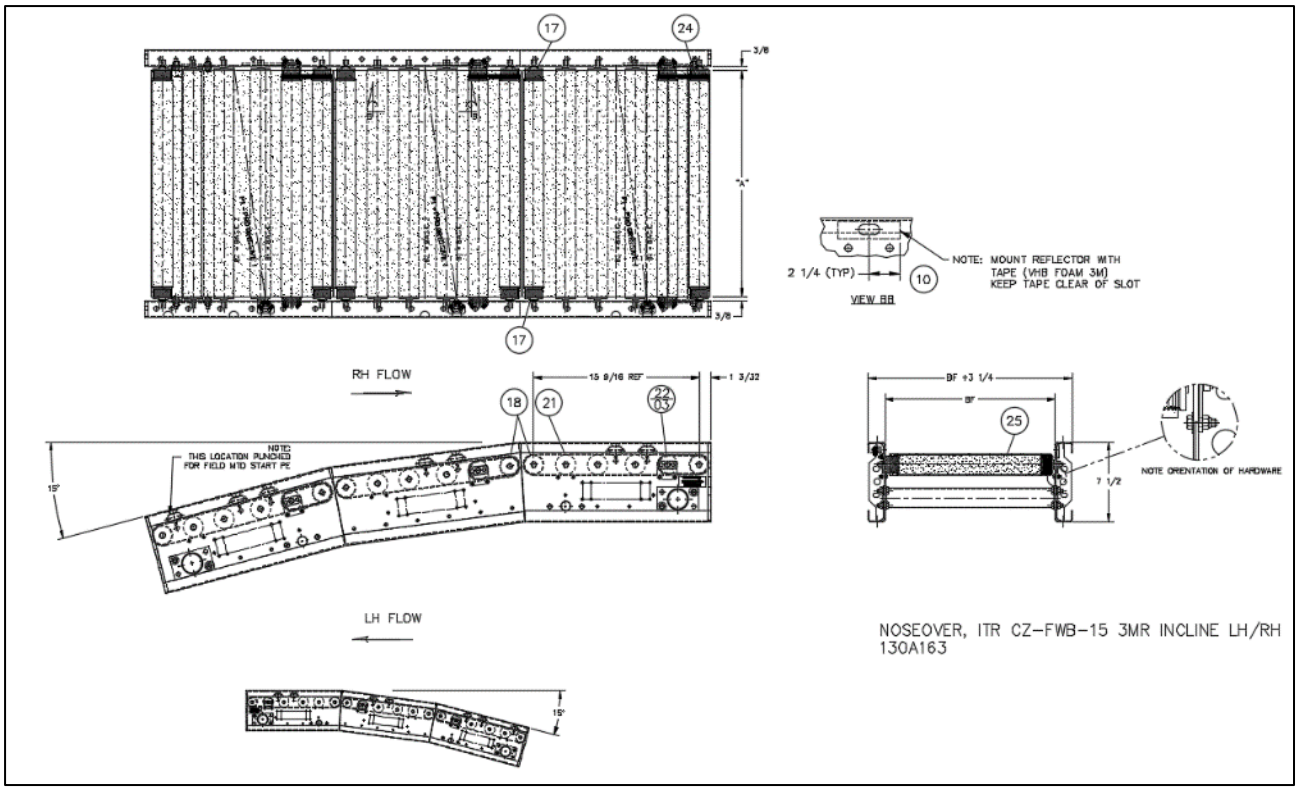

### *21.25.1 Electrical HB-510 Zones LH/RH Shown*



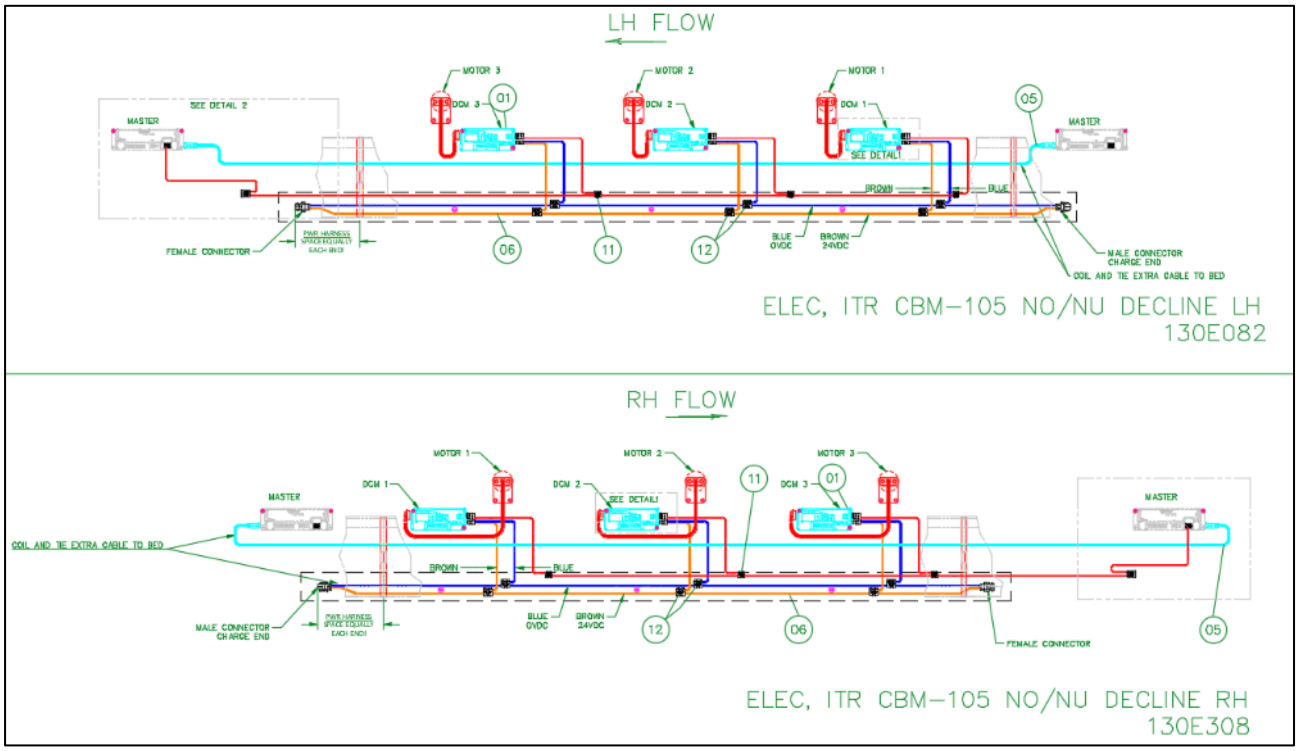
## *21.25.2 Replacement Parts — Noseover Decline (Accumulation)*

| REPLACEMENT PARTS - ITR NOSEOVER DECLINE (ACCUMULATION) 9 & 12 DEGREES | | | | |
|---|---|---|---|---|
| NO, ITR-_ _BF-DECLINE-(HB OR IBE OR CB)-CZ-FWB-_Z-_D-(LH or RH)-FE60BR | | Width & Item # | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** |
| 01 | DRIVERCARD, ITOH **HB-510BP, BRAKE CONTROL** | 1108863 | 1108863 | 1108863 |
| 01 | DRIVERCARD, **ITOH IB-E03** | 1166286 | 1166286 | 1166286 |
| 01 | DRIVERCARD, **ITOH CB-016BP7**, PNP - INPUT/OUTPUT SIGNALS, BRAKE CONTROL | 1143591 | 1143591 | 1143591 |
| 02 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB-510)** | 1137687 | 1137686 | 1137686 |
| 02 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| ---- | CABLE, MOTOR EXTENSION, 600MM, 9PIN/10PIN, **(USE W/ IB-N03/IB-E/HBM-604)** | 1135322 | 1135322 | 1135322 |
| ---- | CONNECTOR, IDC SCOTCHLOK 558 - RED | 1120174 | 1120174 | 1120174 |
| ---- | CONN, WAGO 231-302/026-000 **(USED WITH IBE)** | 1162204 | 1162204 | 1162204 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D W/DURA-BELT POLY-V END CAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE USED WITH HB)** | 1153059 | 1153060 | 1153061 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE - USED WITH IBE)** | 1165467 | 1165468 | 1165469 |
| 24 | BELT, ITR 3"CTR POLY-V 4 RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X36.31", **(9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 1/2" ROLLER TO ROLLER) | 1224264 | 1224265 | Incline |
| | | | | Ref Dwg# 130A167 |

## 21.26 NOSEOVER INCLINE (ACCUMULATION)



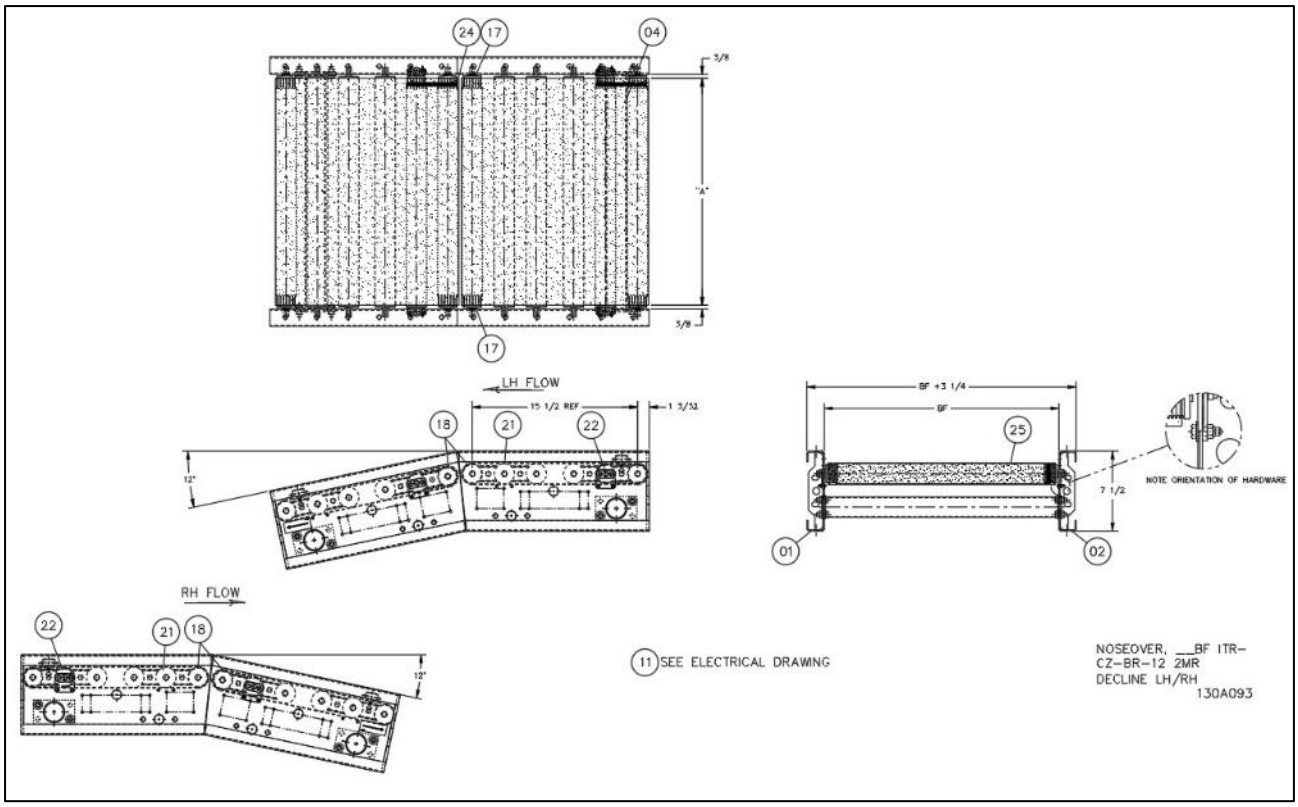

### *21.26.1 Electrical HB-510 Zones LH/RH Shown*



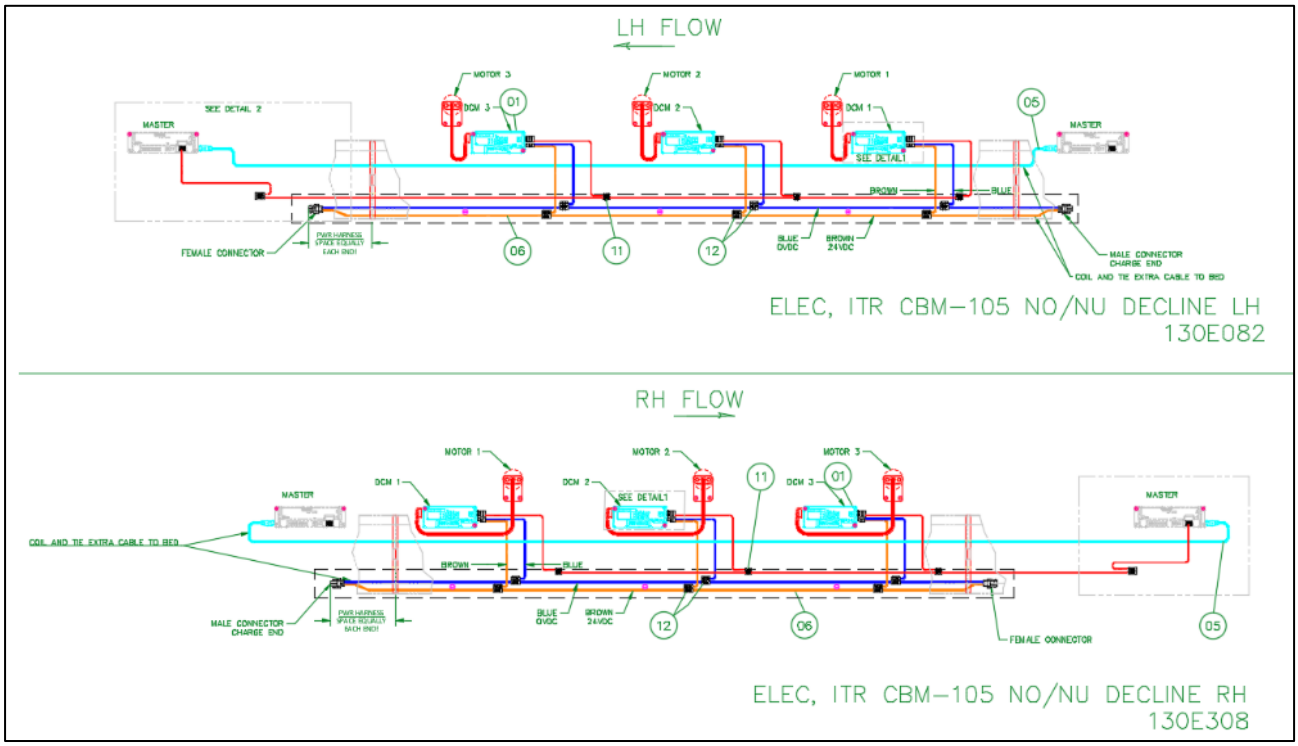
## *21.26.2 Replacement Parts — Noseover Incline (Accumulation)*

| REPLACEMENT PARTS - ITR NOSEOVER INCLINE (ACCUMULATION) 9D, 12D, & 15D | | | | |
|---|---|---|---|---|
| NO, ITR-_ _BF-INCLINE-(HB OR IBE)-CZ-FWB-_Z-_ _D-(LH OR RH)-FP55 | | Width & Item # | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF |
| 01 | DRIVERCARD, ITOH **HB-510P** | 1101261 | 1101261 | 1101261 |
| 01 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 |
| 02 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB-510)** | 1137687 | 1137687 | 1137687 |
| 02 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| --- | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 06 | CONN, WAGO 231-302/026-000 **(USED WITH IBE)** | 1162204 | 1162204 | 1162204 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D W/DURA-BELT POLY-V END CAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH **(USED WITH HB)** | 1153205 | 1153206 | 1153207 |
| 22/03 | ROLLER, ITR _ _BF GV ITOH **(USED WITH IBE)** | 1166259 | 1166260 | 1166261 |
| 24 | BELT, ITR 3"CTR POLY-V 4 RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X36.31", **(9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 1/2" ROLLER TO ROLLER) | 1224264 | 1224265 | 1222081 |
| 25 | BELT, TRAC .08"X__. __"X36.43" **(15 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 9/16" ROLLER TO ROLLER) | 1223756 | 1223252 | 1223994 |
| REF DWG# 130A163 | | | | |

## 21.27 NOSEOVER DECLINE (TRANSPORTATION)



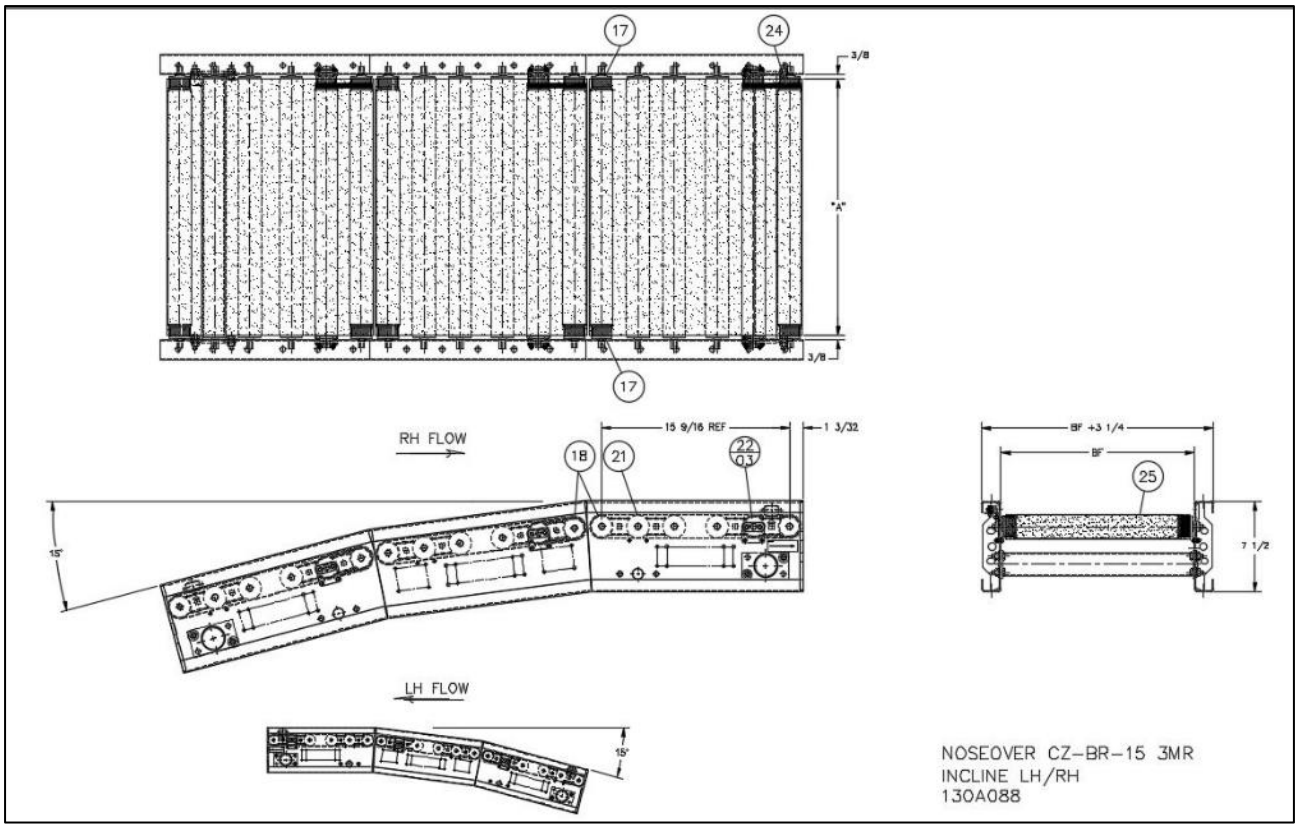

### *21.27.1 Noseover Decline (Transportation) Electrical CBM-105 Shown*



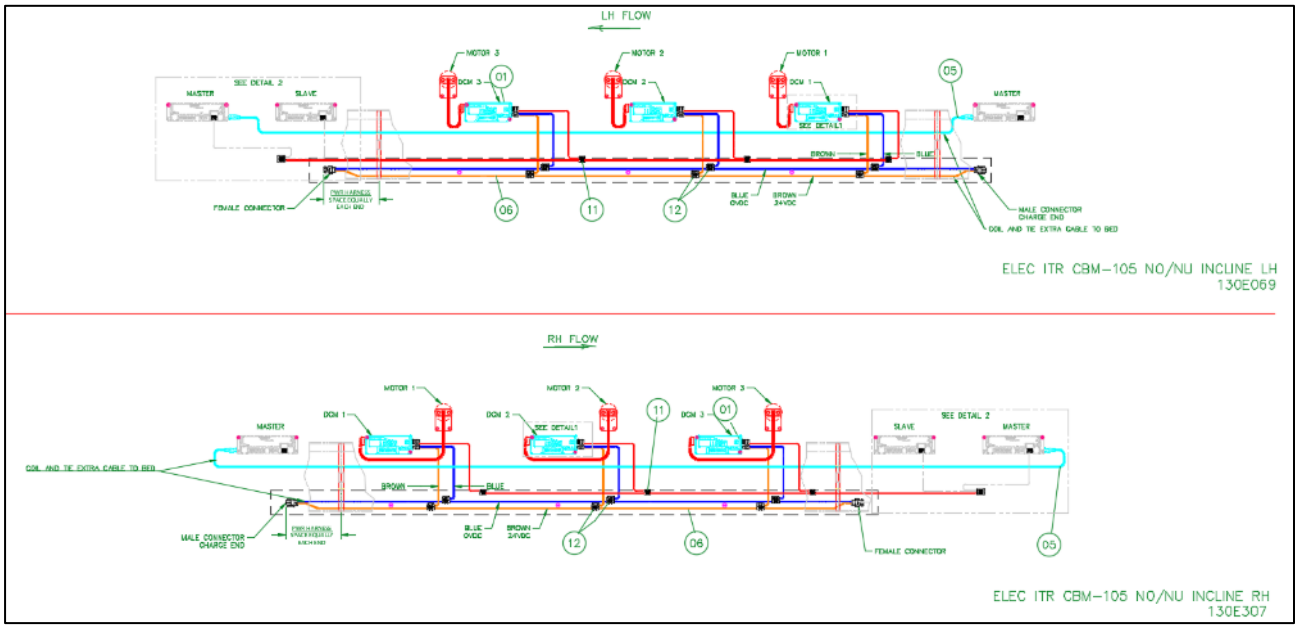
## *21.27.2 Replacement Parts — Noseover Decline (Transportation)*

| REPLACEMENT PARTS - ITR NOSEOVER DECLINE (TRANSPORTATION) 9D & 12D | | | | |
|---|---|---|---|---|
| NO, ITR-_ _BF-DECLINE-CB-CZ-FWB-_ _D-(LH OR RH)-FE60 | | Width & Item # | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF |
| 1 | DRIVERCARD, **ITOH CBM-105FP** | 1153930 | 1153930 | 1153930 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | DRIVER CARD CAT5E COMMUNICATION CABLES | | |
| 06 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 |
| --- | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D, W/DURA-BELT POLY-V END CAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH | 1141751 | 1150242 | 1145796 |
| 24 | BELT, ITR 3"CTR POLY-V 4 RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X36.31", **(9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 1/2" ROLLER TO ROLLER) | 1224264 | 1224265 | 1222081 |
| Ref Dwg# 130A093 | | | | |

## 21.28 NOSEOVER INCLINE (TRANSPORTATION)



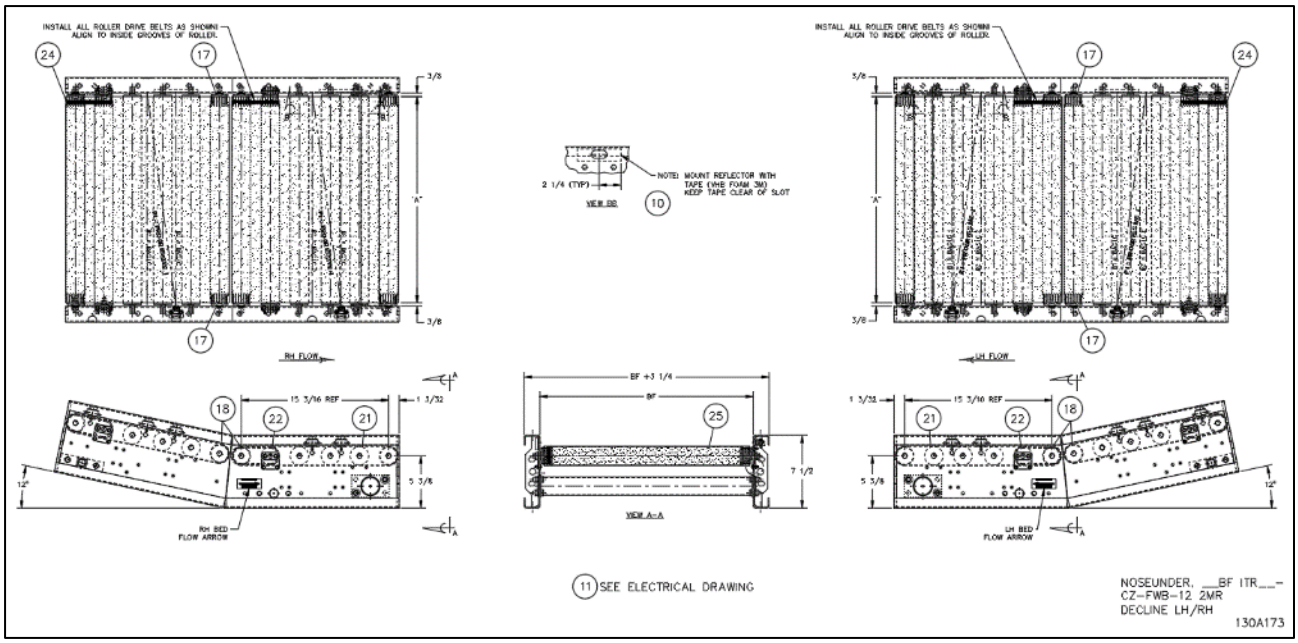

### *21.28.1 Noseover Incline (Transportation) Electrical CBM-105 Shown*



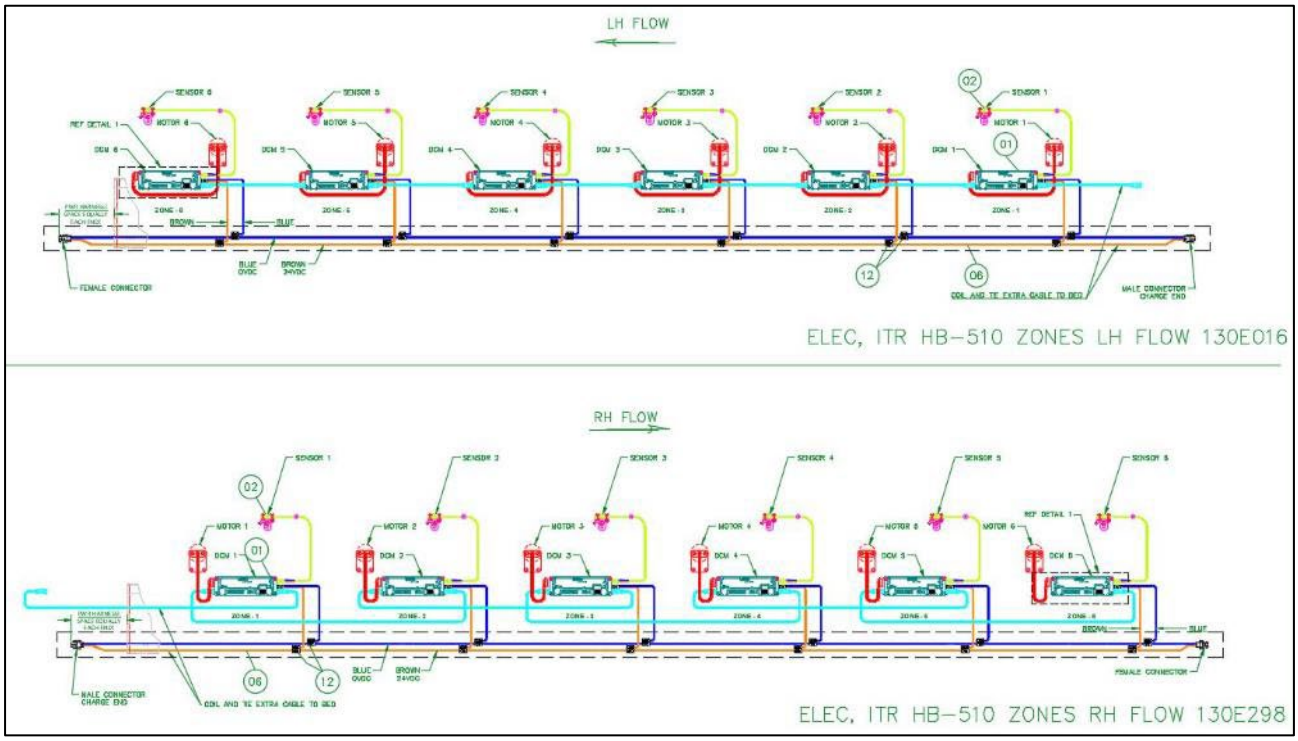
## *21.28.2 Replacement Parts — Noseover Incline (Transportation)*

| REPLACEMENT PARTS - ITR NOSEOVER INCLINE (TRANSPORTATION) 9D, 12D, & 15D | | | | |
|---|---|---|---|---|
| NO, ITR-_ _BF-INCLINE-CB-CZ-FWB-_ _D-(LH OR RH)-FP55 | | Width & Item # | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** |
| 1 | DRIVERCARD, **ITOH CBM-105FP** | 1153930 | 1153930 | 1153930 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D, W/DURA-BELT POLY-V ENDCAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH | 1153205 | 1153206 | 1153207 |
| 24 | BELT, ITR 3"CTR POLY-V 4RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X36.31", (**9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 1/2" ROLLER TO ROLLER) | 1224264 | 1224265 | 1222081 |
| 25 | BELT, TRAC .08"X__. __"X36.43" **(15 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 9/16" ROLLER TO ROLLER) | 1223756 | 1223252 | 1223994 |
| Ref Dwg# 130A088 | | | | |

