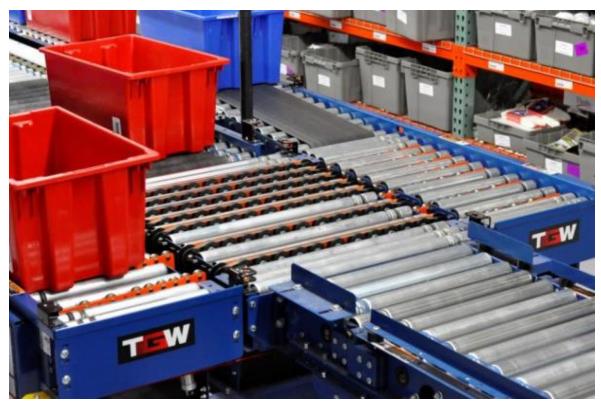
Installation, Operation, Maintenance Manual



IntelliROL® PZM (Pick Zone Module)

P/N: 1167035

Revision Date: March 05, 2019





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IntelliROL® PZM IOM



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Chapter 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 supports and connections.

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

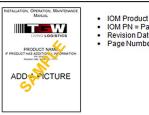
This service manual is intended for use by personnel who are knowledgeable of installation and safe working practices on conveyor systems.

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

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

Manual Structure

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





♦ 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!



Chapter 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 3/01/2019

MHS Conveyor Environment Standards

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

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

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

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Chapter 3: SAFETY RECOMMENDATIONS

MHS Conveyor Safety Recommendation For additional safety information:

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

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

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

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

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

Conveyor Design and Safety Guidelines

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

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

- ANSI Z535.1 Safety Color Code
- ANSI Z244.1 Lockout/Tagout of Energy Sources
- ASME B15.1 Safety standard for Mechanical Power Transmission Apparatus
- ASME B20.1 Safety standard for Conveyors and Related Equipment
- CEMA Safety Standards and Labels
- OSHA 1910.147 The Control of Hazardous Energy
- OSHA 1910.212 General Requirements for all Machines
- OSHA 1910.95 Occupational Noise Exposure

Definitions:

- ANSI = American National Standard Institute
- ASME = American Society of Mechanical Engineers
- **CEMA** = Conveyor Equipment Manufacturers Association
- OSHA = Occupational Safety and Health Administration

WARNING



• Safety: Always lock out power source and follow recommended safety procedures.

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3.1: MHS Conveyor RECOMMENDED STANDARDS FOR CONVEYORS

ANSI Standards for Conveyors

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

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

With any piece of industrial equipment, conditions exist that might cause injury to you or your co-workers. Because it is not possible to describe each potentially hazardous situation that might develop, you must be alert at all times for unsafe conditions. To avoid injury, use maximum possible care and common sense and adhere to all safety standards. Take special care while maintaining and inspecting electrical equipment and devices. All personnel working on or around the system should be aware of, and adhere to, all CAUTION, DANGER, and WARNING signs.

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

ANSI Conveyor Safety Rules



American National Standards Institute

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

CEMA Standards for Conveyors

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

MHS Conveyor recommends these videos for training and education purposes as part of a safe working environment around conveyor equipment. The videos introduce awareness of operations, personnel, maintenance technicians, and management to safety hazards commonly associated with the automated material handling conveyor equipment.

The safety posters reviews important safety labels and are intended to be posted in public places as a day-to-day reinforcement of good safety practices. These posters can be downloaded from the CEMA Website at http://www.cemanet.org/safety-label-posters or for more information for both the safety poster and the videos can be purchased from CEMA. Visit their website — www.cemanet.org

For additional information or contact them at:



CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

5672 Strand Ct., Suite 2 Naples, Florida 34110 239.514.3441

CEMA Safety Label Meanings

ANSI Z535.4 - Product Safety Signs and Labels

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

DANGER -Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

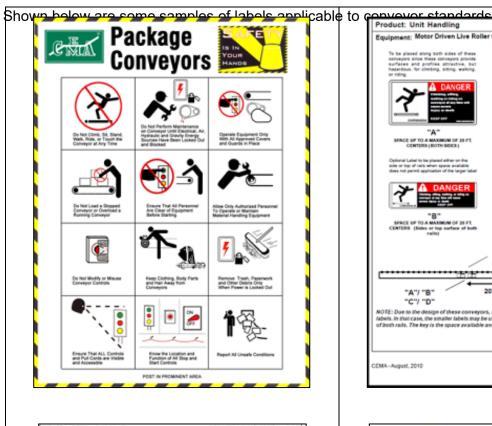
WARNING – Indicates potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

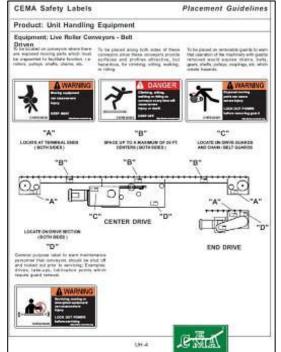
CAUTION – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

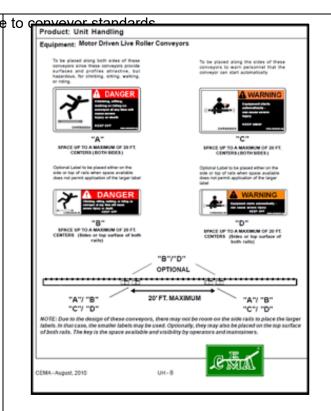
http://www.cemanet.org/cema-safety-label-meanings/

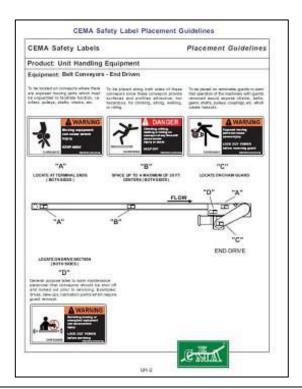


3.2: MHS Conveyor RECOMMENDS PROPER LABELS FOR CONVEYOR TYPES











3.3: WARNINGS AND SAFETY INSTRUCTIONS

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 paid to the following areas of this manual:

↑ WARNING



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

CAUTION

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

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3.3.1: Warnings and Safety Instructions

WARNING



- After maintenance, REPLACE guards immediately.
- Keep ALL warning labels clean and clear of any obstructions.
- Never remove, deface, or paint over WARNING or CAUTION labels. Any damaged label will be replaced by MHS Conveyor at no cost by contacting Lifetime Services.
- It is very important to instruct personnel in proper conveyor use including the location and function of all controls.
- Special emphasis must be given to emergency stop procedures.
- It is important to establish work procedures and access areas, which do not require any part of a person to be under the conveyor.
- It should be required that long hair is covered by caps or hairnets.
- Loose clothing, long hair, and jewelry must be kept away from moving equipment.
- Maintain enough clearance on each side of all conveyor units for safe adjustment and maintenance of all components.
- Provide crossovers or gates at sufficient intervals where needed to eliminate the temptation for personnel to climb over or under any conveyor.
- Walking or riding on a moving conveyor must be prohibited.
- Before performing maintenance on the conveyor, make sure the start-up controls are locked out and cannot be turned on by any person other than the one performing the maintenance.
- If more than, one crewmember is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCKOUT.
- All pneumatic devices must be de-energized and air removed to prevent accidental cycling of the device while performing general maintenance.
- Make sure all personnel are clear of all conveyor equipment before restarting the system.
- 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.

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MARNING



 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.





3.4: MHS Conveyor 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 should be protected by an emergency stop. An operator should not have to move from where he is to actuate the emergency stop.

Conveyors in areas of high pedestrian traffic should also be protected by emergency stop devices.

For all other instances, emergency stops should be located throughout a system such that it is possible to shut down the system without having to walk too far. In these instances the emergency stop is used more to protect the equipment from damage than to protect personnel.

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.

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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.

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Chapter 4: RECEIVING & SITE PREPARATION

General Shipping / Packaging Information

IntelliROL conveyor is shipped in subassemblies. These subassemblies are packaged to guard against damage in shipment when handled properly.

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

CAUTION

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

Preparation of Site

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

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





Chapter 5: Part Inventory & Identification

Label Identification

Each subassembly is shipped completely assembled except typical loose parts, which are in boxes with the subassemblies. Segregate the conveyor subassemblies by types for inventory and ease of locating during installation.



An identification label is attached to the charged end of the center Bed of each ITR Pick Zone Module.

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 weigh-counted and packaged by size and type.



MARNING



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

MARNING



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.



Chapter 6: PICK ZONE MODULE INSTALLATION

ITR Pick Zone Concepts

The ITR Pick Zone Module utilizes motorized roller to convey and transfer product much easier than Line Shaft conveyor.

This rapidly 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.

Operation

The product-carrying rollers are slave-driven by a series of pre-tensioned belts to the motorized roller in each zone. The rollers and urethane belts transfers are activated by a series of photo eyes. The photo eyes are already in place and factory tested

Feature/Benefits

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

A bi-directional urethane belt transfer has a maximum rate of 30 cases per minute.

CAUTION

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

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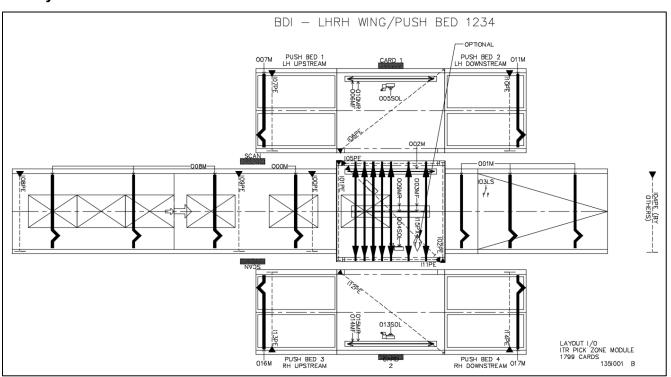
6.1: ITR PICK ZONE APPLICATION OPTIONS

The ITR Pick Zone Module has many standard sizes.

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

ITR Pick Zone Standard Sizes					
MODEL	ITEM#	BF (CTR-WINGS)	CONTROLS	SCANNER GAP (A)	TRANSFER GAP (B)
PZM,ITR-16BF-CB-7S-BDI6 GAP	1155289	22-16	TERM. STRIP	6"	3"
PZM,ITR-22BF-CB-7S-BDI6 GAP	1155290	28-22	TERM. STRIP	6"	3"
PZM,ITR-28BF-CB-7S-BDI6 GAP	1155291	34-28	TERM. STRIP	6"	3"
PZM,ITR-16BF-CB-7S-BDI 3.5 GAP	1155292	22-16	TERM. STRIP	3-1/2"	1/2"
PZM,ITR-22BF-CB-7S-BDI 3.5 GAP	1155293	28-22	TERM. STRIP	3-1/2"	1/2"
PZM,ITR-28BF-CB-7S-BDI3.5 GAP	1155294	34-28	TERM. STRIP	3-1/2"	1/2"
PZM,ITR-16BF-ER-7S-BDI6 GAP	1155295	22-16	1799 ER	6"	3"
PZM,ITR-22BF-ER-7S-BDI6 GAP	1155296	28-22	1799 ER	6"	3"
PZM,ITR-28BF-ER-7S-BDI6 GAP	1155297	34-28	1799 ER	6"	3"
PZM,ITR-16BF-ER-7S-BDI 3.5 GAP	1155298	22-16	1799 ER	3-1/2"	1/2"
PZM,ITR-22BF-ER-7S-BDI 3.5 GAP	1155299	28-22	1799 ER	3-1/2"	1/2"
PZM,ITR-28BF-ER-7S-BDI 3.5 GAP	1155300	34-28	1799 ER	3-1/2"	1/2"
				R	eference Dwg. 135A012

Conveyor Flow



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6.2: DEFINITION OF TERMS

<u>Carrying Roller</u> - 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.

<u>Coefficient of Friction</u> - 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.

<u>Conveyor Width</u> - 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 side channels of a conveyor bed.

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

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

Roller Centers - Distance between center lines of adjacent rollers.

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

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

<u>Slave Belt</u> - 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.

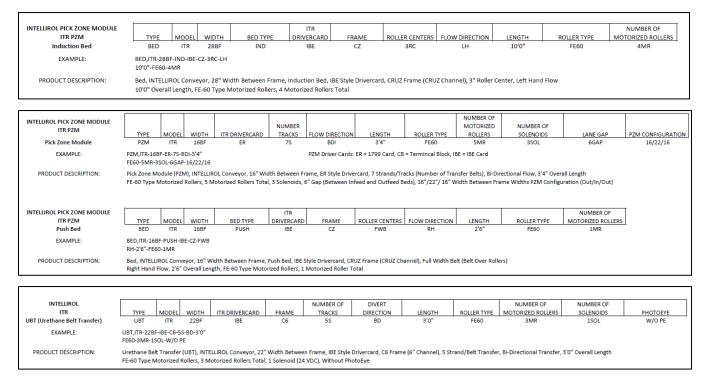
Zone - A portion of conveyor activated by a motorized roller that may be controlled by a photoeye.

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

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6.3: PRODUCT DESCRIPTION EXAMPLES



For the most current list of "**Product Description**" and "**Terms and Abbreviations**" Log into <u>mhs-conveyor.com</u> and select Support/Engineering Support Documents.

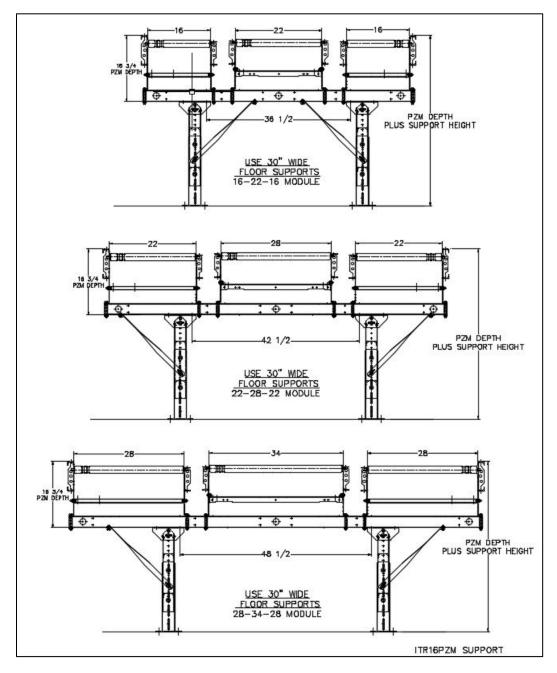
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6.4: SUPPORTS & CONNECTIONS

For details on Supports & Connections, see Support & Connections IOM (#1200485) at https://mhs-conveyor.com/support/iom-manuals/supports-and-connections

6.5: SUPPORTING ITR PICK ZONE MODULE

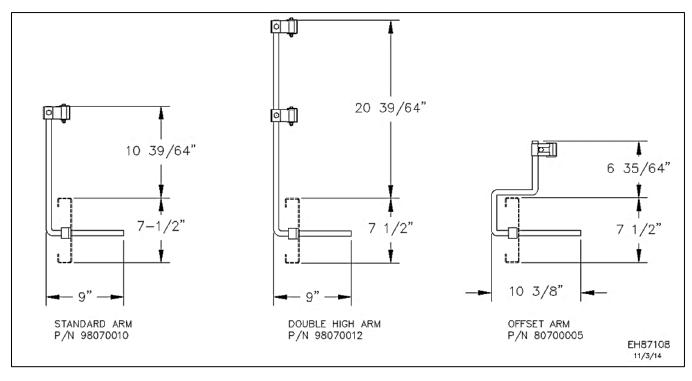


NOTE:

Type "C" braces (not shown) use two type "B" braces overlapped and bolted together for extended length when conveyor height is 48" or more.



6.6: ADJUSTABLE CHANNEL GUARD RAIL TO CRUZ®CHANNEL OPTIONS





6.7: ENVIRONMENT

Temperature range (ambient):

+35° to +100°F. For applications that exceed this temperature range, please consult Applications Engineering.

Ultraviolet Rays:

Avoid exposure of polyurethane O-rings to sunlight.

Oily or Wet Conditions:

Will impair frictional drive characteristics.

Corrosive or Abrasive Substances:

Will adversely affect various components.

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.

Accumulation with Application Engineering approval.

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6.8: DIMENSIONAL REFERENCE POINTS

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

Conveyors should be installed with the center line of the bed matching the center line of the conveyor path within 1/8" of true center. Locate and mark the center of the 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.

