Installation, Operation, Maintenance Manual

MHS CONVEYOR

IntelliROL® HQL

Horizontal Queuing Lane

P/N 1185483

Revision Date: 06/20/2018

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Chapter 1: IOM Introduction

1.1: 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.

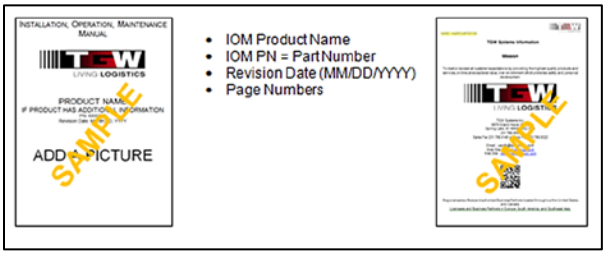
Not all applications and conditions can be covered; therefore, this manual is to be used ONLY as a guide.

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 Fax 231-798-4549.

Visit MHS Conveyor at mhs-conveyor.com.for maintenance videos and other application information.

1.2: 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

2.1: TGW SYSTEMS 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 9/23/2016

2.2: TGW 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.

Chapter 3: SAFETY

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 2535** – 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.

3.1: TGW Systems 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

- 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.

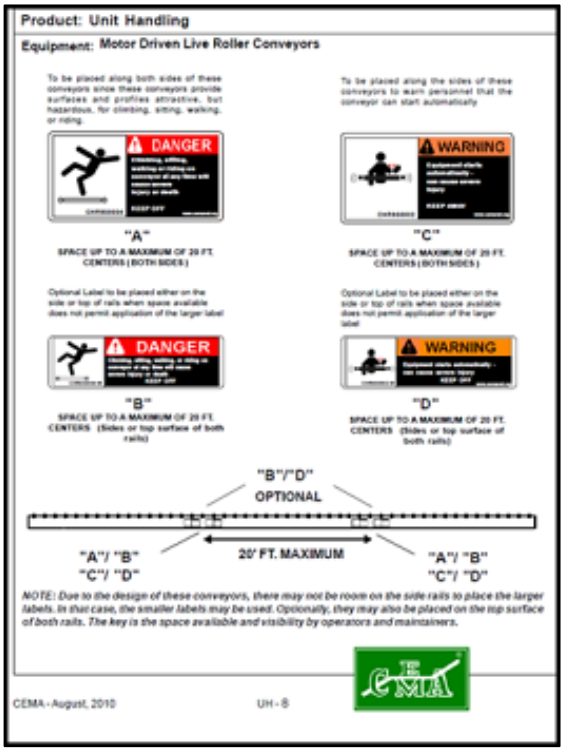
WARNING – Indicates potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

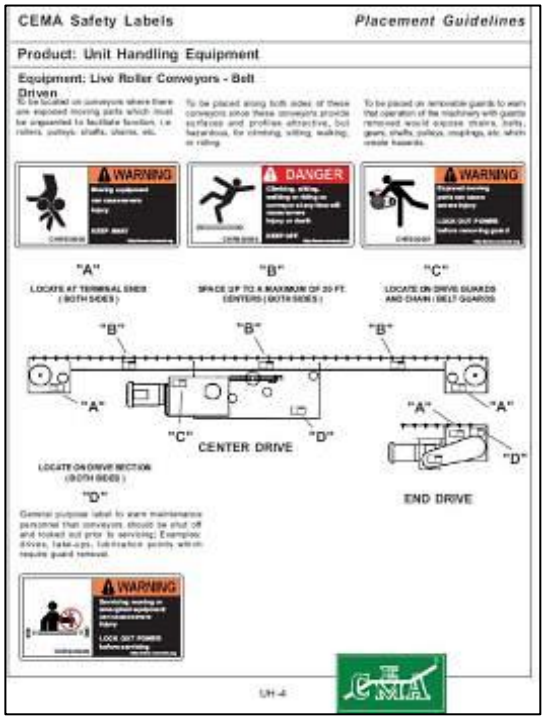
CAUTION – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

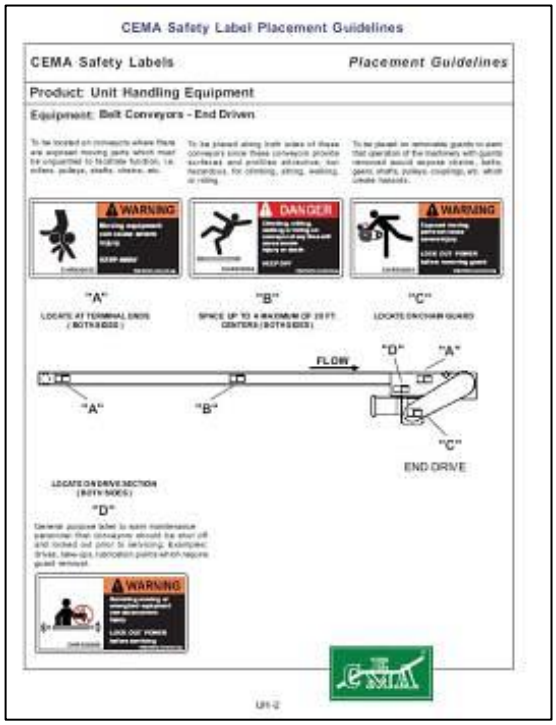
http://www.cemanet.org/cema-safety-label-meanings/

3.2: TGW Recommends Proper Labels for Conveyor Types

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







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.

3.3.1: Safety Warnings

⚠ 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.

⚠ WARNING

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

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

- Lock out power before removing guard. – This Label is Located on Top Guard, Bottom Guard, and End Guard.

- Do NOT operate Without Guard - This label is Located behind Removable Guards.

3.4: TGW Systems 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.

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

Controls Logic

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

Safety Switches

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

Special Devices

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

Rev 08/22/2011

Chapter 4: CHAPTER 4: ITR HQL INTRODUCTION

Concept

The ITR (IntelliROL) HQL (Horizontal Queuing Lane) is a 24v minimum pressure accumulator with an integrated singulating discharge zone. The lanes are designed to dense pack accumulate products utilizing TGW's IntelliROL technology and our (Patent Pending) slip clutch rollers.

The discharge is designed to hold back the train of products, and when given a release signal strip off a single product from the lane.

The functional logic for the lanes is pre-programmed into the Itoh IB-E03 driver cards to simplify the installation and commissioning.

Operation

The HQL is made up on three zones, a discharge zone (ZONE 1), an intermediate accumulation zone (ZONE 2), and a charge accumulation zone (ZONE 3).