## 21.29 NOSEUNDER DECLINE (ACCUMULATION)



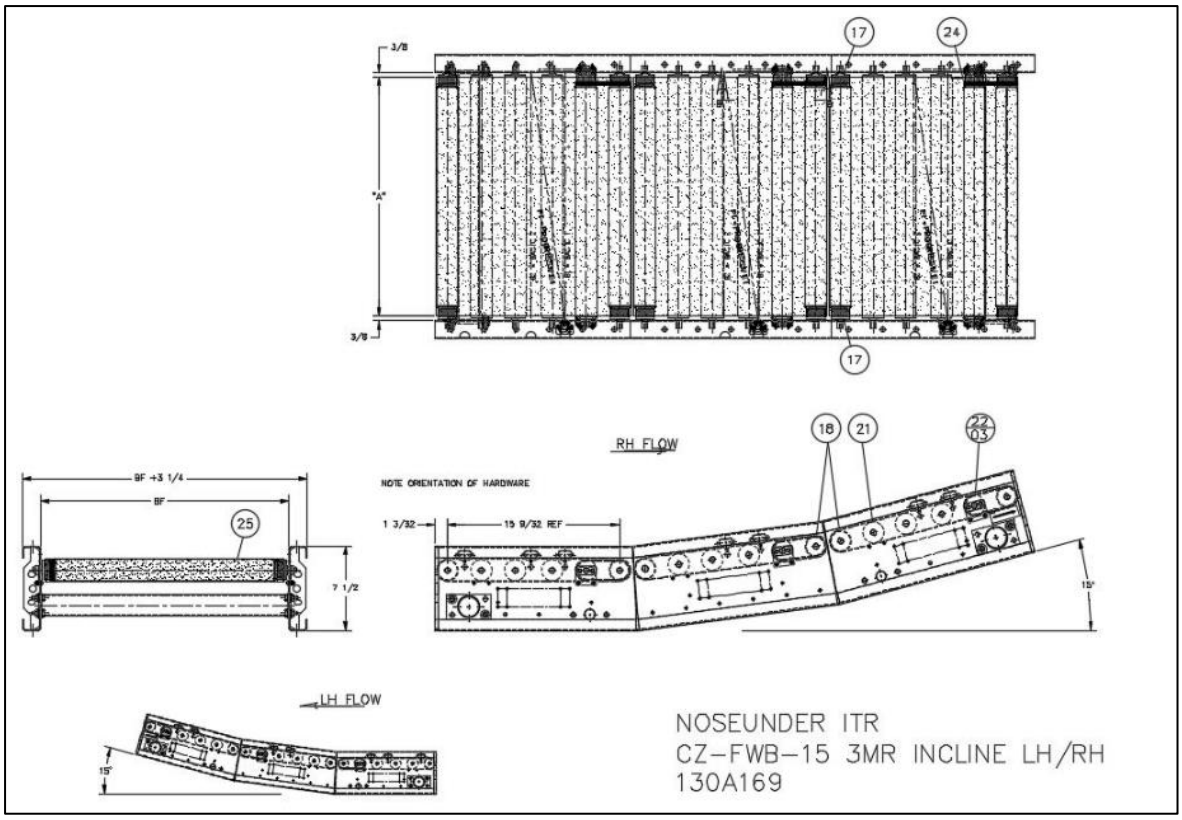

### *21.29.1 Electrical HB-510 Zones LH/RH Shown*



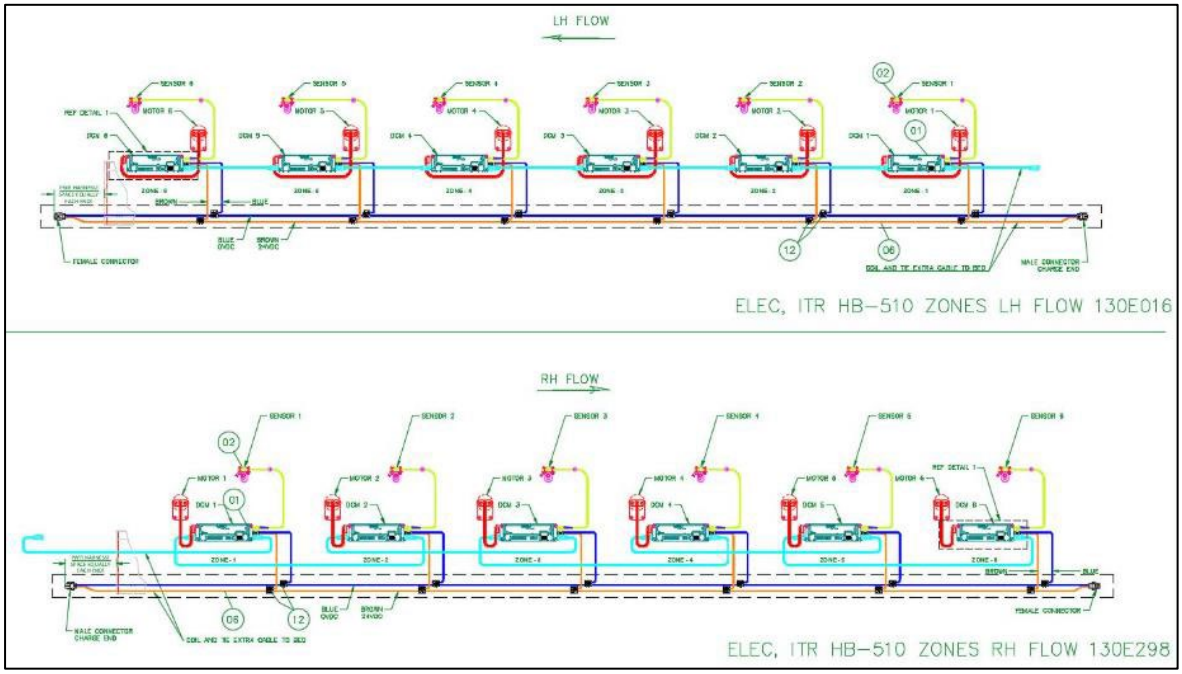
## *21.29.2 Replacement Parts — Noseunder Decline (Accumulation)*

| REPLACEMENT PARTS - ITR NOSEUNDER DECLINE (ACCUMULATION) 9 & 12 DEGREES | | | | |
|---|---|---|---|---|
| NU, ITR-_ _BF-DECLINE-(HB OR IBE)-CZ-FWB-Z-D-(LH or RH)-FE60BR | | Width & Item # | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF |
| 01 | DRIVERCARD, ITOH **HB-510BP, BRAKE CONTROL** | 1108863 | 1108863 | 1108863 |
| 01 | DRIVERCARD, **ITOH IB-E03** | 1166286 | 1166286 | 1166286 |
| 01 | DRIVERCARD, **ITOH CB-016BP7,** PNP - INPUT/OUTPUT SIGNALS, BRAKE CONTROL | 1143591 | 1143591 | 1143591 |
| 02 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| 02 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB)** | 1137687 | 1137687 | 1137687 |
| 10 | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| ---- | CONN, WAGO 231-302/026-000 **(USED WITH IBE)** | 1162204 | 1162204 | 1162204 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D W/DURA-BELT POLY-V ENDCAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE USED WITH HB)** | 1153059 | 1153060 | 1153061 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH, BRAKE **(WITH BRAKE - USED WITH IBE)** | 1165467 | 1165468 | 1165469 |
| 24 | BELT, ITR 3"CTR POLY-V 4RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X35.70" **(USED WITH 9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 3/16" ROLLER TO ROLLER) | 1224264 | 1224265 | 1222081 |
| Ref Dwg# 130A173 | | | | |

## 21.30 NOSEUNDER INCLINE (ACCUMULATION)



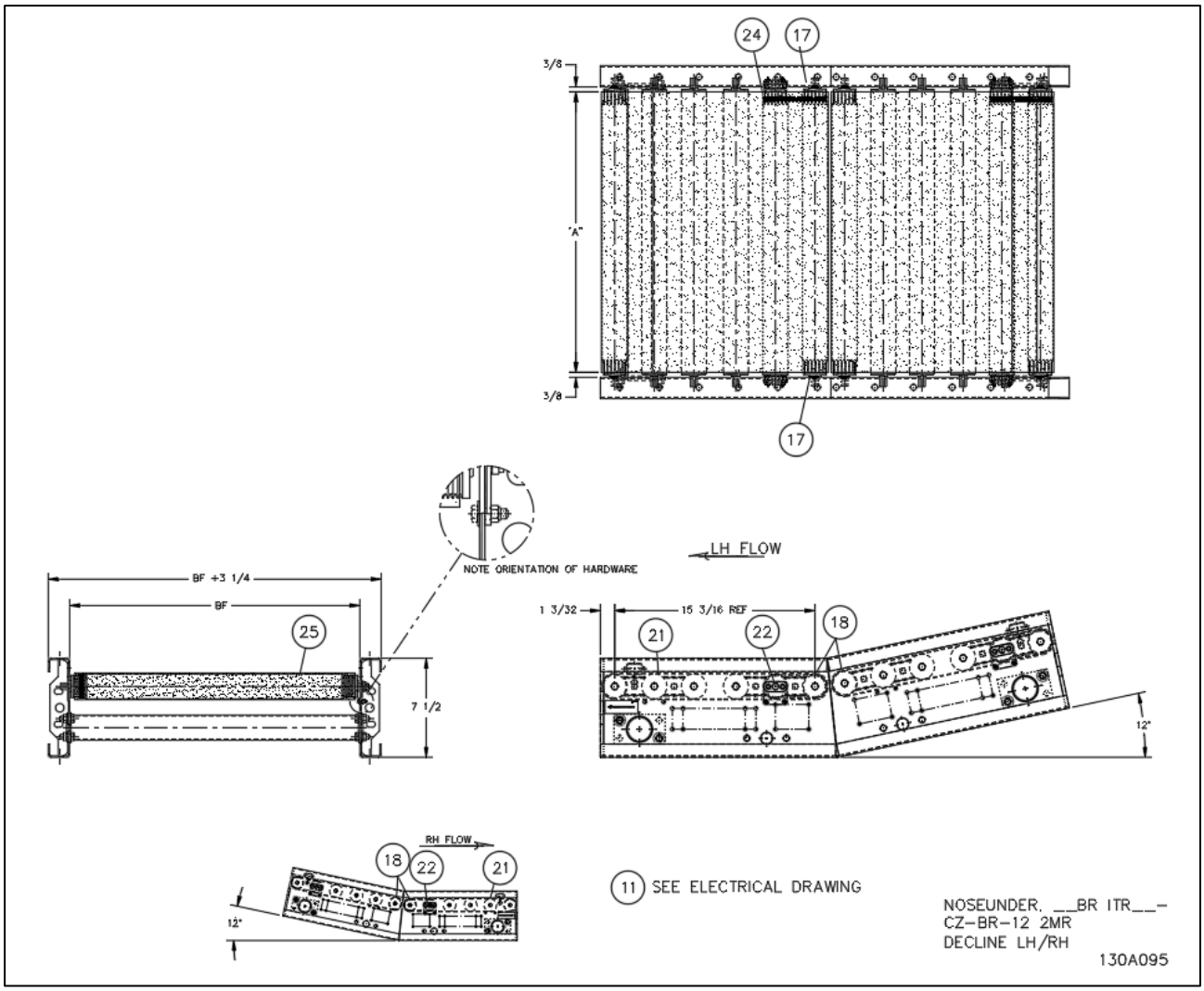

### *21.30.1 Noseunder Incline Electrical HB-510 Zones LH/RH Shown*



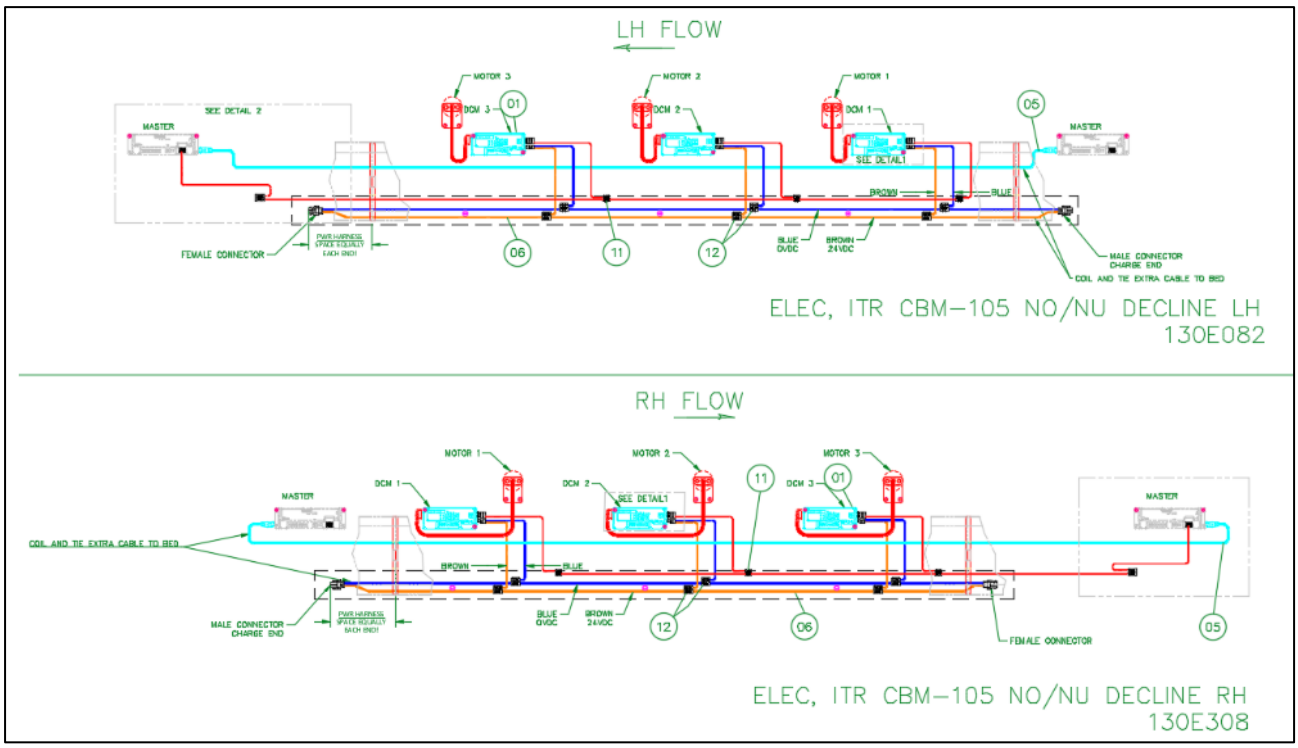
## *21.30.2 Replacement Parts — Noseunder Incline (Accumulation)*

| REPLACEMENT PARTS - ITR NOSEUNDER INCLINE (ACCUMULATION) 9D, 12D, & 15D | | | | |
|---|---|---|---|---|
| NU, ITR-_ _BF-INCLINE-(HB OR IBE)-CZ-FWB-_Z-_ _D-(LH OR RH)-FP55 | | Width & Item # | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** |
| 01 | DRIVERCARD, **ITOH HB-510P** | 1101261 | 1101261 | 1101261 |
| 01 | DRIVERCARD, **ITOH CBM-105FP** | 1153930 | 1153930 | 1153930 |
| 01 | DRIVERCARD, **ITOH IB-E03** | 1166286 | 1166286 | 1166286 |
| 02 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE **(USED WITH IBE)** | 1163456 | 1163456 | 1163456 |
| 02 | PE, REFLEX TYPE ZL, PNP, DARK OPERATE **(USED WITH HB)** | 1137687 | 1137687 | 1137687 |
| ---- | PE, REFLECTOR 4-3/8" X 1-1/8" | 400004 | 400004 | 400004 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 8 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| ---- | CONN, WAGO 231-302/026-000 **(USED WITH IBE)** | 1162204 | 1162204 | 1162204 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D W/DURA-BELT POLY-V ENDCAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH **(USED WITH HB)** | 1153205 | 1153206 | 1153207 |
| 22/03 | ROLLER, ITR _ _BF GV ITOH **(USED WITH IBE)** | 1166259 | 1166260 | 1166261 |
| 24 | BELT, ITR 3"CTR POLY-V 4RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__.__"X35.70" **(USED WITH 9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 3/16" ROLLER TO ROLLER) | 1224300 | 1224298 | 1222071 |
| 25 | BELT, TRAC .08"X__.__"X35.88" **(USED WITH 9 & 15 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 9/32" ROLLER TO ROLLER) | 1224301 | 1224299 | 1222072 |
| Ref Dwg# 130A169 | | | | |

## 21.31 NOSEUNDER DECLINE (TRANSPORTATION)



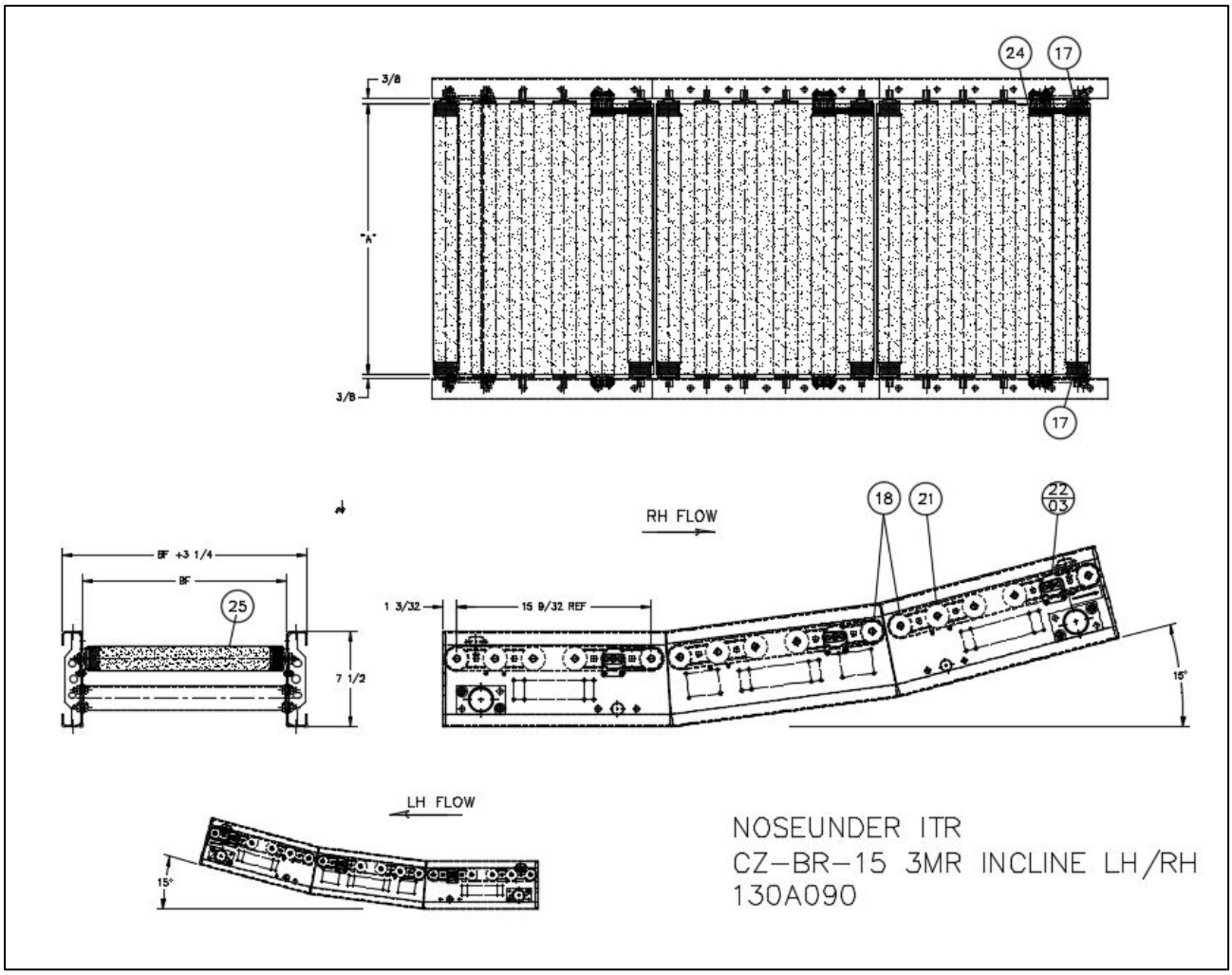
### *21.31.1 Noseunder Decline (Transportation) Electrical CBM-105 Shown*



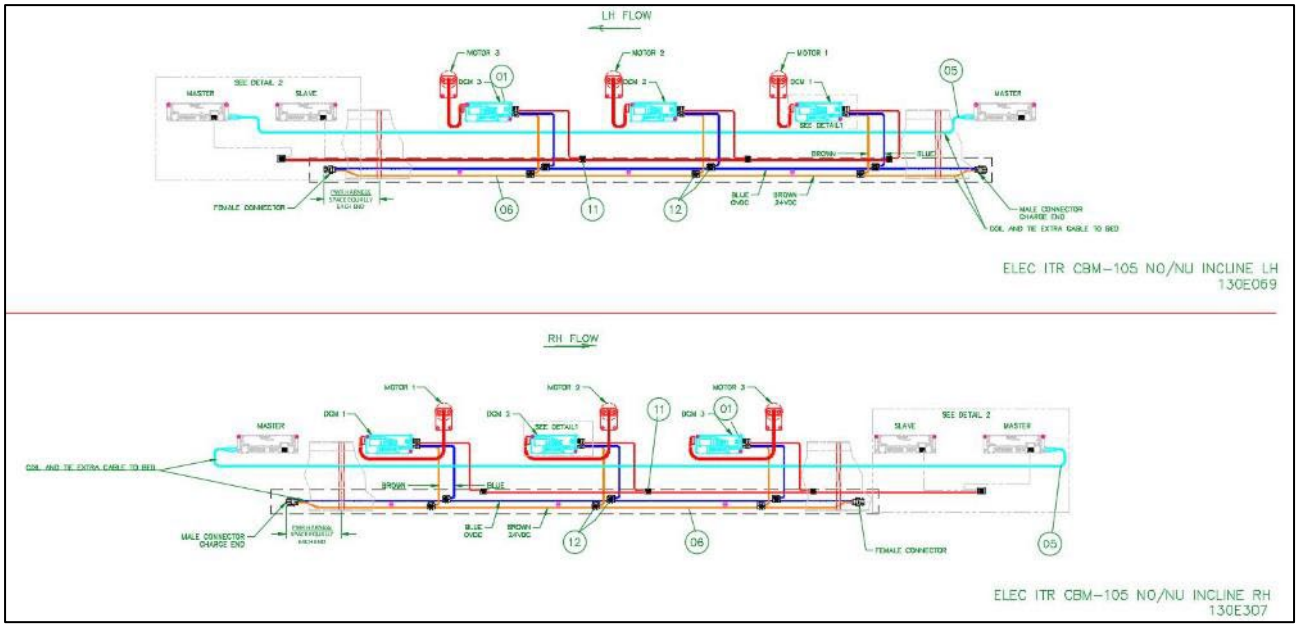
## *21.31.2 Replacement Parts — Noseunder Decline (Transportation)*

| REPLACEMENT PARTS - ITR NOSEUNDER DECLINE (TRANSPORTATION) 9 & 12 DEGREES | | | | |
|---|---|---|---|---|
| **NU, ITR-_ _BF-DECLINE-CB-CZ-FWB-_ _D-(LH OR RH)-FE60** | | **Width & Item #** | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** |
| 1 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 |
| 17 | ORING, 1/2" ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D, W/DURA-BELT POLY-V ENDCAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22 | ROLLER, ITR _ _BF VG ITOH | 1141751 | 1150242 | 1145796 |
| 24 | BELT, ITR 3"CTR POLY-V 4RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X35.70" **(USED WITH 9 & 12 DEGREES)** WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 3/16" ROLLER TO ROLLER) | 1224300 | 1224298 | 1222071 |
| Ref Dwg# 130A095 | | | | |

## 21.32 NOSEUNDER INCLINE (TRANSPORTATION)



## 21.32.1 Noseunder Incline (Transportation) Electrical CBM-105 Shown

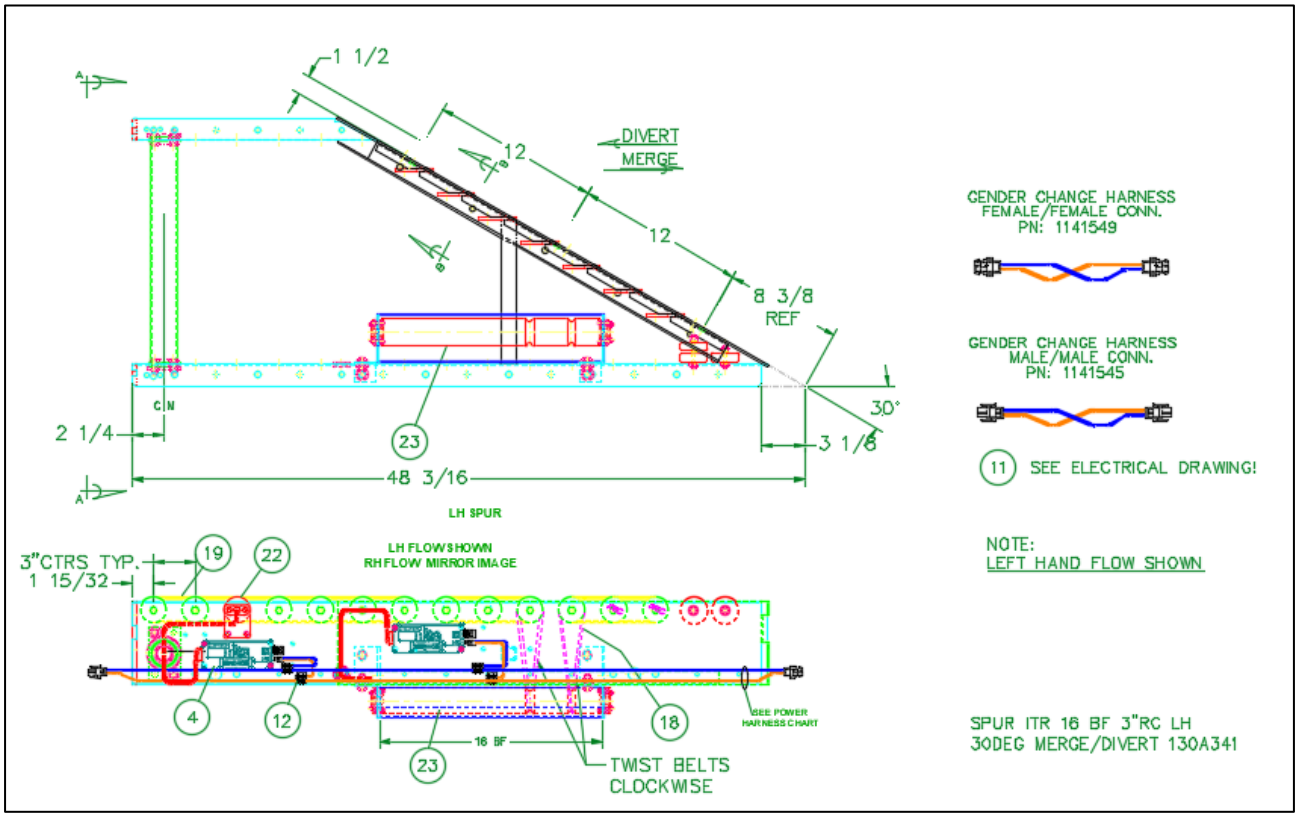



## 21.32.2 Replacement Parts — Noseunder Incline (Transportation)

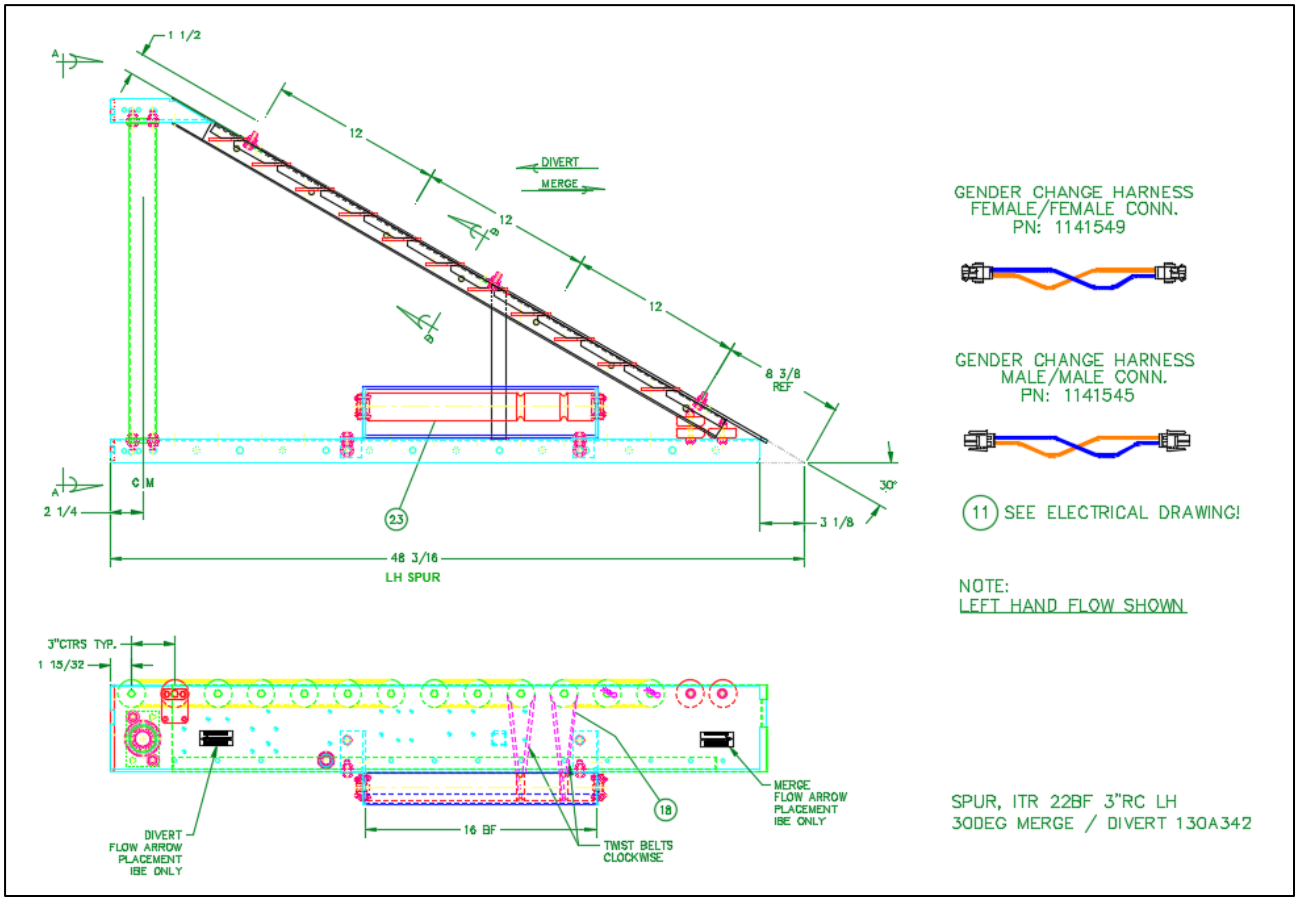
| REPLACEMENT PARTS - ITR NOSEUNDER INCLINE (TRANSPORTATION) 9D, 12D, & 15D | | | | |
|---|---|---|---|---|
| NU, ITR-_ _BF-INCLINE-CB-CZ-FWB-_ _D-(LH OR RH)-FP55 | | Width & Item # | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF |
| 1 | DRIVERCARD, **ITOH CBM-105FP** | 1153930 | 1153930 | 1153930 |
| 5 | CABLE, CTRLS-CAT5E-_'-GRAY | **DRIVER CARD CAT5E COMMUNICATION CABLES** | | |
| 6 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 |
| --- | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 |
| 17 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 |
| 18 | ROLLER, _ _BF POLY-V 1.9 PRBG 2D, W/DURA-BELT POLY-V ENDCAPS | 1208809 | 1208810 | 1208811 |
| 21 | ROLLER, _ _"GRAV 1.9 PLTD PRBG | 60218009 | 60224009 | 60230009 |
| 22/03 | ROLLER, ITR _ _BF VG ITOH | 1153205 | 1153206 | 1153207 |
| 24 | BELT, ITR 3"CTR POLY-V 4RIB | 1142087 | 1142087 | 1142087 |
| 25 | BELT, TRAC .08"X__. __"X35.70" **(USED WITH 9 & 12 DEGREES)**<br>WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 3/16" ROLLER TO ROLLER) | 1224300 | 1224298 | 1222071 |
| 25 | BELT, TRAC .08"X__. __"X35.88" **(USED WITH 9 & 15 DEGREES)**<br>WVT-463, 2.5% STRCH-RIBBED SIDE UP, _ _BF-(15 9/32" ROLLER TO ROLLER) | 1224301 | 1224299 | 1222072 |
| Ref Dwg# 130A090 | | | | |

## 21.33 ITR SPUR TRANSPORTATION 30 DEGREE

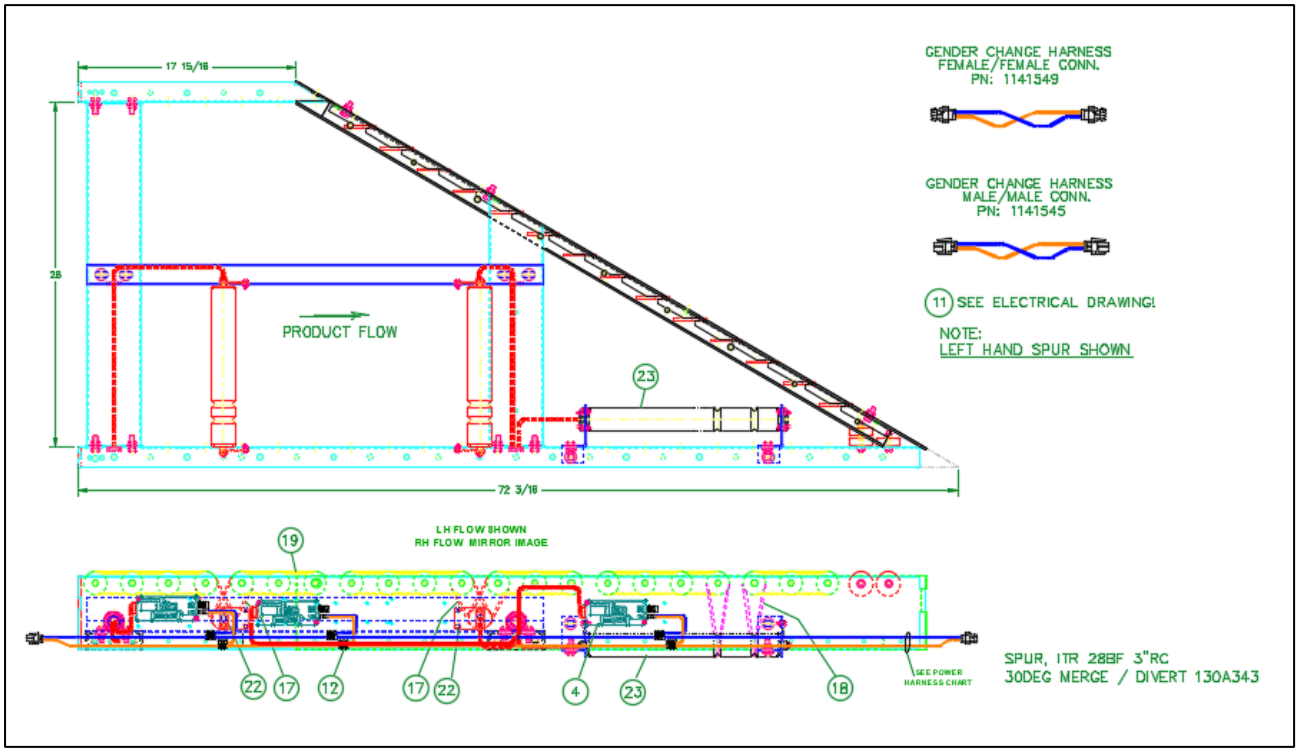
### *21.33.1 ITR Spur, 16BF, 3RC, 30 Degree*