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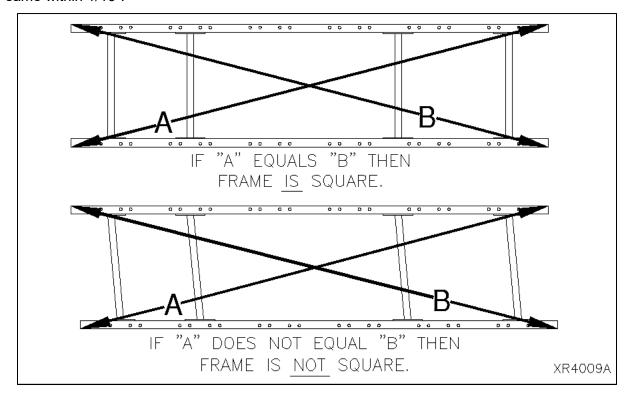
6.9: PZM Installation

The ITR Pick Zone Module may be installed using any of the supporting arrangements described under Support Arrangements in this manual. As each bed is installed in the system, level the conveyor from side to side using a bubble level on the roller at each support.

The bubble location should be within the level indicator lines of the level. The center line of the conveyor should not bow to the right or left more than 1/8" in either direction from a center line 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.)

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".



NOTE:

Conveyor frames must <u>always</u> be installed in a straight line from end to end. After a number of sections have been installed to the chalk line and leveled, check the alignment of each conveyor assembly.

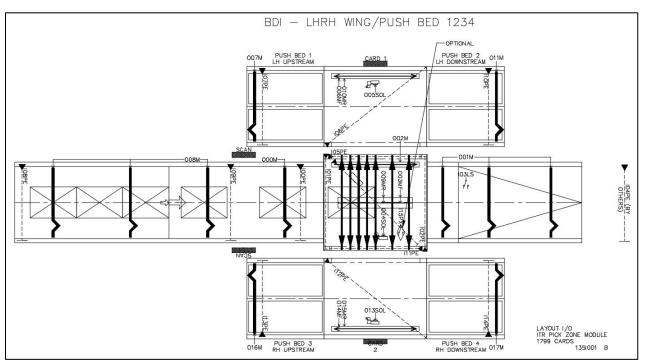


Chapter 7: ESTABLISHING CONVEYOR FLOW

The center bed carrier rollers of the ITR Pick Zone Module run in one direction while the Wing beds can be Bi-directional. The ITR Pick Zone Module has a label on the charge end of the center bed of the Module. This label indicates the direction of flow.



7.1: CONVEYOR FLOW



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Chapter 8: PZM PNEUMATIC-DESCRIPTION OF OPERATION

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

- Upstream induct conveyor running (O00M and O08M)
- Downstream gate conveyor running (O01M)
- Pick zone module transfer rollers running (O02M)
- Pick zone module transfer in down position (I15PX, O04SOL)
- All wing beds in down position (O05SOL, O13SOL)
- All other pick zone module conveyors not running (O03MF, O06MF, O07M, O09MR, O10MR, O11M, O14MF, O15MR, O16M and O17M)

As product appears on the induct conveyor, a gap will be created between each package. This facilitates barcode scanning and sensing of individual products prior to entering the transfer. As gapped packages travel along the induct conveyor, the customer-supplied barcode scanner can read the barcode on each package. This information is then used to determine what to do with each package at the decision point of the pick zone module. Specifically, the decisions needed at the pick zone module are as follows:

- Whether or not to divert the package
- If the transfer is bi-directional, which direction to divert the package
- If the wing bed is bi-directional, which direction to send the package

As I00PE senses a package upstream of the transfer, O00M and O08M will continue to run the induct conveyor if the transfer is clear and down (as detected by I15PX, if included.) Otherwise, O00M and O08M will stop the induct conveyor until the transfer is ready to accept another package.

Once the package has completely entered the transfer, as detected by I01PE, if the package is to be diverted and the wing bed is clear, up to four things will occur as follows:

- 1. O03MF will run the transfer belts
- 2. O04SOL will raise the transfer
- 3. O05SOL or O13SOL will raise the wing bed
- 4. If the transfer is bi-directional, O09MR will set the transfer divert direction (OFF=forward, ON=reverse)

Once the package is present on the wing bed, as detected by I06PE or I12PE, up to three things will occur as follows:

- 1. O06MF or O14MF will run the destination wing bed
- 2. O07M, O11M, O16M or O17M will run the destination push bed
- 3. If the wing bed is bi-directional, O10MR or O15MR will set the wing bed direction (OFF=forward, ON=reverse)

Again, these decisions are based upon the data associated with the barcode on the package. Once the trailing edge of the package enters the wing bed, as detected by I05PE or I11PE, O03MF will stop the transfer belts, O04SOL will lower the transfer and O05SOL or O13SOL will lower the wing bed. Once the package is present on the push bed, as detected by I07PE, I10PE, I13PE or I14PE, O06MF or O14MF will stop the wing bed. Once the trailing edge of the package clears the push bed, as detected by I07PE, I10PE, I13PE or I14PE, O07M, O11M, O16M or O17M will stop the push bed. If the package



is not supposed to be diverted, then the transfer will remain down and the package will travel straight through the pick zone module.

If the package is not being diverted, the next package does not have to wait for the transfer to be clear before being released by the induct conveyor. After a short delay, the next package can be inducted to the transfer. The amount of this delay needs to be long enough to allow the trailing edge of the first package to exit the transfer, as detected by I02PE, prior to the trailing edge of the second package completely entering the transfer, as detected by I01PE. If the package is being diverted, the next package must wait until the trailing edge of the current package enters the wing bed, as detected by I05PE or I11PE. Once this occurs, and the transfer is down, the transfer is considered clear and ready for the next package.

The gate conveyor motors are controlled by O01M. The status of the gate is monitored by I03LS. If the gate is opened, the run signal to the gate conveyor motors will be interrupted, stopping the rollers. Do not turn off O01M. In addition to running the gate conveyor rollers, the signal is also passed through the I03LS limit switch contacts, and then to the input. Also, if the gate is opened when a package is on the transfer, it can be allowed to continue if it is being diverted. Otherwise, it should not be sent straight through the transfer. If a package is stopped on the transfer due to the gate being opened, the induct conveyor should not release additional product to the transfer. This should only be an issue if the package on the transfer was going straight through, since normally a timer would allow another package to be released to the transfer without the transfer being clear.

In addition to the functionality described above, the O01M run signal is also used to power the I04PE photoeye. The O01M run signal should not be turned off when the downstream conveyor is full. The status of product on the downstream conveyor is monitored by I04PE. If the downstream conveyor is full, a package on the transfer can be allowed to continue if it is being diverted. Otherwise, it should not be sent straight through the transfer. If a package is stopped on the transfer due to the downstream conveyor being full, the induct conveyor should not release additional product to the transfer. This should only be an issue if the package on the transfer was going straight through, since normally a timer would allow another package to be released to the transfer without the transfer being clear.

If desired, the entire pick zone module can be stopped, including the induct conveyor, transfer rollers and gate conveyor, due to inactivity. If the pick zone module does not sense any product for a period of time, the system can be stopped. When product begins entering the induct conveyor, as detected by I08PE, the system can be restarted and function as described above.

As described previously in this document, the induct conveyor creates a gap between packages as they travel toward the barcode scanner and transfer. This gapping occurs due to the speed differential between the first two zones and the second two zones of the induct conveyor. If the barcode scanner is a top scanner, the induct conveyor may need to create a larger gap between packages prior to them arriving at the scanner. This can be accomplished by splitting the run signal between the third and fourth zones of the induct conveyor. The first three zones share a run signal (O08M) so that they start and stop together. The fourth zone has its own run signal (O00M) so that it can continue to run while the first three zones are stopped. This should be done for a period of time long enough to create the desired minimum gap between each package. A photoeye (I09PE) is positioned in the third zone to monitor the gap between packages. This photoeye is used to determine if the first three zones need to be stopped to create the desired minimum gap.



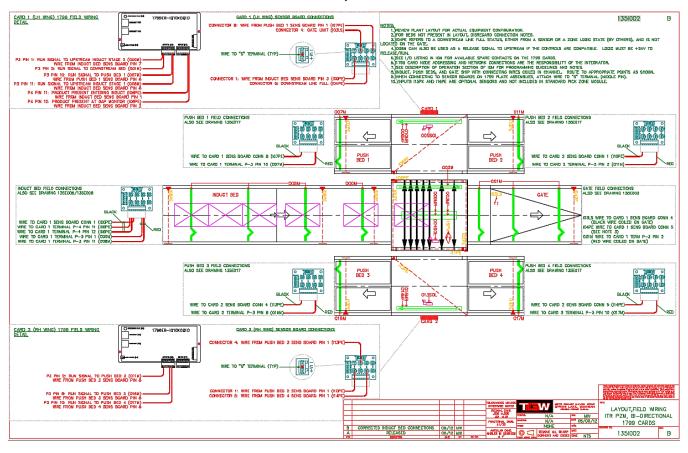
8.1: WING BED LH & RH PUSH BEDS 1234 (1799)

		1799 Inputs (Terminal P4)	
Device Tag	Pin#	Description	Wired At:
100PE	1	Product Present Upstream of Transfer	Field
101PE	2	Product Present Entering Transfer	Bench
102PE	3	Product Present Exiting Transfer Straight	Bench
N/A	4	0V	Bench
103LS	5	Downstream Gate Closed	Field
104PE	6	Downstream Conveyor Full	Field
105PE	7	Product Present Entering Wing Bed 1 (LH)	Bench
106PE	8	Product Present On Wing Bed 1 (LH)	Bench
N/A	9	0V	Bench
107PE	10	Product Present On Push Bed 1 (LH Upstream)	Field
108PE	11	Product Present Entering Induct	Field
109PE	12	Product Present At Gap Monitor	Field
I10PE	1	Product Present On Push Bed 2 (LH Downstream)	Field
I11PE	2	Product Present Entering Wing Bed 2 (RH)	Bench
I12PE	3	Product Present On Wing Bed 2 (RH)	Bench
N/A	4	0V	Bench
I13PE	5	Product Present On Push Bed 3 (RH Upstream)	Field
I14PE	6	Product Present On Push Bed 4 (RH Downstream)	Field
I15PX	7	Transfer Lowered (Optional)	Bench
I16PE	8	Product Present On Transfer (Optional)	Bench
N/A	9	0V	Bench
117	10	Spare	Bonon
118	11	Spare	
I19	12	Spare	
110	112	Opare	
		1700 Outpute (Torminal D3)	
Dovico Tag	Din#	1799 Outputs (Terminal P3)	Wirod At:
Device Tag	Pin #	Description	Wired At:
O00M	1	Description Run Upstream Induct Stage 2	Field
O00M O01M	2	Description Run Upstream Induct Stage 2 Run Downstream	Field Field
O00M O01M O02M	1 2 3	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers	Field Field Bench
O00M O01M O02M N/A	1 2 3 4	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V	Field Field Bench N/C
O00M O01M O02M N/A O03MF	1 2 3 4 5	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts	Field Field Bench N/C Bench
O00M O01M O02M N/A O03MF O04SOL	1 2 3 4 5 6	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer	Field Field Bench N/C Bench Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL	1 2 3 4 5 6 7	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH)	Field Field Bench N/C Bench Bench Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF	1 2 3 4 5 6 7	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH)	Field Field Bench N/C Bench Bench Bench Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A	1 2 3 4 5 6 7 8	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V	Field Field Bench N/C Bench Bench Bench Bench Bench N/C
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A	1 2 3 4 5 6 7 8 9	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream)	Field Field Bench N/C Bench Bench Bench Bench Bench K/C Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M	1 2 3 4 5 6 7 8 9 10	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1	Field Field Bench N/C Bench Bench Bench Bench Bench Bench Field Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M	1 2 3 4 5 6 7 8 9 10 11	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR	1 2 3 4 5 6 7 8 9 10 11 12	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH)	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR	1 2 3 4 5 6 7 8 9 10 11 12 1	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream)	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR O11M	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare	Field Field Bench N/C Bench Bench Bench Bench Bench Bench Field Bench Bench Field Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR O11M O12 N/A	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4	Description Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V	Field Field Bench N/C Bench Bench Bench Bench Bench Bench Field Bench Bench Bench Field Field Field Field Field Field Field Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O11M O12 N/A O13SOL	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH)	Field Field Bench N/C Bench Bench Bench Bench Bench Bench N/C Field Field Bench Bench Bench Bench Bench Bench Bench Bench Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR O11M O12 N/A O13SOL O14MF	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Run Wing Bed 2 (RH)	Field Field Bench N/C Bench Bench Bench Bench Bench Bench Field Bench Bench Bench Field Field Field Field Field Field Field Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O11M O12 N/A O13SOL	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH)	Field Field Bench N/C Bench Bench Bench Bench N/C Field Field Bench Bench Field N/C Field Bench Bench Bench Field N/C Bench Bench Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O10MR O11M O12 N/A O13SOL O14MF	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Run Wing Bed 2 (RH)	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O11M O12 N/A O13SOL O14MF O15MR	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH)	Field Field Bench N/C Bench Bench Bench Bench N/C Field Field Bench Bench Field N/C Field Bench Bench Bench Field N/C Bench Bench Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O11M O12 N/A O13SOL O14MF O15MR O16M	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Run Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH) Run Push Bed 3 (RH Upstream)	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench Bench Bench Bench Bench Bench Field
O00M O01M O02M N/A O03MF O04SOL O05SOL O06MF N/A O07M O08M O09MR O11M O12 N/A O13SOL O14MF O15MR O16M N/A	1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers 0V Run Transfer Belts Raise Transfer Raise Wing Bed 1 (LH) Run Wing Bed 1 (LH) 24V Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Reverse Direction Transfer Belts Reverse Direction Wing Bed 1 (LH) Run Push Bed 2 (LH Downstream) Spare 0V Raise Wing Bed 2 (RH) Run Wing Bed 2 (RH) Reverse Direction Wing Bed 2 (RH) Run Push Bed 3 (RH Upstream)	Field Field Bench N/C Bench Bench Bench Bench Bench Field Field Bench Bench Bench Bench Field N/C Bench Bench Field N/C Bench Bench Bench Field N/C Bench Bench Bench

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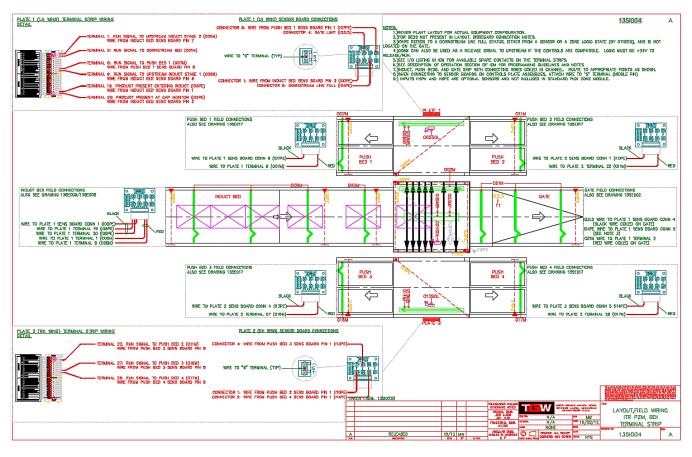


8.2: LAYOUT FIELD WIRING ITR PZM, BI-DIRECTIONAL 1799 CARDS





8.3: LAYOUT FIELD WIRING ITR PZM BID TERMINAL STRIP





Chapter 9: PZM ELECTRIC -DESCRIPTION OF OPERATION

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

- Upstream induct conveyor running (O00M and O08M)
- Downstream gate conveyor running (O01M)
- Pick zone module transfer rollers running (O02M)
- Pick zone module transfer in down position (I17PX)
- All wing beds in down position (I18PX and I20PX)
- All other pick zone module conveyors not running (O03M, O06M, O07M, O11M, O14M, O16M and O17M)

As product appears on the induct conveyor, a gap will be created between each package. This facilitates barcode scanning and sensing of individual products prior to entering the transfer. As gapped packages travel along the induct conveyor, the customer-supplied barcode scanner can read the barcode on each package. This information is then used to determine what to do with each package at the decision point of the pick zone module. Specifically, the decisions needed at the pick zone module are as follows:

- Whether or not to divert the package
- If the transfer is bi-directional, which direction to divert the package
- If the wing bed is bi-directional, which direction to send the package

As I00PE senses a package upstream of the transfer, O00M and O08M will continue to run the induct conveyor if the transfer is clear and down (as detected by I17PX.) Otherwise, O00M and O08M will stop the induct conveyor until the transfer is ready to accept another package.