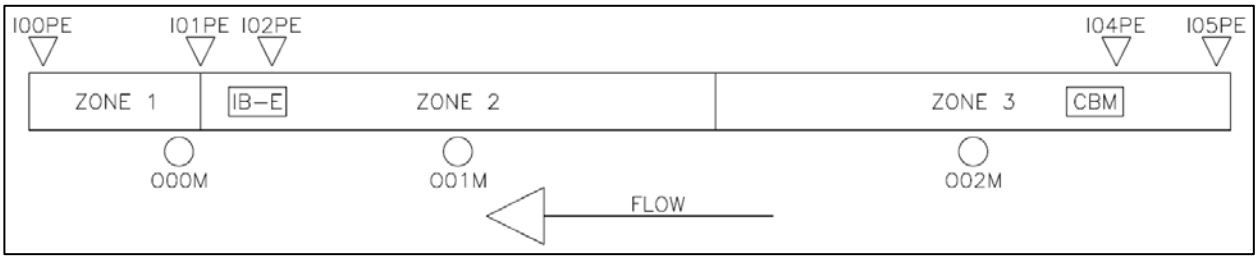


Figure 1: Field Device Layout

4.1: ESTABLISHING CONVEYOR FLOW

HQL beds are supplies as either RH or LH flow. Hand is determined by from the controls/belt side of the conveyor. Products traveling to the right would be considered a right hand (RH) flow bed. From the same position products if product travel is to the left the bed is considered a left hand (LH) flow bed. The identification label described under Parts Inventory & Identification has all of the information to identify the piece of equipment.

General

HQL conveyors are offered in 26"BF only, which has a conveying surface width of 24". The overall width of a HQL bed is 29.25". The length of the HQL charge bed is 8'1" long with a 97" (ZONE 3) accumulation zone. The discharge HQL bed is 9'8" long with a 97" (ZONE 2) accumulation zone and a 19" (ZONE 1) discharge zone. Both accumulation zones have roller centers of 2-5/32". The discharge zone has coated rollers with 2-3/8" roller centers.

4.2: DRIVER CARDS

The HQL is supplied with two driver cards, and each bed is tested at the factory. A pre-programmed Itoh IB-E03 driver card is mounted to the discharge bed, and the charge accumulation bed is supplied with an Itoh CBM-105 driver card. At installation the CBM-105 driver card is connected to the IB-E03, and the IB-E03 controls the functionality for the entire lane.

4.3: PRODUCT SPECIFICATIONS

Product Type:

Cartons, Corrugated and Plastic Trays, Shrink Wrapped Bottles

Rate:

Up to 40 CPM

Weight:

Up to 40lbs

4.4: Definition of Terms

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

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

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

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

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

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

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

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

Minimum Pressure Accumulation – Accumulation products on line conveyor in a manner that allows product to touch and have a slight, constant pressure. This pressure is held back by brake or coated rollers.

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

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

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

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

Slug Release - Simultaneous release of several products.

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

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

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

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

4.5: PRODUCT DESCRIPTION EXAMPLES

INTELLIROL HORIZONTAL QUEING LANE ITR HQL Charge Bed	TYPE	MODEL	WIDTH	BED TYPE	ITR DRIVERCARD	FRAME	ROLLER ZONE LENGTH	FLOW DIRECTION	LENGTH	ROLLER TYPE	NUMBER OF MOTORIZED ROLLERS
	BED	HQL	26BF	CHG	CB	CZ	97Z	LH	8'1"	FE17	1MR

EXAMPLE: BED,HQL-26BF-CHG-CB-CZ-97Z
LH-8'1"-FE17-1MR

PRODUCT DESCRIPTION: Bed, INTELLIROL HQL Conveyor, 26" Width Between Frame, Charge Bed, CB Style Drivercard, CRUZ Frame (CRUZ Channel), 97" Roller Zone Length Left Hand Flow, 8'1" Overall Length, FE-17 Type Motorized Rollers, 1 Motorized Roller Total

INTELLIROL HORIZONTAL QUEING LANE ITR HQL Discharge Bed	TYPE	MODEL	WIDTH	BED TYPE	ITR DRIVERCARD	FRAME	ROLLER ZONE LENGTH	FLOW DIRECTION	LENGTH	ROLLER TYPE	NUMBER OF MOTORIZED ROLLERS
	BED	HQL	26BF	DSC	IBE	CZ	19:97Z	RH	9'8"	FE60:17	2MR

EXAMPLE: BED,HQL-26BF-DSC-IBE-CZ-19:97Z
RH-9'8"-FE60:17-2MR

PRODUCT DESCRIPTION: Bed, INTELLIROL HQL Conveyor, 26" Width Between Frame, Discharge Bed, IBE Style Drivercard, CRUZ Frame (CRUZ Channel), (1)19" and (1)97" Roller Zone Length Right Hand Flow, 9'8" Overall Length, (1)FE-60 and (1)FE-17 Type Motorized Rollers, 2 Motorized Rollers Total

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

4.6: INSTALLATION ARRANGEMENTS

Commissioning of Equipment

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

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

During the Commissioning Phase, it is necessary to load the equipment with product to be conveyed, which provides the means of detecting those areas requiring adjustment.

Personnel will be required to support operational functions and may serve as part of operator training and familiarity with the system.

During the commissioning activity, special attention should be directed toward personnel safety. **No unnecessary risks should be taken** that would endanger the safety of any commissioning personnel.

All personnel must familiarize themselves with all safety features of the system such as emergency stops and power supply disconnects.

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

WARNING	
	• Install all covers and shrouds before operating.

controls.

Precautions

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

Chapter 5: ITR HQL Receiving & Site Preparation

General

MHS Conveyor IntelliROL units are shipped in subassemblies. These subassemblies are packaged to guard against damage in shipment, when handled properly.

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

CAUTION

TAKE CARE DURING THE REMOVAL OF EQUIPMENT FROM THE CARRIER. Remove small items and boxes first. Pull and lift only on the skid, not on the frame, cross member or any part of the equipment.

Preparation of Site

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

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

5.1: PARTS INVENTORY & IDENTIFICATION

Each subassembly is shipped completely assembled. Identify and separate components by type or tag number, for inventory and ease of locating during installation.

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

This label contains:

Item number

- Description
- Job Number
- Mfg. Number
- Date of manufacture
- Tag number (if specified)
- Assembler's clock number
- QR (Quick 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.