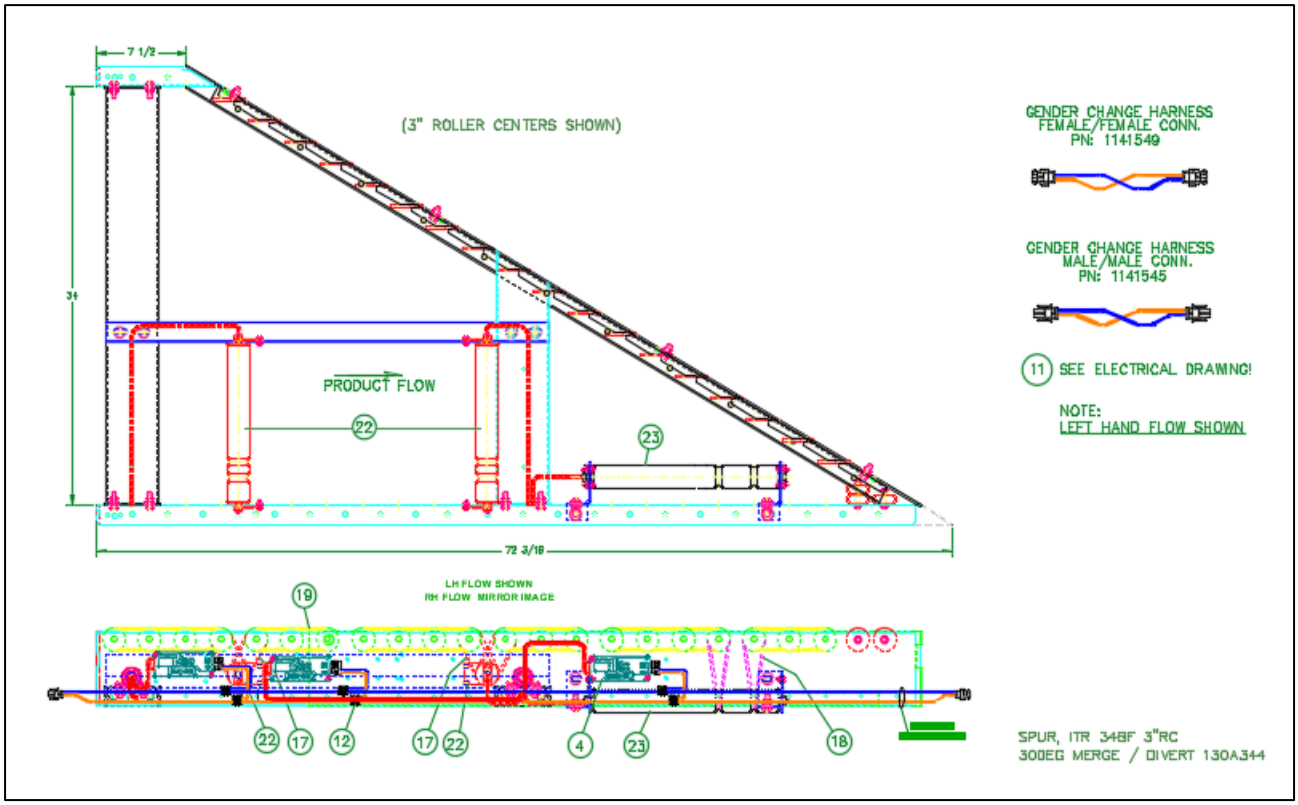
## *21.33.2 ITR Spur, 22BF, 3RC, 30 Degree*



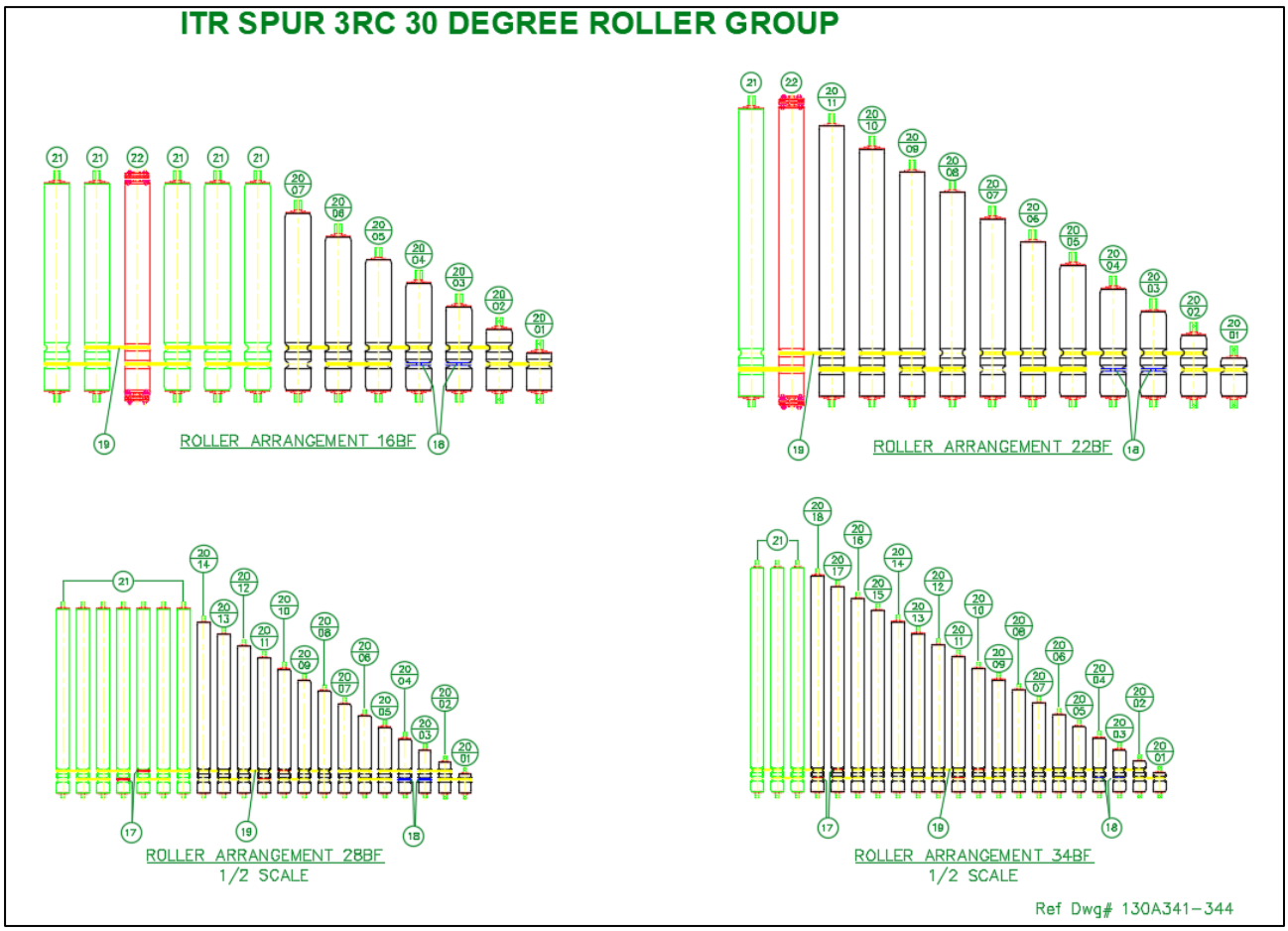
## *21.33.3 ITR Spur, 28BF, 3RC, 30 Degree*



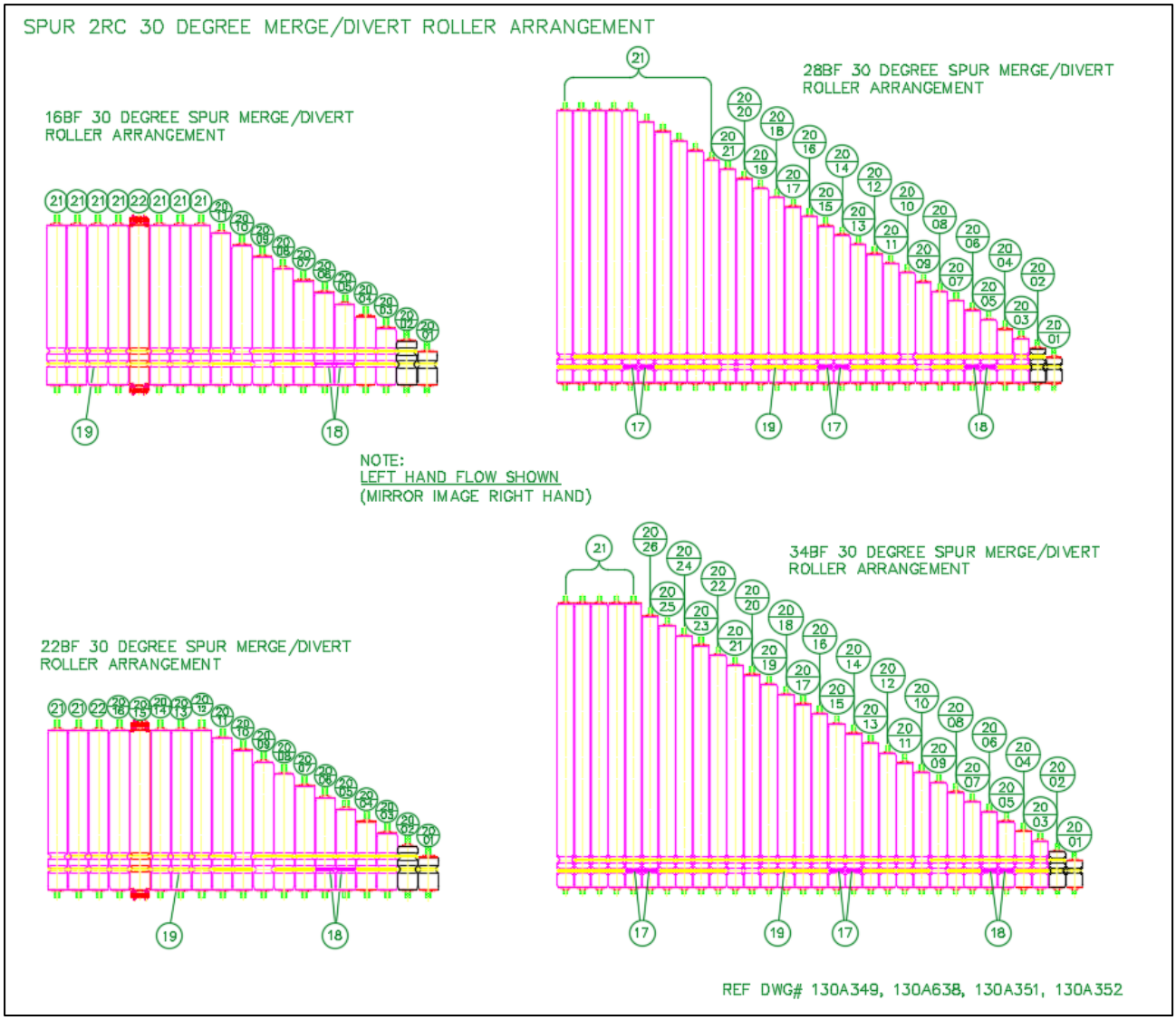
## *21.33.4 ITR Spur, 34BF, 3RC, 30 Degree*



### *21.33.5 ITR Spur, 3RC, 30 Degree Roller Group*



## *21.33.6 ITR Spur 2RC, 30 Degree Merge/Divert Roller Group*



## *21.33.7 Replacement Parts — ITR Spur, 3RC, 30 Degree*

| REPLACEMENT PARTS - ITR SPUR, 3RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, _ _BF-CB-C6-3RC-30D-LH/RH-FE60-_MR | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| 04 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS 28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| --- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | 3'-0" L 1102289 | 5'-6" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| ---- | HARNESS, ITR-POWER-10AWG 4"- FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| --- | **SPUR, O-RINGS** | --- | --- | --- | --- |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| — | **ROLLER SET-3RC-30D-SPUR** | — | — | — | — |
| 20/01 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/02 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/03 | ROLLER, 6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/04 | ROLLER, 8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/05 | ROLLER, 10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/06 | ROLLER, 12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/07 | ROLLER, 13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/08 | ROLLER, 15-1/2BF ITR 1.9 PLTD PRBG | ---- | 1131624 | 1131624 | 1131624 |
| 20/09 | ROLLER, 17-1/4BF ITR 1.9 PLTD PRBG | ---- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9 PLTD PRBG | ---- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9 PLTD PRBG | ---- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9 PLTD PRBG (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH | 1138722 | 1139545 | 1139545 | 1139545 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C (3"GROOVE SPACING) | 1126586 | 1126586 | 1126586 | 1126586 |
| Reference Dwg: Roller Arrangement & 130A341-344 | | | | | |

## *21.33.8 Replacement Parts — ITR Spur, 2RC, 30 Degree*

| REPLACEMENT PARTS - ITR SPUR, 2RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB-C6-2RC-30D-LH/RH-FE60-_MR | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 4 | DRIVERCARD, **ITOH CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| -- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| ---- | HARNESS, ITR-POWER-10AWG 4"-FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| — | **SPUR, O-RINGS** | --- | --- | --- | --- |
| 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | ----- | ----- | E0005536 | E0005536 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | **ROLLER SET-2RC-30D-SPUR** | — | — | — | — |
| 20/01 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/02 | ROLLER, ITR 4-3/4" BF PRBG (NO AXLE) | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/03 | ROLLER, 6" BF ITR 1.9" DIA PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/04 | ROLLER, 7-1/8" BF ITR 1.9" DIA PLTD PRBG | 1152261 | 1152261 | 1152261 | 1152261 |
| 20/05 | ROLLER, 8-5/19" BF ITR 1.9" DIA PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/06 | ROLLER, 9-7/16" BF ITR 1.9" DIA PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/07 | ROLLER, 10-5/8" BF ITR 1.9" DIA PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/08 | ROLLER, 11-3/4" BF ITR 1.9" DIA PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/09 | ROLLER, 12-15/16" BF ITR 1.9" DIA PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER, 14-1/16" BF ITR 1.9" DIA PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER, 15-3/16" BF ITR 1.9" DIA PLTD PRBG | 1152269 | 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 (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH | 1138722 | 1139545 | 1139545 | 1139545 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C (2"GROOVE SPACING) | 1152362 | 1152362 | 1152362 | 1152362 |
| | | Reference Dwg: Roller Arrangement & 130A341-344 | | | |

## *21.33.9 Replacement Parts — ITR Spur, IB-E03, 3RC, 30 Degree, Merge*

| REPLACEMENT PARTS - ITR SPUR, IB-E, 3RC, 30 DEGREE, MERGE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-IBE-C6-3RC-30D-MERGE-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| --- | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, WAGO 231-302/026-000 (USED W/IBE) | 1162204 | 1162204 | 1162204 | 1162204 |
| --- | CABLE, CTRLS-CAT5E-_'-GRAY | REFERENCE Cat5E COMMUNICATION CABLE | | | |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| --- | HARNESS, POWER BROWN & BLUE (NOT BF SPECIFIC) | 3'-0" L 1102289 | 5'-5" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| — | SPUR, O-RINGS | — | — | — | — |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| --- | ROLLER SET-3RC-30D-SPUR | --- | --- | --- | --- |
| 20/1 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/2 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/3 | ROLLER, 6-27/32BF ITR 1.9PLTD, PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/4 | ROLLER, 8-9/16BF ITR 1.9PLTD, PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/5 | ROLLER, 10-5/16BF ITR 1.9PLTD, PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/6 | ROLLER, 12-1/32BF ITR 1.9PLTD, PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/7 | ROLLER, 13-25/32BF ITR 1.9PLTD, PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/8 | ROLLER, 15-1/2BF ITR 1.9PLTD, PRBG | ----- | 1131624 | 1131624 | 1131624 |
| 20/9 | ROLLER, 17-1/4BF ITR 1.9PLTD, PRBG | ----- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9PLTD, PRBG | ----- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9PLTD, PRBG | ----- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9PLTD, PRBG | ----- | ----- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9PLTD, PRBG | ----- | ----- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9PLTD, PRBG | ----- | ----- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9PLTD, PRBG | ----- | ----- | ----- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9PLTD, PRBG | ----- | ----- | ----- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9PLTD, PRBG | ----- | ----- | ----- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9PLTD, PRBG | ----- | ----- | ----- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 (USED W/IBE) | 1165293 | 1165293 | 1165293 | 1165293 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 (3" GROOVE SPACING) (USED W/ IBE) | 1165292 | 1165292 | 1165292 | 1165292 |
| Reference Dwg: Roller Arrangement & 130A341-344 | | | | | |

## *21.33.10 Replacement Parts — ITR Spur Divert, IB-E03, 3RC, 30 Degree*

| REPLACEMENT PARTS - ITR SPUR DIVERT, IB-E03, 3RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| **SPUR, ITR-_ _BF-IBE-C6-3RC-30D-DIVERT-LH/RH-FE60-_MR** | | **Width & Item #** | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 04 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ----- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ----- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| ---- | ROLLER SET-3RC-30D-SPUR | ---- | ---- | ---- | ---- |
| 20/01 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/02 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/03 | ROLLER, 6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/04 | ROLLER, 8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/05 | ROLLER, 10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/06 | ROLLER, 12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/07 | ROLLER, 13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/08 | ROLLER, 15-1/2BF ITR 1.9 PLTD PRBG | ----- | 1131624 | 1131624 | 1131624 |
| 20/09 | ROLLER, 17-1/4BF ITR 1.9 PLTD PRBG | ----- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9 PLTD PRBG | ----- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9 PLTD PRBG | ----- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR 16BF 2G ITOH PM486FE-60 | 1163471 | ----- | ---- | ---- |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | ---- | 1165293 | 1165293 | 1165293 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 (3" GROOVE SPACING) | 1165292 | 1165292 | 1165292 | 1165292 |
| | | Reference Dwg: Roller Arrangement & 130A341-344 | | | |

## *21.33.11 Replacement Parts — ITR Spur Divert, IB-E03, 2RC, 30 Degree*

| REPLACEMENT PARTS - ITR SPUR, DIVERT, IB-E, 2RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB-C6-2RC-30D-LH/RH-FE60-_MR | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| --- | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| ---- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| --- | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| ---- | HARNESS, POWER BROWN & BLUE (NOT BF SPECIFIC) | 3'-0" L 1102289 | 5'-5" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| ---- | HARNESS, ITR-POWER-10AWG 4"-FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| — | SPUR, O-RINGS | — | — | — | — |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | ---- | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| --- | ROLLER SET-2RC-30D-SPUR | --- | --- | --- | --- |
| 20/1 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/2 | ROLLER, ITR 4-3/4"BF PRBG NO AXLE | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/3 | ROLLER, 6BF ITR 1.9 PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/4 | ROLLER, 7-1/8BF ITR 1.9 PLTD PRBG | 1152261 | 1152261 | 1152261 | 1152261 |
| 20/5 | ROLLER, 8-5/16BF ITR 1.9 PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/6 | ROLLER, 9-7/16BF ITR 1.9 PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/7 | ROLLER, 10-5/8BF ITR 1.9 PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/8 | ROLLER, 11-3/4BF ITR 1.9 PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/9 | ROLLER, 12-15/16BF ITR 1.9 PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER, 14-1/16BF ITR 1.9 PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER, 15-3/16BF ITR 1.9 PLTD PRBG | 1152269 | 1152269 | 1152269 | 1152269 |
| 20/12 | ROLLER, 16-3/8BF ITR 1.9 PLTD PRBG | ---- | 1155254 | 1155254 | 1155254 |
| 20/13 | ROLLER, ITR 17-1/2"BF 1.9 PLTD PRBG | ---- | 1133722 | 1133722 | 1133722 |
| 20/14 | ROLLER, 18-3/4BF ITR 1.9 PLTD PRBG | ---- | 1154742 | 1154742 | 1154742 |
| 20/15 | ROLLER, 19-3/4BF ITR 1.9 PLTD PRBG | ---- | 1144374 | 1144374 | 1144374 |
| 20/16 | ROLLER, ITR 21"BF 1.9 PLTD PRBG | ---- | 1133723 | 1133723 | 1133723 |
| 20/17 | ROLLER, 22-3/16BF ITR 1.9 PLTD PRBG | ---- | ---- | 1155255 | 1155255 |
| 20/18 | ROLLER, ITR 23-1/4"BF PRBG | ---- | ---- | 1131992 | 1131992 |
| 20/19 | ROLLER, ITR 24-7/16"BF PRBG1.9 PLTD | ---- | ---- | 1133724 | 1133724 |
| 20/20 | ROLLER, 25-5/8BF ITR 1.9 PLTD PRBG | ---- | ---- | 1155256 | 1155256 |
| 20/21 | ROLLER, 26-3/4BF ITR 1.9 PLTD PRBG | ---- | ---- | 1154745 | 1154745 |
| 20/22 | ROLLER, ITR 27-15/16"BF PRBG1.9 PLTD | ---- | ---- | ---- | 1133726 |
| 20/23 | ROLLER, 29-1/16BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1155257 |
| 20/24 | ROLLER, 30-1/4BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1155258 |
| 20/25 | ROLLER, ITR 31-3/8"BF PRBG 1.9 PLTD | ---- | ---- | ---- | 1133728 |
| 20/26 | ROLLER, 32-1/2BF ITR 1.9 PLTDPRBG | ---- | ---- | ---- | 1155259 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1163471 | --- | --- | ---- |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | ---- | 1165293 | 1165293 | 1165293 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 (3" GROOVE SPACING) | 1171592 | 1171592 | 1171592 | 1171592 |
| Reference Dwg: Roller Arrangement & 130A341-344 | | | | | |

## *21.33.12 Replacement Parts — ITR Spur Divert (High Speed), CB-016 or IB-E, 3RC*

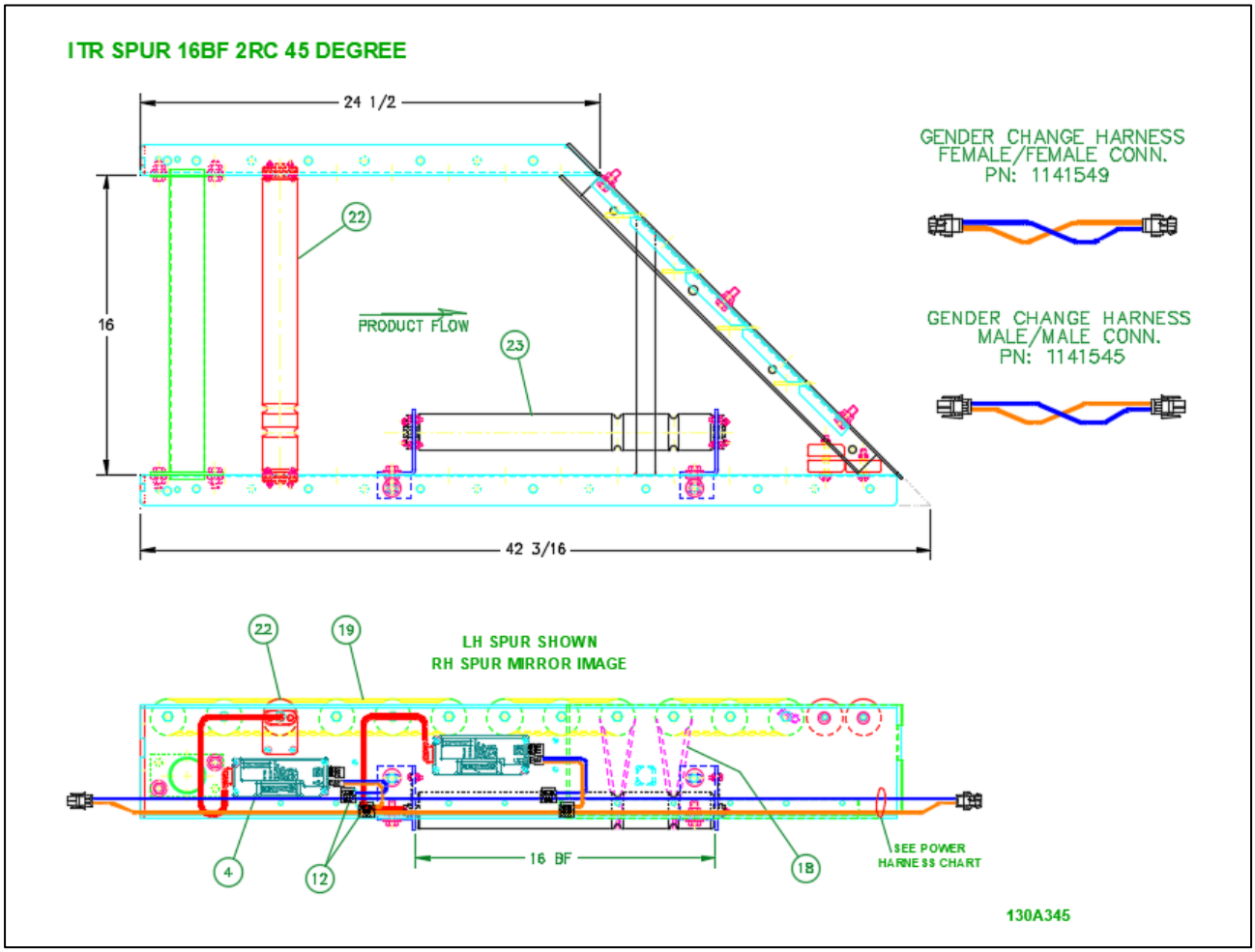
| REPLACEMENT PARTS - ITR SPUR DIVERT (HIGH SPEED), 3RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB016 OR IBE-C6-3RC-30D-DIVERT-LH/RH-FE140 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| ---- | DRIVERCARD, ITOH **CB-016P7** | 1116036 | 1116036 | 1116036 | 1116036 |
| ---- | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| ----- | CONNECTOR, IDC SCOTCH LOK 558 - RED **(USED W/CB)** | 1120174 | 1120174 | 1120174 | 1120174 |
| ----- | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ----- | CONN, 3 COND, W/LEVERS 28 - 12 AWG **(USED W/CB)** | 1102816 | 1102816 | 1102816 | 1102816 |
| ----- | CONN, WAGO 231-302/026-000 **(USED W/IBE)** | 1162204 | 1162204 | 1162204 | 1162204 |
| ----- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ----- | CABLE, POWER CB-016/HB-510 14GA ITR **(USED W/CB)** | 1139543 | 1139543 | 1139543 | 1139543 |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | 3'-0" L 1102289 | 5'-5" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| ---- | HARNESS, ITR-POWER-10AWG _ _L-MALE-PIGTAIL **(NOT BF SPECIFIC)** | 3' L 1145664 | 4' L 1146344 | 7' L 1145663 | 10' L 1143291 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE, ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| — | **ROLLER SET ITR-30D-3RC-SPUR** | — | — | — | — |
| 20/1 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/2 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/3 | ROLLER, 6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/4 | ROLLER, 8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/5 | ROLLER, 10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/6 | ROLLER, 12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/7 | ROLLER, 13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/8 | ROLLER, 15-1/2BF ITR 1.9 PLTD PRBG | ---- | 1131624 | 1131624 | 1131624 |
| 20/9 | ROLLER, 17-1/4BF ITR 1.9 PLTD PRBG | ---- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9 PLTD PRBG | ---- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9 PLTD PRBG | ---- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9 PLTD PRBG | ---- | ---- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9 PLTD PRBG | ---- | ---- | ---- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-140 **(USED W/CB)** | 1168560 | 1134452 | 1154583 | 1154583 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM486FE-140 **(USED W/CB)** | 1134911 | 1134911 | 1134911 | 1134911 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-140 **(USED W/IBE)** | 1196022 | 1167730 | 1167700 | 1167700 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM486FE-140 **(USED W/IBE)** | 1167699 | 1167699 | 1167699 | 1167699 |
| Reference Dwg: Roller Arrangement & 130A341-344 | | | | | |

## *21.33.13 Replacement Parts — ITR Spur Divert (High Speed), CB-016 or IB-E, 2RC*

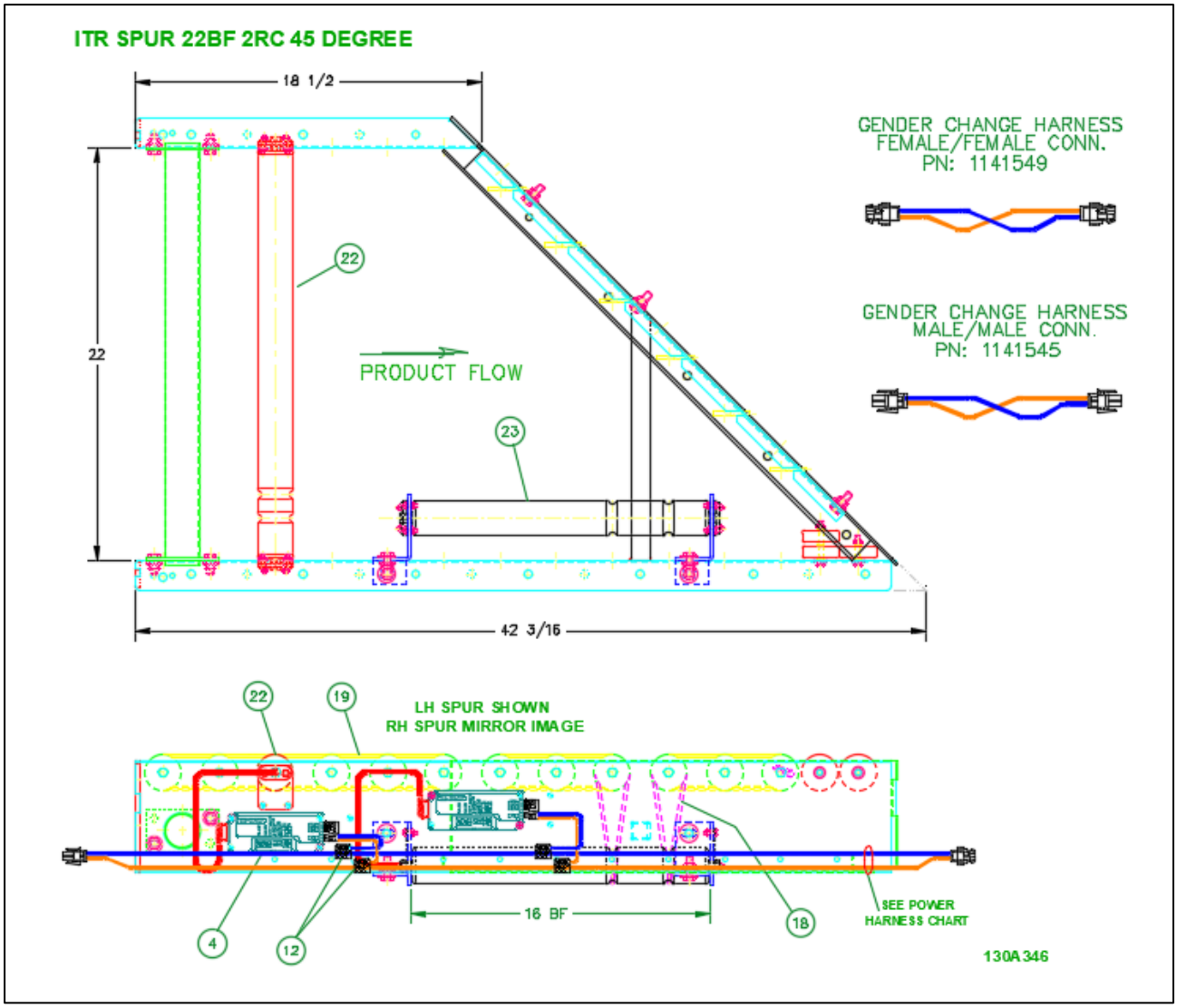
| REPLACEMENT PARTS - ITR SPUR, DIVERT, IB-E, 2RC, 30 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB-C6-2RC-30D-LH/RH-FE60-_MR | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| -- | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| --- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| -- | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| --- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| --- | HARNESS, ITR-POWER-10AWG 4"-FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| — | SPUR, O-RINGS | — | — | — | — |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | --- | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | ROLLER SET-2RC-30D-SPUR | — | — | — | — |
| 20/1 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/2 | ROLLER, ITR 4-3/4"BF PRBG NO AXLE | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/3 | ROLLER, 6BF ITR 1.9 PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/4 | ROLLER, 7-1/8BF ITR 1.9 PLTD PRBG | 1152261 | 1152261 | 1152261 | 1152261 |
| 20/5 | ROLLER, 8-5/16BF ITR 1.9 PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/6 | ROLLER, 9-7/16BF ITR 1.9 PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/7 | ROLLER, 10-5/8BF ITR 1.9 PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/8 | ROLLER, 11-3/4BF ITR 1.9 PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/9 | ROLLER, 12-15/16BF ITR 1.9 PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER, 14-1/16BF ITR 1.9 PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER, 15-3/16BF ITR 1.9 PLTD PRBG | 1152269 | 1152269 | 1152269 | 1152269 |
| 20/12 | ROLLER, 16-3/8BF ITR 1.9 PLTD PRBG | --- | 1155254 | 1155254 | 1155254 |
| 20/13 | ROLLER, ITR 17-1/2"BF 1.9 PLTD PRBG | --- | 1133722 | 1133722 | 1133722 |
| 20/14 | ROLLER, 18-3/4BF ITR 1.9 PLTD PRBG | --- | 1154742 | 1154742 | 1154742 |
| 20/15 | ROLLER, 19-3/4BF ITR 1.9 PLTD PRBG | --- | 1144374 | 1144374 | 1144374 |
| 20/16 | ROLLER, ITR 21"BF 1.9 PLTD PRBG | --- | 1133723 | 1133723 | 1133723 |
| 20/17 | ROLLER, 22-3/16BF ITR 1.9 PLTD PRBG | --- | ---- | 1155255 | 1155255 |
| 20/18 | ROLLER, ITR 23-1/4"BF PRBG | --- | ---- | 1131992 | 1131992 |
| 20/19 | ROLLER, ITR 24-7/16"BF PRBG1.9 PLTD | --- | ---- | 1133724 | 1133724 |
| 20/20 | ROLLER, 25-5/8BF ITR 1.9 PLTD PRBG | --- | ---- | 1155256 | 1155256 |
| 20/21 | ROLLER, 26-3/4BF ITR 1.9 PLTD PRBG | --- | ---- | 1154745 | 1154745 |
| 20/22 | ROLLER, ITR 27-15/16"BF PRBG1.9 PLTD | --- | ---- | --- | 1133726 |
| 20/23 | ROLLER, 29-1/16BF ITR 1.9 PLTD PRBG | --- | ---- | --- | 1155257 |
| 20/24 | ROLLER, 30-1/4BF ITR 1.9 PLTD PRBG | --- | ---- | --- | 1155258 |
| 20/25 | ROLLER, ITR 31-3/8"BF PRBG 1.9 PLTD | --- | ---- | --- | 1133728 |
| 20/26 | ROLLER, 32-1/2BF ITR 1.9 PLTDPRBG | --- | ---- | --- | 1155259 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1163471 | --- | --- | --- |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | --- | 1165293 | 1165293 | 1165293 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 (3" GROOVE SPACING) | 1171592 | 1171592 | 1171592 | 1171592 |
| Reference Dwg: Roller Arrangement & 130A341-344 | | | | | |