Once the package has completely entered the transfer, as detected by I01PE, if the package is to be diverted and the wing bed is clear, the following three things will occur:

- 1. O03M will run the transfer belts
- 2. O04M will raise the transfer, I16PX when detected will stop transfer in the raised position
- 3. O05M or O13M will raise the wing bed, I19PX or I21PX when detected will stop the wing bed in the raised position

Once the package is present on the wing bed, as detected by I06PE or I12PE, the following two things will occur:

- 1. O06M or O14M will run the destination wing bed rollers
- 2. O07M, O11M, O16M or O17M will run the destination push bed

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Again, these decisions are based upon the data associated with the barcode on the package. Once the trailing edge of the package enters the wing bed, as detected by I05PE or I11PE, O03MF will stop the transfer belts, O04M will lower the transfer and O05M or O13M will lower the wing bed. Once the package is present on the push bed, as detected by I07PE, I10PE, I13PE or I14PE, O06M or O14M will stop the wing bed. Once the trailing edge of the package clears the push bed, as detected by I07PE, I10PE, I13PE or I14PE, O07M, O11M, O16M or O17M will stop the push bed. If the package is not supposed to be diverted, then the transfer will remain down and the package will travel straight through the pick zone module.

If the package is not being diverted, the next package does not have to wait for the transfer to be clear before being released by the induct conveyor. After a short delay, the next package can be inducted to the transfer. The amount of this delay needs to be long enough to allow the trailing edge of the first package to exit the transfer, as detected by I02PE, prior to the trailing edge of the second package completely entering the transfer, as detected by I01PE. If the package is being diverted, the next package must wait until the trailing edge of the current package enters the wing bed, as detected by I05PE or I11PE. Once this occurs, and the transfer is down, the transfer is considered clear and ready for the next package.

The gate conveyor motors are controlled by O01M. The status of the gate is monitored by I03LS. If the gate is opened, the run signal to the gate conveyor motors will be interrupted, stopping the rollers. Do not turn off O01M. In addition to running the gate conveyor rollers, the signal is also passed through the I03LS limit switch contacts, and then to the input. Also, if the gate is opened when a package is on the transfer, it can be allowed to continue if it is being diverted. Otherwise, it should not be sent straight through the transfer. If a package is stopped on the transfer due to the gate being opened, the induct conveyor should not release additional product to the transfer. This should only be an issue if the package on the transfer was going straight through, since normally a timer would allow another package to be released to the transfer without the transfer being clear.

In addition to the functionality described above, the O01M run signal is also used to power the I04PE photoeye. The O01M run signal should not be turned off when the downstream conveyor is full. The status of product on the downstream conveyor is monitored by I04PE. If the downstream conveyor is full, a package on the transfer can be allowed to continue if it is being diverted. Otherwise, it should not be sent straight through the transfer. If a package is stopped on the transfer due to the downstream conveyor being full, the induct conveyor should not release additional product to the transfer. This should only be an issue if the package on the transfer was going straight through, since normally a timer would allow another package to be released to the transfer without the transfer being clear.

If desired, the entire pick zone module can be stopped, including the induct conveyor, transfer rollers and gate conveyor, due to inactivity. If the pick zone module does not sense any product for a period of time, the system can be stopped. When product begins entering the induct conveyor, as detected by I08PE, the system can be restarted and function as described above.

As described previously in this document, the induct conveyor creates a gap between packages as they travel toward the barcode scanner and transfer. This gapping occurs due to the speed differential between the first two zones and the second two zones of the induct conveyor. If the barcode scanner is a top scanner, the induct conveyor may need to create a larger gap between packages prior to them arriving at the scanner. This can be accomplished by splitting the run signal between the third and fourth zones of the induct conveyor. The first three zones share a run signal (O08M) so that they start and stop together. The fourth zone has its own run signal (O00M) so that it can continue to run while the first three zones are stopped. This should be done for a period of time long enough to create the desired minimum gap between each package. A photoeye (I09PE) is positioned in the third zone to monitor the gap between packages. This photoeye is used to determine if the first three zones need to be stopped to create the desired minimum gap.

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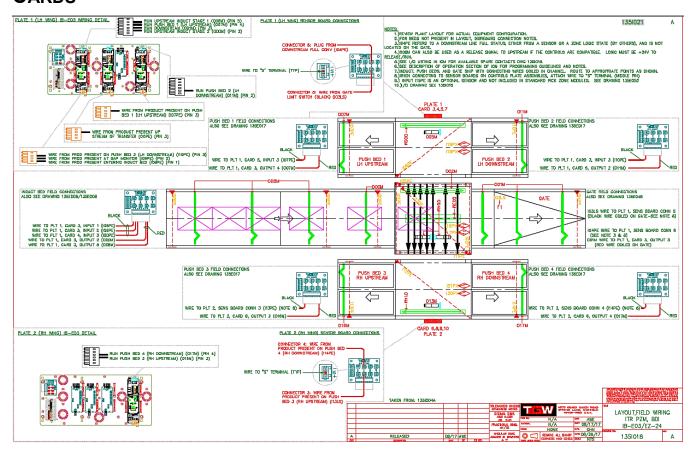
9.1: WING BED LH & RH PUSH BEDS 1234 (IB-E)

		IBE-0	3 Inputs - Electric Lifts	
Device Ta	g Card#	Terminal #	Description	Wired At
I00PE	4	IN 3	Product Present Upstream of Transfer	Field
101PE	3	SENB	Product Present Entering Transfer	Bench
02PE	4	SENB	Product Present Exiting Transfer Straight	Bench
103LS	5	ALM B	Downstream Gate Closed	Field
104PE	5	SENB	Downstream Conveyor Full	Field
105PE	3	SENA	Product Present Entering Wing Bed 1 (LH)	Bench
106PE	5	SENA	Product Present On Wing Bed 1 (LH)	Bench
107PE	5	IN 3	Product Present On Push Bed 1 (LH Upstream)	Field
108PE	3	IN 1	Product Present Entering Induct	Field
109PE	3	IN 2	Product Present At Gap Monitor	Field
110PE	3	IN 3	Product Present On Push Bed 2 (LH Downstream	}
111PE	4	SEN A	Product Present Entering Wing Bed 2 (RH)	Bench
I12PE	6	SENA	Product Present On Wing Bed 2 (RH)	Bench
113PE	6	ALM B	ļ	Field
			· · · · · · · · · · · · · · · · · · ·	
I14PE	6	SEN B	Product Present On Push Bed 4 (RH Downstrea	}
I15PE	3	ALM B	Product Present On Transfer (Optional)	Bench
I16PX	5	IN 1	Transfer Raised	Bench
I17PX	5	IN 2	Transfer Lowered	Bench
I18PX	4	IN 1	Wing Bed 1 (LH) Lowered	Bench
I19PX	4	IN 2	Wing Bed 1 (LH) Raised	Bench
I20PX	6	IN 1	Wing Bed 2 (RH) Lowered	Bench
I21PX	6	IN 2	Wing Bed 2 (RH) Raised	Bench
	3	ALM A	OPEN	
	4	ALM A	OPEN	
	4	ALM B	OPEN	
	5	ALM A	OPEN	
	6	IN 3	OPEN	
	6	ALM A	OPEN	
			IBE-03 Outputs	
Dovice To	a Card#	Terminal #		Wired At
Device ra				
				}
O00M	3	OUT 2	Run Upstream Induct Stage 2	Field
O00M O01M	3	OUT 2 OUT 3	Run Upstream Induct Stage 2 Run Downstream	Field Field
O00M O01M O02M	3 3 4	OUT 2 OUT 3 MTR A	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers	Field Field Bench
O00M O01M O02M O03M	3 3 4 3	OUT 2 OUT 3 MTR A MTR A&B	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts	Field Field Bench Bench
O00M O01M O02M O03M O04M	3 3 4 3 6	OUT 2 OUT 3 MTR A MTR A&B OUT 2	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer	Field Field Bench Bench Bench
O00M O01M O02M O03M O04M O05M	3 3 4 3 6 5	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH)	Field Field Bench Bench Bench Bench
O00M O01M O02M O03M O04M O05M O06M	3 3 4 3 6 5	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH)	Field Field Bench Bench Bench Bench Bench
O00M O01M O02M O03M O04M O05M O06M	3 3 4 3 6 5 5	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A OUT 4	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH) Run Push Bed 1 (LH Upstream)	Field Field Bench Bench Bench Bench Bench Field
O00M O01M O02M O03M O04M O05M O06M O07M	3 3 4 3 6 5 5 5 3	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A OUT 4 OUT 5	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH) Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1	Field Field Bench Bench Bench Bench Bench Field Field
O00M O01M O02M O03M O04M O05M O06M O07M O08M	3 3 4 3 6 5 5 3 3 5	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A OUT 4 OUT 5 OUT 2	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH) Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Run Push Bed 2 (LH Downstream)	Field Field Bench Bench Bench Bench Bench Field Field Field
O00M O01M O02M O03M O04M O05M O06M O07M O08M O11M	3 3 4 3 6 5 5 3 3 5	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A OUT 4 OUT 5 OUT 2 OUT 1	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH) Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Run Push Bed 2 (LH Downstream) Raise/Lower Wing Bed 2 (RH)	Field Field Bench Bench Bench Bench Bench Field Field Field Bench
O00M O01M O02M O03M O04M O05M O06M O07M O08M O11M O13M	3 3 4 3 6 5 5 3 3 5 6	OUT 2 OUT 3 MTR A MTR A&B OUT 2 OUT 1 MTR A OUT 4 OUT 5 OUT 2 OUT 1 MTR A	Run Upstream Induct Stage 2 Run Downstream Run Transfer Rollers Run Transfer Belts Raise/Lower Transfer Raise/Lower Wing Bed 1 (LH) Run Wing Bed 1 (LH) Run Push Bed 1 (LH Upstream) Run Upstream Induct Stage 1 Run Push Bed 2 (LH Downstream) Raise/Lower Wing Bed 2 (RH) Run Wing Bed 2 (RH)	Field Field Bench Bench Bench Bench Field Field Field Bench Bench Field Field Bench Bench
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9.2: LAYOUT FIELD WIRING ITR PZM, BI-DIRECTIONAL IB-E03/EZ-24 CARDS





Chapter 10: ELEVATIONS

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

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

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

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

CAUTION

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

10.1: COMPONENT ORIENTATION

Using your conveyor system layout drawing and the numbers on the I.D. tags on each component, position and orients 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.





Chapter 11: Installation Arrangements

11.1: PZM GENERAL SIZE

The ITR Pick Zone Module has 3 standard sizes with the center bed being 22BF 28BF and 34BF. The Wing bed standard sizes are 16BF 22BF and 28BF. Special sizes may be available.

11.2: PZM DRIVER CARDS

The Driver Cards are mounted on a plate that's attached to the channel of each Wing Bed. All Driver Cards are pre wired and tested before shipping.



11.3: DRIVE / SLAVE BELT BREAK-IN TIME REQUIREMENTS

The roller to roller round drive belts are installed under tension with predetermined initial tension. After a time of static and running conditions, there is an initial tension drop in the belt.

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

11.4: 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 motor 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.

11.5: 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 will adversely affect various components, voiding the warranty.

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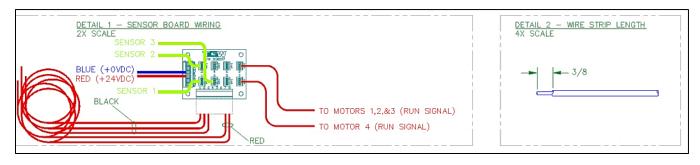


Chapter 12: INDUCT BED FIELD CONNECTIONS



PCB Connector General Location on Induction Bed.

12.1: INDUCT BED SENSOR BOARD WIRING





Chapter 13: ELECTRICAL AND MECHANICAL

13.1: GENERAL FEATURES AND CONCEPTS

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

- Itoh Denki motorized rollers and drivercards.
- Cables are pre-engineered with the appropriate connectors.
- Channels are designed to accommodate any of the electrical variations.
- All channels include welded connectors.
- AutoCAD blocks for the ITR product lines are available upon request.

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Chapter 14: ITR PZM VARIATIONS

14.1.1: PZM (Pick Zone Module) Pneumatic Construction

- ERS or Pick Zone Module transfer belt centers are standard 3.25".
- ERS or Pick Zone Module transfers require 1.75 diameter carrier rollers.
- 3'-4" OAL is a standard.
- Side channels are 10ga construction with welded butt bolt bed connectors.
- PZM's with sensors, PE's (ZL) & reflectors are standard.
- PZM's are made to order Bi-Directional, LH & RH.
- Run Signal Each drivercard requires a signal to run. This signal is provided by the purchaser.
- Minimum product height is 2.5" due to photoeye location.

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14.1.2: ITR PZM Electric Lift

- Drivercard IB-E03 standard drivercard for 24V electric pick zone module.
- EZ-24 drivercard (module) for pulse gear drive motors
- Run Signal Each drivercard requires a signal to run. This signal is provided by the purchaser.
- Minimum product height is 2.5" due to photoeye location.
- ERS or Pick Zone Module transfer belt centers are standard 3.25".
- ERS or Pick Zone Module transfers require 1.75 diameter carrier rollers.
- 3'-4" OAL is a standard.
- Side channels are 10ga construction with welded butt bolt bed connectors.
- PZM's with sensors. PE's (ZL) & reflectors are standard.
- PZM's are made to order Bi-Directional, LH & RH.
- Run Signal Each drivercard requires a signal to run. This signal is provided by the purchaser.
- Minimum product height is 2.5" due to photoeye location.



Chapter 15: CBM-105 AND CB-016 DRIVERCARD

Push Bed Belted Information

The push bed comes with one or two belts, depending on the conveyor BF. These belts provide the positive tractions to move the product downstream away from the transfer module.

The belted zone transports the product from the rollers low position up to a rollers high position. This allows the product to be moved from the wing conveyor across the top of the CRUZ®channel to the center conveyor.

To maintain the integrity of the induction conveyor feeding the transfer module, product should always be moved across upstream of the induction.

Use the Speed Change Table for CBM-105 or CB-016 to determine the belt configuration based on the conveyor BF dimension.