⚠ WARNING

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

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

Chapter 6: ITR HQL INSTALLATION

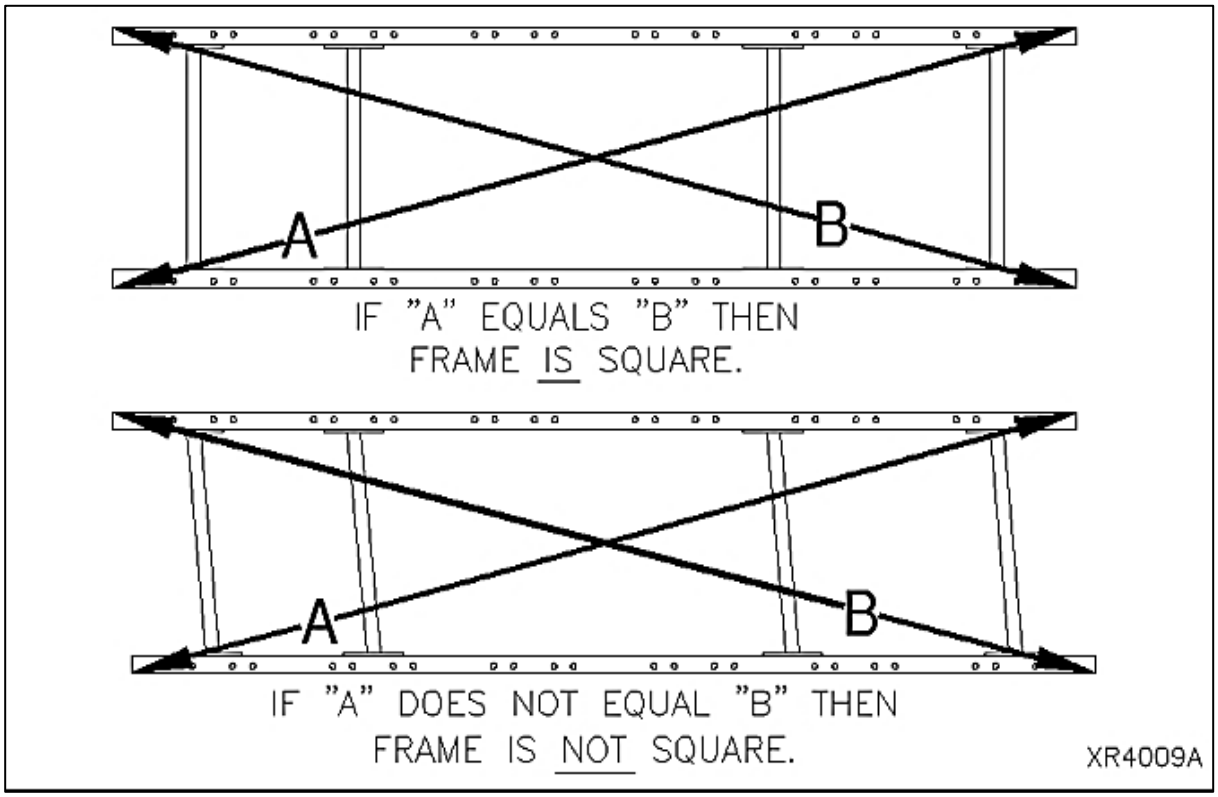
General

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

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

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

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



6.1: Dimensional Reference Points

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

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

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

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

⚠ WARNING

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

6.2: Support Arrangements

Floor Supports

All IntelliROL bed side channels are punched to match hole spacing for MHS Conveyor standard floor supports. Install bolts used to attach the standhead to the frame so the nut is on the bottom. Standhead bolts should be left finger tight while the conveyor is being assembled and aligned.

Floor supports are ordered by nominal height range, which is the dimension from the floor to top of the support. Conveyor elevations are shown on the layout by top-of-roller elevations. This difference must be recognized when setting the support elevations. IntelliROL conveyor is 6 5/16” from top-of-support to top-of-rollers with a 7 1/2” deep channel. (Rollers mounted low in frame.)

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

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

Anchoring

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

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

Precautions

ULTRAVIOLET RAYS of sunlight will weaken polyurethane slave belts.

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

6.3: Support & Connections:

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

6.4: ELEVATIONS

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

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

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

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

CAUTION

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

Component Orientation

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

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

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

Establishing Conveyor Flow

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

Chapter 7: HQ LANE R1.9 DESCRIPTION OF OPERATION

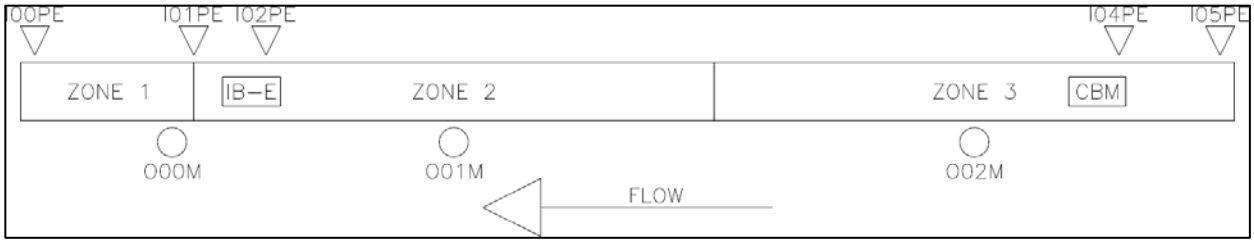


Figure 1: Field Device Layout

Loading Product

Product is loaded at the charge end. Placing product in front of the WAKE UP CLEAR photo eye (I05PE) will activate both ZONE 2 and ZONE 3 motorized rollers (O01M and O02M.) The ZONE 1 motorized roller (O00M) will remain off. Product will travel all the way to the first roller of the discharge zone, and then block the PRODUCT AT DISCHARGE CLEAR photo eye (I01PE.) ZONE 2 will stop, but ZONE 3 will continue to run as long as product is being loaded. If I05PE is clear for more than 60 seconds, ZONE 3 will shut off. Sixty seconds is more than enough time for a product to travel the entire length of the HQ Lane.

As product continues to be loaded at the charge end of the HQ Lane, it will travel to the end of ZONE 3. Once product reaches ZONE 2, it will be pushed into ZONE 2 by ZONE 3. As the product fills ZONE 2, the slip rollers will turn under the product, with some resistance. This will cause the product to be dense packed with minimum pressure accumulation. The rollers in the discharge section are positioned higher than the accumulation zones, providing an effective stop. As ZONE 2 becomes full, product will continue to accumulate back into ZONE 3. ZONE 3 will continue to run as product is loaded until the ZONE 3 CLEAR photo eye (I04PE) becomes blocked or the loading ceases and the 60 second timer elapses. Once ZONE 3 becomes full, and the ZONE 3 CLEAR photo eye (I04PE) is blocked for more than two seconds, ZONE 3 will stop. If more products are loaded at the charge end of the HQ Lane, in an effort to completely fill the lane, ZONE 3 will run for two seconds, and then stop again.