## 21.34 ITR SPUR TRANSPORTATION 45 DEGREE

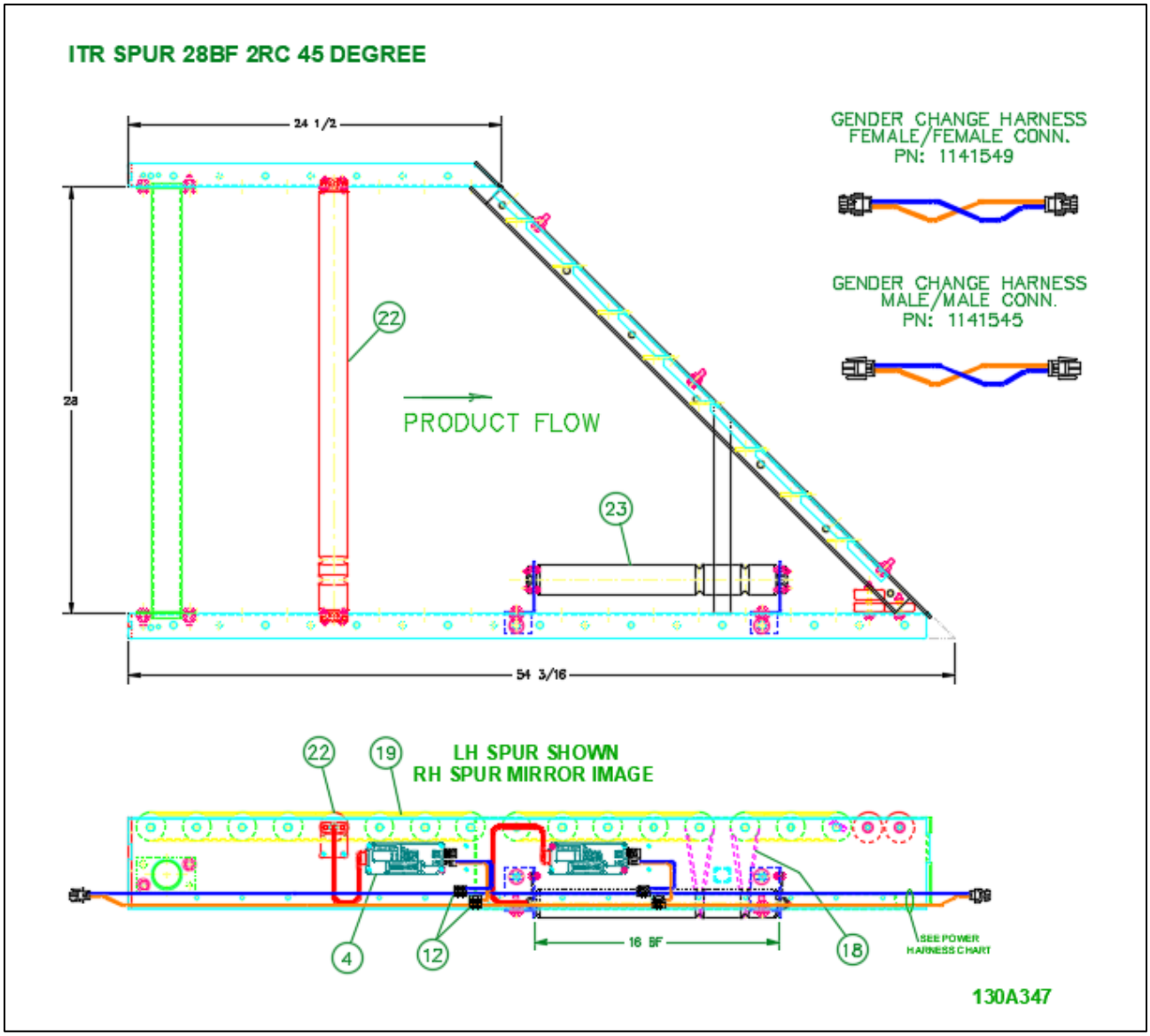
### *21.34.1 ITR Spur 45 Degree 16BF*



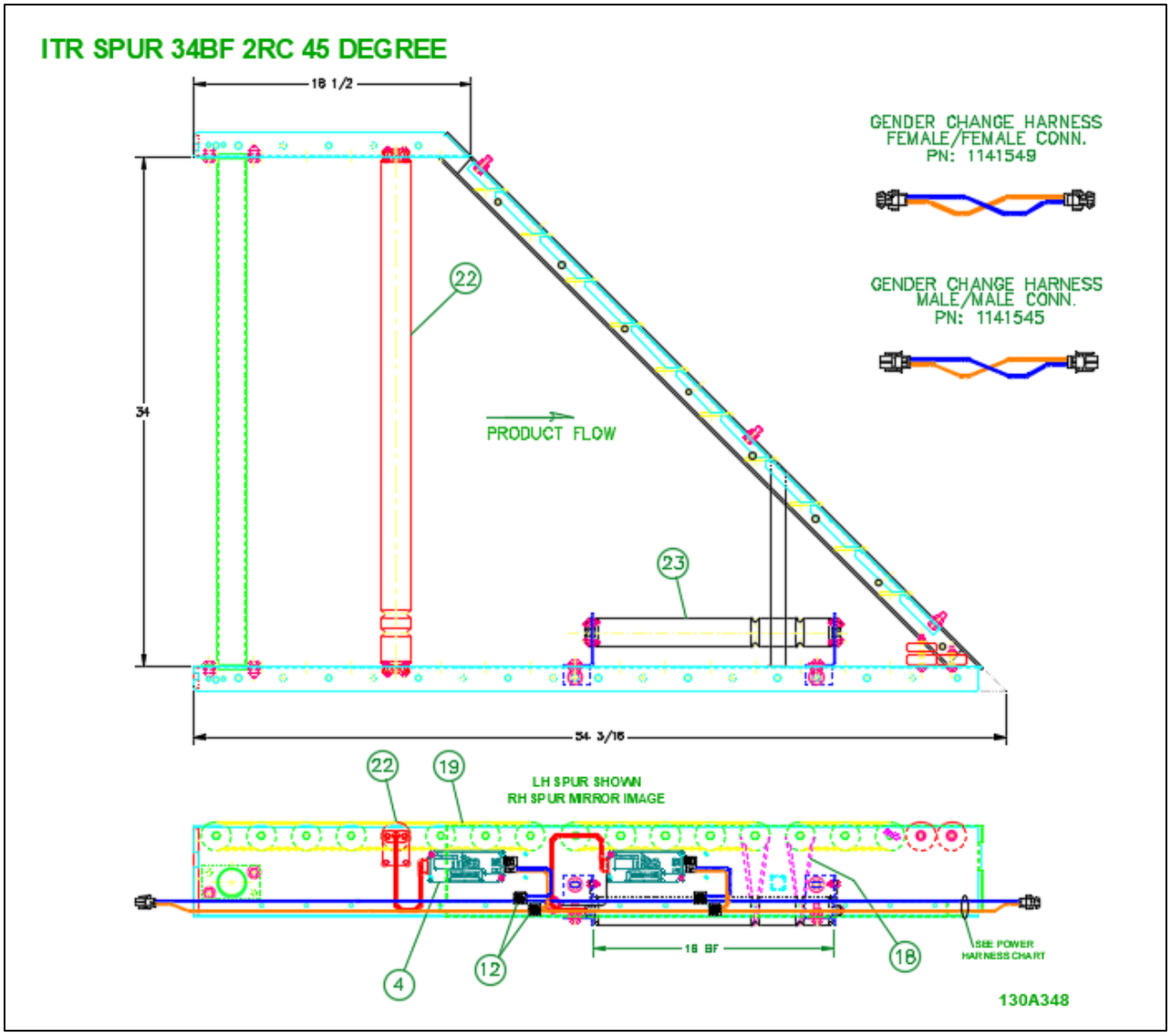
## *21.34.2 ITR Spur 45 Degree 22BF*



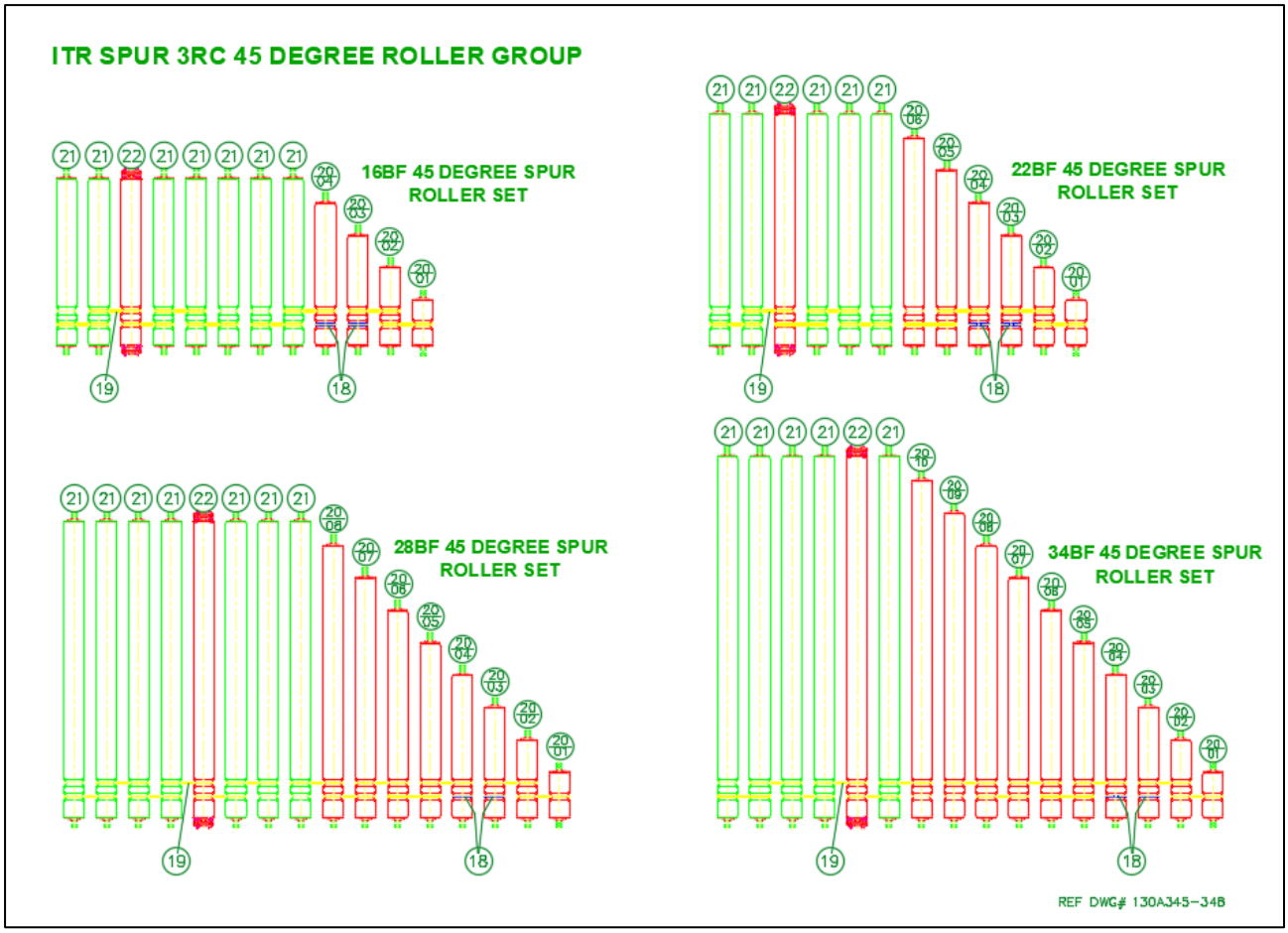
### *21.34.3 ITR Spur 45 Degree 28BF*



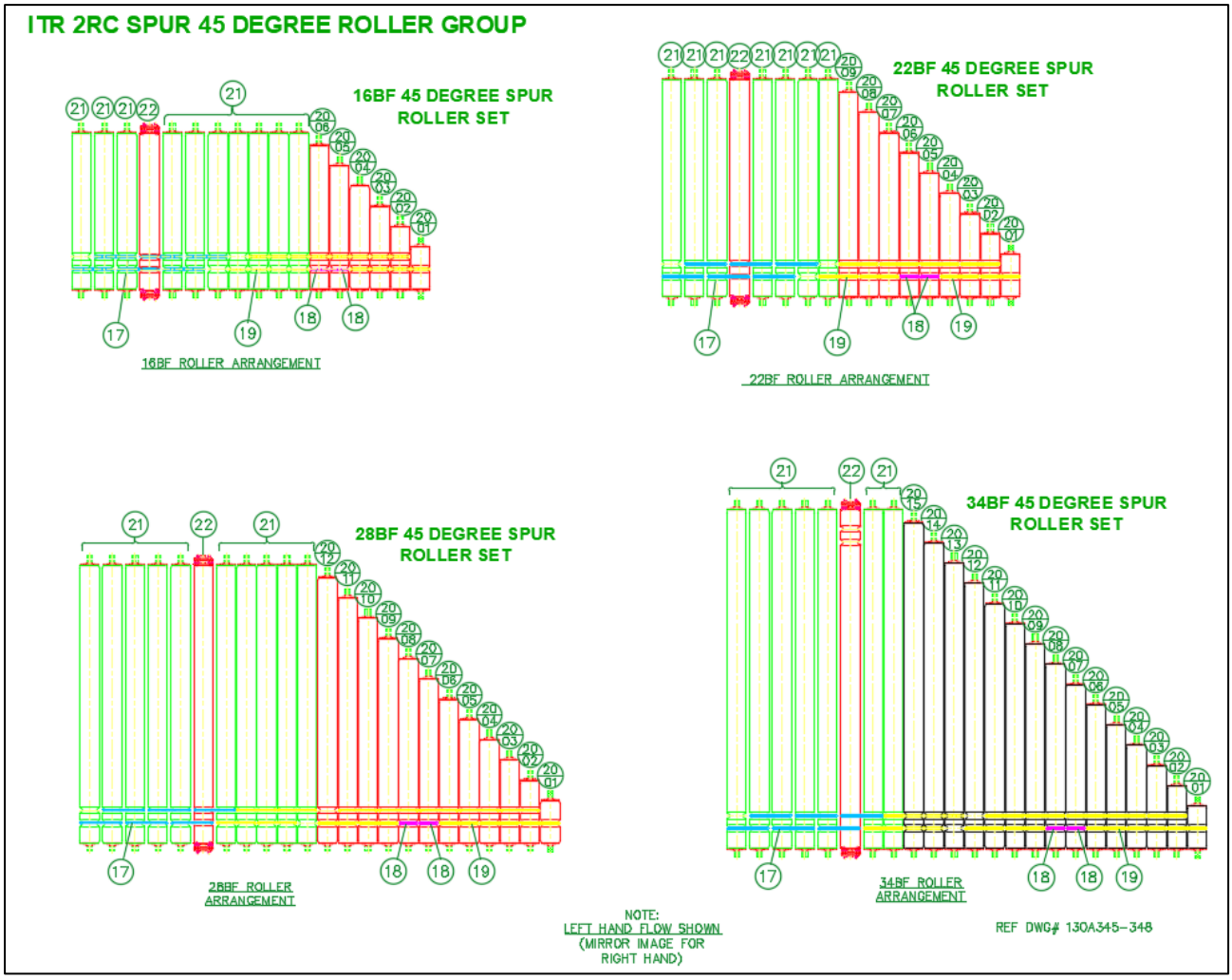
### *21.34.4 ITR Spur 45 Degree 34BF*



## *21.34.5 ITR Spur, 3RC, 45 Degree, Roller Group*



## *21.34.6 ITR Spur, 2RC, 45 Degree, Roller Group*



## *21.34.7 Replacement Parts — ITR Spur, CBM-105, 3RC, 45 Degree*

| REPLACEMENT PARTS - SPUR, 3RC, 45 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB-C6-3RC 45D-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 4 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | CONNECTOR, IDC SCOTCH LOK 55816-22AWG RUN, 16-22AWG | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 10-12AWG RUN, 14-18AWG | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS 28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE MOTOR EXTENSION CABLE TABLE** | | | |
| --- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| — | **ROLLER SET-3RC-45D-SPUR** | — | — | — | — |
| 20-01 | ROLLER, ITR 4-3/4" BF PRBG (NO AXLE) | E0003268 | E0003268 | E0003268 | E0003268 |
| 20-02 | ROLLER, 7-3/4" BF ITR 1.9" DIA PLTD PRBG | 1144370 | 114370 | 114370 | 1114370 |
| 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 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 | 1126586 | 1126586 | 1126586 | 1126586 |
| *Reference Dwg: Roller Arrangement & 130A345-348* | | | | | |

## *21.34.8 Replacement Parts — ITR Spur, CBM-105, 2RC, 45 Degree*

| REPLACEMENT PARTS - SPUR, 2RC, 45 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB-C6-2RC 45D-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 04 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| ---- | CONNECTOR, IDC SCOTCH LOK 55816-22AWG RUN, 16-22AWG | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 10-12AWG RUN, 14-18AWG | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS 28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE MOTOR EXTENSION CABLE TABLE** | | | |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | 3'-0" L 1102289 | 5'-5" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 17 | ORING, 3/16" DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | **ROLLER SET-2RC-45D-SPUR** | — | — | — | — |
| 20-01 | ROLLER, ITR 4-3/4" BF PRBG (NO AXLE) | E0003268 | E0003268 | E0003268 | E0003268 |
| 20-02 | ROLLER, 6-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154738 | 1154738 | 1154738 | 1154738 |
| 20-03 | ROLLER, 8-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154739 | 1154739 | 1154739 | 1154739 |
| 20-04 | ROLLER, 10-3/4" BF ITR 1.9" DIA PLTD PRBG | 1144371 | 1144371 | 1144371 | 1144371 |
| 20-05 | ROLLER, 12-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154740 | 1154740 | 1154740 | 1154740 |
| 20-06 | ROLLER, 14-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154741 | 1154741 | 1154741 | 1154741 |
| 20-07 | ROLLER, 16-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1144373 | 1144373 | 1144373 |
| 20-08 | ROLLER, 18-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1154742 | 1154742 | 1154742 |
| 20-09 | ROLLER, 20-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1154743 | 1154743 | 1154743 |
| 20-10 | ROLLER, 22-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1144375 | 1144375 |
| 20-11 | ROLLER, 24-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1154744 | 1154744 |
| 20-12 | ROLLER, 26-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1154745 | 1154745 |
| 20-13 | ROLLER, 28-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1144377 |
| 20-14 | ROLLER, 30-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1155572 |
| 20-15 | ROLLER, 32-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1155573 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C-PM 486 FE-60 | 1152362 | 1152362 | 1152362 | 1152362 |
| *Reference Dwg: Roller Arrangement & 130A345-348* | | | | | |

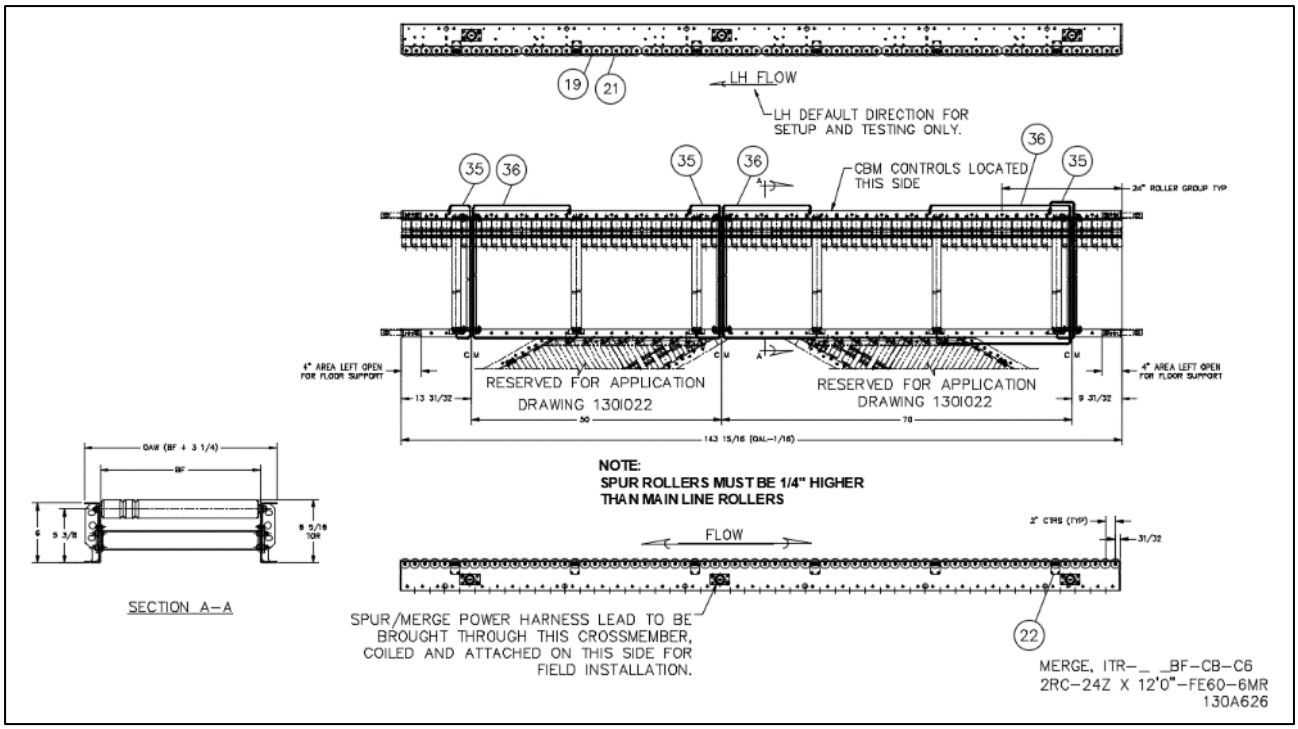
## *21.34.9 Replacement Parts — ITR Spur, IB-E03, 3RC, 45 Degree, Merge*

| REPLACEMENT PARTS - ITR SPUR, IB-E, 3RC, 45 DEGREE, MERGE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-IBE-C6-3RC-45D-MERGE-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| ---- | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| --- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| --- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| --- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | **ROLLER SET-2RC-45D-SPUR** | — | — | — | — |
| 20-01 | ROLLER, ITR 4-3/4" BF PRBG (NO AXLE) | E0003268 | E0003268 | E0003268 | E0003268 |
| 20-02 | ROLLER, 7-3/4" BF ITR 1.9" DIA PLTD PRBG | 1144370 | 1144370 | 1144370 | 1144370 |
| 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, 28-3/4BF ITR 1.9" DIA PLTD PRBG | ---- | --- | ---- | 1144377 |
| 20-10 | ROLLER, 31-3/4BF ITR 1.9" DIA PLTD PRBG | ---- | --- | ---- | 1144378 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1165292 | 1165292 | 1165292 | 1165292 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C, PM 486 FE-60 | 1163471 | 1163472 | 1163473 | 1163474 |
| Reference Dwg: Roller Arrangement & 130A345-348 | | | | | |

## *21.34.10 Replacement Parts — ITR Spur, IB-E03, 2RC, 45 Degree, Merge*

| REPLACEMENT PARTS - ITR SPUR, IB-E, 2RC, 45 DEGREE, MERGE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-IBE-C6-2RC-45D-MERGE-LH/RH-FE60 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| ---- | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCHLOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 17 | ORING, 3/16" DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | **ROLLER SET-2RC-45D-SPUR** | — | — | — | — |
| 20-01 | ROLLER, ITR 4-3/4" BF PRBG (NO AXLE) | E0003268 | E0003268 | E0003268 | E0003268 |
| 20-02 | ROLLER, 6-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154738 | 1154738 | 1154738 | 1154738 |
| 20-03 | ROLLER, 8-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154739 | 1154739 | 1154739 | 1154739 |
| 20-04 | ROLLER, 10-3/4" BF ITR 1.9" DIA PLTD PRBG | 1144371 | 1144371 | 1144371 | 1144371 |
| 20-05 | ROLLER, 12-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154740 | 1154740 | 1154740 | 1154740 |
| 20-06 | ROLLER, 14-3/4" BF ITR 1.9" DIA PLTD PRBG | 1154741 | 1154741 | 1154741 | 1154741 |
| 20-07 | ROLLER, 16-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1144373 | 1144373 | 1144373 |
| 20-08 | ROLLER, 18-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1154742 | 1154742 | 1154742 |
| 20-09 | ROLLER, 20-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | 1154743 | 1154743 | 1154743 |
| 20-10 | ROLLER, 22-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1144375 | 1144375 |
| 20-11 | ROLLER, 24-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1154744 | 1154744 |
| 20-12 | ROLLER, 26-3/4" BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | 1154745 | 1154745 |
| 20-13 | ROLLER, 28-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1144377 |
| 20-14 | ROLLER, 30-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1155572 |
| 20-15 | ROLLER, 32-3/4BF ITR 1.9" DIA PLTD PRBG | ----- | ---- | ---- | 1155573 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1163471 | 1163472 | 1163473 | 1163474 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C, PM 486 FE 60 | 1171592 | 1171592 | 1171592 | 1171592 |
| Reference Dwg: Roller Arrangement & 130A345-348 | | | | | |

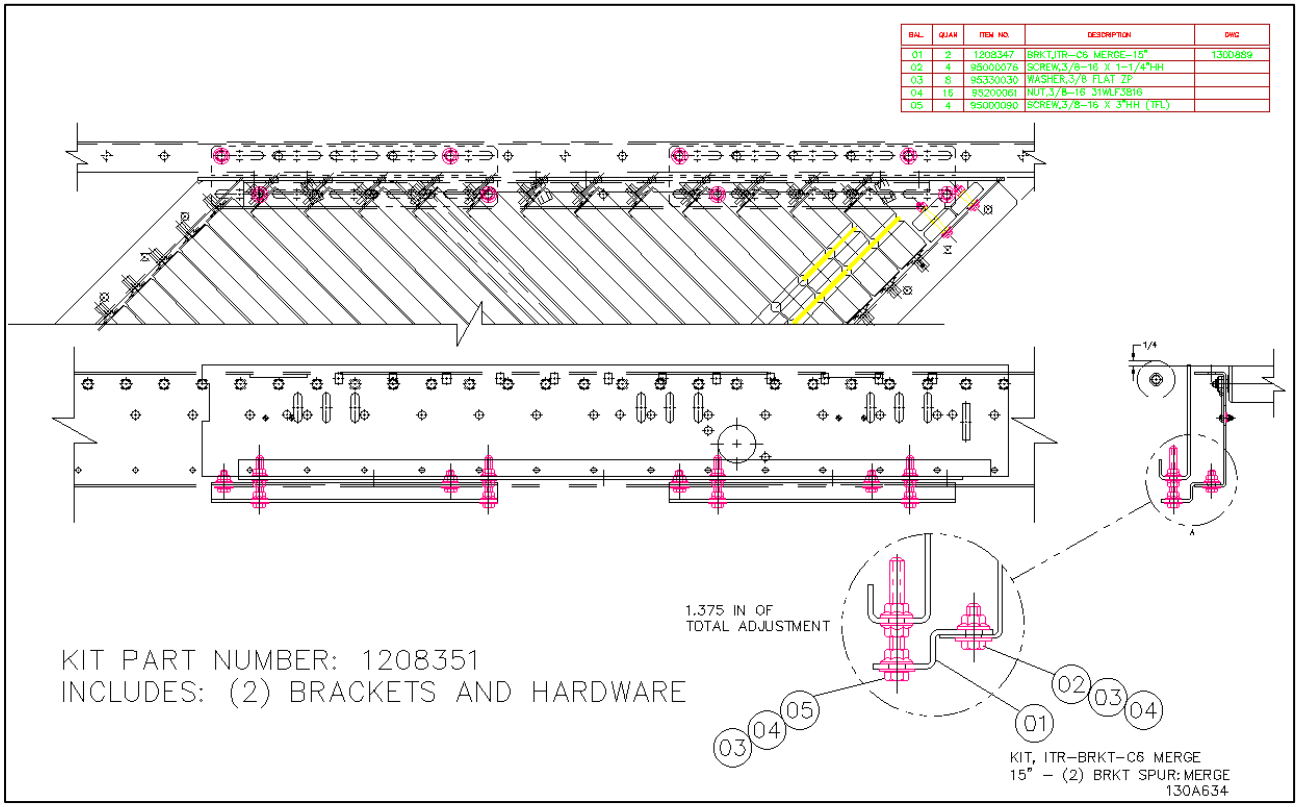
## 21.35 ITR MERGE




### *21.35.1 Replacement Parts — ITR Merge*

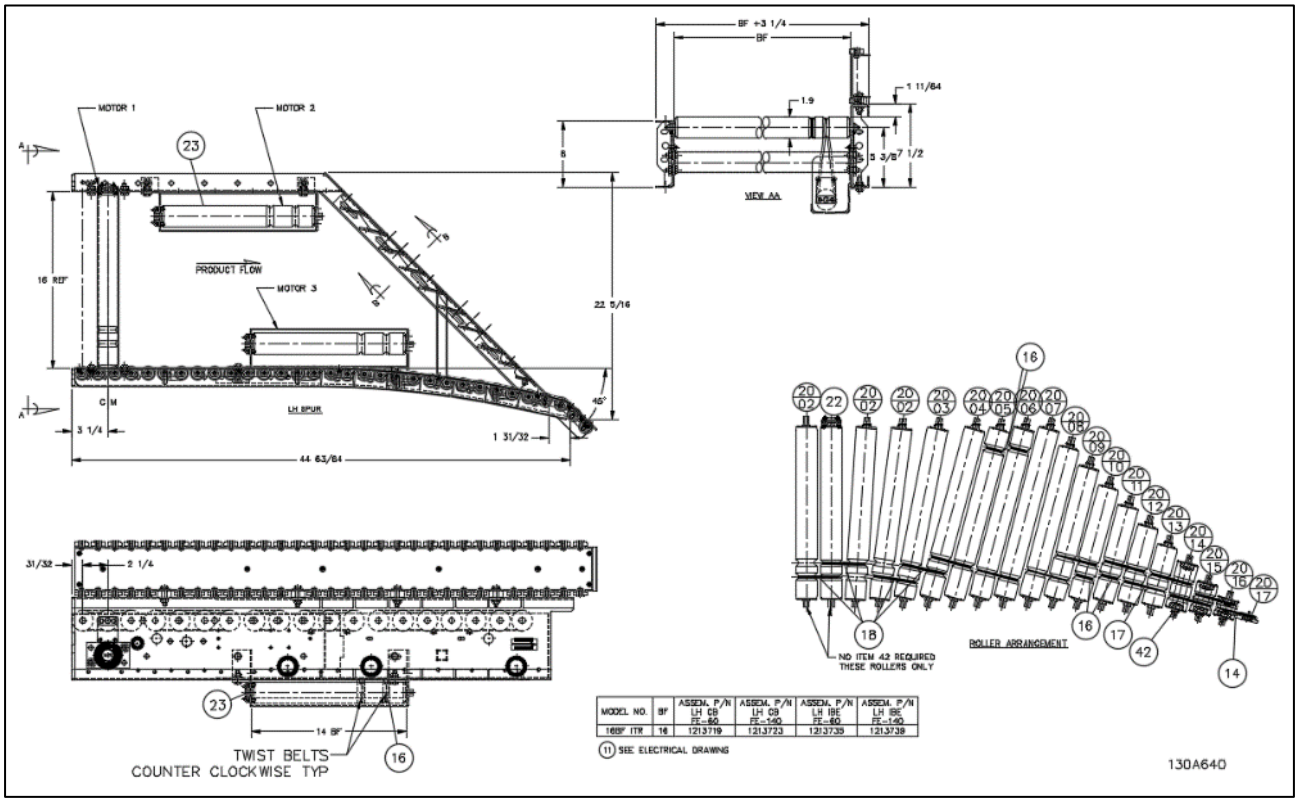
| REPLACEMENT PARTS - ITR MERGE | | | | | |
|---|---|---|---|---|---|
| MERGE, ITR-_ _BF-(CB OR IBE)-C6-2RC-24Z | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 1 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| 1 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 21 | ROLLER, _ _ITR 1.9PLTD PRBG | E0002412 | E0002413 | E0002414 | E0006220 |
| 3 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/CBM-105)** | 1138722 | 1138723 | 1138724 | 1138725 |
| 3 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/IBE)** | 1163471 | 1163472 | 1163473 | 1163474 |
| --- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| 35 & 36 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| Reference Dwg: 130A626 | | | | | |
| **Single bed that does not come with a spur bed; but is designed to have a spur mounted to it. Must use designated bracket MHS P/N: 1208351.** | | | | | |