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15.1: ITR CB-016 & CBM-105 ELECTRICAL COMPONENTS

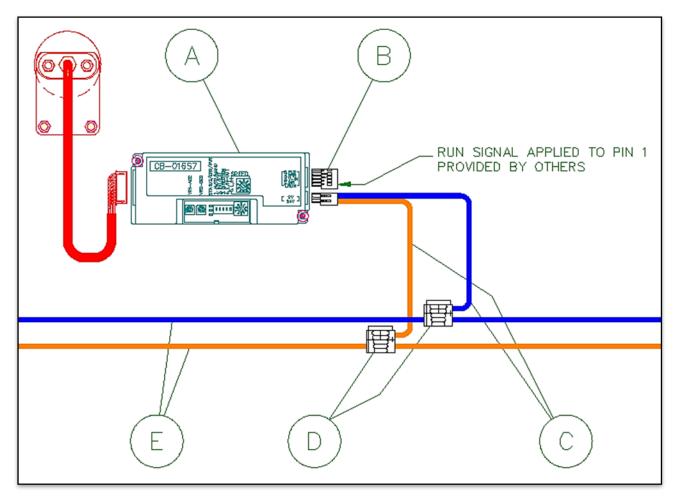


Figure 1 - CB-016 Drivercard

- (A) CB-016 and CBM-105 item (with hardware): 1139716 CB-016 / 1153930 CBM-105
- B 5-Pin connector (for run signal connection): 733105
- © Power tap cable (for short distances < 6"): 1139543
- © Scotchlok connectors (connect power tap to power harness): 3M567
- Power harness see power harness table

Table1: Power Harness

Item No.	Description
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'

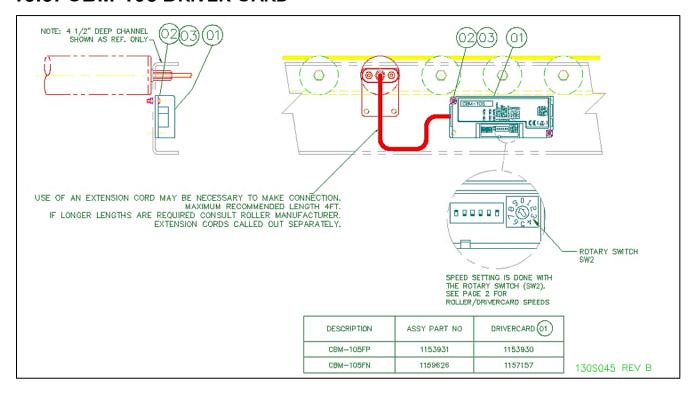


15.1.1: Replacement Parts for Motor extension cables

Item No.	Description	Description 2
1138704	CABLE, MOTOR EXTENSION,600MM	ITOH M-F-EXT 9-PIN-600mm
1138705	CABLE, MOTOR EXTENSION,1200MM	ITOH M-F-EXT 9-PIN-1200mm
1138706	CABLE, MOTOR EXTENSION,2700MM	ITOH M-F-EXT 9-PIN-2700mm



15.3: CBM-105 DRIVER CARD



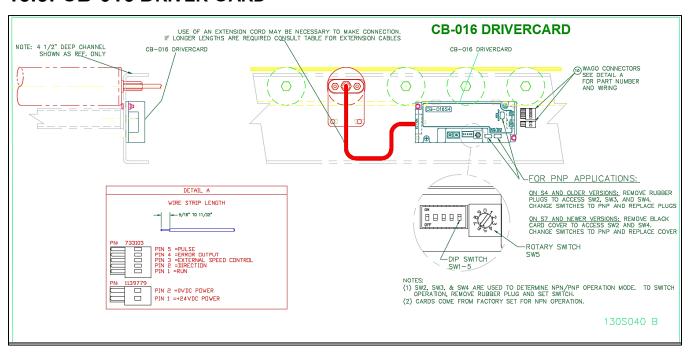


15.4: CBM-105 SPEED CHART

CBM-105 DRIVERCARD / FE ROLLER ROLLER: FE-17 ROLLER: FE-60 ROLLER: FE-140 ROLLER: FE-140														
	JLLEK: FI			OLLEK: FI			ULLE	K: FE		_		LLEK: F		
TOW NOMINAL	ROTARY	ACTUAL SPEED ±5%	NOMINAL	ROTARY	ACTUAL SPEED ±5%	NOMINA	RC	TARY	ACTI SPEED		TGW IDMINAL	ROTARY	ACTUAL SPEED ±5%	
SPEED	SWITCH	(fpm)	SPEED	SWITCH	(fpm)	SPEED	- SV	VITCH	SPEED (fpi		SPEED	SWITCH	(fpm)	
5 6	0	(ipin) 6.9	2	5 0			5	0		87.5	85 85		0 87.5	
9	1	9.2	3	_	32.8	1	_	1		116.6	115		1 115.6	
13	2	13.8	4		49.2	1	_	2		174.9	170		2 174.9	
18	3	18.4	6.	5 3	65.6	2	0	3		233.2	230		3 233.2	
25	4	27.7	9.	5 4	98.4			4	349.7/(285.7)	345		4 349.7	
35	5	36.9	13	0 5	131.2			5					5 466.3/(408.2)	
40	6	41.5	14	_		2	5	6					6 524.7/(408.2)	
45	7	45.1	16	_	154.0		_	7	433.1/(285.7)	405		7	
50	8		18	0 8				8					8 565.2/(408.2)	
	9	55.3/(48.0)		9	196.8/(170.6)			9					9	
otes:	deb euro muni	bers are "NO-LO	DAD// PATED)	5 Date diamen	harran udant	ho rolloric m	a bla	of dolor	do.e.	- continuous	aluation for III	load cood	tion	
spe eus w	nun two nun	ibeis are NO-L	DAUY(RATED)	. Nate o num	Dersare Wilati	The foller is G	pable	OI GOINS	under	a con un uous	outy ruii	io au con u	LIOII.	
F	ROLLER		<u>NI-102</u>		RCARE		<u> '</u>	KUL		LLER: F	P-140			
TGW		ACTU	IAL	TGW		ACTUAL	\dashv	TG	w		AC	TUAL		
NOMINA	ROTA	RY		NOMINAL	ROTARY	SPEED ±59	.		INAL	ROTARY		D±5%		
SPEED	SWIT	CH (fpn		SPEED	SWITCH	(fpm)	' l		EED	SWITCH		pm)		
	25		26.7	120		(1011)	-	351	120			121.7		
		0			0						0			
	35	1	35.6	160	1	16:			160		1	162.3		
	50	2	53.4	240	2	24:	_		240		2	243.4		
	70	3	71.2		3	324.5/(306	3)		320		3	324.5		
	05	4	106.8		4						4 486.6	(470.7)		
14	40	5	142.4		5						5			
16	60	6	160.2	305	6	AAC OUGOS	~ l		470		6			
17	75	7 178.0/(175.5)		7	446.0/(306	-)		470		7 627.1	/(470.7)		
		8 195.8/(8						8			
18	80	9 213.7/(9						9			
		5 213.7/(.	173.3]		9		_				7		1700045	DEV.
													1308045	KEV I
	otes:													
lotes:			_											
pee ds w		ımbers are "N		RATED)". Ra	ited number	s are what	he ro	lleris	capabl	e of doing	undera			
pee ds w		ımbers are "N I load conditi		RATED)". Ra	ited number	s are what	he ro	lleris	capabl	e of doing	undera			



15.5: CB-016 DRIVER CARD





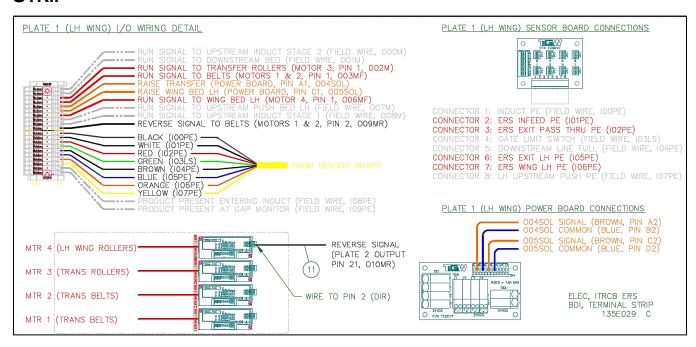
15.6: CB-016 DRIVER CARD SPEED CHANGE TABLE

	SPEED CHANGE TABLE									
20 DISCREET SPEED CHANGE STEPS FOR EXTERNAL CONTROL VIA 0-10V SIGNAL	INTERNAL VIA DIP SI	EET SPEED STEPS FOR CONTROL WITCH AND SWITCH	FP R	DLLERS	(ГРМ)	FE	ROLLERS (F	PN)	FS ROLLE	rs (FPN)
VOLTAGE INPUT	DIP SW1-5	ROTARY SW5	100,140 190,255	20,30, 45,55	5,8, 10,15	70,100,1 40180,2 10	20,30,4 5 55,60	5,8,10, 15,17	20,30, 45,55	5,8, 10,15
9.55-9.95	ON	9	971.9	214.1	56.8	698.9	197.5	55.4	214.1	56.8
9.05-9.45	0N	8	890.9	196.3	52.1	640.6	181.0	50.8	196.3	52.1
8.55-8.95	ON	7	850.4	187.3	49.7	611.5	172.8	48.5	187.3	49.7
8.05-8.45	0N	6	809.9	178.4	47.3	582.4	164.5	46.2	178.4	47.3
7.55-7.95	ON	5	769.4	169.5	45.0	553.3	156.3	43.9	169.5	45.0
7.05-7.45	ON	4	728.9	160.6	42.6	524.1	148.1	41.6	160.6	42.6
6.55-6.95	ON	3	647.9	142.7	37.9	465.9	131.6	36.9	142.7	37.9
6.05-6.45	ON	2	607.4	133.8	35.5	436.8	123.4	34.6	133.8	35.5
5.55-5.95	ON	1	566.9	124.9	33.1	407.6	115.2	32.3	124.9	33.1
5.05-5.45	00	0	526.4	116.0	30.8	378.5	106.9	30.0	116.0	30.8
4.55-4.95	OFF	9	485.9	107.0	28.4	349.4	98.7	27.7	107.0	28.4
4.05-4.45	OFF	8	445.4	98.1	26.0	320.3	90.5	25.4	98.1	26.0
3.55-3.95	OFF	7	404.8	89.2	23.7	291.1	82.3	23.1	89.2	23.7
3.05-3.45	OFF	6	364.3	80.3	21.3	262.0	74.0	20.8	80.3	21.3
2.55-2.95	OFF	5	324.0	71.4	18.9	233.0	65.8	18.5	71.4	18.9
2.05-2.45	OFF	4	283.5	62.5	16.6	203.9	57.6	16.2	62.5	16.6
1.55-1.95	OFF	3	243.0	53.5	14.2	174.8	49.4	13.9	53.5	14.2
1.05-1.45	OFF	2	202.5	44.6	11.8	145.6	41.1	11.5	44.6	11.8
0.55-0.95	OFF	0	162.0	35.7	9.5	116.5	32.9	9.2	35.7	9.5
0.05-0.45	OFF	V	121.5	26.8	7.1	87.4	24.7	6.9	26.8	7.1
CB-016 DRIVER	CARD									

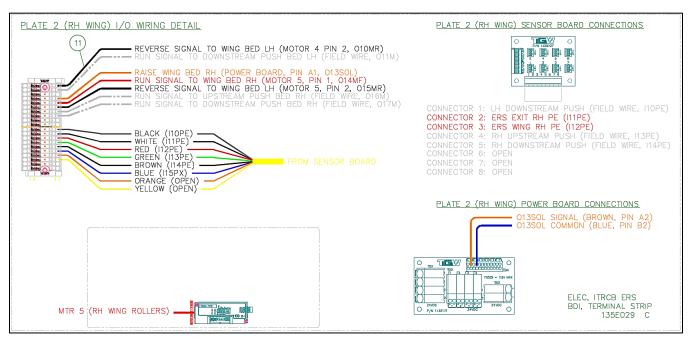
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15.7: ELECTRICAL PLATE 1(LH WING) I/O WIRING DETAIL TERMINAL STRIP

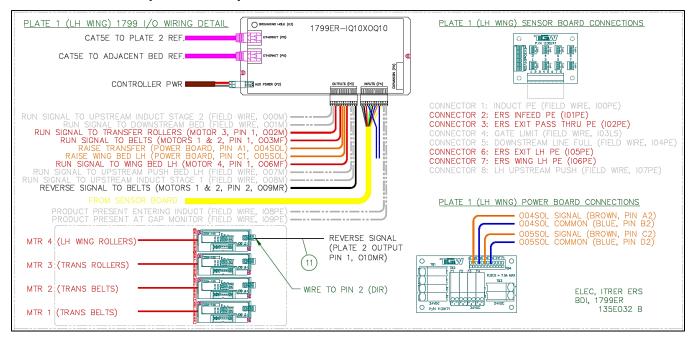


15.8: ELECTRICAL PLATE 2 (RH WING) I/O WIRING DETAIL TERMINAL STRIP

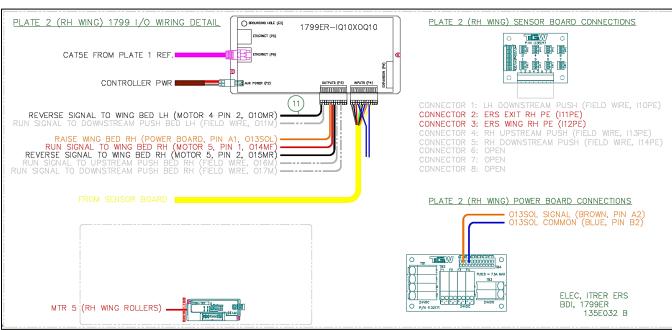




15.9: PLATE 1 (LH WING) 1799 I/O WIRING DETAILS

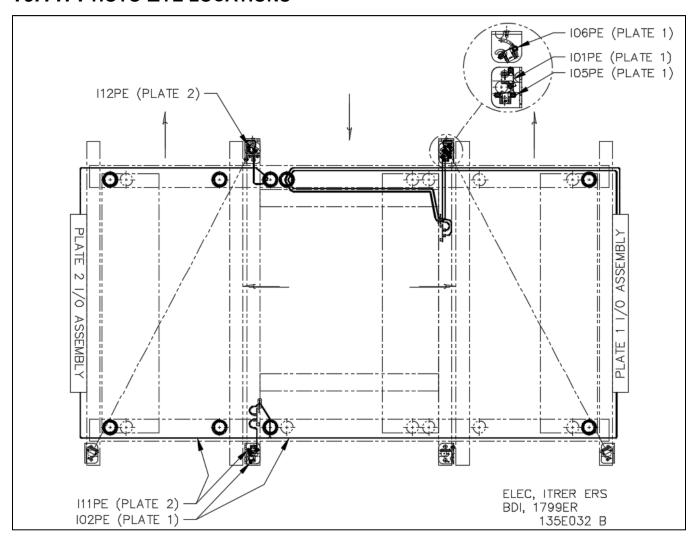


15.10: PLATE 2 (RH WING) 1799 I/O WIRING DETAILS



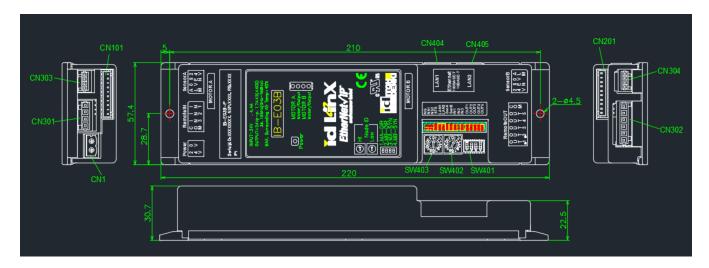


15.11: PHOTO EYE LOCATIONS





Chapter 16: ITOH DENKI IB-E DRIVERCARD



16.1: GENERAL NOTES:

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

16.2: 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-E and ICE Manual for additional information: http://itohdenki.com/



16.3: OPERATING ENVIRONMENT

Cor	nditions	Notes
Ambient temperature	-20 to 40°C (-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	Comorning to IEC00040-1 and OE040

16.4: 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.

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16.5: APPLICABLE POWER ROLLERS (MOTORIZED ROLLERS)

16.5.1: IB-E01 and IB-E03B

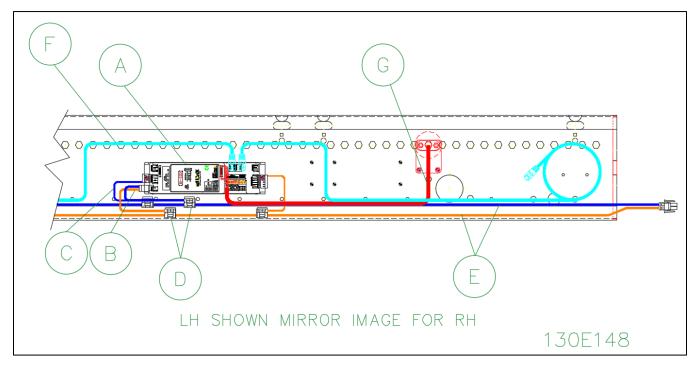
Standard*	With Brake Option
PM486FE	PM486FE-BR
PM486FS	PM486FS-BR
PM486FP	PM486FP-BR
PM570FE	PM570FE-BR
PM605FE	PM605FE-BR
PM635FS	PM635FS-BR

^{*} IB-E01 and IB-E03B 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.

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16.6: ITR IB-E ELECTRICAL COMPONENTS



- A. IB-E03 driver card (includes hardware no connectors): 1166288
- B. Cable Power IB-E(for short distances < 6"): 1165236
- C. Cable Remote in IBE, X 9" 16GA blue wire: 1165238
- D. Scotchlok Connectors (connect power tap to power harness): 3M567
- E. Power Harness: See Table 1.
- F. Cat5E Communication Cable: See Table 2.
- G. Cable, Motor Extension: See Table 3.