Discharging Product

Standard Products

To discharge standard products from the HQ Lane, the REQUEST PRODUCT DISCHARGE network signal needs to be set to ON by the PLC. This will cause ZONE 1 to run at the selected speed, as well as cause ZONE 2 to push. As the discharge zone operates at a higher speed than the accumulation zones, a gap will be created, stripping one product off ZONE 2. The single product will make a velocity transfer to the take-away belt. Once the discharged product has cleared the ZONE 1 CLEAR photo eye (I00PE), the rest of the accumulated line will index to the PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) and stop.

When the REQUEST PRODUCT DISCHARGE network signal is set to ON, the HQ Lane will only discharge one product. The REQUEST PRODUCT DISCHARGE signal must be cycled off and on for each package to be released. When the HQ Lane receives a REQUEST PRODUCT DISCHARGE signal, it is latched in the HQ Lane program and the discharge cycle begins. Once the ZONE 1 CLEAR photo eye (I00PE) is cleared by a package being discharged, and the PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) is blocked by the next product to be discharged, the

discharge cycle is complete. The REQUEST PRODUCT DISCHARGE signal must be reset to OFF, and then set to ON for another package to be discharged.

Small Products

To discharge small products from the HQ Lane, the REQUEST PRODUCT DISCHARGE network signal needs to be set to ON by the PLC. In addition, the SMALL PRODUCT SELECTED network signal must be set to ON as well. When the signals are set to ON, ZONE 1 will run at the selected speed and ZONE 2 will push. After 500 milliseconds, ZONE 2 will stop pushing and wait for the product discharge to be completed. As the discharge zone operates at a higher speed than the accumulation zones, a gap will be created, stripping one product off ZONE 2. The single product will make a velocity transfer to the take- away belt. Once the discharged product has cleared the ZONE 1 CLEAR photo eye (I00PE), all accumulated product will index to the PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) and stop.

When the REQUEST PRODUCT DISCHARGE network signal is set to ON, the HQ Lane will only discharge one product. The REQUEST PRODUCT DISCHARGE signal must be cycled off and on for each package to be released. When the HQ Lane receives a REQUEST PRODUCT DISCHARGE signal, it is latched in the HQ Lane program and the discharge cycle begins. Once the ZONE 1 CLEAR photo eye (I00PE) is cleared by a package being discharged, and the PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) is blocked by the next product to be discharged, the discharge cycle is complete. The REQUEST PRODUCT DISCHARGE signal must be reset to OFF, and then set to ON for another package to be discharged.

PLC Interface

Inputs

PLC Input Description	*PLC Input Tag*
Product Discharge Complete	BufferLaneCommander:I.D_InData[0].0
Infeed Zone Product Present	BufferLaneCommander:I.D_InData[0].1
Lane Full	BufferLaneCommander:I.D_InData[0].2
Lane Empty	BufferLaneCommander:I.D_InData[0].3
Waiting for Product	BufferLaneCommander:I.D_InData[0].4
Motor Fault	BufferLaneCommander:I.D_InData[0].5
ZONE 1 Jam Fault	BufferLaneCommander:I.D_InData[0].6
False Discharge	BufferLaneCommander:I.D_InData[0].7
Jam PE Product Clear	BufferLaneCommander:I.D_InData[1].0

Table 1: PLC Interface

Inputs

There are six status signals that are sent from the HQ Lane to PLC inputs.

Status Signal

1. ***Product Discharge Complete*** – each time product is discharged from the HQ Lane and the discharge cycle has been completed, this signal will be set to ON. It will be reset to OFF the next time the Request Product Discharge signal makes a transition from OFF to ON.
2. Infeed Zone Product Present– product being loaded onto the HQ Lane and blocking the WAKE UP CLEAR photo eye (I05PE) will cause this signal to be set to ON.
3. Lane Full – this signal will be set to ON when all of the following conditions are true. It will be reset to OFF if any one of the conditions becomes false.
    a. PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) is blocked
    b. ADDITIONAL PRODUCT AT DISCHARGE CLEAR photo eye (I02PE) is blocked
    c. ZONE 3 CLEAR photo eye (I04PE) has been blocked for at least two seconds
    d. WAKE UP CLEAR photo eye (I05PE) is blocked
4. Lane Empty – this signal will be set to ON when all of the following conditions are true. It will be reset to OFF if any one of the conditions becomes false.
    a. ZONE 1 CLEAR photo eye (I00PE) is clear
    b. PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) is clear
    c. ADDITIONAL PRODUCT AT DISCHARGE CLEAR photo eye (I02PE) is clear
    d. ZONE 3 CLEAR photo eye (I04PE) is clear
    e. WAKE UP CLEAR photo eye (I05PE) is clear
    f. ZONE 1 motorized roller is off
    g. ZONE 2 motorized roller is off
    h. ZONE 3 motorized roller is off
5. Waiting for Product – this signal will be set to ON when all of the following conditions are true. It will be reset to OFF if any one of the conditions becomes false.
    a. Request Product Discharge signal set to ON
    b. PRODUCT AT DISCHARGE CLEAR photo eye (I01PE) is clear
    c. ADDITIONAL PRODUCT AT DISCHARGE CLEAR photo eye (I02PE) is clear
    d. Discharge cycle is not active
6. Jam PE Product Clear – each time product blocks the JAM PE PRODUCT CLEAR photo eye (I03PE), this signal will be set to OFF. Otherwise, when it is clear, the signal will be set to ON.

Fault Signals

There are three fault signals that are sent from the HQ Lane to PLC inputs. Setting the Fault Reset signal from the PLC to ON will clear the faults once the fault condition has been resolved.

1. Motor Fault – the IB-E driver card is indicating a fault for ZONE 1 motor, the IB-E driver card is indicating a fault for ZONE 2 motor or the CBM driver card is indicating a fault for ZONE 3 motor.
2. ZONE 1 Jam Fault - ZONE 1 CLEAR photo eye (I00PE) is blocked for at least five seconds.
3. False Discharge – two or more products have been discharged during one continuous discharge cycle.