## *21.35.2 ITR Merge Bracket Kit 30 & 45 Degree*



# ITR SWEEP SPUR 45 DEGREE

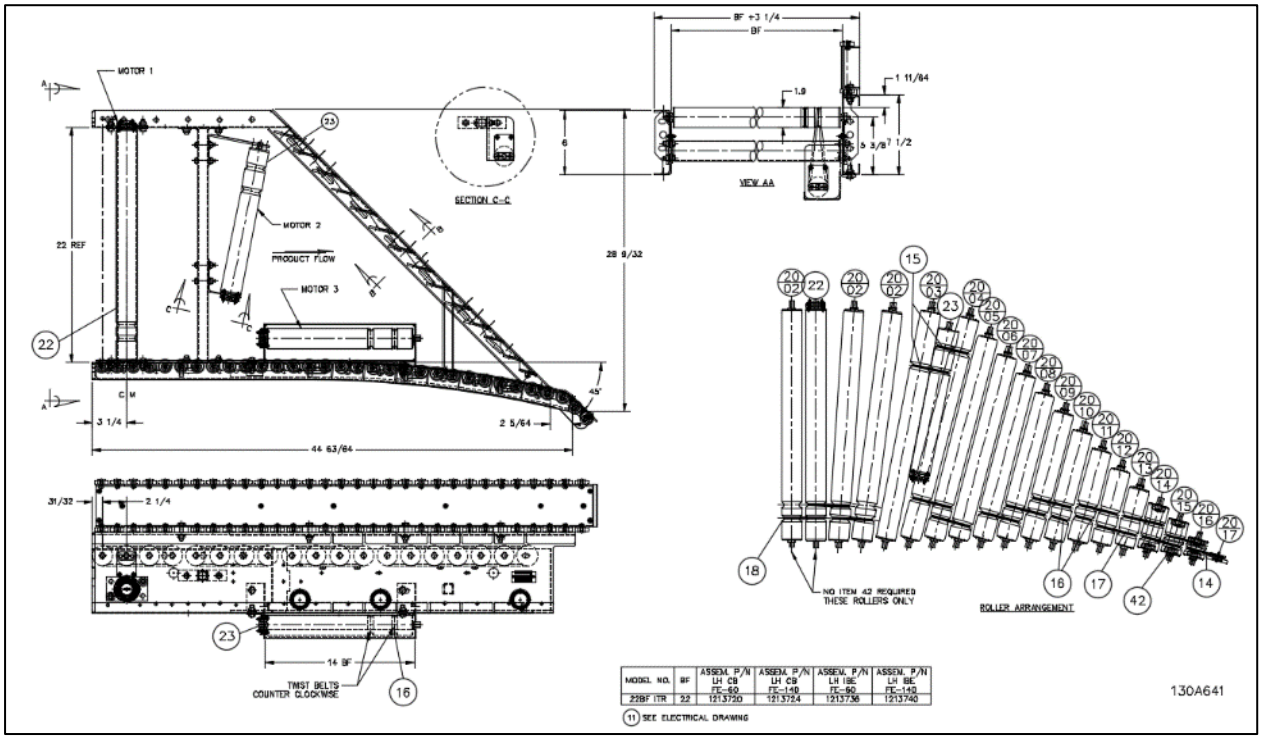
## *21.35.3 ITR Sweep Spur 16BF*




| MODEL NO. | BF | ASSEM. P/N LH CB FC-60 | ASSEM. P/N LH CB FC-140 | ASSEM. P/N LH IBC FC-60 | ASSEM. P/N LH IBC FC-140 |
|---|---|---|---|---|---|
| 16BF ITR | 16 | 1213719 | 1213723 | 1213735 | 1213739 |

(11) SEE ELECTRICAL DRAWING

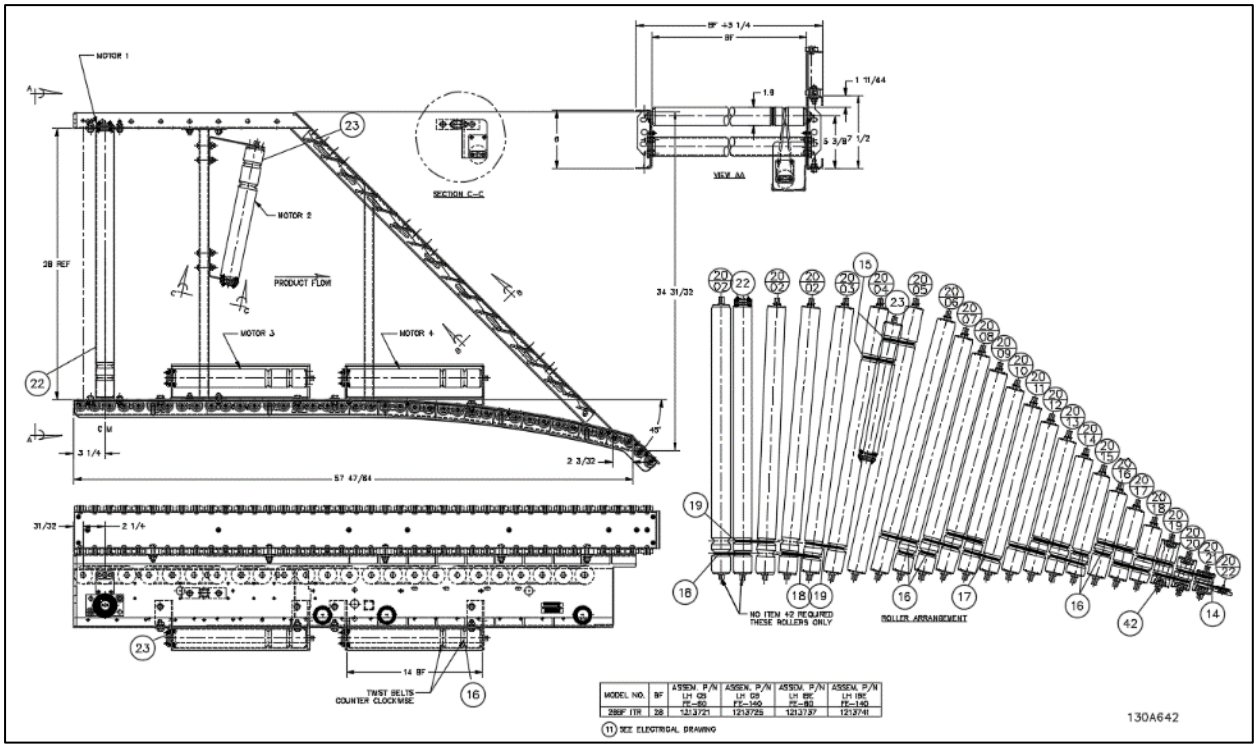
## *21.35.4 ITR Sweep Spur 22BF*



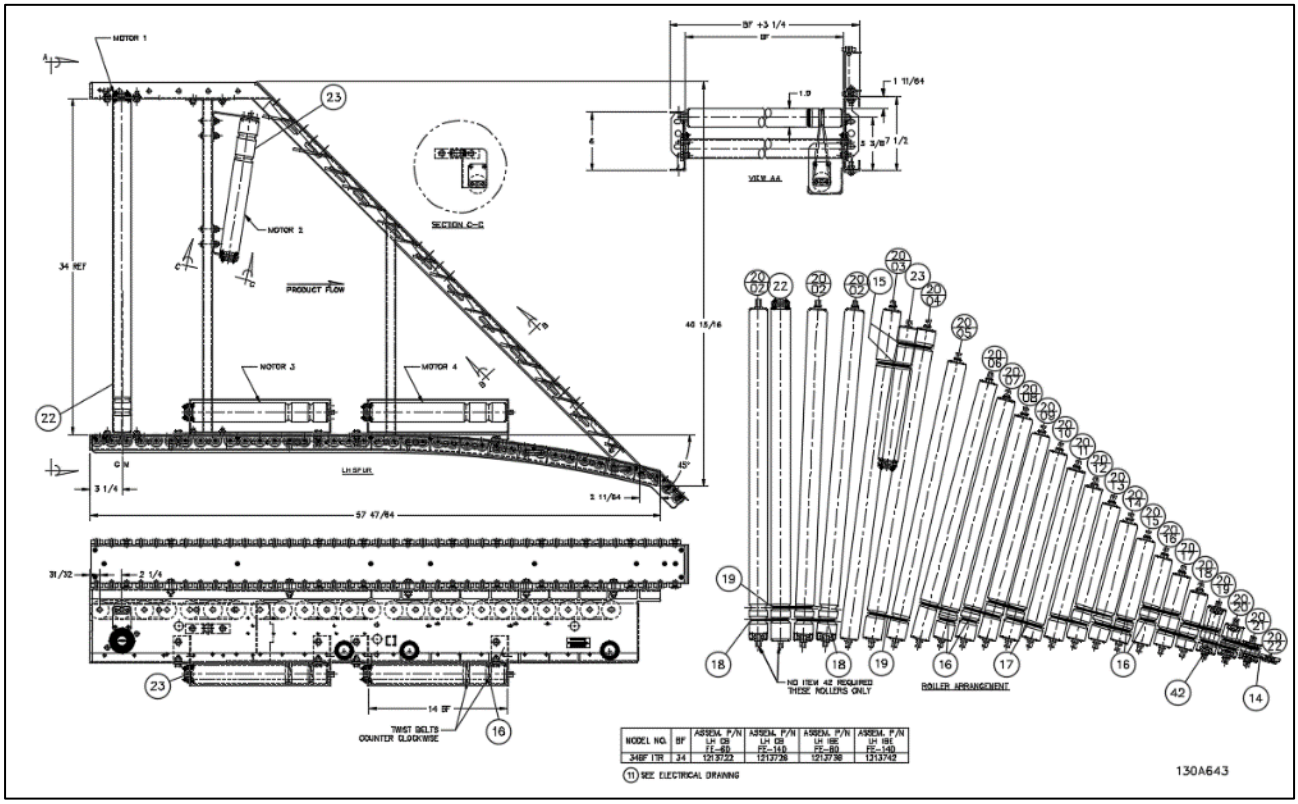

| MODEL NO. | BF | ASSEM. P/N LH CB FC-60 | ASSEM. P/N LH CB FC-140 | ASSEM. P/N LH IBC FC-60 | ASSEM. P/N LH IBC FC-140 |
|---|---|---|---|---|---|
| 22BF ITR | 22 | 1213720 | 1213724 | 1213736 | 1213740 |

(11) SEE ELECTRICAL DRAWING

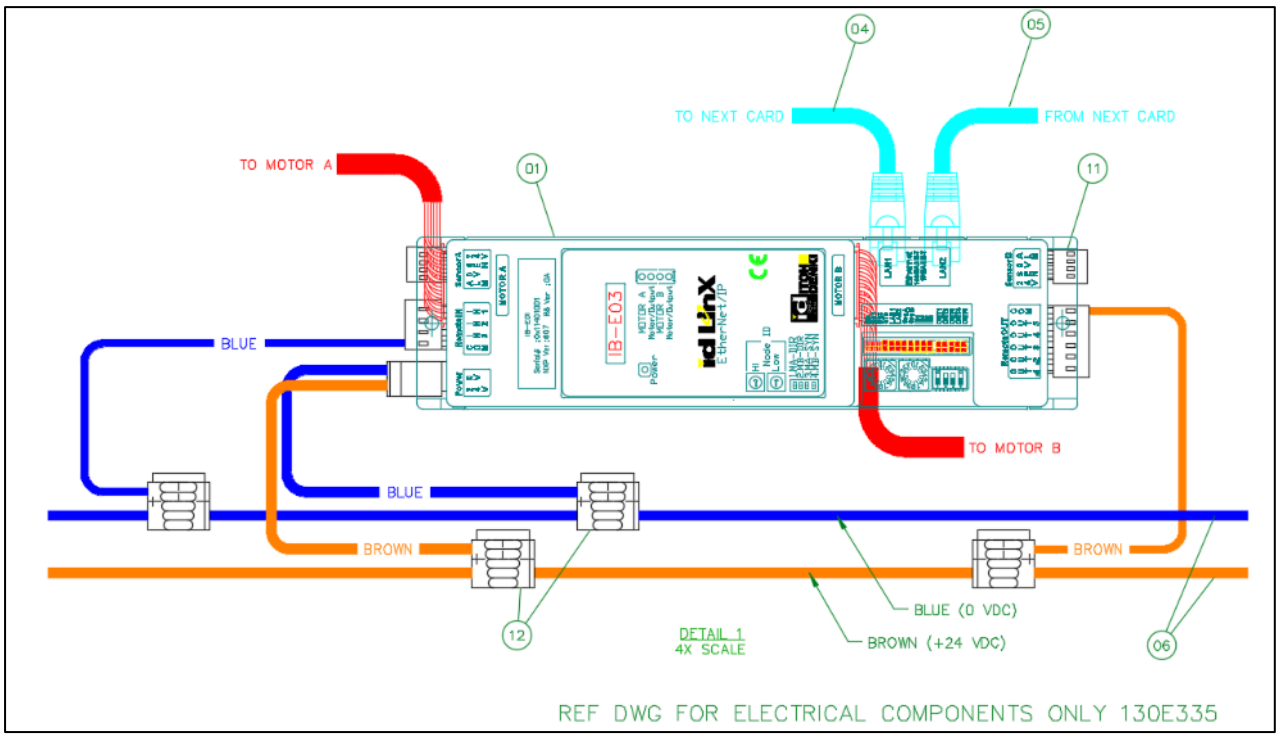
## *21.35.5 ITR Sweep Spur 28BF*




## *21.35.6 ITR Sweep Spur 34BF*



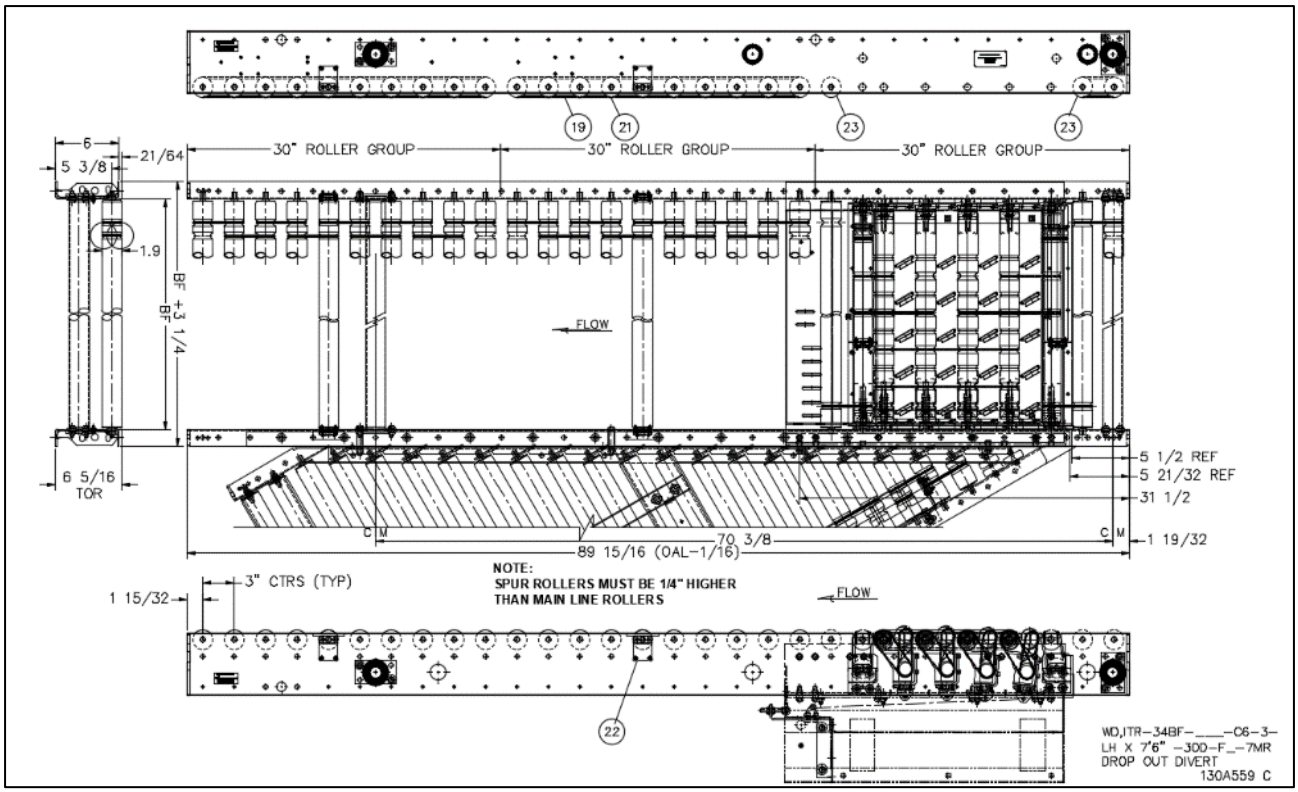
### *21.35.7 ITR Sweep Spur Reference Electrical Components*



## *21.35.8 Replacement Parts — ITR Sweep Spur 2.25RC 45 Degree*

| REPLACEMENT PARTS - ITR SWEEP SPUR, 2.25RC, 45 DEGREE | | | | | |
|---|---|---|---|---|---|
| SPUR, ITR-_ _BF-CB OR IBE-C6-2.25RC-45D-LH/RH-3'6"-FE60-3MR-SWP-GEN3 | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 01 | DRIVERCARD, ITOH **CB-016P7** | 1116036 | 1116036 | 1116036 | 1116036 |
| 01 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| ----- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| 04 & 05 | CABLE, CTRLS-CAT5E-_'-GRAY **(USED W/IBE)** | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - **RED (USED W/CB)** | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONN, 3 COND, W/LEVERS 28 - 12 AWG **(USED W/CB)** | 1102816 | 1102816 | 1102816 | 1102816 |
| 11 | CONN, WAGO 231-302/026-000 **(USED W/IBE)** | 1162204 | 1162204 | 1162204 | 1162204 |
| ---- | SKATEWHEEL, ASY 6002 W/ADAPTER | 1138618 | 1138618 | 1138618 | 1138618 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 14 | ORING, 83A 1/8 X 8" CLEAR | E0001238 | E0001238 | E0001238 | E0001238 |
| 15 | ORING, 3/16 DIA X 13" HT BLUE | ---- | ---- | 1103665 | 1103665 |
| 16 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 17 | ORING, 3/16 DIA X 8" HT BLUE | 1142395 | 1142395 | 1142395 | 1142395 |
| 18 | ORING, 3/16 DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 19 | ORING, 3/16 DIA X 8.688 HT BLUE | ---- | ---- | 1137420 | 1137420 |
| 42 | ORING, 1/2"ID (3/32 WALL) | 90530050 | 90530050 | 90530050 | 90530050 |
| — | **ROLLER SET ITR SWEEP SPUR** | — | — | — | — |
| 20/02 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 20/03 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195553 | 1195564 | 1195575 | 1195591 |
| 20/04 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195554 | 1195565 | 1195576 | 1195592 |
| 20/05 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195555 | 1195566 | 1195577 | 1195593 |
| 20/06 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195556 | 1195567 | 1195578 | 1195594 |
| 20/07 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195557 | 1195568 | 1195579 | 1195595 |
| 20/08 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195558 | 1195569 | 1195580 | 1195596 |
| 20/09 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195559 | 1195570 | 1195581 | 1195597 |
| 20/10 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195560 | 1195571 | 1195582 | 1195598 |
| 20/11 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195561 | 1195572 | 1195583 | 1195599 |
| 20/12 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195562 | 1195573 | 1195584 | 1195600 |
| 20/13 | ROLLER, ITR SWEEP SPUR, _ _BF | 1195563 | 1195574 | 1195585 | 1195601 |
| 20/14 | ROLLER, ITR SWEEP SPUR, _ _BF | 1205985 | 1205985 | 1195586 | 1195602 |
| 20/15 | ROLLER, ITR SWEEP SPUR, _ _BF | 1205984 | 1205987 | 1195587 | 1195603 |
| 20/16 | ROLLER, ITR SWEEP SPUR, _ _BF | 1205986 | 1205986 | 1195588 | 1195604 |
| 20/17 | ROLLER, ITR SWEEP SPUR, _ _BF | 1160266 | 1160266 | 1195589 | 1195605 |
| 20/18 | ROLLER, ITR SWEEP SPUR, _ _BF | ---- | ---- | 1195590 | 1195606 |
| 20/19 | ROLLER, ITR SWEEP SPUR, _ _BF | ---- | ---- | 1205988 | 1205990 |
| 20/20 | ROLLER, ITR SWEEP SPUR, _ _BF | ---- | ---- | 1205989 | 1205991 |
| 20/21 | ROLLER, ITR SWEEP SPUR, _ _BF | ---- | ---- | 1205990 | 1205992 |
| 20/22 | WHEEL, ASY NBS30 ALUM. SMOOTH | ---- | ---- | 1160266 | 1160266 |
| ---- | BRG, 6002ZZC3SRI2-Q | 1179675 | 1179675 | 1179675 | 1179675 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-140 **(USED W/CB-016)** | 1168560 | 1134452 | 1142856 | 1155281 |
| 23 | ROLLER, ITR 14BF 2G ITOH - FE-140 **(USED W/CB-016)** | 1168164 | 1168164 | 1168164 | 1168164 |
| 22 | ROLLER, ITR _ _BF 2G ITOH **(USED W/ IBE)** | 1196022 | 1167730 | 1166001 | 1171660 |
| 23 | ROLLER, ITR 14BF 2G ITOH **(USED W/ IBE)** | 1180186 | 1180186 | 1180186 | 1180186 |
| Reference Dwg: 130A640 - 130A643 | | | | | |

## 21.36 ITR WHEEL DIVERT (PNEUMATIC)



## *21.36.1 Replacement Parts — ITR Wheel Divert, CBM-105, 3RC (Pneumatic)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, CB, 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-CB-C6-3RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| 1 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, 3 COND, W/LEVERS 28 - 12 AWG | 1102816 | 1102816 | 1102816 | 1102816 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| ---- | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | **3'-0" L 1102289** | **5'-5" L 1102288** | **8'-0" L 1102287** | **10'-6" L 1102286** |
| — | DIVERTER WAVE | — | — | — | — |
| 1 | CYL, AIR, 1" BORE, 2" STROKE | 1109080 | 1109080 | 1109080 | 1109080 |
| 9 | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG, 5 GRV DROP OUT TUB | 1195067 | 1191372 | 1194884 | 1198402 |
| 3 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | 1191381 | 1191381 | 1191381 | 1191381 |
| 2 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 4 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| --- | TUBING, 1/4"POLYU-95DURO.160ID | E0001391 | E0001391 | E0001391 | E0001391 |
| 25 | ORING, 83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING, .210 DIA X 9.1" HT REDITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING, 83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING, 83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 37 | ORING, 3/16 DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING, 3/16 DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING, 3/16 DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| — | SPUR, O-RINGS | — | — | — | — |
| 18 | ORING, 3/16 DIA X 17.95" HT BLUE 8" CTR | 1167247 | 1167247 | 1167247 | 1167247 |
| 17 &19 | ORING, 3/16 DIA X 9.5" HT BLUE, ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| --- | ROLLER SET ITR-30D-3RC-SPUR | ----- | ----- | ----- | ----- |
| 20/1 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/2 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/3 | ROLLER, 6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/4 | ROLLER, 8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/5 | ROLLER, 10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/6 | ROLLER, 12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/7 | ROLLER, 13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/8 | ROLLER, 15-1/2BF ITR 1.9 PLTD PRBG | --- | 1131624 | 1131624 | 1131624 |
| 20/9 | ROLLER, 17-1/4BF ITR 1.9 PLTD PRBG | --- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9 PLTD PRBG | --- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9 PLTD PRBG | --- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9 PLTD PRBG | --- | --- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9 PLTD PRBG | --- | --- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9 PLTD PRBG | --- | --- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22/03 | ROLLER, ITR _ _BF 2G ITOH | --- | --- | 1139545 | 1139545 |
| 22/03 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG 1D1S (_ _BF) | E0002422 | E0002423 | E0002424 | 1198370 |
| 23/03 | ROLLER, ITR SPUR 2G ITOH, 2C (3"GROOVE SPACING) | 1126586 | 1126586 | 1126586 | 1126586 |
| | | | | | Ref Dwg# 130A559 |

## *21.36.2 Replacement Parts — ITR Wheel Divert, CBM-105, 2RC (Pneumatic)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, CB, 2RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-CB-C6-2RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 1 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 11 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 2 | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 | 1102816 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| — | **DIVERTER WAVE** | — | — | — | — |
| ---- | CYL, AIR, 1" BORE, 2" STROKE | 1109080 | 1109080 | 1109080 | 1109080 |
| ---- | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB | 1195066 | 1191359 | 1194883 | 1198388 |
| ---- | ROLLER, WD _ _BF ITR PRBG, 5 GRV DROP OUT TUB | 1195067 | 1191372 | 1194884 | 1198402 |
| 2 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 4 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| --- | TUBING, 1/4"POLYU-95DURO.160ID | E0001391 | E0001391 | E0001391 | E0001391 |
| 3 | ROLLER, ITR 13.25BF 2G ITOH | 1191381 | 1191381 | 1191381 | 1191381 |
| 25 | ORING, 83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING, .210 DIA X 9.1" HT RED ITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING, 83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING, 83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 37 | ORING, 3/16DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING, 3/16DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING, 3/16DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 17 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16DIA X 15.312 HT BLUE FOR ITR 6.5 CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 18 | ORING, 3/16DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| --- | **ROLLER SET-2RC-30D-SPUR** | ---- | ---- | ---- | ---- |
| 20/1 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/2 | ROLLER, ITR 4-3/4"BF PRBG NO AXLE | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/3 | ROLLER, 6BF ITR 1.9 PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/4 | ROLLER, 7-1/8BF ITR 1.9 PLTD PRBG | --- | 1152261 | 1152261 | 1152261 |
| 20/5 | ROLLER, 8-5/16BF ITR 1.9 PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/6 | ROLLER, 9-7/16BF ITR 1.9 PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/7 | ROLLER, 10-5/8BF ITR 1.9 PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/8 | ROLLER, 11-3/4BF ITR 1.9 PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/9 | ROLLER, 12-15/16BF ITR 1.9 PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER, 14-1/16BF ITR 1.9 PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER, 15-3/16BF ITR 1.9 PLTD PRBG | 1152269 | 1152269 | 1152269 | 1152269 |
| 20/12 | ROLLER, 16-3/8BF ITR 1.9 PLTD PRBG | --- | 1155254 | 1155254 | 1155254 |
| 20/13 | ROLLER, ITR 17-1/2"BF 1.9 PLTD PRBG | --- | 1133722 | 1133722 | 1133722 |
| 20/14 | ROLLER, 18-3/4BF ITR 1.9 PLTD PRBG | --- | 1154742 | 1154742 | 1154742 |
| 20/15 | ROLLER, 19-3/4BF ITR 1.9 PLTD PRBG | --- | 1144374 | 1144374 | 1144374 |
| 20/16 | ROLLER, ITR 21"BF 1.9 PLTD PRBG | --- | 1133723 | 1133723 | 1133723 |
| 20/17 | ROLLER, 22-3/16BF ITR 1.9 PLTD PRBG | --- | --- | 1155255 | 1155255 |
| 20/18 | ROLLER, ITR 23-1/4"BF PRBG | --- | --- | 1131992 | 1131992 |
| 20/19 | ROLLER, ITR 24-7/16"BF PRBG1.9 PLTD | --- | --- | 1133724 | 1133724 |
| 20/20 | ROLLER, 25-5/8BF ITR 1.9 PLTD PRBG | --- | --- | 1155256 | 1155256 |
| 20/21 | ROLLER, 26-3/4BF ITR 1.9 PLTD PRBG | --- | --- | 1154745 | 1154745 |
| 20/22 | ROLLER, ITR 27-15/16"BF PRBG1.9 PLTD | --- | --- | --- | 1133726 |
| 20/23 | ROLLER, 29-1/16BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155257 |
| 20/24 | ROLLER, 30-1/4BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155258 |
| 20/25 | ROLLER, ITR 31-3/8"BF PRBG1.9 PLTD | --- | --- | --- | 1133728 |
| 20/26 | ROLLER, 32-1/2BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155259 |
| 20 | ROLLER, _ _ITR 1.9 PLTD PRBG 1D1S (_ _BF) | E0002422 | E0002423 | E0002424 | 1198370 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH | --- | --- | 1139545 | 1139545 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C (2"GROOVE SPACING) | 1152362 | 1152362 | 1152362 | 1152362 |

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, CB, 2RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-CB-C6-2RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG1D1S (_ _BF) | --- | --- | 1198370 | 1198370 |
| | | | | | Ref Dwg# 130A559 |

## *21.36.3 Replacement Parts — ITR Wheel Divert, IB-E03, 3RC (Pneumatic)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, IB-E03, 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD,ITR-_ _BF-IBE-C6-3RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 04 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| --- | CONNECTOR, IDC SCOTCHLOK 562 - YELLOW | 3M562 | 3M562 | 3M562 | 3M562 |
| --- | CONNECTOR, IDC SCOTCH LOK 564 - WHITE | ---- | ---- | 3M564 | 3M564 |
| --- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| — | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| — | **DIVERTER WAVE** | — | — | — | — |
| 1 | CYL, AIR, 1" BORE, 2" STROKE | 1109080 | 1109080 | 1109080 | 1109080 |
| 9 | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG, 5 GRV DROP OUT TUB | 1195067 | 1191372 | 1194884 | 1198402 |
| 3 | ROLLER, ITR 13.25BF 2G ITOHPM486FE-60 | 1198348 | 1198348 | 1198348 | 1198348 |
| 2 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 4 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| --- | TUBING, 1/4"POLYU-95DURO.160ID | E0001391 | E0001391 | E0001391 | E0001391 |
| 25 | ORING, 83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING, .210 DIA X 9.1" HT REDITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING, 83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING, 83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 37 | ORING, 3/16 DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING, 3/16 DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING, 3/16 DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 18 | ORING, 3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS (20% STRETCH) | 1167247 | 1167247 | 1167247 | 1167247 |
| 17 & 19 | ORING, 3/16 DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| ---- | ROLLER SET ITR-3RC-30D | ---- | ---- | ---- | ---- |
| 20/1 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/2 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/3 | ROLLER, 6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/4 | ROLLER, 8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/5 | ROLLER, 10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/6 | ROLLER, 12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/7 | ROLLER, 13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/8 | ROLLER, 15-1/2BF ITR 1.9 PLTD PRBG | --- | 1131624 | 1131624 | 1131624 |
| 20/9 | ROLLER, 17-1/4BF ITR 1.9 PLTD PRBG | --- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER, 18-31/32BF ITR 1.9 PLTD PRBG | --- | 1131625 | 1131625 | 1131625 |