Table 1 IB-E Power Harness

Item No.	Description
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

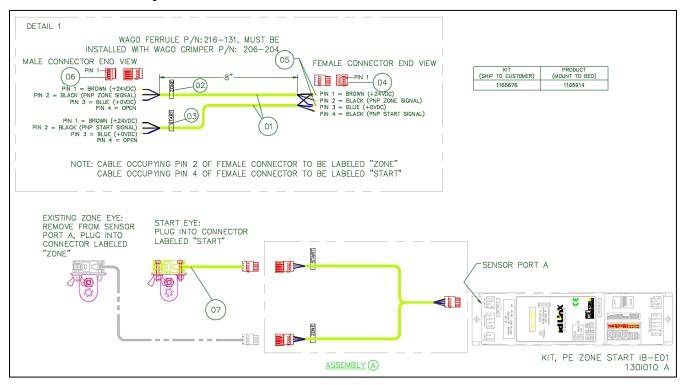
Item No.	Description
E0034025	CABLE,CTRLS-CAT5E-3'-GRAY
E0034026	CABLE,CTRLS-CAT5E-5'-GRAY
E0034027	CABLE,CTRLS-CAT5E-7'-GRAY
E0030796	CABLE,CTRLS-CAT5E-10'-GRAY
E0009905	CABLE,CTRLS-CAT5E-14'-GRAY
E0009904	CABLE,CTRLS-CAT5E-25'-GRAY

Table 3 – Cable Motor Extensions

Item No.	Description
1135339	CABLE, MOTOR EXTENSION, 600MM ITOH M-F-EXT-10PIN-600 USE W/IB-N03/IB-E/HBM-604/BRAKE
1135340	CABLE, MOTOR EXTENSION, 1200MM ITOH M-F-EXT-10PIN-1200 USE W/IB-N03/IB-E/HBM-604/BRAKE
1135341	CABLE, MOTOR EXTENSION, 1200MM ITOH M-F-EXT-10PIN-1200 USE W/IB-N03/IB-E/HBM-604/BRAKE



16.6.1: IB-E Photoeye Cable Kit

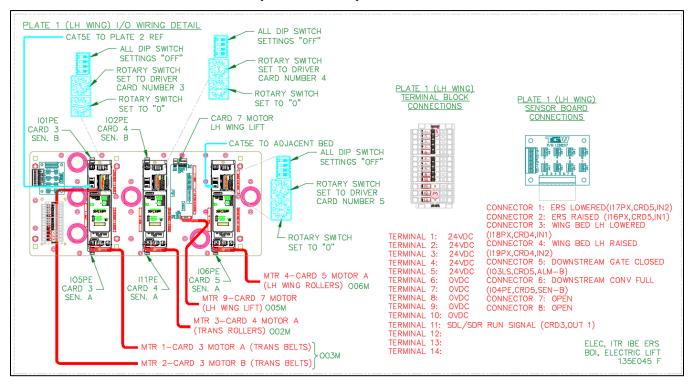


16.6.2: Replacement Parts - IB-E Photoeye Kit

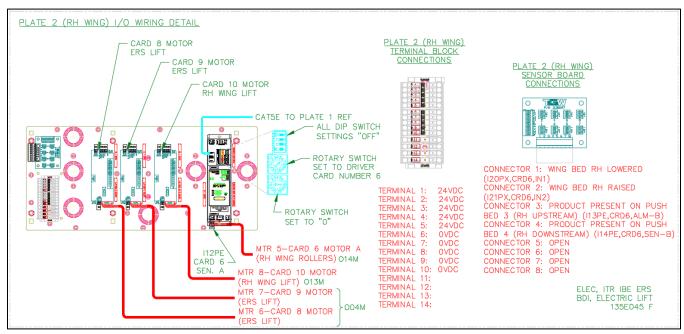
	General Photoeye Cables & Kit						
Balloon	ltem#	Description	Mounted	DWG #			
1 - 6	1165676	KIT,CTRLS-PE ZONE START- IBE	FIELD MOUNTED	1301010			



16.7: ELECTRICAL PLATE 1(LH WING) I/O WIRING DETAIL



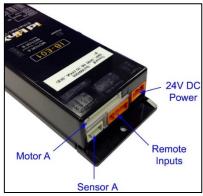
16.8: ELECTRICAL PLATE 2 (RH WING) I/O WIRING DETAIL





16.9: HARDWARE CONNECTIONS

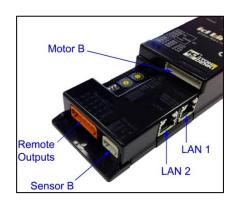
16.9.1: Left ("A") Side



		Sensor A
Connection	Pin Outs	Description
Motor A	1 10	Brushless DC Driver When configured as a discrete output (NPN, sinking, only): 3 - Discrete output U (IB-E04F pins 3 & 4) 4 - Discrete output V (IB-E04F pins 5 & 6) 5 - Discrete output W (IB-E04F pins 7 & 8) See "Precaution: Motor Port Discrete Output Wiring" below. Connector for wiring: JST XHP-10 (IB-E04F XHP-12) Included with motorized roller
Sensor A	1 4	1-24V DC (550mA max) 2-Sensor input (35mA max) 3-0V 4-Sensor alarm input (35mA max) 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. 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) Connector for wiring: WAGO 733-104
Remote Inputs (Auxiliary)	1 4	1 - Remote input 1 2 - Remote input 2 3 - Remote input 3 4 - Common (24V DC for NPN or 0V for PNP) Connector for wiring: WAGO 734-204
24V DC Power	1 2	Input Power 1 - 0V 2 - 24V DC Connector for wiring: WAGO 231-302/026-000



16.9.2: Right ("B") Side



Connection	Pin Outs	Description			
Motor B	1 10	Brushless DC Driver When configured as a discrete output (NPN, sinking, only): 3 - Discrete output U (IB-E04F pins 3 & 4) 4 - Discrete output V (IB-E04F pins 5 & 6) 5 - Discrete output W (IB-E04F pins 7 & 8) See "Precaution: Motor Port Discrete Output Wiring" below. Connector for wiring: JST XHP-10 (IB-E04F XHP-12) Included with motorized roller			
Sensor B	1 4	1 - 24V DC (550mA max) 2 - Sensor input (35mA max) 3 - 0V 4 - Sensor alarm input (35mA max) 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. 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) Connector for wiring: WAGO 733-104			
Remote Outputs (Auxiliary)	1 6	1 - Remote output 1, 1A max 2 - Remote output 2, 1A max 3 - Remote output 3, 20mA max 4 - Remote output 4, 20mA max 5 - Remote output 5, 20mA max 6 - Common (24V DC for PNP or 0V for NPN) Connector for wiring: WAGO 734-206			
LAN (1 & 2)	* 1	1 - Tx + 2 - Tx - 3 - Rx + 4 - n/a 5 - n/a 6 - Rx - 7 - n/a 8 - n/a Connector for wiring: RJ-45			



16.9.3: Rotary Switches and DIP Switches



Switch	Position	Description		
		Hexadecimal setting of IP address' last octet. 192.168.1.xxx		
IP Address High	0 ~ F	Example 1:		
Byte		High Byte: "0"		
		Low Byte: "1"		
		Hexadecimal value "01" = 1 (decimal)		
		IP Address: 192.168.1.1		
IP Address Low	0 ~ F	Example 2: High Byte: "A" Low Byte: "7"		
Byte		Hexadecimal value "A7" = 167 (decimal)		
		IP Address: 192.168.1.167		
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.

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16.10: 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).

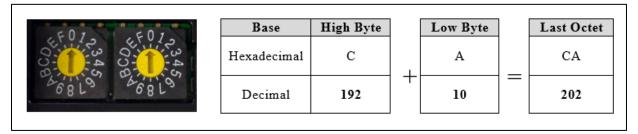
IP Address Setting (Last Octet)

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.

Hig	h Byte		L	ow 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	│ ㅗ │	5	5
6	96	T	6	6
7	112		7	7
8	128		8	8
9	144		9	9
А	160		А	10
В	176		В	11
С	192		С	12
D	208		D	13
E	224		E	14
F	240		F	15

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



16.10.1: LED Indicators

See troubleshooting error statuses.



16.11: MODULE STATUS INDICATORS

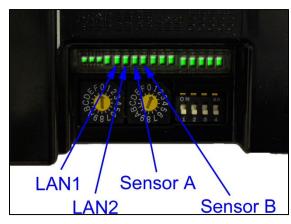


LED	LED indication pattern		Description
	Green	Red	
	OFF	OFF	No network power
	ON	OFF	Normal operation
	ON	Flash (1Hz)	No setting on device
MS	OFF	Flash (1Hz)	Network error at LAN 1 or LAN 2
	OFF	ON	Network error at LAN 1 and LAN 2
	Flash (1Hz)	Flash (1Hz)	Boot up sequence
	OFF	OFF	No communication
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

^{*} NS2 is only on the IB-E01



16.12: LAN AND SENSOR STATUS INDICATORS

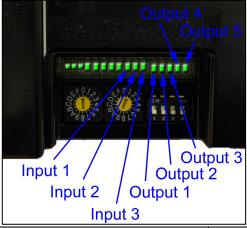


LED	LED indication pattern		Description		
	Green	Red			
LAN1	Flash	-	Active LAN communication		
& LAN2	OFF	-	No LAN communication		
Son A & Son D	ON	-	Sensor input is active		
SenA & SenB	OFF	-	No sensor input		

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16.13: 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		

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16.14: 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	
	OFF	OFF	Motor is not running	
	Flash (1Hz)	OFF	Motor is running, CW	
	ON	OFF	Motor is running, CCW	
MOTOR A	OFF	Flash (6Hz)	Low voltage error	
& MOTOR B	OFF	Flash (1Hz)	Motor unplugged error	
WOTOKB	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*	

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Chapter 17: Troubleshooting – IB-E Motor Driver

Error Type	Priority	Suspected Cause	Suggested Solution	Reset Method		Motor
Low Voltage	1	Supply voltage < 20V DC	Maintain supply voltage ≥ 20V DC	Automatic	Stop	
Fuse blown		Fuse is blown	Replace IB-E	-		
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		Stop
Motor Thermal	5	High temperature in motor	Allow motor to cool	Automatic or Manual	Run	
Back EMF (Over speeding)		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	Remove the cause of error or review ICE logic for output	Based on logic conditions	:	
Sensor Timer	8	element output is active				Based on logic
Sensor Alarm	9	Occurs when the (sensor) Alarm signal is active	Check the sensor or wiring of the sensor connection	Automatic		conditions

[&]quot;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.

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17.1: 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
 - o 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 Chapter 1 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:
 - o 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 Chapter 1 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 Chapter 1 LED Indicators)
- Check DIP switch 3 and/or 4 (refer to Chapter 1 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 Chapter 1 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 Chapter 1 – Hardware connections and Chapter 2 – General Wiring and Precautions)

- Check the status LEDs on the IB-E (refer to Chapter 1 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 Chapter 1 – Hardware connections and Chapter 2 – General Wiring and Precautions)



- Check the status LEDs on the IB-E (refer to Chapter 1 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 Chapter 1 Hardware connections and Chapter 2 – General Wiring and Precautions)
- Check the status LEDs on the IB-E (refer to Chapter 1 LED Indicators)
- Check the logic for the correct discrete motor port output

17.2: SOFTWARE ISSUES

Read/write (configuration or logic) failure

- Check the IP address settings on the IB-E (refer to Chapter 1 Rotary Switches and DIP Switches)
- Check the IP address setting in ICE (refer to Chapter 5 Project Tree)
- Check the PC's IP address (refer to Chapter 6 Property Setting)
- Check the PC's firewall settings (refer to Chapter 4 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 Chapter 1 Rotary Switches and DIP Switches)
- Check the IP address setting in ICE (refer to Chapter 5 Project Tree)
- Check the PC's IP address (refer to Chapter 6 Property Setting)
- Check the PC's firewall settings (refer to Chapter 4 Windows Firewall)
- Make sure the IB-E has had enough time to reboot between consecutive writes/downloads.



17.3: MODULE RESET

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

1. 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.



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



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

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



Chapter 18: ELECTRICAL SAFETY GUIDELINES

WARNING



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

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



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

NOTE:

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



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



Chapter 19: Conveyor Controls - Safety Guidelines

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

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

<u>START PUSHBUTTON</u> - Start pushbutton should be the flush type or guarded such that inadvertently leaning against them will not actuate them. They should be provided with a legend plate clearly defining which conveyors will be started.

<u>STOP PUSHBUTTON</u> - Stop pushbutton should be the extended type such that any contact with it is sufficient to stop the conveyor. They should have a legend plate defining which conveyors will be stopped.

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

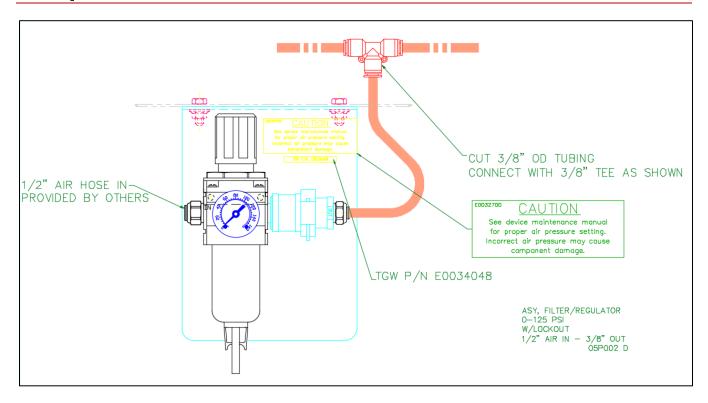
Emergency stop devices should also protect high pedestrian areas where high voltage motors are used. Actuating an emergency stop must dropout the start circuit and all electrical power, requiring restarting the system using the start pushbutton provided.

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

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Chapter 20: AIR SUPPLY REQUIREMENTS



20.1: GENERAL GUIDE

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

20.2: 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.

20.3: AIR DROPS

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

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

20.4: Low Pressure Switch

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

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20.5: PNEUMATIC REQUIREMENTS

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

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Chapter 21: PREVENTIVE MAINTENANCE

21.1: GENERAL PM

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

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

21.2: DAILY

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

21.3: WEEKLY

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





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

21.4: 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.

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⚠ WARNING



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

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Chapter 22: PZM TROUBLESHOOTING GUIDE

	IntelliROL Troubleshooting Guide				
#	Problem	Possible Cause	Remedy		
	Power Roller does				
1	not turn	ITR roller not properly installed	Check that the Power Moller is properly inserted into the frame. Adjust as necessary		
			Check the tube and end caps are not contacting the frame, side rails or other parts. Power		
			Moller should be allowed to move freely		
		Too many slave rollers connected to drive	Inspect MDR zone to ensure proper number of idlers is adequate related to the Powered		
		roller	Roller. Refer to IOM Manual for additional information		
		Power Cable extensively twisted Check that the Power Moller's shafts are	Inspect cable for kinks or cracks in wiring.		
		properly mounted with the applicable			
		bracket(s). Proper mounting is required for			
		tube rotation.	For FE series motors one bracket securing the cable side shaft.		
			For FS / FP / FH series motors two brackets securing both cable side and spring loaded		
			shafts		
		When slave driving idler rollers check that the			
		number of idlers driven is adequate for the			
		particular model of Power Moller being used.	Check air pressure on take up assembly. Make sure belt tension is proper.		
		Check that the power cable is in good			
		condition, with no twisting or severe kinks in			
		the cable that would indicate broken wires.			
		Also check for any cuts in the power cable or			
		wires near the connector end.	Locate and correct interference		
2	LED status	Red LED OFF.	Install belt properly Check that the power supply is on.		
	LLD States	Green LED OFF.	Check that the card is correctly wired. Reference IOM manual.		
		Orange LED OFF	Measure the voltage, stable 24V DC is required.		
			Check that the motor connector is properly plugged into the card then cycle the run /		
		Red LED ON,	sensor signal.		
		Green LED ON,			
		Orange LED ON			
			Thermal protection active – motor or card reached thermal limit, motor will not operate		
			until one minute after the card or motor has cooled down below thermal limit. Consider		
			possible causes of why the Power Moller is reaching thermal limit; cycle times, ambient		
		If sensor is blocked	temperature, load changes, roller not turning freely, etc. Do not remove power to the card to reset the error, damage may occur		
		ii serisor is sicercu	Check that the sensor is properly wired in the correct position and is the proper voltage.		
		Red LED OFF,	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		
		Green LED ON,	supply.		
			If using a run signal check the wiring to CN2 is in the correct position and wired correctly,		
		Orange LED ON	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		
		If sensor is blocked	accumulate product at the sensor. Reference IOM manual.		
			Replace roller		
			Refer to IOM Manual for detailed information OR refer to appropriate ITOH Denki driver		
3	Flashing LED	Many options	card manuals for additional options.		
	Rollers "dancing"				
l	or spinning				
4	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	Legate and Adjust Rever Supply to correct as went as well-increase		
		of zones	Locate and Adjust Power Supply to correct current supply issue Set card to Basic Accumulation. Refer to IOM Manual for additional information.		
		Supply of power not equally distributed	Within the ITR transportation product line you can only use FP or FN cards within a string.		
		Mixture of driver cards	Reference IOM Manual for additional information		
			If power supply is not purchased from TGW, please consult manufactures operation		
		Power Supply Issue	directions.		
			0V line of all power supplies connected within a conveyor "unit" need to be connected.		
		Multiple connected Power Supply units	Reference IOM for additional detailed information		

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22.1: TROUBLESHOOTING GUIDE CONTINUED

		IntelliRO	L Troubleshooting Guide
#	Problem	Possible Cause	Remedy
	Infeed zone not		
	activating or		
5	running	Need input signal	Install TGW start eye kit, or provide 24V run signal
		Loose connection between driver cards	Inspect, and adjust, connection cables as necessary
	Discharge zone not	Down flow sending not providing "release"	
6	releasing	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.
	One Zone not		
7	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.
	Driver Card		
	continuously		
8	faulting	Poor supply of power	Inspect to see if power supply is transmitting correct voltage
		Power Supply unit not wired correctly to the	Inspect termination points to ensure proper wiring. Adjust accordingly. Reference IOM
		24V supply line	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.
	Driver cards		-
	faulting regularly in	Programming issue. Transfer belt rollers	ITR rollers driving the transfer bands only need to run when signal is provided to UBT to
10	UBT	running 24/7	divert product.
	Thermal Limit		
11	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	Inspect mounting plate/conveyor surface to ensure complete surface connection for
		conveyor frame	maximum heat dissipation.
			Inspect area around roller to ensure nothing is rubber or lodged by the roller causing extra
		Excess friction or drag on motorized roller	friction.