Outputs

PLC Output Description	PLC Output Tag
Request Product Discharge	BufferLaneCommander:O.D_OutData[0].0
Small Product Selected	BufferLaneCommander:O.D_OutData[0].1
Additional Product Info Selected	BufferLaneCommander:O.D_OutData[0].2
Takeaway Belt Running	BufferLaneCommander:O.D_OutData[0].6
Fault Reset	BufferLaneCommander:O.D_OutData[0].7
Discharge Speed Selection	BufferLaneCommander:O.D_OutData[1]

Table 2: PLC Interface – Outputs

There are six control signals that are sent from the PLC outputs to the HQ Lane.

1. ***Request Product Discharge*** – set this signal to ON to initiate the discharge of product. If the signal remains on for more than one discharge cycle, additional product will be discharged, one at a time, until the signal is reset to OFF.
2. ***Small Product Selected*** – this signal is set to ON to request minimal product push during the discharge cycle. This is required when running fridge packs or similar products.
3. ***Additional Product Info Selected*** – this signal is not used in the current HQ Lane program. It is available in the future if one signal (Small Product Requested) is not enough to differentiate between various types of products.
4. Takeaway Belt Running – this signal is set to ON when the takeaway belt is running. It is set to OFF when the belt is stopped. This signal will be used to condition the ZONE 1 Jam Fault and will not prevent the HQ Lane from discharging product if the takeaway belt is stopped.
5. ***Fault Reset*** – once the cause of a fault condition has been resolved, set this signal to ON to reset the latched fault in the HQ Lane program.
6. ***Discharge Speed Selection*** – set this word to a value between 1 and 4. These values correspond to selecting motor speed 1, 2, 3 or 4. Speed 1 is 100% motor speed, which is about 260FPM at the surface of the coated rollers in the discharge zone (Zone 1). Speed 2 is 75% motor speed, which is about 220FPM. Speed 3 is 50% motor speed, which is about 150FPM. Speed 4 is 25% motor speed, which is about 75FPM.

Chapter 8: POWER SUPPLY STANDARD

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

For more details visit https://mhs-conveyor.com/support/application-control-guidelines

8.1: General Electrical Requirements

⚠ WARNING

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

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

⚠ WARNING

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

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

⚠ WARNING

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

Chapter 9: ITR HQL Maintenance & Troubleshooting

9.1: General Preventive Maintenance

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

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

Daily

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

⚠ WARNING

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

⚠ WARNING

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

9.2: INTELLIROL HQL TROUBLESHOOTING GUIDE

ITR HQL Mechanical/Electrical

	Problem	Possible Cause	Remedy
1.	Power Roller does not turn	ITR roller not properly installed	Check that the Power Moller is properly inserted into the frame. Adjust as necessary
			Check the tube and end caps are not contacting the frame, side rails or other parts. Power Moller should be allowed to move freely
		Check that the Power Moller's shafts are properly mounted with the applicable bracket(s). Proper mounting is required for tube rotation.	For FE series motors one bracket securing the cable side shaft.
			For FS / FP / FH series motors two brackets securing both cable side and spring loaded shafts
		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.	Inspect cable for kinks or cracks in wiring
2.	Lack of Drive	Poly-V Belt walked of the roller	Re-install and track belts .If damaged replace belt.
3.	Flashing LED	Many options	Refer to IOM Manual for detailed information OR refer to appropriate ITOH Denki driver card manuals for additional options.
4.	Rollers "dancing" or spinning uncontrollably	Power Supply not centered within the string of zones	Locate and Adjust Power Supply to correct current supply issue
		Power Supply Issue	If power supply is not purchased from MHS Conveyor, please consult manufactures operation directions.
		Multiple connected Power Supply units	0V line of all power supplies connected within a conveyor "unit" need to be connected. Reference IOM for additional detailed information
5.	Infeed zone not activating or running	Loose connection between driver cards	Inspect, and adjust, connection cables as necessary
		Fuse blown	Replace fuse to circuit board
6.	Discharge zone not releasing	No "release" signal being provided	Use PLC connection, or Photo Eye & Reflector to provide zone with discharge open signal.
7.	One Zone not turning	Loose wire connection	Check all stranded wires to ensure they are inserted properly
	One Zone not turning Driver Card	Loose connector cable	Check all quick connections within power harness to ensure they are properly connected

	continuously faulting	Poor supply of power	Inspect to see if power supply is transmitting correct voltage
9.	Driver Card continuously faulting Rollers are turning slowly	Power supply unit not wired correctly to the 24V supply line	Inspect terminal points to ensure proper wiring. Adjust accordingly. Reference IOM Manual for additional information
		Bad bearing in slave roller	Replace worn out components to relieve the extra stress on ITR roller
		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.
10.	Rollers are turning slowly Thermal Limit reached	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 Card or Roller are over heating	Check the ambient temperature. Consult IOM Manual for acceptable temperature ranges
11.	Thermal Limit reached Motor Fault Signal	Back plate of driver card not touching conveyor frame	Inspect mounting plate/conveyor surface to ensure complete surface connection for maximum heat dissipation.
		Excess friction or drag on motorized roller	Inspect area around roller to ensure nothing is rubber or lodged by the roller causing extra friction.
		Fault in motor 1, 2, or 3.	Refer to appropriate ITOH Denki driver card manual. Once fault is resolved, send fault reset signal.
12.	Zone 1 Jam Fault Signal	Jam at discharge of HQL.	Clear jam and send fault reset signal.
		Photoeye misalignment	Adjust photoeye to aligned position
13.	False Discharge Signal	Two or more products have been discharged during one discharge cycle.	Correct product sequence if necessary and send fault reset signal.

Chapter 10: Replacement Parts Identification

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

Parts that specifically pertain to CRUZbelt are included with illustrations.

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

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

10.1: 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.