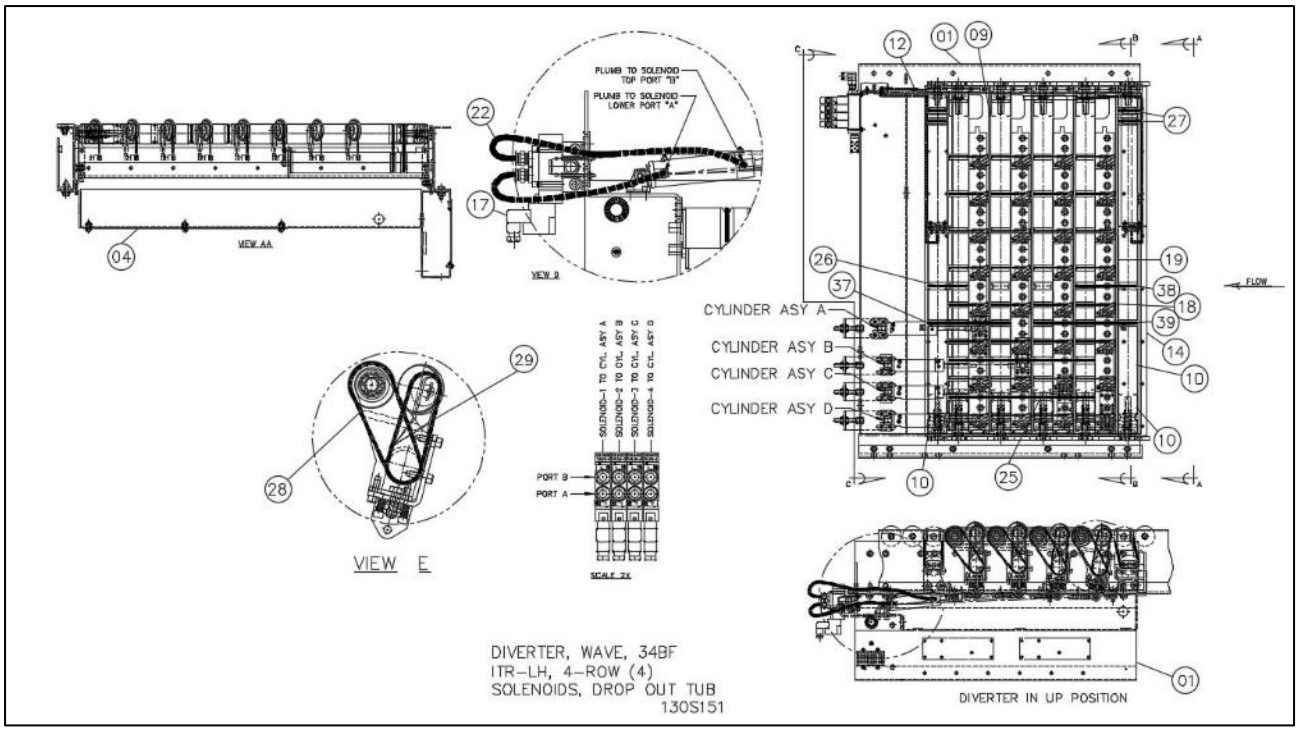
| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, IB-E03, 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD,ITR-_ _BF-IBE-C6-3RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 20/11 | ROLLER, 20-11/16BF ITR 1.9 PLTD PRBG | --- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER, 22-7/16BF ITR 1.9 PLTD PRBG | --- | --- | 1131627 | 1131627 |
| 20/13 | ROLLER, 24-5/32BF ITR 1.9 PLTD PRBG | --- | --- | 1131628 | 1131628 |
| 20/14 | ROLLER, 25-29/32BF ITR 1.9 PLTD PRBG | --- | --- | 1131629 | 1131629 |
| 20/15 | ROLLER, 27-5/8BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140043 |
| 20/16 | ROLLER, 29-3/8BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140044 |
| 20/17 | ROLLER, 31-3/32BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140045 |
| 20/18 | ROLLER, 32-13/16BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1163471 | 1163472 | 1163473 | 1163474 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | --- | --- | 1165293 | 1165293 |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG 1D1S (_ _BF) | E0002422 | E0002423 | E0002424 | 1198370 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 **(3" GROOVE SPACING)** | 1165292 | 1165292 | 1165292 | 1165292 |
| | | | | | REF DWG# 130A559 |

## *21.36.4 Replacement Parts — ITR Wheel Divert, IB-E03, 2RC (Pneumatic)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, CB, 2RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-2RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| 1 | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| 12 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 11 | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 42 | CONNECTOR, IDC SCOTCHLOK 562 | 3M562 | 3M562 | 3M562 | 3M562 |
| 47 | CONNECTOR, IDC SCOTCHLOK 564 | 3M564 | 3M564 | 3M564 | 3M564 |
| ---- | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| --- | CABLE, CTRLS-CAT5E-_'-GRAY | REFERENCE Cat5E COMMUNICATION CABLE | | | |
| | | | | | |
| — | DIVERTER WAVE | — | — | — | — |
| ---- | CYL, AIR, 1" BORE, 2" STROKE | 1109080 | 1109080 | 1109080 | 1109080 |
| ---- | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB | 1195066 | 1191359 | 1194883 | 1198388 |
| ---- | ROLLER, WD _ _BF ITR PRBG, 5 GRV DROP OUT TUB | 1195067 | 1191372 | 1194884 | 1198402 |
| 2 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 4 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| --- | TUBING, 1/4"POLYU-95DURO.160ID | E0001391 | E0001391 | E0001391 | E0001391 |
| 3 | ROLLER, ITR 13.25BF 2G ITOH | 1191381 | 1191381 | 1191381 | 1191381 |
| 25 | ORING, 83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING, .210 DIA X 9.1" HT RED ITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING, 83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING, 83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 37 | ORING, 3/16DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING, 3/16DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING, 3/16DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| — | SPUR, O-RINGS | — | — | — | — |
| 17 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR | E0005536 | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16DIA X 15.312 HT BLUE FOR ITR 6.5 CTRS, 20% STRETCH | 1167247 | 1167247 | 1167247 | 1167247 |
| 18 | ORING, 3/16DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| — | ROLLER SET-2RC-30D-SPUR | — | — | — | — |
| 20/1 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/2 | ROLLER, ITR 4-3/4"BF PRBG NO AXLE | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/3 | ROLLER, 6BF ITR 1.9 PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/4 | ROLLER, 7-1/8BF ITR 1.9 PLTD PRBG | 1152261 | 1152261 | 1152261 | 1152261 |
| 20/5 | ROLLER, 8-5/16BF ITR 1.9 PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/6 | ROLLER, 9-7/16BF ITR 1.9 PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/7 | ROLLER, 10-5/8BF ITR 1.9 PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/8 | ROLLER, 11-3/4BF ITR 1.9 PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/9 | ROLLER, 12-15/16BF ITR 1.9 PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER, 14-1/16BF ITR 1.9 PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER, 15-3/16BF ITR 1.9 PLTD PRBG | 1152269 | 1152269 | 1152269 | 1152269 |
| 20/12 | ROLLER, 16-3/8BF ITR 1.9 PLTD PRBG | --- | 1155254 | 1155254 | 1155254 |
| 20/13 | ROLLER, ITR 17-1/2"BF 1.9 PLTD PRBG | --- | 1133722 | 1133722 | 1133722 |
| 20/14 | ROLLER, 18-3/4BF ITR 1.9 PLTD PRBG | --- | 1154742 | 1154742 | 1154742 |
| 20/15 | ROLLER, 19-3/4BF ITR 1.9 PLTD PRBG | --- | 1144374 | 1144374 | 1144374 |
| 20/16 | ROLLER, ITR 21"BF 1.9 PLTD PRBG | --- | 1133723 | 1133723 | 1133723 |
| 20/17 | ROLLER, 22-3/16BF ITR 1.9 PLTD PRBG | --- | --- | 1155255 | 1155255 |
| 20/18 | ROLLER, ITR 23-1/4"BF PRBG | --- | --- | 1131992 | 1131992 |
| 20/19 | ROLLER, ITR 24-7/16"BF PRBG1.9 PLTD | --- | --- | 1133724 | 1133724 |
| 20/20 | ROLLER, 25-5/8BF ITR 1.9 PLTD PRBG | --- | --- | 1155256 | 1155256 |
| 20/21 | ROLLER, 26-3/4BF ITR 1.9 PLTD PRBG | --- | --- | 1154745 | 1154745 |
| 20/22 | ROLLER, ITR 27-15/16"BF PRBG1.9 PLTD | --- | --- | --- | 1133726 |
| 20/23 | ROLLER, 29-1/16BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155257 |
| 20/24 | ROLLER, 30-1/4BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155258 |
| 20/25 | ROLLER, ITR 31-3/8"BF PRBG1.9 PLTD | --- | --- | --- | 1133728 |
| 20/26 | ROLLER, 32-1/2BF ITR 1.9 PLTD PRBG | --- | --- | --- | 1155259 |
| 20 | ROLLER, _ _ITR 1.9 PLTD PRBG 1D1S (_ _BF) | E0002422 | E0002423 | E0002424 | 1198370 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |

| REPLACEMENT PARTS - ITR WHEEL DIVERT PNEUMATIC, CB, 2RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-2RC-30D-LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 22 | ROLLER, ITR _ _BF 2G ITOH | --- | --- | 1139545 | 1139545 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1138722 | 1138723 | 1138724 | 1138725 |
| 23 | ROLLER, ITR SPUR 2G ITOH, 2C (2"GROOVE SPACING) | 1152362 | 1152362 | 1152362 | 1152362 |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG1D1S (_ _BF) | --- | --- | 1198370 | 1198370 |
| | | | | | Ref Dwg# 130A559 |

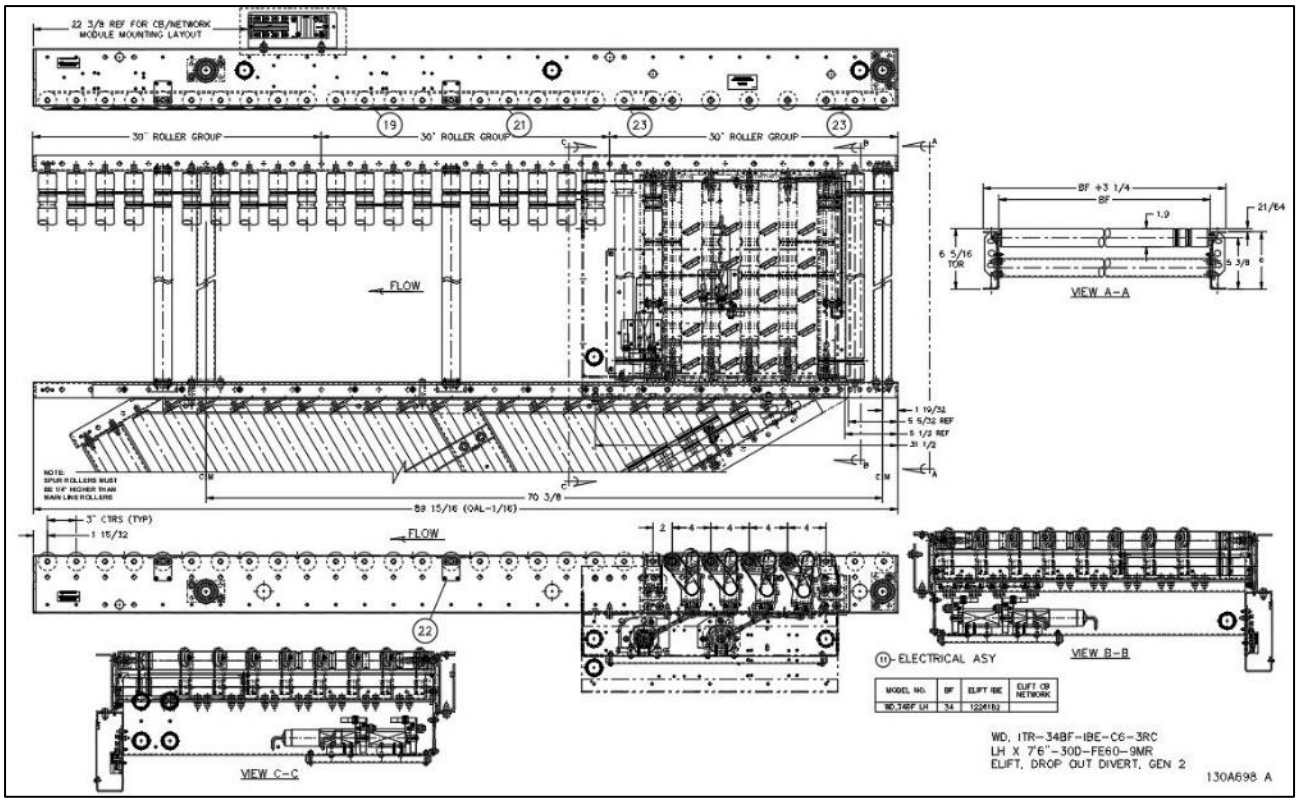
## 21.37 ITR WHEEL DIVERTER (PNEUMATIC LIFT)




### *21.37.1 Replacement Parts — ITR Wheel Diverter (Pneumatic Lift)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT (PNEUMATIC) CB, OR IBE, 2RC & 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-CB OR IBE-C6-2RC OR 3RC-30D LH/RH-FE60-_MR-_SOL-W/DROPOUT | | Width & Item # | | | |
| **Balloon** | **Description** | **16BF** | **22BF** | **28BF** | **34BF** |
| — | **DIVERTER WAVE** | — | — | — | — |
| 01 | CYL, AIR, 1" BORE, 2" STROKE AD | 1109080 | 1109080 | 1109080 | 1109080 |
| 02 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 04 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| 09 | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG, 5 GRV DROP OUT TUB | 1195067 | 1191372 | 1194884 | 1198402 |
| ---- | ROLLER, ASY ITR - HEX FLAT UP GROOVES | ---- | ---- | ---- | ---- |
| 11/03 | ROLLER, ITR 13.25BF 2G ITOHPM486FE-60 **(USED W/IBE)** | 1198348 | 1198348 | 1198348 | 1198348 |
| 11/03 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 **(USED W/CB, OR HB)** | 1191381 | 1191381 | 1191381 | 1191381 |
| 12 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| 22 | TUBING, 1/4"POLYU-95DUR0.160ID | E0001391 | E0001391 | E0001391 | E0001391 |
| 25 | ORING, 83A WD 3/16 X 25-3/8 | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING, .210 DIA X 9.1" HT RED ITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING, 83A 1/8" X 10 | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING, 83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 37 | ORING, 3/16DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING, 3/16DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING, 3/16DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| | | | | | Ref Dwg# 130S151 |

## 21.38 ITR WHEEL DIVERT (ELECTRIC LIFT)




### *21.38.1 Replacement Parts — ITR Wheel Divert, IB-E03, 3RC (Electric Lift)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT ELECTRIC LIFT, IB-E, 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-3RC-30D-LH/RH-FE60-_MR-ELIFT-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| ---- | ELECTRICAL COMPONENTS | — | — | — | — |
| 04 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| ---- | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| ---- | CONNECTOR, IDC SCOTCHLOK 562 - YELLOW | 3M562 | 3M562 | 3M562 | 3M562 |
| ----- | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | REFERENCE Cat5E COMMUNICATION CABLE | | | |
| —— | DIVERTER, WAVE | — | — | — | — |
| 02 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 04 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| 03 | CONN,2 COND, W/LEVERS 24 - 12 AWG | 1185928 | 1185928 | 1185928 | 1185928 |
| 06 | PCB, DB, PE,4A8 STATION | 1138197 | 1138197 | 1138197 | 1138197 |
| 08 | CAM, DRIVE, WD ELEC LIFT | 1200657 | 1200657 | 1200657 | 1200657 |
| 09 | ROLLER, WD _ _BF ITR PRBG DROP OUT TUB PRBG 6203 BRG | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG,5 GRV DROP OUT TUB PRBG 6203 BRG | 1195067 | 1191372 | 1194884 | 1198402 |
| 21 | FUSE,4A,125V CARTRIDGE | 1102221 | 1102221 | 1102221 | 1102221 |
| 22 | FUSE, HOLDER IN-LINE, CARTRIDGE | 1102222 | 1102222 | 1102222 | 1102222 |
| 25 | ORING,83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 27 | ORING,.210 DIA X 9.1" HT REDITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING,83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING,83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 32 | SWITCH, PROX,12MM DIA | 1184770 | 1184770 | 1184770 | 1184770 |
| 37 | ORING,3/16 DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING,3/16 DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING,3/16 DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |

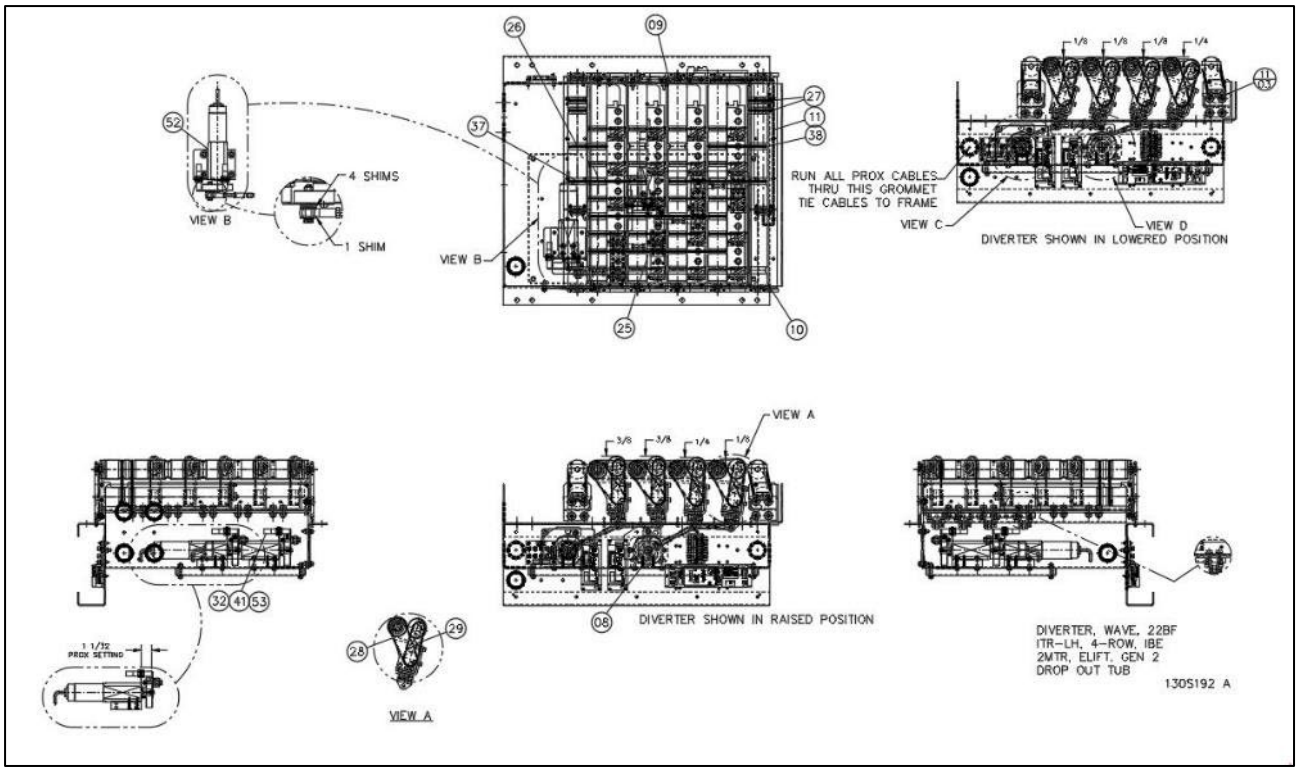
| REPLACEMENT PARTS - ITR WHEEL DIVERT ELECTRIC LIFT, IB-E, 3RC, 30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-3RC-30D-LH/RH-FE60-_MR-ELIFT-W/DROPOUT | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 41 | CABLE, M12 TO WAGO 733-103,3M FEMALE M12 | 1198538 | 1198538 | 1198538 | 1198538 |
| 46 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 47 | TERM, BLOCK,2-COND,20-10AWG600V,30A, GRAY,6.2mm | 1145413 | 1145413 | 1145413 | 1145413 |
| 48 | TERM, SEPARATOR, ORANGE,2mm | 1180509 | 1180509 | 1180509 | 1180509 |
| 49 | TERM, END BARRIER, GRAY,1mm | 1145415 | 1145415 | 1145415 | 1145415 |
| 54 | DRIVERCARD, INSIGHT-EZ-QUBE-HTBF-P, HIGH TORQUE | 1226133 | 1226133 | 1226133 | 1226133 |
| 52 | DRIVE, KYOWA 24VDC PULSE GEAR PULSE ROLLER | 1177986 | 1177986 | 1177986 | 1177986 |
| --- | **SPUR, O-RINGS** | --- | --- | --- | --- |
| 17 & 19 | ORING,3/16 DIA X 9.5" HT BLUE ITR 3"CTR | ----- | ----- | E0005536 | E0005536 |
| 18 | ORING,3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| --- | **ROLLER SET-3RC-30D-SPUR** | --- | --- | --- | --- |
| 20/1 | ROLLER, ITR 3-3/8"BF PRBG NO AXLE | 1143249 | 1143249 | 1143249 | 1143249 |
| 20/2 | ROLLER, ITR 5-1/8"BF PRBG NO AXLE | 1130836 | 1130836 | 1130836 | 1130836 |
| 20/3 | ROLLER,6-27/32BF ITR 1.9 PLTD PRBG | 1131620 | 1131620 | 1131620 | 1131620 |
| 20/4 | ROLLER,8-9/16BF ITR 1.9 PLTD PRBG | 1131621 | 1131621 | 1131621 | 1131621 |
| 20/5 | ROLLER,10-5/16BF ITR 1.9 PLTD PRBG | 1143250 | 1143250 | 1143250 | 1143250 |
| 20/6 | ROLLER,12-1/32BF ITR 1.9 PLTD PRBG | 1131622 | 1131622 | 1131622 | 1131622 |
| 20/7 | ROLLER,13-25/32BF ITR 1.9 PLTD PRBG | 1131623 | 1131623 | 1131623 | 1131623 |
| 20/8 | ROLLER,15-1/2BF ITR 1.9 PLTD PRBG | ----- | 1131624 | 1131624 | 1131624 |
| 20/9 | ROLLER,17-1/4BF ITR 1.9 PLTD PRBG | ----- | 1143251 | 1143251 | 1143251 |
| 20/10 | ROLLER,18-31/32BF ITR 1.9 PLTD PRBG | ----- | 1131625 | 1131625 | 1131625 |
| 20/11 | ROLLER,20-11/16BF ITR 1.9 PLTD PRBG | ----- | 1143252 | 1143252 | 1143252 |
| 20/12 | ROLLER,22-7/16BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131627 | 1131627 |
| 20/13 | ROLLER,24-5/32BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131628 | 1131628 |
| 20/14 | ROLLER,25-29/32BF ITR 1.9 PLTD PRBG | ----- | ----- | 1131629 | 1131629 |
| 20/15 | ROLLER,27-5/8BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140043 |
| 20/16 | ROLLER,29-3/8BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140044 |
| 20/17 | ROLLER,31-3/32BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140045 |
| 20/18 | ROLLER,32-13/16BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1140046 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002422 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 | 1163471 | 1163472 | 1163473 | 1163474 |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG 1D1S (_ _BF) | E0002412 | E0002423 | E0002424 | 1198370 |
| 23 | ROLLER, ITR SPUR 2G ITOH PM 486 FE-60 (3" GROOVE SPACING) | 1165292 | 1165292 | 1165292 | 1165292 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | ----- | ----- | 1165293 | 1165293 |
| 03 | ROLLER, ITR 13.25BF 2G ITOHPM486FE-60 | 1198348 | 1198348 | 1198348 | 1198348 |
| | | | | | **REF DWG# 130A698** |

## *21.38.2 Replacement Parts — ITR Wheel Divert, IB-E03, 2RC (Electric Lift)*

| REPLACEMENT PARTS - ITR WHEEL DIVERT ELECTRIC LIFT, IB-E03, 2RC,30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-2RC-30D-LH/RH-FE60-_MR-ELIFT-W/DROPOUT | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| --- | ELECTRICAL COMPONENTS | ----- | ----- | ----- | ----- |
| 04 | DRIVERCARD, ITOH **IB-E03** | 1166286 | 1166286 | 1166286 | 1166286 |
| —— | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| —— | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| —— | CONNECTOR, IDC SCOTCHLOK 562 - YELLOW | 3M562 | 3M562 | 3M562 | 3M562 |
| —— | CABLE, MOTOR EXTENSION, 600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| — | CABLE, CTRLS-CAT5E-_'-GRAY | **REFERENCE Cat5E COMMUNICATION CABLE** | | | |
| —— | HARNESS, POWER BROWN & BLUE **(NOT BF SPECIFIC)** | 3'-0" L 1102289 | 5'-5" L 1102288 | 8'-0" L 1102287 | 10'-6" L 1102286 |
| 03 | CONN,2 COND, W/LEVERS 24 - 12 AWG | 1185928 | 1185928 | 1185928 | 1185928 |
| 06 | PCB, DB, PE,4A8 STATION | 1138197 | 1138197 | 1138197 | 1138197 |
| 08 | CAM, DRIVE, WD ELEC LIFT | 1200657 | 1200657 | 1200657 | 1200657 |
| 09 | ROLLER, WD _ _BF ITR PRBG | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG,5 GRV | 1195067 | 1191372 | 1194884 | 1198402 |
| 18 | ORING,3/16 DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| — | **DIVERTER WAVE** | — | — | — | — |
| 02 | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| 04 | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| 21 | FUSE,4A,125V CARTRIDGE | 1102221 | 1102221 | 1102221 | 1102221 |
| 22 | FUSE, HOLDER IN-LINE, CARTRIDGE | 1102222 | 1102222 | 1102222 | 1102222 |
| 25 | ORING,83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 27 | ORING,.210 DIA X 9.1" HT REDITR 2.75"CTR | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING,83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING,83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 32 | SWITCH, PROX,12MM DIA, FLUSH MT4MM RANGE, M12 4-PIN CONN PNP | 1184770 | 1184770 | 1184770 | 1184770 |
| 37 | ORING,3/16 DIA X 14.5" HT BLUE 6" CTR | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING,3/16 DIA X 11" HT BLUE ITR 4"CTR | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING,3/16 DIA X 17.95" HT BLUE 8" CTR | 1172696 | 1172696 | 1172696 | 1172696 |
| 41 | CABLE, M12 TO WAGO 733-103,3M FEMALE M12 | 1198538 | 1198538 | 1198538 | 1198538 |
| 46 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 47 | TERM, BLOCK,2-COND,20-10AWG600V,30A, GRAY,6.2mm | 1145413 | 1145413 | 1145413 | 1145413 |
| 48 | TERM, SEPARATOR, ORANGE,2mm | 1180509 | 1180509 | 1180509 | 1180509 |
| 49 | TERM, END BARRIER, GRAY,1mm | 1145415 | 1145415 | 1145415 | 1145415 |
| 52 | DRIVE, KYOWA 24VDC PULSE GEAR PULSE ROLLER | 1177986 | 1177986 | 1177986 | 1177986 |
| 54 | DRIVERCARD,INSIGHT-EZ-QUBE-HTBF-P,HIGH TORQUE | 1226133 | 1226133 | 1226133 | 1226133 |
| — | **SPUR, O-RINGS** | — | — | — | — |
| 17 | ORING,3/16 DIA X 9.5" HT BLUE ITR 3"CTR | ----- | ----- | E0005536 | E0005536 |
| 18 | ORING,3/16" DIA X 15.312" HT BLUE FOR ITR 6.5" CTRS | 1167247 | 1167247 | 1167247 | 1167247 |
| 19 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| ---- | ROLLER SET-2RC-30D-SPUR | ----- | ----- | ----- | ----- |
| 20/1 | ROLLER, ITR 3-11/16" BF PRBG (NO AXLE) 1 GROOVE | 1152360 | 1152360 | 1152360 | 1152360 |
| 20/2 | ROLLER, ITR 4-3/4"BF PRBG NO AXLE | E0003268 | E0003268 | E0003268 | E0003268 |
| 20/3 | ROLLER,6BF ITR 1.9 PLTD PRBG | 1152260 | 1152260 | 1152260 | 1152260 |
| 20/4 | ROLLER,7-1/8BF ITR 1.9 PLTD PRBG | 1152261 | 1152261 | 1152261 | 1152261 |
| 20/5 | ROLLER,8-5/16BF ITR 1.9 PLTD PRBG | 1152262 | 1152262 | 1152262 | 1152262 |
| 20/6 | ROLLER,9-7/16BF ITR 1.9 PLTD PRBG | 1152263 | 1152263 | 1152263 | 1152263 |
| 20/7 | ROLLER,10-5/8BF ITR 1.9 PLTD PRBG | 1152264 | 1152264 | 1152264 | 1152264 |
| 20/8 | ROLLER,11-3/4BF ITR 1.9 PLTD PRBG | 1152265 | 1152265 | 1152265 | 1152265 |
| 20/9 | ROLLER,12-15/16BF ITR 1.9 PLTD PRBG | 1152266 | 1152266 | 1152266 | 1152266 |
| 20/10 | ROLLER,14-1/16BF ITR 1.9 PLTD PRBG | 1152268 | 1152268 | 1152268 | 1152268 |
| 20/11 | ROLLER,15-3/16BF ITR 1.9 PLTD PRBG | 1152269 | 1152269 | 1152269 | 1152269 |
| 20/12 | ROLLER,16-3/8BF ITR 1.9 PLTD PRBG | ----- | 1155254 | 1155254 | 1155254 |
| 20/13 | ROLLER, ITR 17-1/2"BF 1.9 PLTD PRBG | ----- | 1133722 | 1133722 | 1133722 |
| 20/14 | ROLLER,18-3/4BF ITR 1.9 PLTD PRBG | ----- | 1154742 | 1154742 | 1154742 |
| 20/15 | ROLLER,19-3/4BF ITR 1.9 PLTD PRBG | ----- | 1144374 | 1144374 | 1144374 |
| 20/16 | ROLLER, ITR 21"BF 1.9 PLTD PRBG | ----- | 1133723 | 1133723 | 1133723 |
| 20/17 | ROLLER,22-3/16BF ITR 1.9 PLTD PRBG | ----- | ----- | 1155255 | 1155255 |
| 20/18 | ROLLER, ITR 23-1/4"BF PRBG | ----- | ----- | 1131992 | 1131992 |
| 20/19 | ROLLER, ITR 24-7/16"BF PRBG1.9 PLTD | ----- | ----- | 1133724 | 1133724 |
| 20/20 | ROLLER,25-5/8BF ITR 1.9 PLTD PRBG | ----- | ----- | 1155256 | 1155256 |

| REPLACEMENT PARTS - ITR WHEEL DIVERT ELECTRIC LIFT, IB-E03, 2RC,30 DEGREES | | | | | |
|---|---|---|---|---|---|
| WD, ITR-_ _BF-IBE-C6-2RC-30D-LH/RH-FE60-_MR-ELIFT-W/DROPOUT | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 20/21 | ROLLER,26-3/4BF ITR 1.9 PLTD PRBG | ----- | ----- | 1154745 | 1154745 |
| 20/22 | ROLLER, ITR 27-15/16"BF PRBG1.9 PLTD | ----- | ----- | ----- | 1133726 |
| 20/23 | ROLLER,29-1/16BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1155257 |
| 20/24 | ROLLER,30-1/4BF ITR 1.9 PLTD PRBG | ----- | ----- | ----- | 1155258 |
| 20/25 | ROLLER, ITR 31-3/8"BF PRBG 1.9 PLTD | ----- | ----- | ----- | 1133728 |
| 20/26 | ROLLER,32-1/2BF ITR 1.9 PLTDPRBG | ----- | ----- | ----- | 1155259 |
| 21 | ROLLER, _ _ITR 1.9" DIA PLTD (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(USED W/ IBE)** | 1163471 | 1163472 | 1163473 | 1163474 |
| 22 | ROLLER, ITR 13.25BF 2G ITOH PM486FE-60 | ----- | ----- | 1165293 | 1165293 |
| 03 | ROLLER, ITR 13.25BF 2G ITOHPM486FE-60 | 1198348 | 1198348 | 1198348 | 1198348 |
| 23 | ROLLER, _ _ITR 1.9PLTD PRBG 1D1S (_ _BF) | E0002422 | E0002423 | E0002424 | 1198370 |
| 03 | ROLLER, ITR SPUR 2G ITOH,2 CPM 486 FE-60 **(2" GROOVE SPACING)** | 1171592 | 1171592 | 1171592 | 1171592 |
| | | | | | REF DWG# 130A698 |