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Chapter 23: 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.

23.1: 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 a 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 majorities 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 know 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 maybe optionally used by the customer.

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23.2: DRIVE AND SLAVE O-RINGS FOR THE ITR PICK ZONE MODULE

Driver & Slave O-Rings for ITR Pick Zone					
ITEM # DESCRIPTION Application					
1148786	ORING 3/16 DIA X 22-3/16				
1136169	ORING 3/16 DIA X7-1/2	Straight Slave			
1144848	ORING 3/16 DIA X 9-1/2 HT BLUE	Straight Slave			

23.3: COMMUNICATION CABLES

DRIVER CARD COMMUNICATION CABLE (CAT5E)					
Item No. Description Application					
E0034025	CABLE, CAT5E 3' GRAY	COMM. CABLE BETWEEN			
E0034026	CABLE,CAT5E 5' GRAY	COMM. CABLE BETWEEN			
E0034027	CABLE,CAT5E 7' GRAY	COMM. CABLE BETWEEN			
E0030796	CABLE,CAT5E 10' GRAY	COMM. CABLE BETWEEN			
E0009905	CABLE,CAT5E 14' GRAY	COMM. CABLE BETWEEN			
E0009904	CABLE,CAT5E 25' GRAY	COMM. CABLE BETWEEN			

23.4: POWER HARNESS

	INTELLIROL 24VDC POWER HARNESS				
Item No.	Description	Application			
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,POWER,10AWG.12.5' A=12.5',B=12	24VDC POWER CABLE TO DRIVER CARDS			
1129502	HARNESS,ITR-POWER-10AWG-12.5'	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			
		USED BETWEEN POWER SUPPLIES TO			
1161502	HARNESS,ITR-PWR INTRPT-10AWG-4"-COMMON CONDUCTOR	CONNECT COMMONS			
1138166	HARNESS,ITR-POWER-10AWG-33'-(10 METER)	24VDC POWER CABLE TO DRIVER CARDS			
3M567	CONNECTOR, POWER SPLICE 10 AWG				
MALE/MALE PO	OWER HARNESS				
1141545	HARNESS,ITR-POWER-10AWG-4"-MALE/MALE CONN	USE TO CHANGE POWER FLOW			
1134347	HARNESS, POWER, 10AWG, 1' MALE CONN BOTH ENDS, GENDER BENDER	USE TO CHANGE POWER FLOW			
1134348	HARNESS,POWER,10AWG,3'-MALE CONN BOTH ENDS-GENDER BENDER	USE TO CHANGE POWER FLOW			
1134349	HARNESS, POWER, 10AWG, 5.5' MALE CONN BOTH ENDS, GENDER BENDER	USE TO CHANGE POWER FLOW			
FEMALE/FEMA	LE POWER HARNESS				
1141549	HARNESS,ITR-POWER-10AWG-4"-FEMALE/FEMALE CONN	USE TO CHANGE POWER FLOW			
1134344	HARNESS, POWER, 10AWG, 1' FEMALE CONN BOTH ENDS, GENDER BENDER	USE TO CHANGE POWER FLOW			
1134345	HARNESS,POWER,10AWG,3' FEMALE CONN BOTH ENDS, GENDER BENDER	USE TO CHANGE POWER FLOW			
1134346	HARNESS, POWER, 10AWG, 5.5' FEMALE CONN BOTH ENDS, GENDER BENDER	USE TO CHANGE POWER FLOW			

23.5: MOTOR CABLES USED WITH CBM-105, CB-016 OR HB-510

	CABLE,MOTOR EXTENSION USED WITH CB-016 OR HB-510				
Item No.	Description				
1138704	CABLE,MOTOR EXTENSION,600MM ITOH M-F-EXT-9PIN-600 USE W/ CB-016 OR HB-510				
1138705	CABLE,MOTOR EXTENSION,1200MM ITOH M-F-EXT-9PIN-1200 USE W/ CB-016 OR HB-510				
1137706	CABLE,MOTOR EXTENSION,2700MM ITOH M-F-EXT-9PIN-2700 USE W/ CB-016 OR HB-510				

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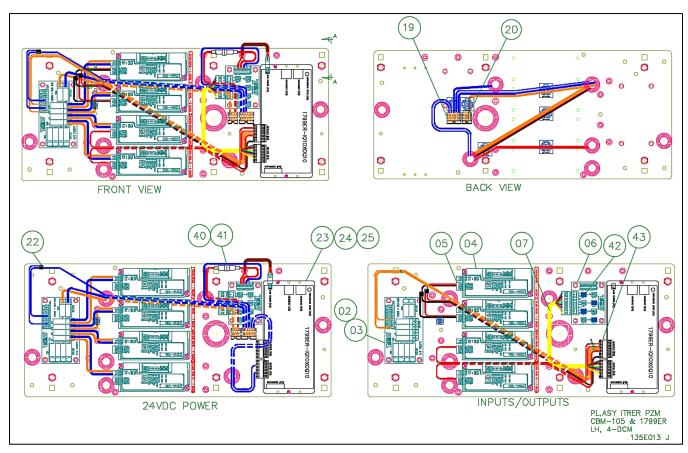
23.6: MOTOR CABLES USED WITH IB-E03

	CABLE,MOTOR EXTENSION USED WITH IB-E03				
Item No.	Description				
1135339	CABLE,MOTOR EXTENSION,600MM ITOH M-F-EXT-10PIN-600 USE W/ IB-N03/IB-E/HBM-604/BRAKE				
1135340	CABLE,MOTOR EXTENSION,1200MM ITOH M-F-EXT-10PIN-1200 USE W/ IB-N03/IB-E/HBM-604/BRAKE				
1135341	CABLE,MOTOR EXTENSION,2700MM ITOH M-F-EXT-10PIN-2700 USE W/ IB-N03/IB-E/HBM-604/BRAKE				

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23.7: ITR DRIVER CARDS WITH 1799 I/O CARD

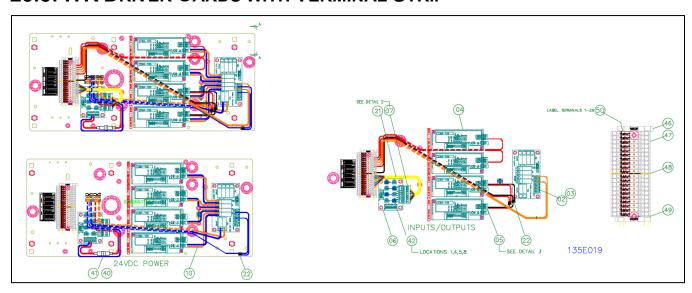


23.7.1: Replacement Parts - ITR Driver Cards with CBM-105 & 1799 I/O Card

		Width & Item#		
Balloon	Description	16 BF	22 BF	28 BF
02	PCB, DB, FUSED, 10A FOR HB510/CB016	1132171	1132171	113217
03	FUSE, 7.5A,32V, ATO MINI BLADE	1132721	1132721	113272
04	DRIVERCARD,ΠΟΗ CBM-105FP	1153930	1153930	115393
05	CONN,FEMALE 5 POLE PIN 20-28AWG	733105	733105	73310
06	PCB, DB, PE, 4A 8 STATION	1138197	1138197	113819
07	CABLE,ADAPTER,9IN,1799 TO WAGO 231 8-POLE	1144918	1144918	114491
10	CABLE,POWER,CB-016 PZM 14GA,ITR	1144897	1144897	114489
19	CONN, 5 COND, W/LEVERS 28 - 12 AWG	1137437	1137437	113743
20	CONN, 3 COND, W/LEVERS 28 - 12 AWG	1102816	1102816	110281
21	CABLE,POWER,8IN,ITR,1799	1144899	1144899	114489
22	CONNECTOR,IDC SCOTCHLOK 558 16-22AWG RUN,16-22AWG	1120174	1120174	112017
25	MODULE,I/O 10IN/10OUT, 1799	1142334	1142334	114233
40	FUSE,4A,125V,CARTRIDGE,GMA	1102221	1102221	110222
41	FUSE,HOLDER IN-LINE,CARTRIDGE	1102222	1102222	110222
42	CONN,FEMALE 3 POLE PIN	1139780	1139780	113978
43	CONNECTOR,12 PIN,2.5MM	1140805	1140805	114080



23.8: ITR DRIVER CARDS WITH TERMINAL STRIP

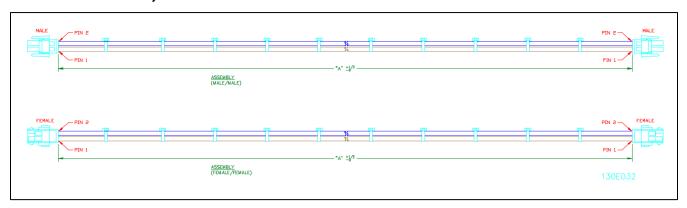


23.8.1: Replacement Parts - ITR Terminal Strip

			Width & Item#	!
Balloon	Description	16 BF	22 BF	28 BF
02	PCB, DB, FUSED, 7.5A	1132171	1132171	1132171
03	FUSED, 7.5A, 32V, ATO	1132721	1132721	1132721
04	DRIVERCARD, ITOH CBM-105	1153930	1153930	1153930
06	PCB, DB,PE, 4A, 8 STATION WAGO	1138197	1138197	1138197
07	CONN., WAGO 231-108 / 026-000	1138668	1138668	1138668
10	CABLE, POWERT, CB-016 PZM	1144897	1144897	1144897
20	CONN., 3 COND, W / LEVERS	1102816	1102816	1102816
21	CABLE, BELDEN 9421 OR EQUIV.	1140038	1140038	1140038
22	CONNECTOR, IDC SCOTCHLOK 558 (RED)	1120174	1120174	1120174
40	FUSE, 4A, 125V, CARTRIDGE, GMA	110221	110221	110221
41	FUSE, HOLDER IN-LINE, CARTRIDGE	1102222	1102222	1102222
42	CONN., FEMALE 3 POLE PIN	1139780	1139780	1139780
46	TERM, END STOP WAGO 249-116	1132919	1132919	1132919
47	TERM 2 COND, WAGO 2002-1201	1114381	1114381	1114381
48	TERM, INTRMED PLT, WAGO 2002-1292	1132918	1132918	1132918
49	TERM, INTRMED PLT, WAGO 2002-1291	1114382	1114382	1114382
50	WMB-MLTI-MARK 1-50, WAGO 793-666	1142173	1142173	1142173



23.9: HARNESS, GENDER CHANGING

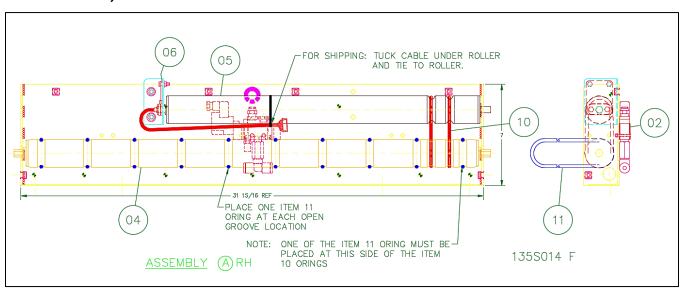


23.9.1: Replacement Parts - Harness, Gender Changing

	MALE/MALE POWER HARNESS				
Item No.	Description				
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"				
	130E032				



23.10: PAN, BOTTOM ITR ERS



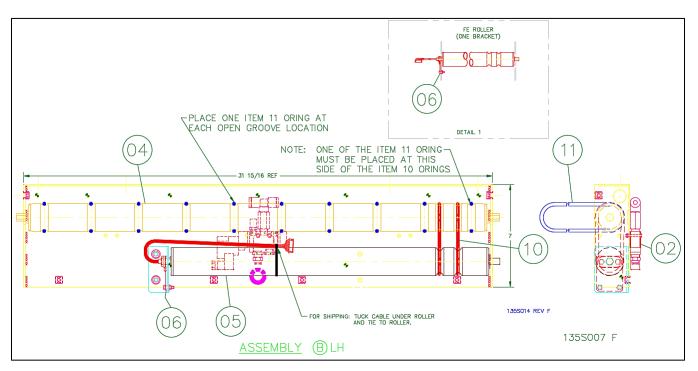
23.10.1: Replacement Parts - Pan Bottom ITR ERS LH & RH

REPLACEMENT PARTS - PAN ASY BOTTOM ITR ERS LH & RH				
Wide				#
Balloon	Description	16 BF	22 BF	28 BF
02	VALVE,SMC 4WAY 24VDC W/FITT & DIN CORD	1139102	1139102	1139102
04	ROLLER,CARRIER DRIVE,	1132732	1132732	1132732
05	ROLLER,ITR 22BF 2G ITOH	1138723	1138723	1138723
06	BRKT,MOUNTING ITOH,FLATS UP	1132447	1132447	1132447
10	ORING,1/4"DIA X 9.5" HT BLUE	1144848	1144848	1144848
11	ORING,83A ST TRNS 3/16X22-3/16	1148786	1148786	1148786
			Dwg# 1	35S014 Rev F



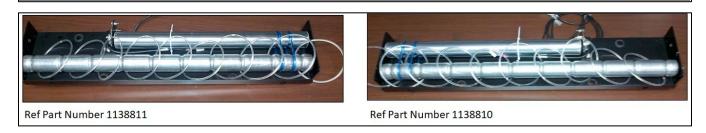


23.11: PAN BOTTOM ITR ERS WING (FE ROLLER)



23.11.1: Replacement Parts - Pan Assembly

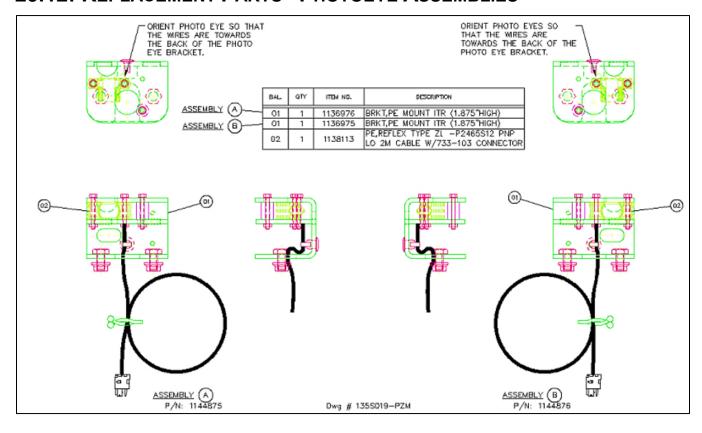
Width & Item#				‡		
Balloon Description 16 BF 22 BF						
02	VALVE,SMC 4WAY 24VDC W/FITTS & DIN CORD	1139102	1139102	1139102		
04	ROLLER,CARRIER DRIVE,	1132732	1132732	1132732		
05	ROLLER,ITR 22BF 2G ITOH	1138723	1138723	1138723		
06	BRKT,MOUNTING ITOH,FLATS UP	1132447	1132447	1132447		
10	ORING,1/4"DIA X 9.5" HT BLUE	1144848	1144848	1144848		
11	ORING,83A ST TRNS 3/16X15-7/32	1148787	1148787	1148787		