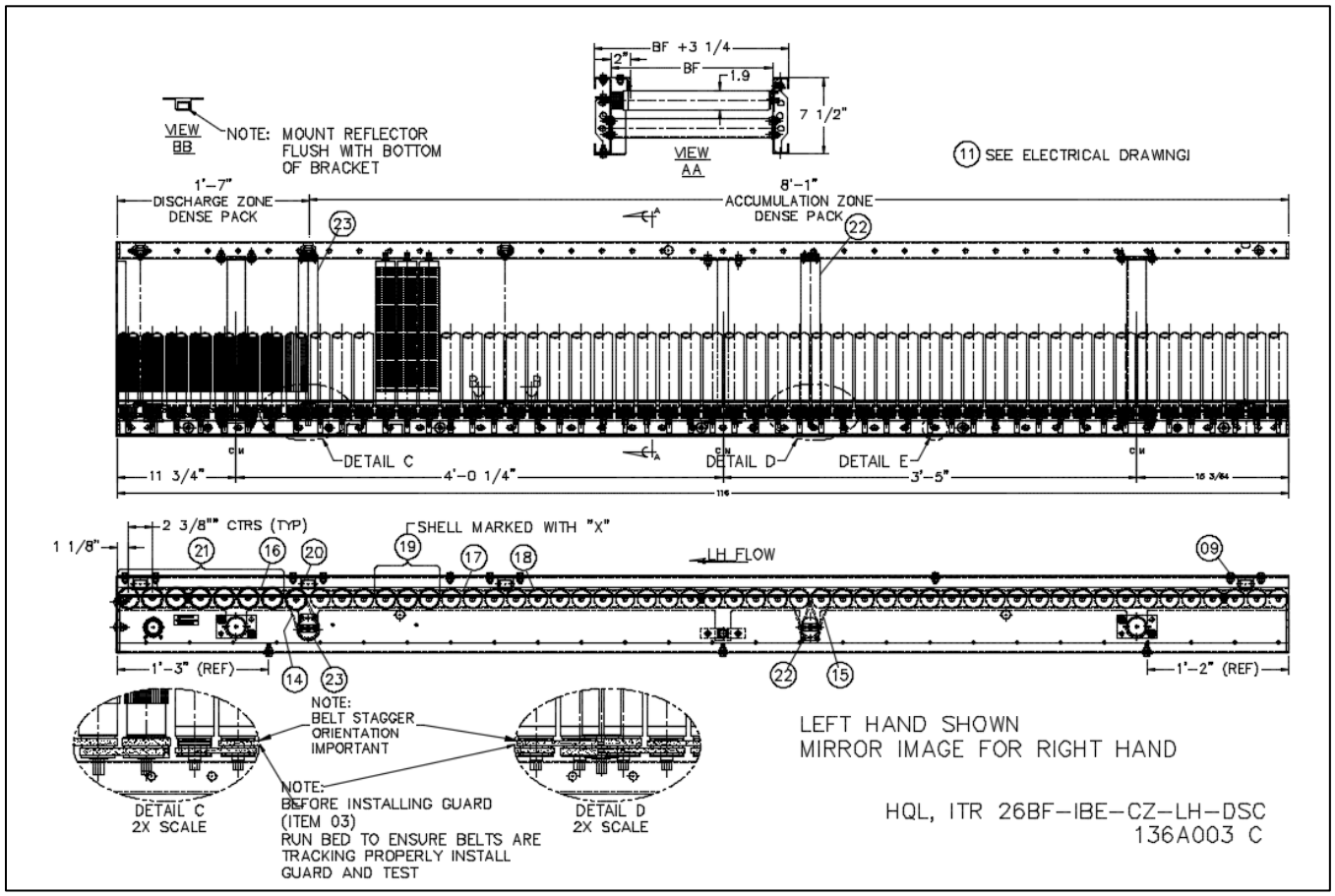
Level #3

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.