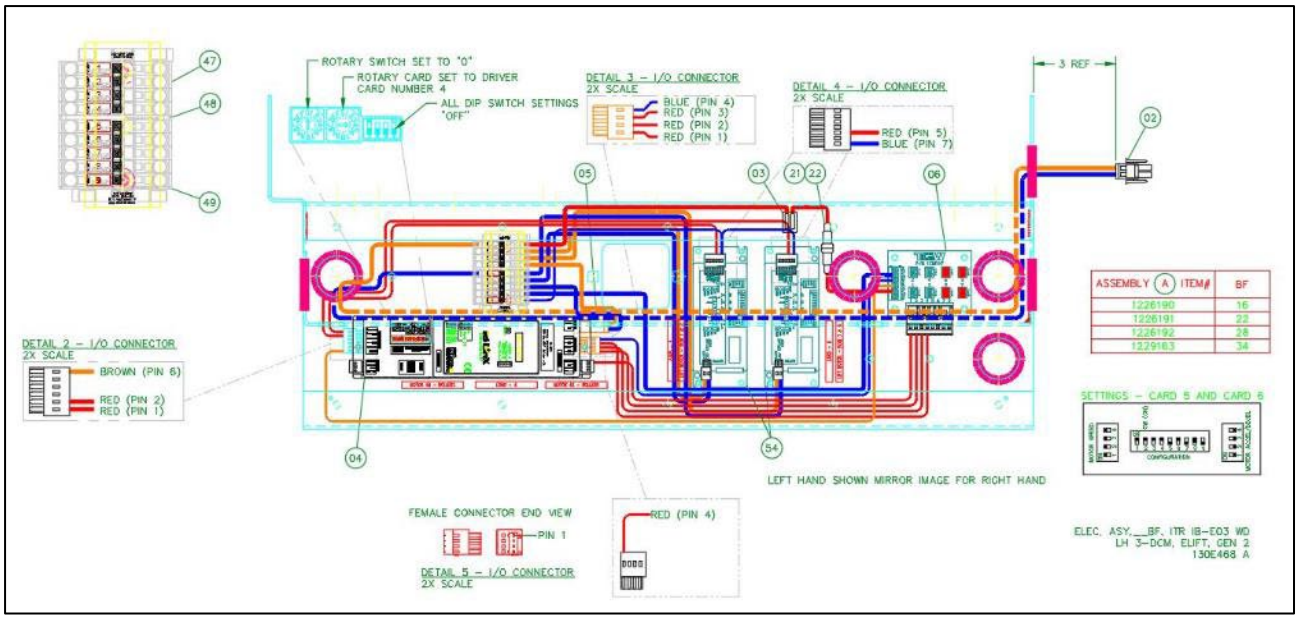
## 21.39 ITR WHEEL DIVERTER (ELECTRIC LIFT)




### *21.39.1 Replacement Parts – ITR Wheel Diverter (Electric Lift) Components*

| REPLACEMENT PARTS - ITR WHEEL DIVERT 24V ELECTRIC LIFT COMPONENTS | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| --- | WHEEL, ASY NBS30 (MOLDED TIRE) ALUMINUM | 1158076 | 1158076 | 1158076 | 1158076 |
| --- | WHEEL, ASY IDLER NBS30 ALUMINUM | 1158077 | 1158077 | 1158077 | 1158077 |
| --- | BRG, RADIAL #6802ZZC3SRI2 | E0031808 | E0031808 | E0031808 | E0031808 |
| 08 | CAM, DRIVE, WD | 1200657 | 1200657 | 1200657 | 1200657 |
| 09 | ROLLER, WD _ _BF ITR PRBG | 1195066 | 1191359 | 1194883 | 1198388 |
| 10 | ROLLER, WD _ _BF ITR PRBG | 1195067 | 1191372 | 1194884 | 1198402 |
| 11/03 | ROLLER, ITR 13.25BF 2G ITOHPM486FE-60 | 1198348 | 1198348 | 1198348 | 1198348 |
| 25 | ORING,83A WD 3/16 X 25-3/8" | 1141505 | 1141505 | 1141505 | 1141505 |
| 26 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 27 | ORING,.210 DIA X 9.1" HT RED | 1172694 | 1172694 | 1172694 | 1172694 |
| 28 | ORING,83A 1/8" X 10" | 1141229 | 1141229 | 1141229 | 1141229 |
| 29 | ORING,83A 1/8 X 9-1/4" BLACK | E0001239 | E0001239 | E0001239 | E0001239 |
| 32 | SWITCH, PROX,12MM DIA, FLUSH MT PNP | 1184770 | 1184770 | 1184770 | 1184770 |
| 37 | ORING,3/16 DIA X 14.5" HT BLUE | 1172695 | 1172695 | 1172695 | 1172695 |
| 38 | ORING,3/16 DIA X 11" HT BLUE | 1127703 | 1127703 | 1127703 | 1127703 |
| 39 | ORING,3/16 DIA X 17.95" HT BLUE | 1172696 | 1172696 | 1172696 | 1172696 |
| 41 | CABLE, M12 TO WAGO 733-103,3M FEMALE M12 | 1198538 | 1198538 | 1198538 | 1198538 |
| 52 | DRIVE, KYOWA 24VDC PULSE GEAR PULSE ROLLER | 1177986 | 1177986 | 1177986 | 1177986 |
| | | | | | Ref Dwg# 130S192 A |

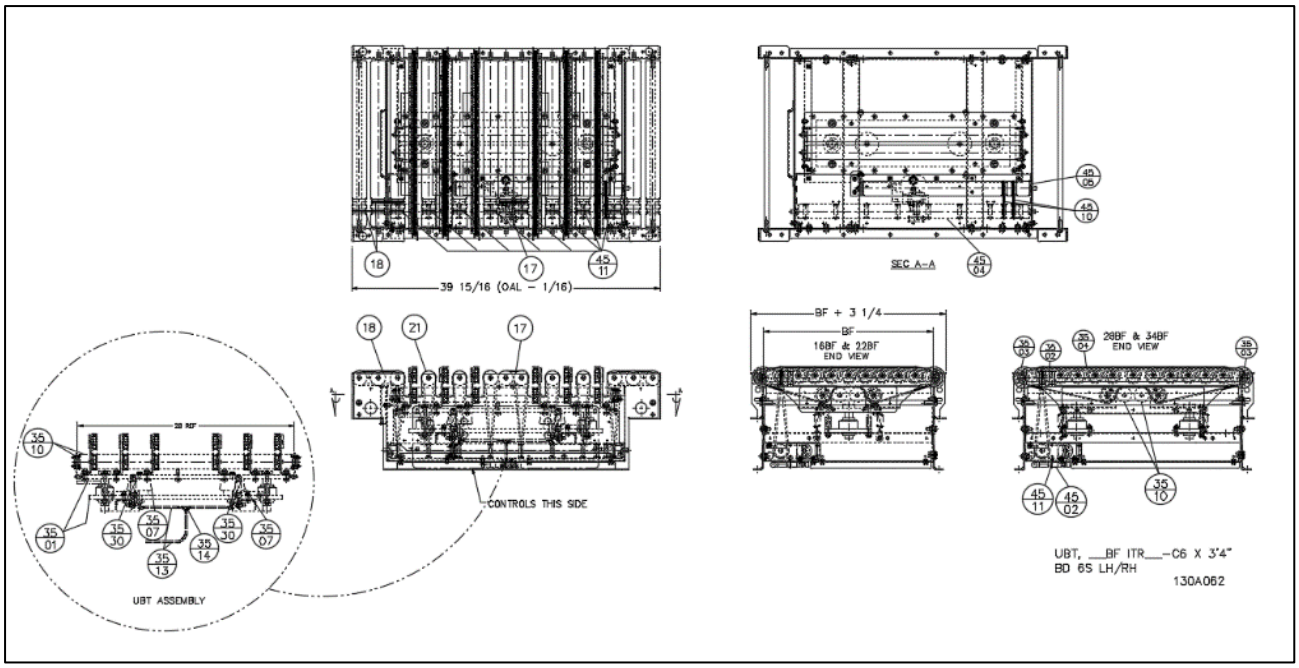
## 21.40 ITR WHEEL DIVERTER (ELECTRIC LIFT) - ELECTRICAL COMPONENTS




### *21.40.1 Replacement Parts — ITR Wheel Diverter (Electric Lift) – Electrical Components*

| REPLACEMENT PARTS - ITR WHEEL DIVERT ELECTRIC LIFT, ELECTRICAL COMPONENTS IBE | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| 3 | CONN,2 COND, W/LEVERS24 - 12 AWG | 1185928 | 1185928 | 1185928 | 1185928 |
| 4 | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| 5 | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 6 | PCB, DB, PE,4A8 STATION | 1138197 | 1138197 | 1138197 | 1138197 |
| 21 | FUSE,4A,125V CARTRIDGE | 1102221 | 1102221 | 1102221 | 1102221 |
| 22 | FUSE, HOLDER IN-LINE, CARTRIDGE | 1102222 | 1102222 | 1102222 | 1102222 |
| 47 | TERM, BLOCK,2-COND,20-10AWG600V,30A, GRAY, 6.2mm | 1145413 | 1145413 | 1145413 | 1145413 |
| 48 | TERM, SEPARATOR, ORANGE,2mm | 1180509 | 1180509 | 1180509 | 1180509 |
| 49 | TERM, END BARRIER, GRAY,1mm | 1145415 | 1145415 | 1145415 | 1145415 |
| 54 | DRIVERCARD, INSIGHT-EZ-QUBE-HTBF-P, HIGH TORQUE | 1226133 | 1226133 | 1226133 | 1226133 |
| | | | | | Ref Dwg# 130E468 |

## 21.41 ITR UBT (PNEUMATIC LIFT) - MECHANICAL COMPONENTS 5S & 6S



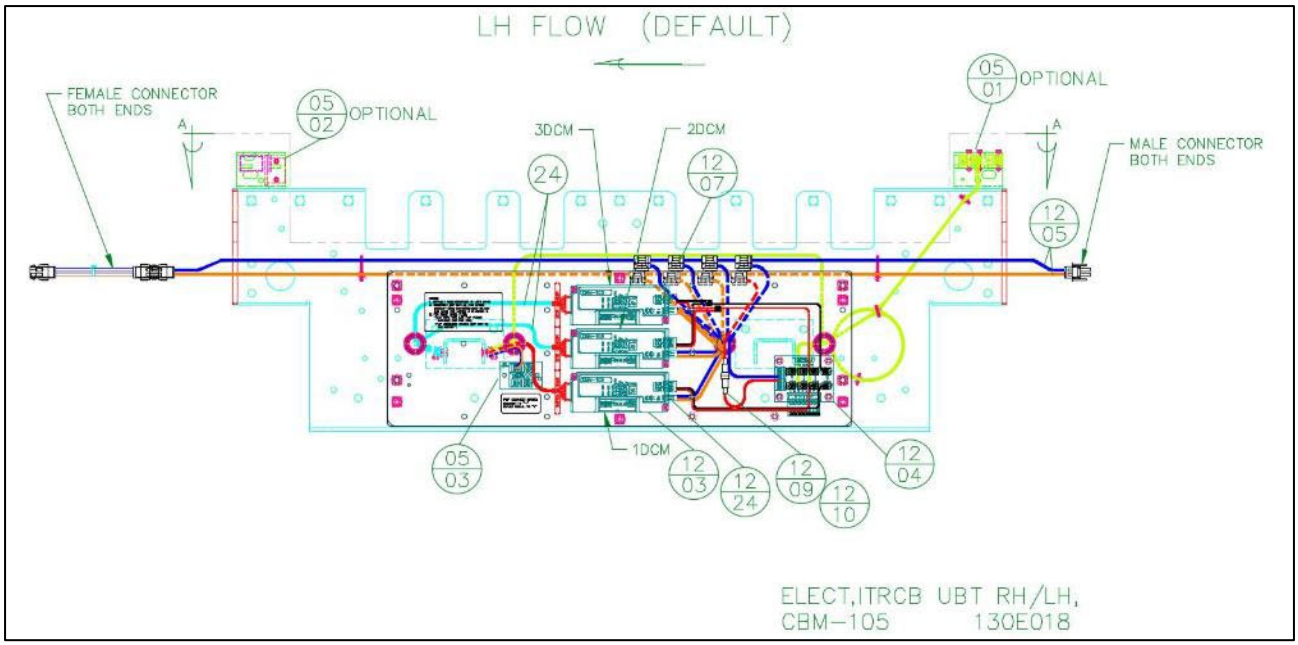
## *21.41.1 Replacement Parts — ITR UBT (Pneumatic Lift) - Mechanical Components CB, 5s & 6s*

| REPLACEMENT PARTS - ITR UBT PNUEMATIC LIFT, BI-DIRECTIONAL, CB, 5s or 6s | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **UBT, MECH _ _BF ITR UBT** | — | — | — | — |
| 17 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 18 | ORING, 3/16 DIA X 8.688 HT BLUE | 1137420 | 1137420 | 1137420 | 1137420 |
| 21 | ROLLER, _ _ITR 1.9 PLTD PRBG (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| — | **UBT, ASY _ _BF ITR 5s & 6s** | — | — | — | — |
| 35/01 | LIFT TABLE, ASY A&B ITR2 UBT, 36"PER PRINT (5s) | 1154634 | 1154634 | 1159922 | 1159922 |
| 35/01 | LIFT TABLE, ASY A&B ITR2 UBT, 36"PER PRINT (6s) | 1132815 | 1132815 | 1141051 | 1141051 |
| 35/07 | AIRBAG, FIRESTONE | 90000025 | 90000025 | 90000025 | 90000025 |
| 35/13 | TUBING, 1/4"POLY U-95 DUR0.160ID | E0005539 | E0005539 | E0005539 | E0005539 |
| 35/14 | TEE, UNION BARBED 1/4" TO 1/4"H | 89000520 | 89000520 | 89000520 | 89000520 |
| 35/10 | ROLLER, ITR 24BF NG ITOH-PM486FP-55-595-D-24-JR-KF-JR HEX SHAFT **(5s)-(CB)** | 1215120 | 1215120 | 1215120 | 1215120 |
| 35/10 | ROLLER, ITR 28BF NG ITOH PM486FP-55-696-D-24-JR-KF JR HEX SHAFT **(6s)-(CB)** | 1143813 | 1143813 | 1143813 | 1143813 |
| 35/30 | SPRING, EXT 3/40D X 2" LG .075W LOOPS MUST BE INLINE +/- 20 | 90800263 | 90800263 | 90800263 | 90800263 |
| — | **WHEELBRKT, ASY ITR UBT _ _BF** | — | — | — | — |
| 35/02 | IDLER, ASY FLAT FACE ITR UBT | 1132379 | 1132379 | 1132379 | 1132379 |
| 35/03 | IDLER, ASY FLANGED ITR UBT | 1159961 | 1159961 | 1159961 | 1159961 |
| 35/04 | BELT, 83A .188 X .468 X 66"_ _BF ITR2 UBT | 1132754 | 1132755 | 1132756 | 1132757 |
| — | **PAN, ASY BOTTOM ITR** | — | — | — | — |
| 45/02 | VALVE, SMC 4WAY 24VDC W/FITT &3M CABLE, ITR UBT/ERS | 1139102 | 1139102 | 1139102 | 1139102 |
| 45/04 | ROLLER, CARRIER DRIVEITR2 UBT 4"C, 36" LG UBT **(5s)** | 1154791 | 1154791 | 1154791 | 1154791 |
| 45/04 | ROLLER, CARRIER DRIVEITR2 UBT 4"C, 36" LG UBT **(6s)** | 1132730 | 1132730 | 1132730 | 1132730 |
| 45/05 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(5s) (CB)** | 1138722 | 1138722 | 1138722 | 1138722 |
| 45/05 | ROLLER, ITR _ _BF 2G ITOH PM 486 FE-60 - **(6s) (CB)** | 1138723 | 1138723 | 1138723 | 1138723 |
| 45/10 | ORING, 1/4"DIA X 9.5" HT BLUE | 1144848 | 1144848 | 1144848 | 1144848 |
| 45/11 | ORING, 83A ST TRNS 3/16X21-3/8 | 1149850 | 1149850 | 1149850 | 1149850 |
| | | | | | Reference Dwg: 130A062 |

## *21.41.2 Replacement Parts — ITR UBT (Pneumatic Lift) - Mechanical Components IBE, 5s & 6s*

| REPLACEMENT PARTS - ITR UBT PNUEMATIC LIFT, BI-DIRECTIONAL, IBE, 5s or 6s | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **UBT, MECH _ _BF ITR UBT** | — | — | — | — |
| 17 | ORING, 3/16 DIA X 7-3/4" HT BLUE ITR 2"CTR | 1142656 | 1142656 | 1142656 | 1142656 |
| 18 | ORING, 3/16 DIA X 8.688 HT BLUE | 1137420 | 1137420 | 1137420 | 1137420 |
| 21 | ROLLER, _ _ITR 1.9 PLTD PRBG (_ _BF) | E0002412 | E0002413 | E0002414 | E0006220 |
| — | **UBT, ASY _ _BF ITR 5s & 6s** | — | — | — | — |
| 35/01 | LIFT TABLE, ASY A&B ITR2 UBT, 36"PER PRINT (5s) | 1154634 | 1154634 | 1159922 | 1159922 |
| 35/01 | LIFT TABLE, ASY A&B ITR2 UBT, 36"PER PRINT (6s) | 1132815 | 1132815 | 1141051 | 1141051 |
| 35/07 | AIRBAG, FIRESTONE | 90000025 | 90000025 | 90000025 | 90000025 |
| 35/13 | TUBING, 1/4"POLY U-95 DUR0.160ID | E0005539 | E0005539 | E0005539 | E0005539 |
| 35/14 | TEE, UNION BARBED 1/4" TO 1/4"H | 89000520 | 89000520 | 89000520 | 89000520 |
| 35/10 | ROLLER, ITR 24BF NG ITOH-PM486FP-55-595-D-24-JR-Z060-KF-JR HEX SHAFT, 600MM CABLE W/ 10 PIN CONN **(5s) (IBE)** | 1215122 | 1215122 | 1215122 | 1215122 |
| 35/10 | ROLLER, ITR 28BF NG ITOH PM486FP-55-696-D-24-JR-Z060-KF JR HEX SHAFT, 600MM CABLE W/ 10 PIN CONN **(6s) (IBE)** | 1167000 | 1167000 | 1167000 | 1167000 |
| 35/30 | SPRING, EXT 3/40D X 2" LG .075W LOOPS MUST BE INLINE +/- 20 | 90800263 | 90800263 | 90800263 | 90800263 |
| — | **WHEELBRKT, ASY ITR UBT _ _BF** | — | — | — | — |
| 35/02 | IDLER, ASY FLAT FACE ITR UBT | 1132379 | 1132379 | 1132379 | 1132379 |
| 35/03 | IDLER, ASY FLANGED ITR UBT | 1159961 | 1159961 | 1159961 | 1159961 |
| 35/04 | BELT, 83A .188 X .468 X 66"_ _BF ITR2 UBT | 1132754 | 1132755 | 1132756 | 1132757 |
| — | **PAN, ASY BOTTOM ITR** | — | — | — | — |
| 45/02 | VALVE, SMC 4WAY 24VDC W/FITT &3M CABLE, ITR UBT/ERS | 1139102 | 1139102 | 1139102 | 1139102 |
| 45/04 | ROLLER, CARRIER DRIVEITR2 UBT 4"C, 36" LG UBT **(5s)** | 1154791 | 1154791 | 1154791 | 1154791 |
| 45/04 | ROLLER, CARRIER DRIVEITR2 UBT 4"C, 36" LG UBT **(6s)** | 1132730 | 1132730 | 1132730 | 1132730 |
| 45/05 | ROLLER, ITR _ _BF 2G ITOH PM486FE-60 **(5s) (IBE)** | 1163471 | 1163471 | 1163471 | 1163471 |
| 45/05 | ROLLER, ITR _ _BF 2G ITOH PM 486 FE-60 - **(6s) (IBE)** | 1163472 | 1163472 | 1163472 | 1163472 |
| 45/10 | ORING, 1/4"DIA X 9.5" HT BLUE | 1144848 | 1144848 | 1144848 | 1144848 |
| 45/11 | ORING, 83A ST TRNS 3/16X21-3/8 | 1149850 | 1149850 | 1149850 | 1149850 |
| | | | | | Reference Dwg: 130A062 |

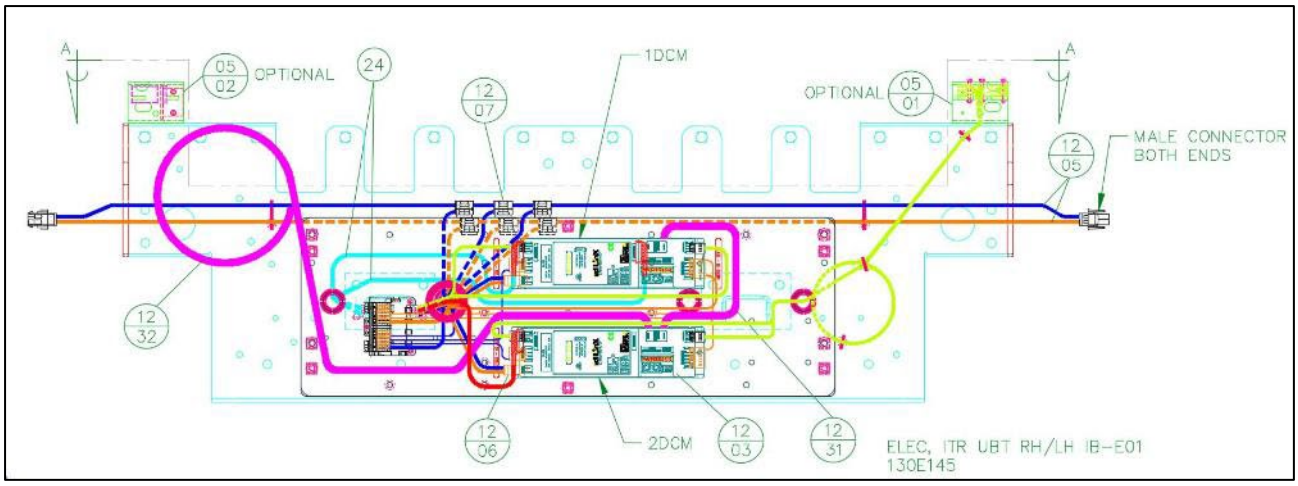
## 21.42 ITR UBT (PNEUMATIC LIFT) - ELECTRICAL COMPONENTS CB, 5S & 6S




### *21.42.1 Replacement Parts — ITR UBT (Pneumatic Lift) - Electrical Components CB, 5s & 6s*

| REPLACEMENT PARTS - ITR UBT PNEUMATIC, ELECTRICAL COMPONENTS, CB, 5s & 6s | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | **ELECTRICAL COMPONENTS** | — | — | — | — |
| 24 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| — | **PE, ASY ITR UBT, PE AND RF** | — | — | — | — |
| 05/01 | PE, REFLEX TYPE ZL, PNP, LIGHT OP, 2M CABLE | 1138113 | 1138113 | 1138113 | 1138113 |
| 05/02 | PE, REFLECTOR 20MM X 30MM ADHESIVE BACKED | 1136359 | 1136359 | 1136359 | 1136359 |
| 05/03 | PCB, DB, PE, EXTENSION (CBM-105FP) | 1138198 | 1138198 | 1138198 | 1138198 |
| — | **PL, ASY ITR CB UBT, LH/RH CBM-105** | — | — | — | — |
| 12/03 | DRIVERCARD, ITOH CBM-105FP | 1153930 | 1153930 | 1153930 | 1153930 |
| 12/04 | PCB, DB, PE, 4A8 STATION | 1138197 | 1138197 | 1138197 | 1138197 |
| 12/07 | CONNECTOR, IDC SCOTCH LOK 567 -BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 12/09 | FUSE, HOLDER IN-LINE, CARTRIDGE | 102222 | 102222 | 102222 | 102222 |
| 12/10 | FUSE, 4A, 125V, CARTRIDGE | 1102221 | 1102221 | 1102221 | 1102221 |
| 12/24 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| | | | | | Reference Dwg: 130E018 |

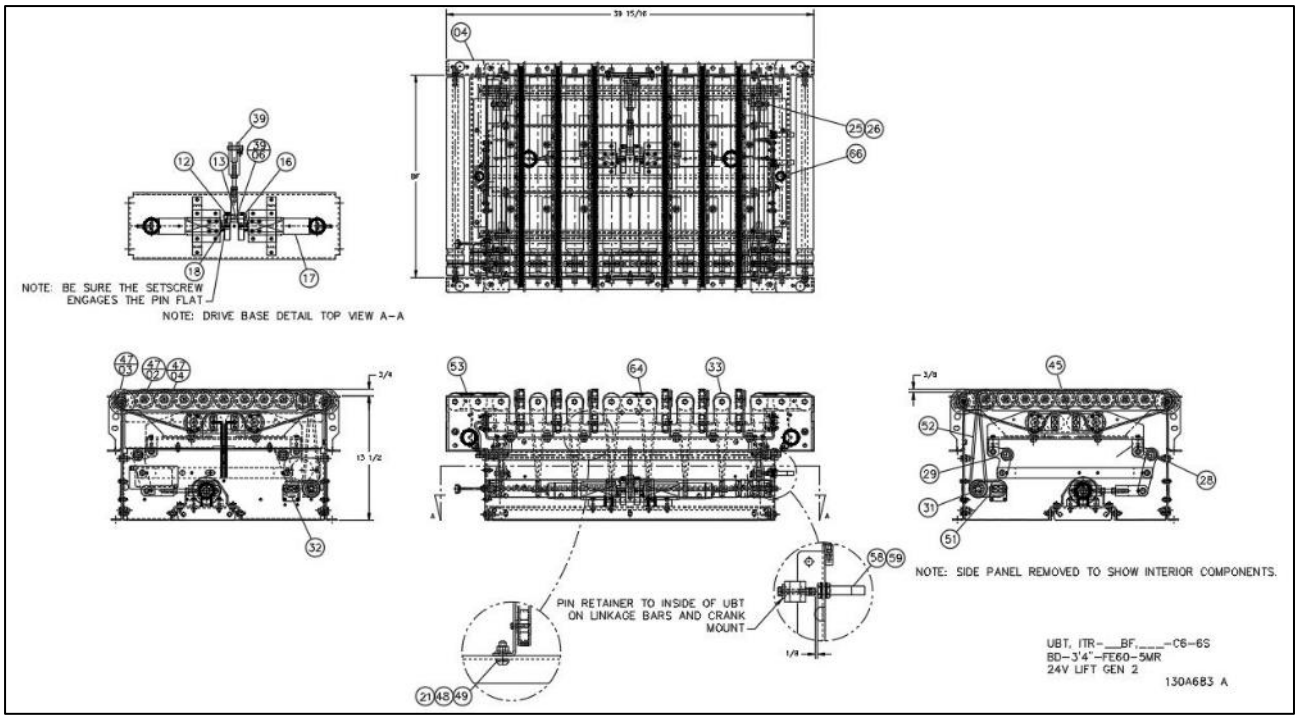
## 21.43 ITR UBT (PNEUMATIC LIFT) - ELECTRICAL COMPONENTS IB-E03, 5S & 6S




### *21.43.1 Replacement Parts — ITR UBT (Pneumatic Lift) - Electrical Components IB-E03 5s & 6s*

| REPLACEMENT PARTS - ITR UBT PNEUMATIC, ELECTRICAL COMPONENTS, IBE, 5s & 6s | | | | | |
|---|---|---|---|---|---|
| | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| 24 | CABLE, MOTOR EXTENSION, 600, 1200, OR 2700 MM LONG | REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD | | | |
| — | PE, ASY ITR UBT | | — | — | — |
| 05/01 | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE | 1163456 | 1163456 | 1163456 | 1163456 |
| 05/02 | PE, REFLECTOR 20MM X 30MM ADHESIVE BACKED | 1136359 | 1136359 | 1136359 | 1136359 |
| — | PL, ASY ITR CB UBT, LH/RH IB-E03 | — | — | — | — |
| 12/03 | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| 12/06 | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 12/07 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| ---- | CABLE, CTRLS-CAT5E-_'-GRAY | REFERENCE Cat5E COMMUNICATION CABLE | | | |
| Reference Dwg: 130E145 | | | | | |

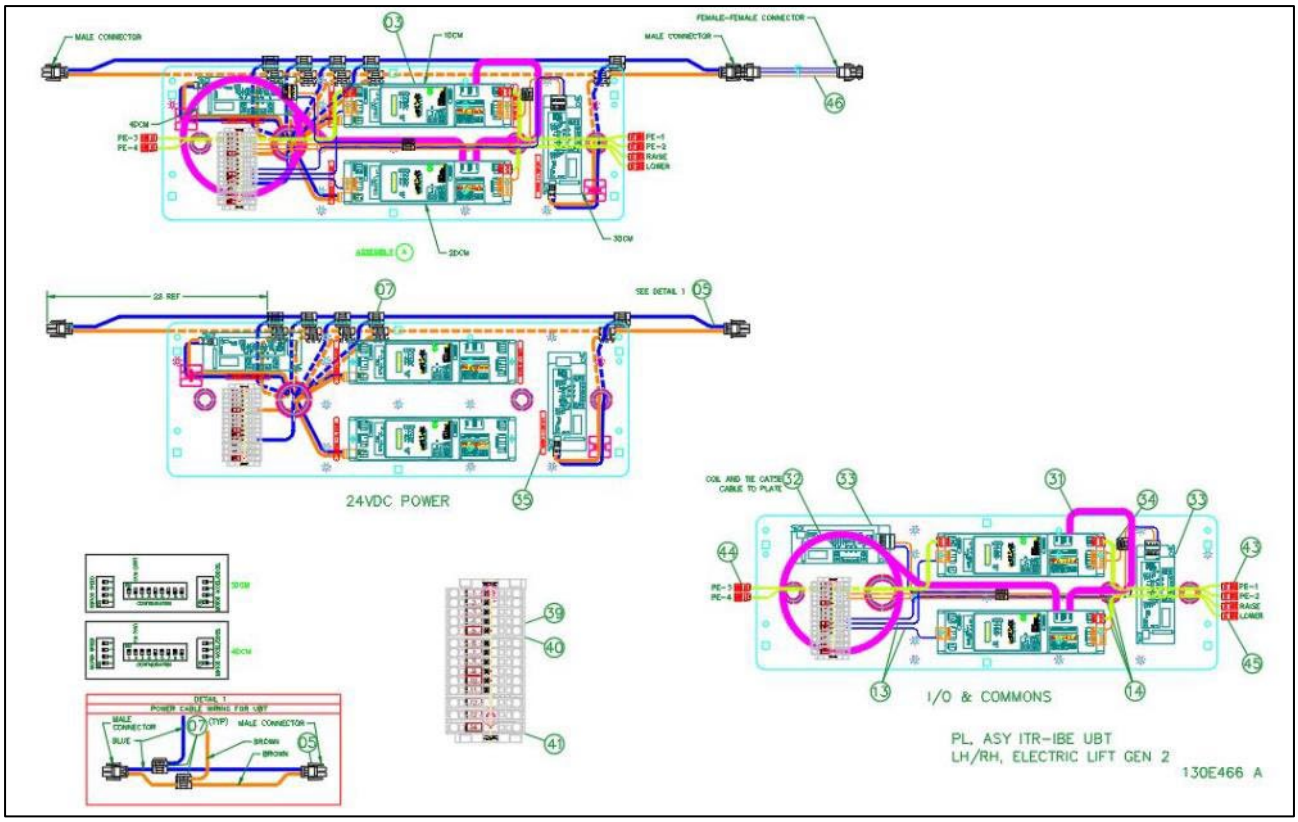
## 21.44 ITR UBT (ELECTRIC LIFT) - MECHANICAL COMPONENTS 5S & 6S