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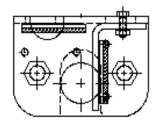
23.12: REPLACEMENT PARTS - PHOTOEYE ASSEMBLIES

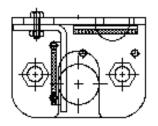


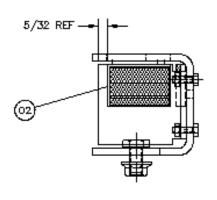


23.12.1: Replacement Parts - Reflector Assembly

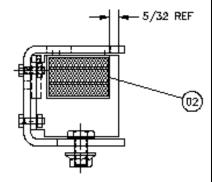
	BAL.	QUAN	ITEN NO.	DESCRIPTION	DVG.
ASSEMBLY (A)—	02	2	1136359	PE,REFLECTOR 20MM X 30MM	
ASSEMBLY (B)—	02	2	1136359	PE,REFLECTOR 20MM X 30MM	







ASSEMBLY (A) P/N: 1136982

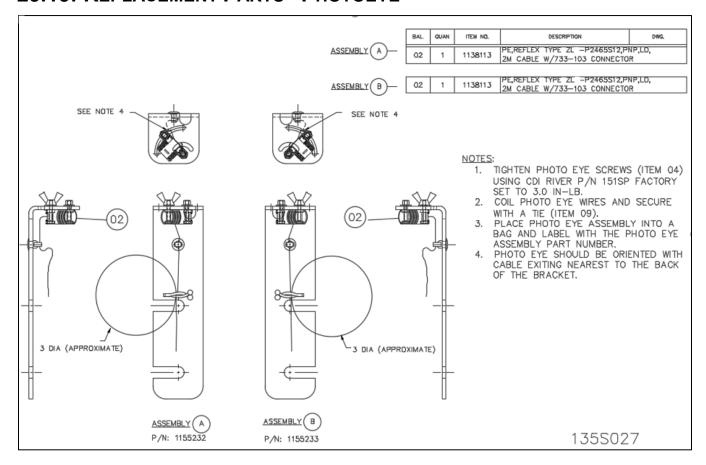


ASSEMBLY (B) P/N: 1136983

1305008

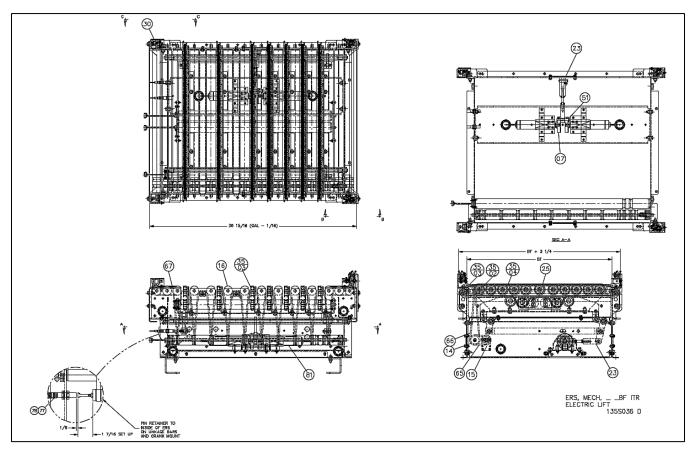


23.13: REPLACEMENT PARTS - PHOTOEYE





23.14: ITR ERS MECHANICS - ELECTRIC LIFT

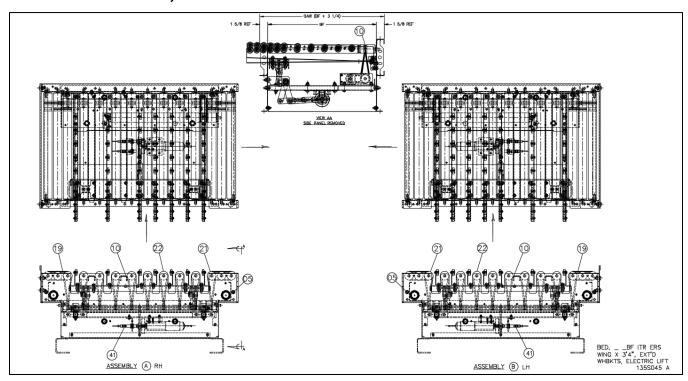


23.14.1: Replacement Parts – ITR ERS Mechanics – Electric Lift

ERS,BF ITR-C6 X 3'4" 7S BDI FE-60,W/PE'S Width & Item#						
Balloon	Description	16 BF	22 BF	28 BF		
7	CAM, DRIVE ELECTRIC LIFT UBT,ERS,WING BED	1196464	1196464	1196464		
14	ROLLER,CARRIER DRIVE ITR 2 UBT 3-1/4"C,7-STRAND LOCO DRIVE	1196871	1196871	1196871		
15	ROLLER,ITR 34BF 2G ITOH PM 486 FE-60 (1.25" GROOVE SPACING)	1184858	1184858	1184858		
16	ROLLER,ITR BF 1.75D PRBG 2D	1196875	1196875	1196876		
23	ASY, DRIVE LINKAGE ELECTRIC LIFT	1196442	1196442	1196442		
25	ROLLER,ITR 30BF NG ITOH PM 486 FE-60 MOTOR CABLE W/ 10-PIN CONN	1184974	1184974	1184974		
30	PE,REFLEX TYPE ZL	1163456	1163456	1163456		
30	REFLECTOR 20X30X4-SELF-ADHESIVE	00203650	00203650	00203650		
35/02	IDLER,ASY FLAT FACE ITR UBT MID	1132379	1132379	1132379		
35/03	IDLER,ASY FLANGED ITR UBT END	1159961	1159961	1159961		
35/04	BELT,83A .188 X .468 X"BF ITR2 UBT	1132754	1132755	1132756		
51	PIN,HEAD TYPE,SET SCREW FLAT	1184947	1184947	1184947		
65	ORING,3/16DIA X 8-1/4" HT BLUE	E0034023	E0034023	E0034023		
66	ORING,83A ST TRNS 3/16X21-3/8	1149850	1149850	1149850		
67	ORING,83A3/16 X 7-1/2	1136169	1136169	1136169		
77	SWITCH,PROX,12MM DIA	1184770	1184770	1184770		
78	CABLE, M12 TO WAGO 733-103	1198538	1198538	1198538		
81	DRIVE,KYOWA 24VDC PULSE GEAR	1177986	1177986	1177986		



23.15: WING BED, ITR ERS – ELECTRIC LIFT

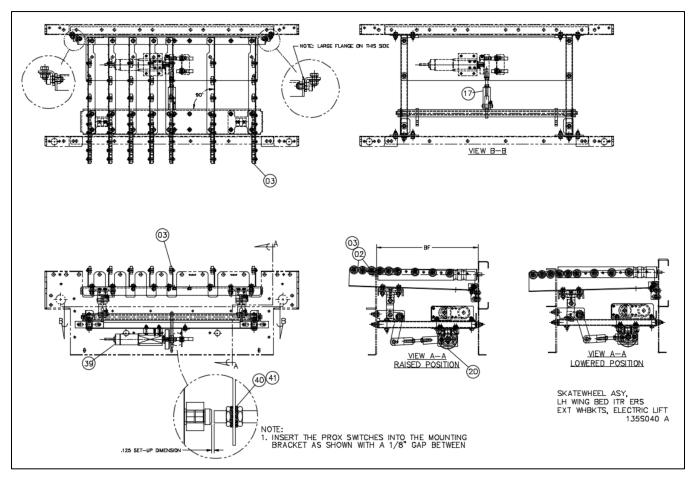


23.15.1: Replacement Parts – Wing Bed ERS – Electric Lift

ED,BF	ITR ERS WING X 3'4"LH/RH	'	Width & Item#				
Balloon	Description		22 BF	28 BF			
4	ROLLER,CARRIER DRIVEITR ERS 3.25"C	1132732	1132732	1132732			
5	ROLLER, ITR 22BF 2G ITOH PM 486 FE-60 600MM MOTOR CABLE W/ 10 PIN CONN	1163472	1163472	1163472			
10	ORING,1/4"DIA X 9.5" HT BLUE	1144848	1144848	114484			
11	ORING,83A ST TRNS 3/16X15-7/32	1148787	1148787	114878			
19	ORING,83A3/16 X 7-1/2	1136169	1136169	113616			
21	ROLLER,ITR _ BF 1.75D PRBG 2D	1135967	1135967	113596			
22	ROLLER,ITRBF 1.75D PRBG 1D	1136163	1136162	113616			
3	SKATEWHEEL,ASY 6002 W/ADAPTER	1138618	1138618	113861			
17	ASY, DRIVE LINKAGE ELECTRIC LIFT	1196442	1196442	119644			
20	CAM, DRIVEELECTRIC LIFTUBT,ERS,WING BED	1196464	1196464	119646			
32	PIN,HEAD TYPE,SET SCREW FLAT	1196950	1196950	119695			
39	DRIVE,KYOWA 24VDC PULSE GEAR	1177986	1177986	117798			
40	SWITCH,PROX,12MM DIA	1184770	1184770	118477			
41	CABLE, M12 TO WAGO 733-103	1198538	1198538	119853			



23.16: SKATEWHEEL WING BED - ELECTRIC LIFT

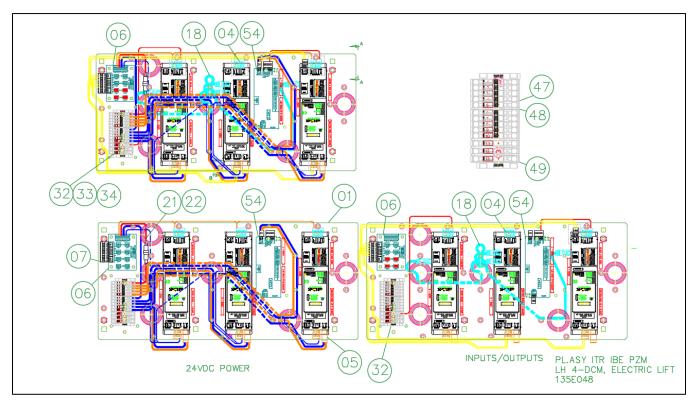


23.16.1: Replacement Parts - Skatewheel Wing - Electric Lift

REPLACEMENT PARTS - SKATEWHEEL, ASY - ELECTRIC LIFT						
SKATEWHEEL,ASY _ BF LH Width & Item#						
Balloon	Description	16 BF	22 BF	28 BF		
3	SKATEWHEEL,ASY 6002 W/ADAPTER	1138618	1138618	1138618		
17	ASY, DRIVE LINKAGEELECTRIC LIFT	1196442	1196442	1196442		
20	CAM, DRIVEELECTRIC LIFTUBT,ERS,WING BED	1196464	1196464	1196464		
32	PIN,HEAD TYPE,SET SCREW FLAT 3	1196950	1196950	1196950		
39	DRIVE,KYOWA 24VDC PULSE GEAR	1177986	1177986	1177986		
40	SWITCH,PROX,12MM DIA,	1184770	1184770	1184770		
			Reference	Dwg: 135S04		



23.17: ITR DRIVER CARDS WITH IB-E03 & EZ24



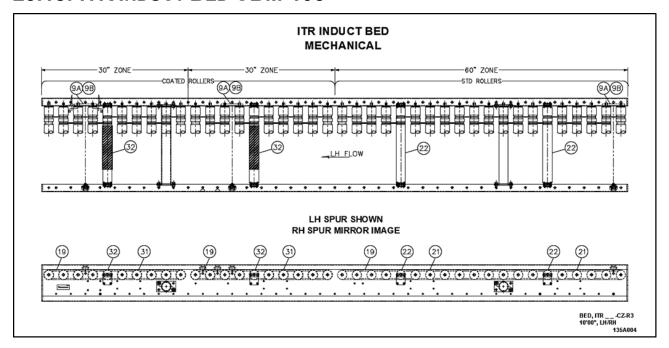
23.17.1: Replacement Parts - IB-E03 & EZ24 Driver Cards

B-E03 PZM LH or RH 4-DCM,ELECTRIC LIFT ISSCRIPTION RIVERCARD,ITOH IB-E03BP EFLECTOR 20X30X4-SELF-ADHESIVE DNN, WAGO 231-302/026-000 CB, DB, PE, 4A8 STATION ABLE,CTRLS-CAT5E'-GRAY	16 BF 1166286 00203650 1162204 1138197 REFERENC	22 BF 1166286 00203650 1162204 1138197 E Cat5E COMM	28 BF 1166286 00203650 1162204 1138197
RIVERCARD,ITOH IB-E03BP EFLECTOR 20X30X4-SELF-ADHESIVE DNN, WAGO 231-302/026-000 CB, DB, PE, 4A8 STATION ABLE,CTRLS-CAT5E'-GRAY	1166286 00203650 1162204 1138197	1166286 00203650 1162204 1138197 E Cat5E COMN	1166286 00203650 1162204 1138197
EFLECTOR 20X30X4-SELF-ADHESIVE DNN, WAGO 231-302/026-000 DB, DB, PE, 4A8 STATION ABLE,CTRLS-CAT5E'-GRAY	00203650 1162204 1138197	00203650 1162204 1138197 E Cat5E COMN	00203650 1162204 1138197
DNN, WAGO 231-302/026-000 CB, DB, PE, 4A8 STATION ABLE,CTRLS-CAT5E'-GRAY	1162204 1138197	1162204 1138197 E Cat5E COMN	1162204 1138197
CB, DB, PE, 4A8 STATION ABLE,CTRLS-CAT5E'-GRAY	1138197	1138197 E Cat5E COMN	1138197
ABLE,CTRLS-CAT5E'-GRAY	·	E Cat5E COMN	
	REFERENC		1UNICATION
		CABLE	
JSE,4A,125V,CARTRIDGE,GMA5 X 20MM BUSSMANN,GMA-4A	1102221	1102221	1102221
ABLE,MOTOR EXTENSION,1200MMITOH M-F-EXT-9PIN-1200 SE W/ CB-016 OR HB-510	1138705	1138705	1138705
JSE,HOLDER IN-LINE,CARTRIDGE 5X15MM AND 5X20MM JSSMANN HHT, #16AWG LEADS	1102222	1102222	1102222
ABLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-9PIN-2700 SE W/ CB-016 OR HB-510	1138706	1138706	1138706
ABLE,MOTOR EXTENSION,600MMITOH M-F-EXT-10PIN-600 SE W/ IB-N03/IB-E/HBM-604/BRAKE	1135339	1135339	1135339
ABLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-10PIN-2700 SE W/ IB-N03/IB-E/HBM-604/BRAKE	1135341	1135341	1135341
DNNECTOR,IDC SCOTCHLOK 56210-12AWG RUN,10-12AWGYELLOW	3M562	3M562	3M562
RM, BLOCK, 2-COND, 20-10AWG600V, 30A, GRAY, 6.2mm	1145413	1145413	1145413
RM,SEPARATOR,ORANGE, 2mm	1180509	1180509	1180509
RM, END BARRIER, GRAY, 1mm	1145415	1145415	1145415
RIVERCARD,INSIGHT EZ24	1173108	1173108	1173108
A S A S A S I I I I	E W/ CB-016 OR HB-510 SE,HOLDER IN-LINE,CARTRIDGE 5X15MM AND 5X20MM SSMANN HHT, #16AWG LEADS BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-9PIN-2700 E W/ CB-016 OR HB-510 BLE,MOTOR EXTENSION,600MMITOH M-F-EXT-10PIN-600 E W/ IB-N03/IB-E/HBM-604/BRAKE BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-10PIN-2700 E W/ IB-N03/IB-E/HBM-604/BRAKE INNECTOR,IDC SCOTCHLOK 56210-12AWG RUN,10-12AWGYELLOW RM, BLOCK, 2-COND, 20-10AWG600V, 30A, GRAY, 6.2mm RM,SEPARATOR,ORANGE, 2mm RM, END BARRIER, GRAY, 1mm	BLE,MOTOR EXTENSION,1200MMITOH M-F-EXT-9PIN-1200 E W/ CB-016 OR HB-510 SE,HOLDER IN-LINE,CARTRIDGE 5X15MM AND 5X20MM SSMANN HHT, #16AWG LEADS BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-9PIN-2700 E W/ CB-016 OR HB-510 BLE,MOTOR EXTENSION,600MMITOH M-F-EXT-10PIN-600 E W/ IB-N03/IB-E/HBM-604/BRAKE BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-10PIN-2700 E W/ IB-N03/IB-E/HBM-604/BRAKE INNECTOR,IDC SCOTCHLOK 56210-12AWG RUN,10-12AWGYELLOW RM, BLOCK, 2-COND, 20-10AWG600V, 30A, GRAY, 6.2mm 1180509 RM, END BARRIER, GRAY, 1mm 1145415	BLE,MOTOR EXTENSION,1200MMITOH M-F-EXT-9PIN-1200 E W/ CB-016 OR HB-510 SE,HOLDER IN-LINE,CARTRIDGE 5X15MM AND 5X20MM SSMANN HHT, #16AWG LEADS BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-9PIN-2700 E W/ CB-016 OR HB-510 BLE,MOTOR EXTENSION,600MMITOH M-F-EXT-10PIN-600 E W/ IB-N03/IB-E/HBM-604/BRAKE BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-10PIN-2700 E W/ IB-N03/IB-E/HBM-604/BRAKE BLE,MOTOR EXTENSION,2700MMITOH M-F-EXT-10PIN-2700 E W/ IB-N03/IB-E/HBM-604/BRAKE NNECTOR,IDC SCOTCHLOK 56210-12AWG RUN,10-12AWGYELLOW 3M562 RM, BLOCK, 2-COND, 20-10AWG600V, 30A, GRAY, 6.2mm 1180509 RM, END BARRIER, GRAY, 1mm 1145415 1145415