Chapter 11: REPLACEMENT PARTS

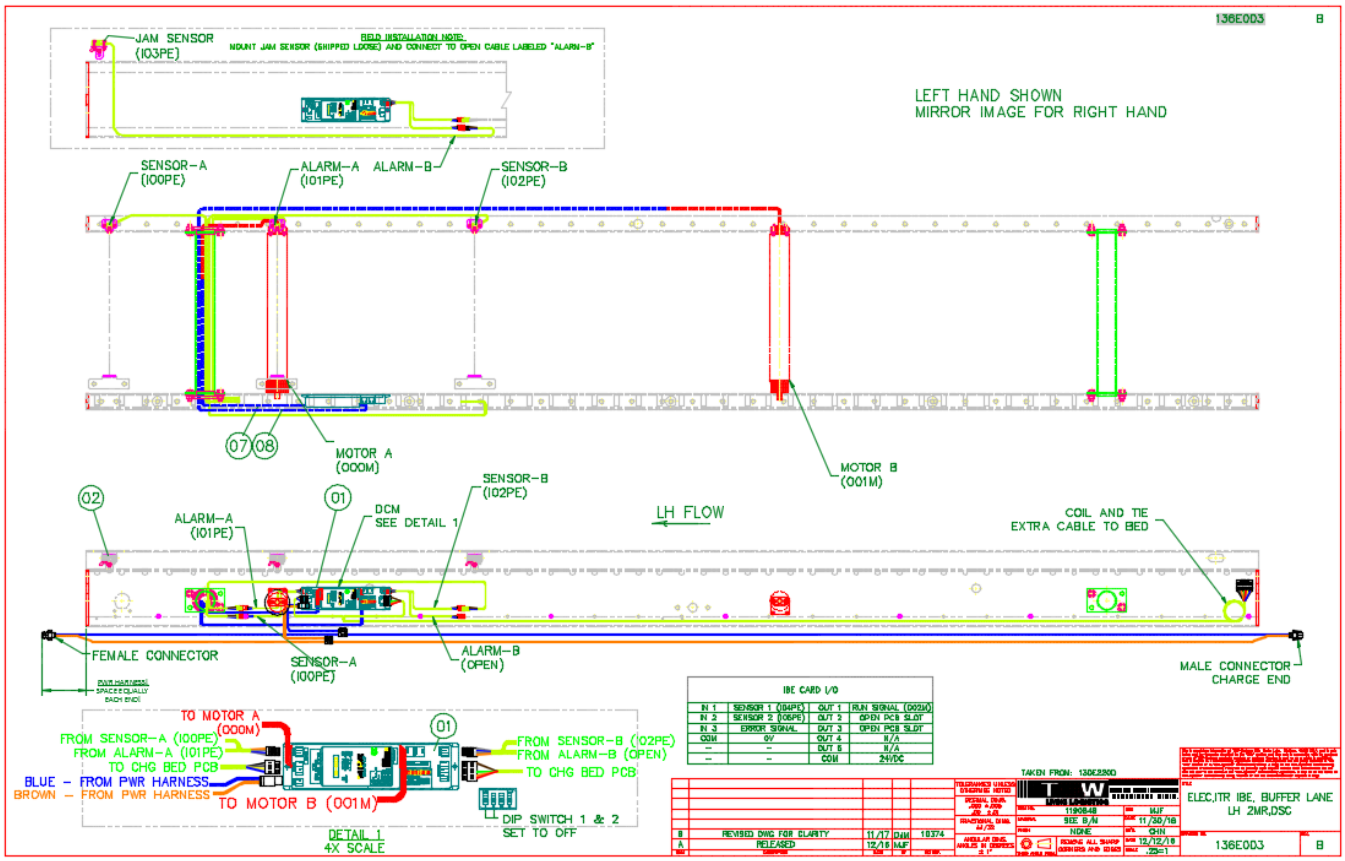
11.1: HQL ITR IBE BED CZ-DSC LH/ RH



11.1.1: Replacement Parts - HQL ITR IBE Bed CZ-DSC LH/ RH

REPLACEMENT PARTS FOR HQL,ITR IBE CZ RH/LH DSC		
BALLOON	**ITEM #**	**DESCRIPTION**
09	1136359	PE,REFLECTOR 20MM X 30MM,ADHESIVE BACKED
14	1171962	BELT,ITR 3.54"CTR POLY-V 4RIB,BESTORQ 4EPJ313
15	1174439	BELT,ITR 3"CTR POLY-V 4RIB,BESTORQ 4EPJ286
16	1159357	BELT,ITR 2.36"CTR POLY-V 4RIB,BESTORQ 4EPJ256
17	1171961	BELT,ITR 2.16"CTR POLY-V 3RIB,BESTORQ 3EPJ246
18	1161573	ROLLER,26BF ITR SLIP,.6LB,POLY-V,1.9PRBG
19	1161128	ROLLER,26BF ITR POLYV 1.9CTD,PRBG,1/16" SMOOTH URETHANE SLV
20	1161130	ROLLER,26BF ITR POLYV 1.9CTD,PRBG,1/8" RIBBED URETHANE SLV
21	1161129	ROLLER,26BF ITR POLYV 1.9CTD,PRBG,1/8" SMOOTH URETHANE SLV
22	1157652	ROLLER,ITR 26BF VG ITOH,PM486FE-17-619-D-24-VG-KF
23	1172835	ROLLER,ITR 26BF HX ITOH,BRAKE,PM486FE-60-619-D-24-BR-HX-OS
		Ref, Dwg # 136A003

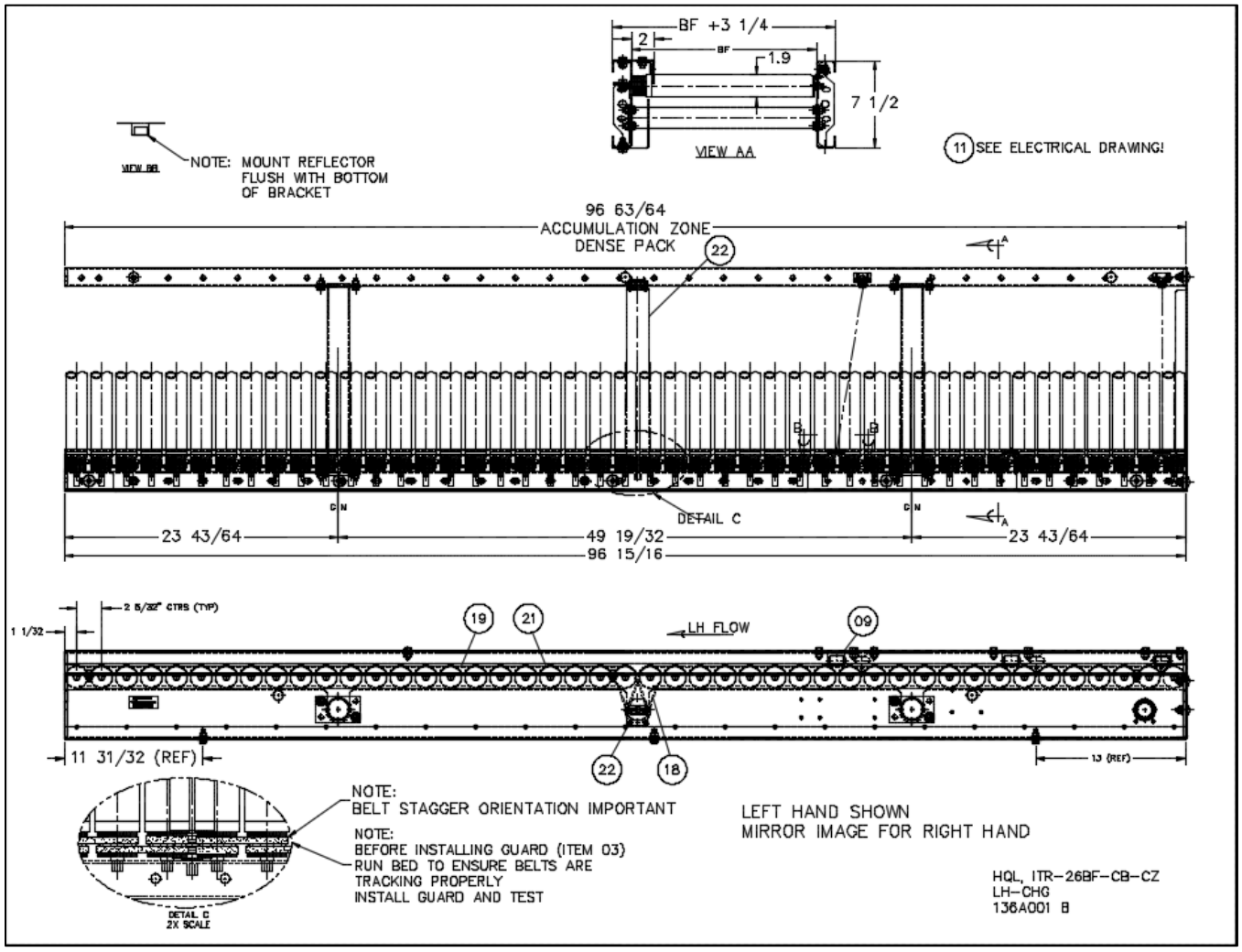
11.2: ELECTRICAL HQL ITR BED IBE BUFFER LANE DSC



11.2.1: Replacement Parts - Electrical HQL ITR Bed IBE Buffer Lane DSC

REPLACEMENT PARTS FOR ELEC, HQL ITR BED IBE BUFFER LANE 2MR DSC		
BALLOON	**ITEM #**	**DESCRIPTION**
01	1179738	DRIVERCARD,ITOH IB-E03, W/ HQLANE PROGRAM,VER 1.8
02	1138112	PE,ASY SICK ZL2 PNP LIGHT OP 2000MM LEAD W/ 733-103 W/REFLECTOR & TAPE **(RH)**
02	1183584	PE,ASY SICK ZL2 PNP LIGHT OP-2000MM LEAD W/ 733-103-W/REFLECTOR & TAPE **(LH)**
07	1135340	CABLE,MOTOR EXTENSION,1200MM ITOH M-F-EXT-10PIN-1200 USE W/ IB-N03/IB-E/HBM-604/BRAKE **(LH)**
07	1135341	CABLE,MOTOR EXTENSION,2700MM ITOH M-F-EXT-10PIN-2700 USE W/ IB-N03/IB-E/HBM-604/BRAKE **(RH)**
08	1135324	CABLE,MOTOR EXTENSION ITOH M-F-EXT-9PIN/10PIN-2700MM
		Ref, Dwg # 136E003B