## *21.44.1 Replacement Parts — ITR UBT (Electric Lift) - Mechanical Components 5s & 6s*

| REPLACEMENT PARTS - ITR UBT (ELECTRIC LIFT), BI-DIRECTIONAL, IBE, 5S or 6S | | | | | |
|---|---|---|---|---|---|
| **UBT, ITR-_ _BF-IBE-C6-5S OR 6S-BD-FE60-_MR-ELIFT-W/PE** | | **Width & Item #** | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| 12 | CAM, DRIVE ELECTRIC LIFT UBT, ERS, WING BED | 1196464 | 1196464 | 1196464 | 1196464 |
| 17 | DRIVE, KYOWA 24VDC PULSE GEAR PULSE ROLLER | 1177986 | 1177986 | 1177986 | 1177986 |
| — | **ASY, DRIVE CRANK & ASY, IDLE CRANK** | — | — | — | — |
| 28 & 29 | BUSHING, BRONZE, FLANGED3/4 X 1/2 X 1 LG,1/8 FLNG THK | 1177970 | 1177970 | 1177970 | 1177970 |
| 28 & 29 | BUSHING, BRONZE, PLAIN 1/2 X 5/8 X 3/8 LG | 1184965 | 1184965 | 1184965 | 1184965 |
| 31 | ROLLER, CARRIER DRIVE ITR 2 UBT 4"C,5-STRAND ELECTRIC LIFT **(5S)** | 1196474 | 1196474 | 1196474 | 1196474 |
| 32 | ROLLER, ITR 23BF 2G ITOH PM 486 FE-60 - **(5S)** | 1191569 | 1191569 | 1191569 | 1191569 |
| 31 | ROLLER, CARRIER DRIVE ITR, UBT 4"C,6-STRAND ELECTRIC LIFT **(6S)** | 1187651 | 1187651 | 1187651 | 1187651 |
| 32 | ROLLER, ITR 31BF 2G ITOH PM 486 FE-60 - **(6S)** | 1191570 | 1191570 | 1191570 | 1191570 |
| 33 | ROLLER, _ _ITR 1.9 PLTD PRBG ELECTRIC LIFT UBT | 1196522 | 1196523 | 1196524 | 1196525 |
| 39 | ASY, DRIVE LINKAGE ELECTRIC LIFT | 1196442 | 1196442 | 1196442 | 1196442 |
| — | **ASY, DRIVE LINKAGE** | — | — | — | — |
| 39/06 | BUSHING, BRONZE, FLANGED3/8 X 1/2 X 3/8 LG1/16 FLNG THK | 1184963 | 1184963 | 1184963 | 1184963 |
| — | **ROLLER, ASY ITR _ _BF NG** | — | — | — | — |
| 45 | ROLLER, ITR 23BF NG ITOH-PM486FP-55- **(5S)** | 1214900 | 1214900 | 1214900 | 1214900 |
| 45 | ROLLER, ITR 31BF NG ITOH-PM486FP-55- **(6S)** | 1215118 | 1215118 | 1215118 | 1215118 |
| — | **WHEEL BRKT, ASY ITR UBT _ _"BF** | — | — | — | — |
| 47/02 | IDLER, ASY FLAT FACE ITR UBT | 1132379 | 1132379 | 1132379 | 1132379 |
| 47/03 | IDLER, ASY FLANGED ITR UBT | 1159961 | 1159961 | 1159961 | 1159961 |
| 47/04 | BELT,83A .188 X .468 X 66"_ _BF ITR2 UBT | 1132754 | 1132755 | 1132756 | 1132757 |
| 51 | ORING,3/16 DIA X 8-1/4" HT BLUE | E0034023 | E0034023 | E0034023 | E0034023 |
| 52 | ORING,83A ST TRNS 3/16X21-3/8 | 1149850 | 1149850 | 1149850 | 1149850 |
| 53 | ORING,3/16 DIA X 8.688 HT BLUE | 1137420 | 1137420 | 1137420 | 1137420 |
| 59 | SWITCH, PROX,12MM DIA, FLUSH MT4MM RANGE | 1184770 | 1184770 | 1184770 | 1184770 |
| 64 | ORING,3/16 DIA X 7-3/4" HT BLUE ITR **2"CTR** | 1142656 | 1142656 | 1142656 | 1142656 |
| ---- | CABLE, M12 TO WAGO 733-104,2M5P FEMALE | 1183766 | 1183766 | 1183766 | 1183766 |
| ---- | CABLE, MOTOR EXTENSION,600,1200, OR 2700 MM LONG | **REFERENCE CABLE, MOTOR EXTENSION USED WITH STATED DRIVER CARD** | | | |
| Reference Dwg: 130A683 | | | | | |

## 21.45 ITR UBT, (ELECTRIC LIFT) - ELECTRICAL COMPONENTS IB-E03, 5S & 6S




### *21.45.1 Replacement Parts — ITR UBT (Electric Lift) - Electrical Components IB-E03, 5s & 6s*

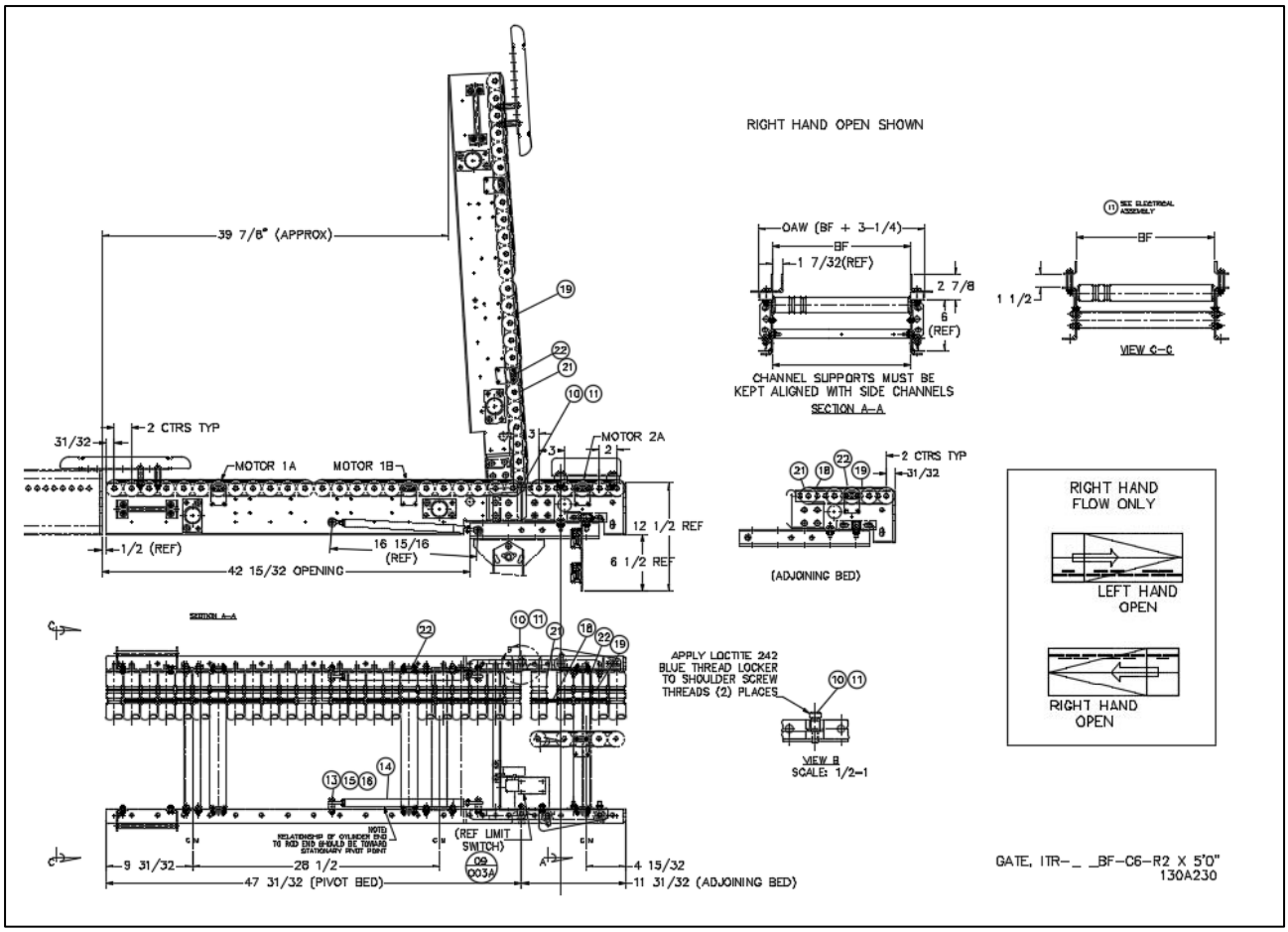
| REPLACEMENT PARTS - ITR UBT (ELECTRIC LIFT) *ELECTRICAL* COMPONENTS, BI-DIRECTIONAL, IBE, 5S or 6S | | | | | |
|---|---|---|---|---|---|
| UBT, ITR-_ _BF-IBE-C6-5S OR 6S-BD-FE60-_MR-ELIFT-W/PE | | Width & Item # | | | |
| Balloon | Description | 16 BF | 22 BF | 28 BF | 34 BF |
| — | ELECTRICAL COMPONENTS | — | — | — | — |
| 03 | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| ----- | PE, REFLEX TYPE ZL, PNP, LIGHT OPERATE | 1163456 | 1163456 | 1163456 | 1163456 |
| ----- | PE, REFLECTOR 20MM X 30MM ADHESIVE BACKED | 1136359 | 1136359 | 1136359 | 1136359 |
| 12/05 | HARNESS, POWER,10AWG | REFERENCE HARNESS TABLES | | | |
| --- | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 07 | CONNECTOR, IDC SCOTCH LOK 567 - BROWN | 3M567 | 3M567 | 3M567 | 3M567 |
| 31 & 32 | CABLE, CTRLS-CAT5E-_'-GRAY | REFERENCE Cat5E COMMUNICATION CABLE | | | |
| 33 | DRIVERCARD, INSIGHT EZ-QUBE-HTBF | 1226133 | 1226133 | 1226133 | 1226133 |
| 34 | CONNECTOR, IDC SCOTCH LOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 39 | TERM, BLOCK,2-COND,20-10AWG600V,30A, GRAY,6.2mm | 1145413 | 1145413 | 1145413 | 1145413 |
| 40 | TERM, SEPARATOR, ORANGE,2mm | 1180509 | 1180509 | 1180509 | 1180509 |
| 41 | TERM, END BARRIER, GRAY,1mm | 1145415 | 1145415 | 1145415 | 1145415 |
| | | | | | Reference Dwg: 130E466 |

## 21.46 ITR UBT LIFT TABLE TRANSFER OPTIONAL SPARE PARTS

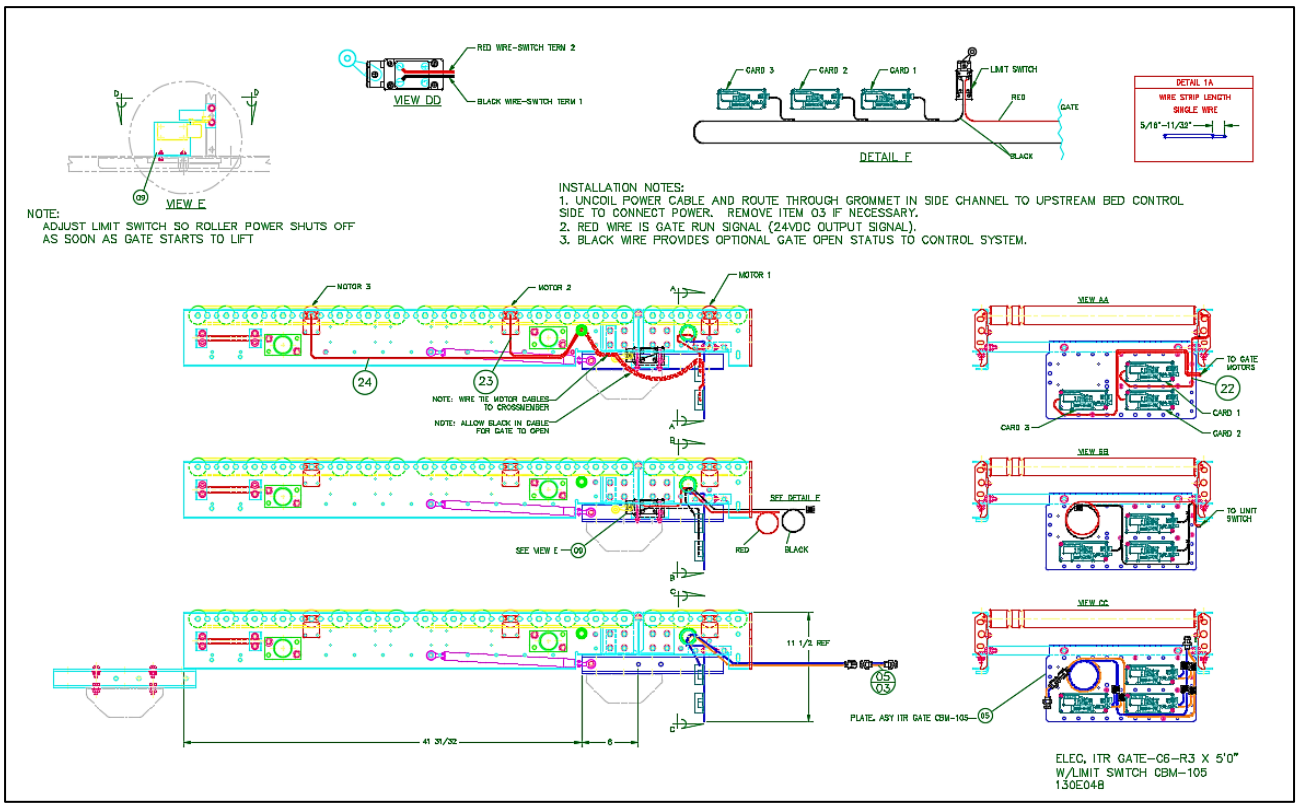

### *21.46.1 Optional Replacement Parts — ITR Lift Table Transfer*

| Optional Replacement Part Numbers Lift Table Transfer | |
|---|---|
| **ITEM #** | **DESCRIPTION** |
| E0009398 | BRG, BUSHING THOMSON A-162536 |
| E0009399 | RING, GRIP THOMSON W 1000 |
| | Dwg# 130W003 |

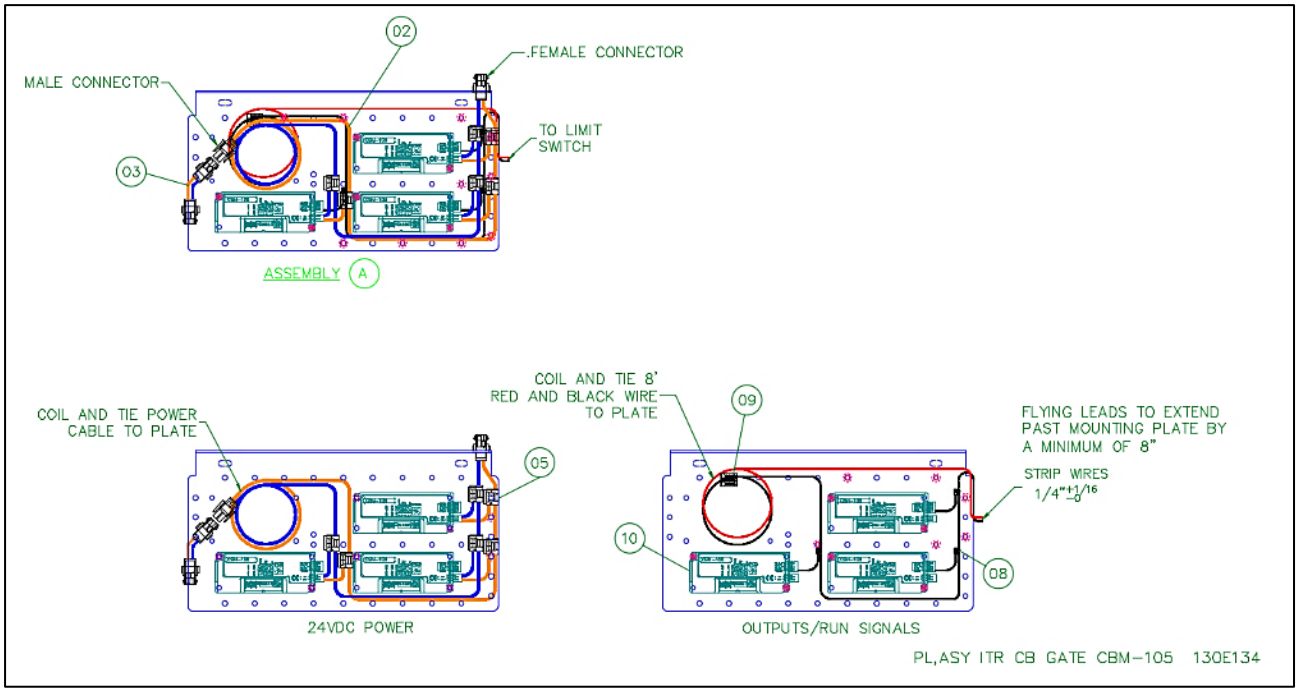
## 21.47 ITR GATE



## 21.47.1 ITR Gate, Electrical with Limit Switch CBM-105



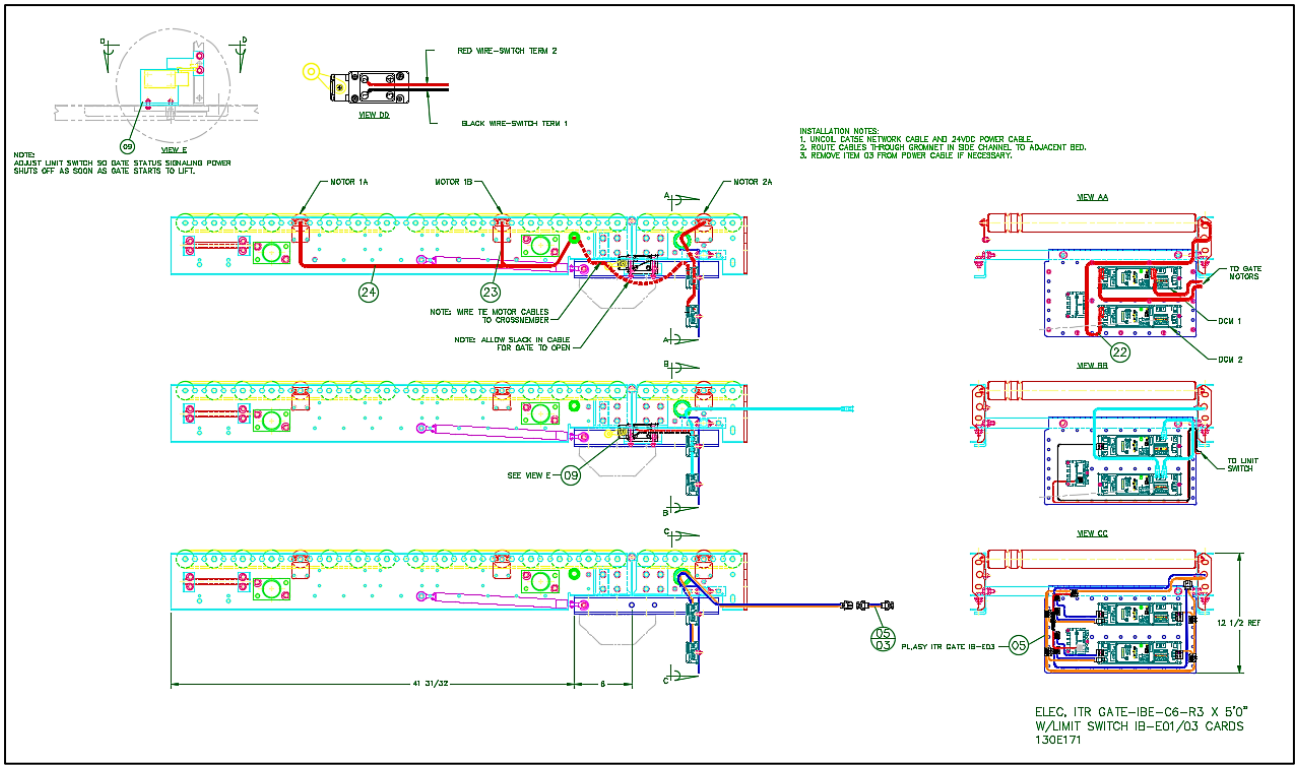

## 21.47.2 ITR Gate, Plate Assembly Electrical Components CBM-105



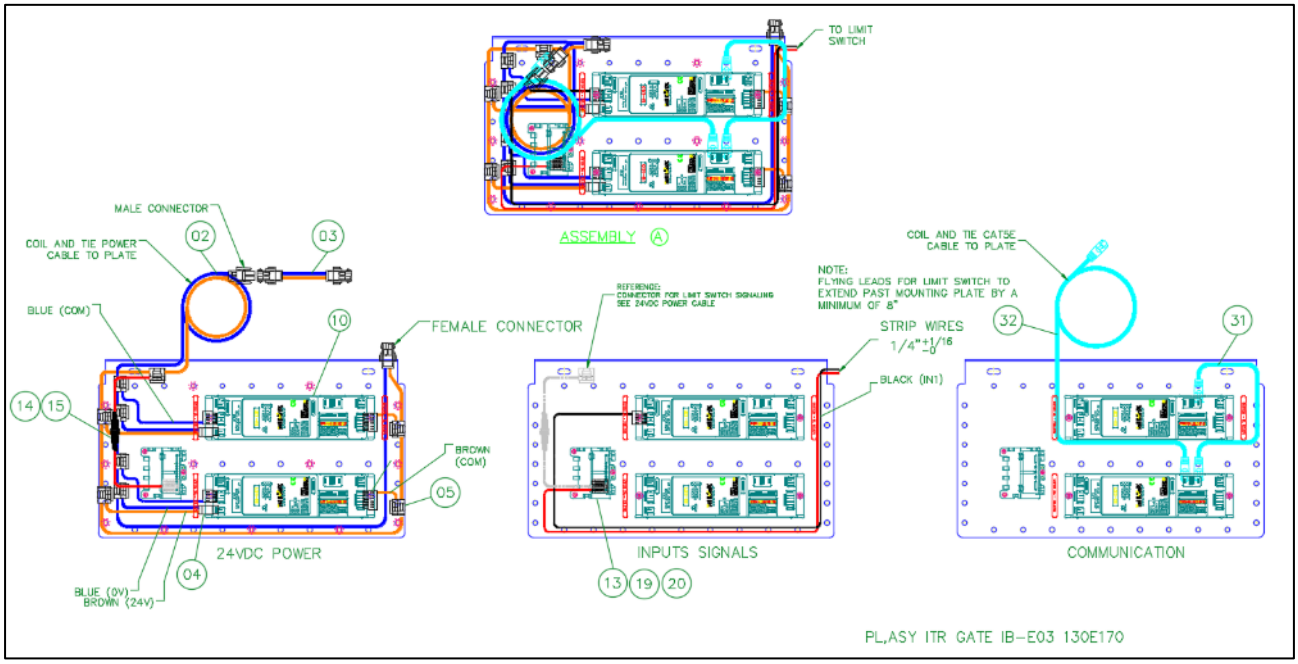
### *21.47.2.1 Replacement Parts – ITR Gate, CBM-105, 2RC & 3RC*

| REPLACEMENT PARTS - ITR GATE, CB, 2RC & 3RC | | | | | |
|---|---|---|---|---|---|
| GATE, ITR-_ _BF CB-C6-(2RC OR 3RC)-_ _"-FE60 | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| **1** | **ADJOINING GATE** | — | — | — | — |
| 19 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR **(USED WITH 3RC)** | E0005536 | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR **(USED WITH 2RC)** | E0005536 | E0005536 | E0005536 | E0005536 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR **(USED WITH 2RC)** | 1142656 | 1142656 | 1142656 | 1142656 |
| 21 | ROLLER, _ _ITR 1.9PLTD PRBG | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH | 1138722 | 1138723 | 1138724 | 1138725 |
| **2** | **PIVOT GATE** | — | — | — | — |
| 10 | BRG, BRONZE BOSTON FB-810-5 | 90050017 | 90050017 | 90050017 | 90050017 |
| 14 | SPRING, GAS 16-4, _ _ _ NEWTONS **(USED WITH 2RC)** | 1115812 | E0004269 | E0004270 | E0004271 |
| 14 | SPRING, GAS 16-4, _ _ _NEWTONS **(USED WITH 3RC)** | E0004267 | E0004268 | E0004269 | E0004270 |
| 16 | ROD, END PLAIN SPHERICAL DURBAL | E0003165 | E0003165 | E0003165 | E0003165 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE | 1142656 | 1142656 | 1142656 | 1142656 |
| **11** | **ELEC, GATE, ITR CB-016, LIMIT SWITCH** | — | — | — | — |
| 22 | CABLE, MOTOR EXTENSION, 600MM **USE W/ CB-016 OR HB-510** | 1138704 | 1138704 | 1138704 | 1138704 |
| 23 | CABLE, MOTOR EXTENSION, 1200MM **USE W/ CB-016 OR HB-510** | 1138705 | 1138705 | 1138705 | 1138705 |
| 24 | CABLE, MOTOR EXTENSION, 2700MM USE **W/ CB-016 OR HB-510** | 1138706 | 1138706 | 1138706 | 1138706 |
| **11/05** | **PL, ASY ITR GATE CB** | — | — | — | — |
| 2 | HARNESS, ITR-POWER-10AWG 5.5' | 1102288 | 1102288 | 1102288 | 1102288 |
| 3 | HARNESS, ITR-POWER-10AWG, 4"-FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| 5 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 | 3M567 |
| 8 | CONNECTOR, IDC SCOTCHLOK 558 - RED | 1120174 | 1120174 | 1120174 | 1120174 |
| 9 | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 | 1102816 |
| 10 | DRIVERCARD, ITOH **CBM-105FP** | 1153930 | 1153930 | 1153930 | 1153930 |
| **11/09** | **ASY, GATE LIMIT SWITCH ITR** | — | — | — | — |
| 003A | SWITCH, LIMIT 802T-AP AB | 802TAP | 802TAP | 802TAP | 802TAP |
| | | Ref Dwg# 130A230, 130E048, 130E134 | | | |

## *21.47.3 ITR Gate, Electrical with Limit Switch IB-E03*




## *21.47.4 ITR Gate, Plate Assembly Electrical Components IB-E03*



## *21.47.5 Replacement Parts — ITR Gate, 2RC & 3RC, IB-E03*

| REPLACEMENT PARTS - ITR GATE, IBE, 2RC & 3RC | | | | | |
|---|---|---|---|---|---|
| GATE, ITR-_ _BF IBE-C6-(2RC OR 3RC)-_ _"-FE60 | | Width & Item # | | | |
| **Balloon** | **Description** | **16 BF** | **22 BF** | **28 BF** | **34 BF** |
| **1** | **ADJOINING GATE** | — | — | — | — |
| 19 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR **(USED WITH 3RC)** | E0005536 | E0005536 | E0005536 | E0005536 |
| 18 | ORING, 3/16DIA X 9.5" HT BLUE ITR 3"CTR **(USED WITH 2RC)** | E0005536 | E0005536 | E0005536 | E0005536 |
| 19 | ORING, 3/16DIA X 7-3/4" HT BLUE ITR 2"CTR **(USED WITH 2RC)** | 1142656 | 1142656 | 1142656 | 1142656 |
| 21 | ROLLER, _ _ITR 1.9PLTD PRBG | E0002412 | E0002413 | E0002414 | E0006220 |
| 22 | ROLLER, ITR _ _BF 2G ITOH PM486 FE-60 | 1163471 | 1163472 | 1163473 | 1163474 |
| **2** | **PIVOT GATE** | — | — | — | — |
| 10 | BRG, BRONZE BOSTON FB-810-5 | 90050017 | 90050017 | 90050017 | 90050017 |
| 14 | SPRING, GAS 16-4, _ _ _NEWTONS **(USED WITH 2RC)** | E0004268 | 1205446 | E0004270 | E0004271 |
| 14 | SPRING, GAS 16-4, _ _ _ NEWTONS **(USED WITH 3RC)** | E0004267 | E0004268 | E0004269 | E0004270 |
| 16 | ROD, END PLAIN SPHERICAL DURBAL | E0003165 | E0003165 | E0003165 | E0003165 |
| 21 | ROLLER, _ _ITR 1.9PLTD PRBG | E0002412 | E0002413 | E0002414 | E0006220 |
| **11** | **ELEC, GATE, ITR IB-E03, LIMIT SWITCH** | — | — | — | — |
| 22 | CABLE, MOTOR EXTENSION, 600MM **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | 1135339 | 1135339 | 1135339 | 1135339 |
| 23 | CABLE, MOTOR EXTENSION, 1200MM **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | 1135340 | 1135340 | 1135340 | 1135340 |
| 24 | CABLE, MOTOR EXTENSION, 2700MM **USE W/ IB-N03/IB-E/HBM-604/BRAKE** | 1135341 | 1135341 | 1135341 | 1135341 |
| **11/05** | **PL, ASY ITR GATE IB-E03** | — | — | — | — |
| 2 | HARNESS, ITR-POWER-10AWG 5.5' | 1102288 | 1102288 | 1102288 | 1102288 |
| 3 | HARNESS, ITR-POWER-10AWG, 4"-FEMALE/FEMALE CONN | 1141549 | 1141549 | 1141549 | 1141549 |
| 4 | CONN, WAGO 231-302/026-000 | 1162204 | 1162204 | 1162204 | 1162204 |
| 5 | CONNECTOR, IDC SCOTCHLOK 567 | 3M567 | 3M567 | 3M567 | 3M567 |
| 10 | DRIVERCARD, ITOH IB-E03 | 1166286 | 1166286 | 1166286 | 1166286 |
| 13 | CONN, 3 COND, W/LEVERS | 1102816 | 1102816 | 1102816 | 1102816 |
| 14 | FUSE, 4A, 125V, CARTRIDGE, GMA | 1102221 | 1102221 | 1102221 | 1102221 |
| 15 | FUSE, HOLDER IN-LINE, CARTRIDGE | 1102222 | 1102222 | 1102222 | 1102222 |
| 31 | CABLE, CTRLS-CAT5E-3'-GRAY | E0034025 | E0034025 | E0034025 | E0034025 |
| 32 | CABLE, CTRLS-CAT5E-5'-GRAY | E0034026 | E0034026 | E0034026 | E0034026 |
| 11/09 | ASY, GATE LIMIT SWITCH ITR | --- | --- | --- | --- |
| 003A | SWITCH, LIMIT 802T-AP AB | 802TAP | 802TAP | 802TAP | 802TAP |
| | | | | | Ref Dwg# 130A230, 130E170, 130E171 |

# INTELLIROL REVISION HISTORY

| Revision Date | Chapter and Description | Initials |
|---|---|---|
| 4/16/2021 | Pneumatic Requirements<br>1. A more accurate name for pop-off is pressure-relief.<br>2. This is not a switch but a valve (just vents to atmosphere)<br>3. Pressure settings above and below operating range are general recommendations, subject to the accuracy of the devices.<br>4. Pneumatic actuators used in ITR product line are rated for high pressure, 45 psi pressure-relief valve could be considered unnecessary. | CN /SL |
| 04/16/2021 | Spare Parts Chapter - Updated drawings 130A034-038 & 130A640-643 | DG |
| 07/6/2021 | Added optional spare parts for Transfer Lift Table | AB CN |
| 08/10/2021 | Add merge bracket kit part number 1208351 for clarity per ECN 11891. | EN EB DP |
| 09/22/2021 | Added MHS Conveyor name, logo, and format | AB MD |
| 12/08/2021 | Updated Coated Roller part list descriptions | AB / DG |
| 08/08/2022 | Add Description of Operation chapter | TE |
| 08/08/2022 | Removed Noseover and Noseunder Decline 15 Degrees | DG |
| 09/06/2022 | Add safety warnings | MM |
| 11/04/2022 | Updated chapter 15.6 IB-E03 ELECTRICAL COMPONENTS chart to include Photo-eye | MD CN |
| 01/31/2023 | Update Shroud part list. No new revision | MD |
| 02/16/2023 | Spare Parts section Noseover and Noseunder updated belt part numbers. | DG |
| 03/06/2023 | Full Width Belt – Updated belt part numbers. | DG |
| 4/6/2023 | MHS Conveyor Controls Safety Guidelines – Updated Emergency stop | SM, AB |
| 8/25/2023 | Replace part EZ-24 (1173108) with EZ-Qube card (1226133). | TE MD |
| 1/29/2024 | Lift gate maximum cycles updated. | CN MD |
| 1/29/2024 | Clarify description for IB-E03 | CN |
| 6/6/2024 | Updated temperature range for IntelliROL with belts | AB MD |
| 9/13/2024 | Removed Power Merge | AB |
| 9/13/2024 | Update maintenance and safety chapters. | MD AB |
| | | |
| | | |

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MHS Conveyor, located in Norton Shores, Michigan, is a leading deliverer of “smart” material handling systems, technologies, products, and services, creating solutions for material flow applications. As a global supplier of conveyor systems and equipment since 1964, MHS Conveyor provides sorters, conveyors, and accessories to satisfy a broad spectrum of accumulation, transportation, and sortation applications.

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