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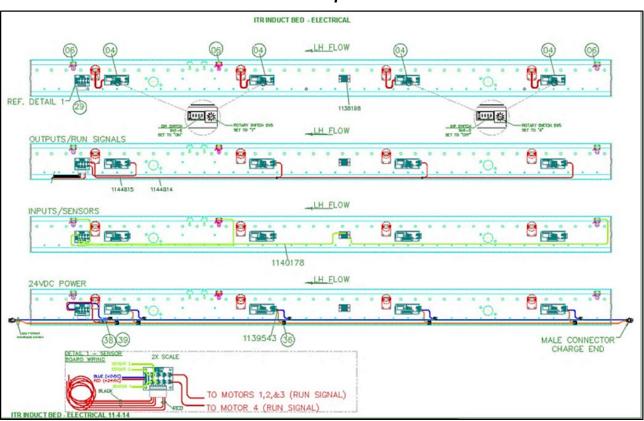


23.18: ITR INDUCT BED CBM-105



The IntelliROL Pick Zone Module starts with the Induction Bed. The Induct Bed gaps the product so it can be transferred.

23.18.1: Induct Bed CBM-105 Electrical Components



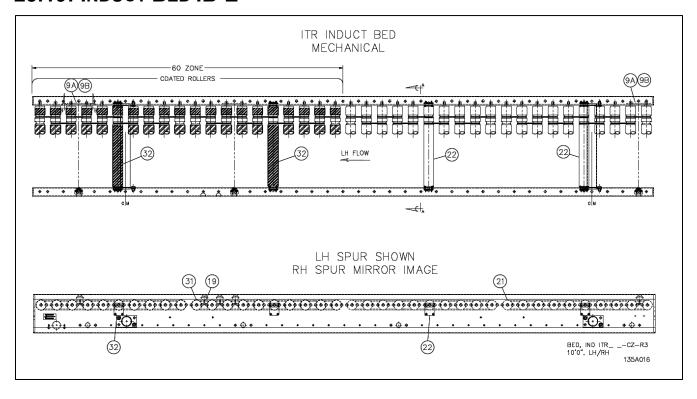


23.18.2: Replacement Parts - Induct Bed CBM-105

	REPLACEMENT PARTS - ITR INDUCT BED, CBM-105				
		Width & Item#			
Balloon	Description	16 BF	22 BF	28 BF	34 BF
04	DRIVERCARD,ITOH CBM-105FP	1153930	1153930	1153930	1153930
36	CONNECTOR,IDC SCOTCH LOK 567 10-12AWG RUN,14-18AWG-BROWN	3M567	3M567	3M567	3M567
38	FUSE,HOLDER IN-LINE,CARTRIDGE	1102222	1102222	1102222	1102222
39	FUSE,4A,125V CARTRIDGE	1102221	1102221	1102221	1102221
	HARNESS,POWER BROWN & BLUE 10AWG WITH MALE/FEMALE CONN	3'-0" L	5'-5" L	8'-0" L	10'-6" L
	(NOT BF SPECIFIC)	1102289	1102288	1102287	1102286
	CABLE,MOTOR EXTENSION,	REFERENCE MOTOR EXTENSION CABL			ON CABLE
	600,1200,OR 2700 MM LONG	TABLE			
06	PE,REFLEX TYPE ZL, PNP,LIGHT OP,2M CABLE	1138113	1138113	1138113	1138113
9A	PE,REFLECTOR 4-3/8" X 1-1/8"	400004	400004	400004	400004
9B	TAPE,FOAM DBL SIDED 1" SQUARE	E0005429	E0005429	E0005429	E0005429
11	CONNECTOR,IDC SCOTCH LOK 55816-22AWG RUN,16-22AWG	1120174	1120174	1120174	1120174
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,ITRBF 2G ITOH FE-60	1138722	1138723	1138724	1138725
	PCB, DB, PE, EXTENSION	1138198	1138198	1138198	1138198
29	PCB DB PE 4Amp 8 STATION	1138197	1138197	1138197	1138197
31	ROLLER,ITR 1.9" DIA CTD PRBG 1/16" PVC SLV	1134693	1132204	1131724	1140369
32	ROLLER,ITR BF 2G CTD ITOH	1140375	1140376	1140377	1140378
		R	Reference D	wg: 135A004	& 135E006

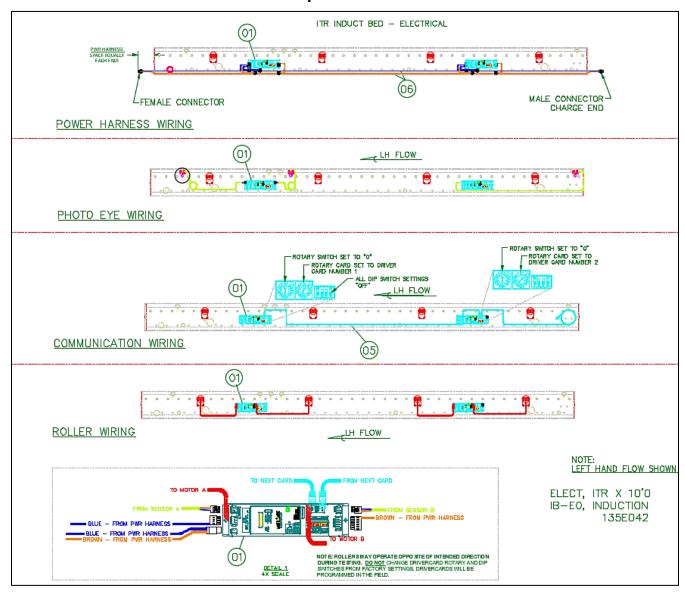


23.19: INDUCT BED IB-E





23.19.1: Induct Bed IB-E Electrical Components





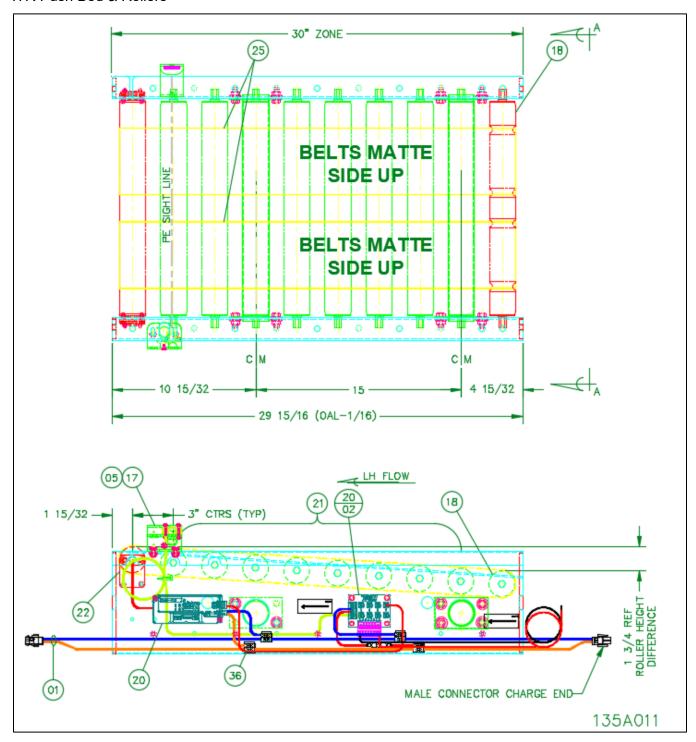
23.19.2: Replacement Parts - Induct Bed IB-E

	REPLACEMENT PARTS - ITR INDUCT BED, IBE					
			Width 8	& Item#		
Balloon	Description	16 BF	22 BF	28 BF	34 BF	
01	DRIVERCARD,ITOH IB-E03BP	1166286	1166286	1166286	1166286	
	PE,REFLEX TYPE ZL-P2465S14	1163456	1163456	1163456	1163456	
9A	PE,REFLECTOR 4-3/8" X 1-1/8"	400004	400004	400004	400004	
9B	TAPE,FOAM DBL SIDED 1" SQUARE	E0005429	E0005429	E0005429	E0005429	
05	CABLE,CTRLS-CAT5E'-GRAY	REFERENCE Cat5E COMMUNICATION CABLE			ICATION	
06	HARNESS,POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L 1102289	5'-6" L	8'-0" L	10'-6" L 1102286	
	CABLE,MOTOR EXTENSION, 600,1200,OR 2700 MM LONG	REFERENCE MOTOR EXTENSION CABL TABLE			ON CABLE	
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,ITRBF 2G ITOH PM 486 FE-60 600MM MOTOR CABLE W/10 PIN CONN	1163471	1163472	1163473	1163474	
31	ROLLER,ITR 1.9" DIA CTD PRBG 1/16" PVC SLV	1134693	1132204	1131724	1140369	
32	ROLLER,ITR _ BF 2G ITOHPM 486 FE-60 600MM MOTOR CABLE W/ 10 PIN CONN	1204326	1195028	1203061		
		R	Reference D	wg: 135A016	& 135E042	

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ITR Push Bed & Rollers





23.19.3: Replacement Parts - ITR CBM-105 Push Bed

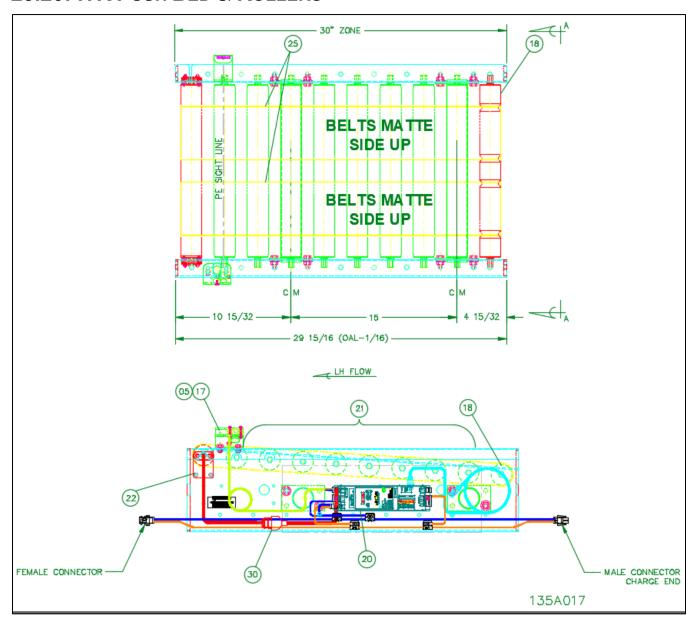
BED,ITR-	BF-PUSH-CB-CZ-LH OR RH -2'6"-FE60- MR			
,	DESCRIPTION	16BF	22BF	28BF
20/02	PCB, DB, PE, 4A8 STATION	1138197	1138197	1138197
17	PE,REFLEX TYPE ZL-P2465S12PNP,LIGHT OP,2M CABLEW/733-103	1138113	1138113	1138113
05	PE,REFLECTOR 20MM X 30MMADHESIVE BACKED	1136359	1136359	1136359
20	DRIVERCARD,ITOH CBM-105FP	1153930	1153930	1153930
36	CONNECTOR,IDC SCOTCHLOK 56710-12AWG RUN,14-18AWG BROWN	3M567	3M567	3M567
	HARNESS,POWER BROWN & BLUE 10AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L 1102289	5'-5" L 1102288	8'-0" L 1102287
	FUSE,HOLDER IN-LINE,CARTRIDGE5X15MM AND 5X20MM	1102222	1102222	1102222
	FUSE,4A,125V,CARTRIDGE,GMA5 X 20MM BUSSMANN,GMA-4A	1102221	1102221	1102221
18	ROLLER,BF ITR1.9PLTD PRBG W/TRACKING GRVS12GA	1135830	1138664	1139691
21	ROLLER,"GRAV 1.9 PLTD PRBG(16BF)	60218009	60224009	60230009
3	ROLLER,ITRBF NG ITOHPM486FE-60-391-D-24-KF	1138739	1138740	1138741
25	BELT,TRACTION 11"X58.75"X.06383A, BLACK, 2.4 STRETCH30" ZONE (27"ROLLER TO ROLLER)	1135832	1134004	1135832







23.20: ITR PUSH BED & ROLLERS





23.20.1: Replacement Parts - ITR IB-E03 Push Bed

	REPLACEMENT PARTS - ITR PZM IBE PUSH BED			
BED,ITR	BF-PUSH-IBE-CZ-LH OR RH -2'6"-FE60MR			
BALLOON	DESCRIPTION	16BF	22BF	28BF
20	DRIVERCARD,ITOH IB-E03BP	1166286	1166286	1166286
17	PE,REFLEX TYPE ZL-P2465S14 PNP,LIGHT OPERATE,2M CABLE	1163456	1163456	1163456
5	CABLE,CTRLS-CAT5E-7'-GRAY	E0034027	E0034027	E0034027
	CONN, WAGO 231-302/026-000	1162204	1162204	1162204
	CONNECTOR,IDC SCOTCHLOK 567 10-12AWG RUN,14-18AWG BROWN	3M567	3M567	3M567
	PE,REFLECTOR 20MM X 30MM	1136359	1136359	1136359
	CABLE,CTRLS-CAT5E'-GRAY	REFERENCE Cat5E COMMUNICATION CABLE		
	HARNESS,POWER BROWN & BLUE14 AWG WITH MALE/FEMALE CONN (NOT BF SPECIFIC)	3'-0" L 1102289	5'-6" L 1102288	8'-0" L 1102287
18	ROLLER,BF ITR 1.9PLTD PRBG W/TRACKING GRVS 12GA	1135830	1138664	1139691
21	ROLLER, "GRAV 1.9 PLTD PRBG	60218009	60224009	60230009
3	ROLLER,ITR BF NG ITOH PM 486 FE 600MM MOTOR CABLE W/ 10 PIN CONN	1163480	1163481	1163482
25	BELT,TRACTION 11"X58.75"X.063 83A, BLACK, 2.4 STRETCH 30" ZONE(27"ROLLER TO ROLLER)	1135832	1134004	1135832
30	CABLE,MOTOR EXTENSION,600MM ITOH M-F-EXT-10PIN-600 USE W/ IB-N03/IB-E/HBM-604/BRAKE (RH)	1135339	1135339	1135339
			Ref Dwg	135A017 REV A

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GENERAL INFORMATION

Website Link:

mhs-conveyor.com

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MHS Conveyor INFORMATION

Mission

MHS Conveyor, located in Spring Lake, 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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