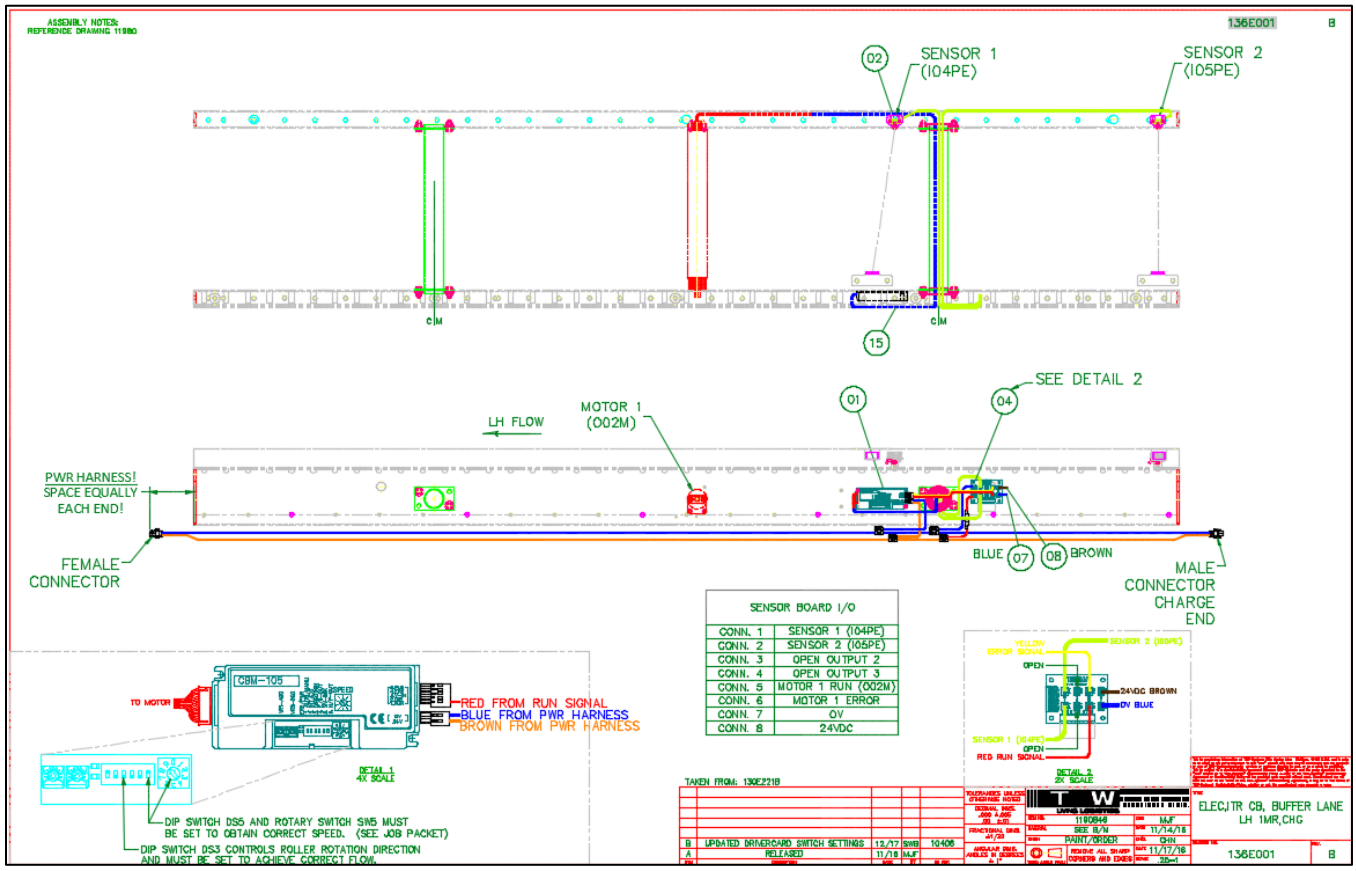
11.3: HQL ITR CBM 105 BED CZ-CHG LH/ RH



11.3.1: Replacement Parts - HQL ITR CBM 105 Bed CZ-CHG LH/ RH

REPLACEMENT PARTS FOR HQL,ITR CB CZ CHG RH/LH		
BALLOON	**ITEM #**	**DESCRIPTION**
09	1136359	PE,REFLECTOR 20MM X 30MM ADHESIVE BACKED
18	1174439	BELT,ITR 3" CTR POLY-V 4-RIB (BESTORQ 4EPJ286)
19	1171961	BELT,ITR 2.16" CTR POLY-V 3-RIB (BESTORQ 3EPJ246)
21	1161573	ROLLER,26" BF ITR SLIP .6LB POLY-V 1.9" DIA PRBG
22	1157652	ROLLER,ITR 26BF VG ITOH PM486FE-17-619-D-24-VG-KF
		Ref, Dwg # 136A001

11.4: ELECTRICAL HQL ITR BED CBM-105 LH/RH



11.4.1: Replacement Parts - Electrical HQL ITR Bed CBM-105 LH/RH

REPLACEMENT PARTS FOR ELEC, HQL ITR CHG BED 1MR CBM-105 LH/RH		
BALLOON	**ITEM #**	**DESCRIPTION**
01	1153930	DRIVERCARD,ITOH CBM-105FP
02	1183584	PE,ASY SICK ZL2 PNP LIGHT OP-2000MM LEAD W/ 733-103-W/REFLECTOR & TAPE **(LH)**
02	1138112	PE,ASY SICK ZL2 PNP LIGHT OP 2000MM LEAD W/ 733-103 W/REFLECTOR & TAPE **(RH)**
04	1138197	PCB,DB PE, 4AMP 8-STATION
15	1138705	CABLE,MOTOR EXTENSION,1200MM ITOH M-F-EXT-9PIN-**1200** USE W/ CB-016 OR HB-510 **(RH)**
15	1138706	CABLE,MOTOR EXTENSION,2700MM ITOH M-F-EXT-9PIN-**2700** USE W/ CB-016 OR HB-510 **(LH)**
----	1102221	FUSE,4A,125V,CARTRIDGE,GMA-5 X 20MM- BUSSMANN,GMA-4A
		Ref, Dwg # 136E001B

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

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