

# **[IntelliSort<sup>®</sup>] [CB 4000 Sorter]**

Cross-Belt Site Assessment (CBSA)

PCW1 (Rossford, OH)

Project No. M-19-00072

January 26, 2022

## Introduction

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## Introduction

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### Table of Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>8</b>
1.1	Overview .....	8
1.2	Intended Audience.....	8
<b>2</b>	<b>CTB.IC.I ISSUES .....</b>	<b>10</b>
2.1	CTB.IC.I Issues .....	10
2.2	CTB.IC.I Relocation.....	11
<b>3</b>	<b>OUT OF SPECIFICATION ITEMS .....</b>	<b>13</b>
3.1	Out of Specification Items.....	13
<b>4</b>	<b>INDUCTIONS.....</b>	<b>15</b>
4.1	Induction Operator Issues .....	15
4.2	Induction Code Modifications.....	15
4.3	Induction Activation Clocks.....	16
<b>5</b>	<b>CHUTE THROUGH GOING WOOD.....</b>	<b>18</b>
5.1	Through Going Wood Catch Point.....	18
<b>6</b>	<b>CONTROL ENGINEERING, INC. AIR KNIFE .....</b>	<b>20</b>
6.1	Air Knife.....	20
6.2	Air Knife Chute .....	21
<b>7</b>	<b>CHUTES .....</b>	<b>23</b>
7.1	Offset Adjustments .....	23
7.2	High-Capacity Chute Hood Design .....	24
<b>8</b>	<b>SITE VISIT SUMMARY.....</b>	<b>26</b>
8.1	Site Visit Summary .....	26
<b>9</b>	<b>ASSESSMENT ENGINEERS.....</b>	<b>28</b>

## List of Tables

Table 3-1 Induction Activation Clocks.....	16
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## List of Figures

Figure 2-1 CTB.IC.I Distance .....	11
Figure 5-1 (2 to 1) Chutes Jam Photoeye.....	18
Figure 6-1 Controls Engineering, Inc. Air Knife.....	20
Figure 6-2 Air Knife Chute .....	21
Figure 7-1 Bypass S010601 Items in the Net .....	23
Figure 7-2 High-Capacity Chute Hood.....	24

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## **Introduction**

# 1 Introduction

The information contained in this document is intended to be generic in nature.

## 1.1 Overview

This document outlines the results from site assessment to investigate the root cause for items landing in the safety nets and to correct some PLC code edits that were implemented during the site commissioning phase.

## 1.2 Intended Audience

This document is written to provide guidance to Honeywell Intelligrated's Engineering and any other authorized Honeywell Intelligrated personnel who may have a need for this information.



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## **CTB.IC.I Issues**

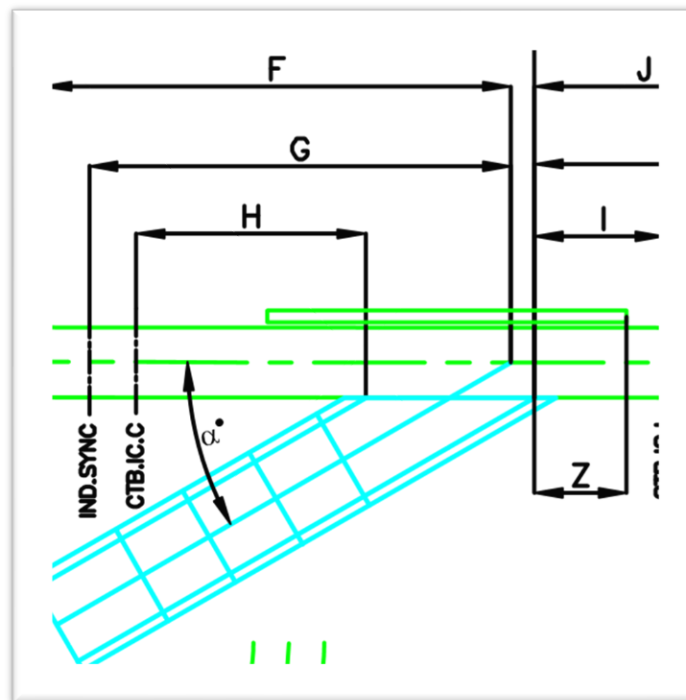
## 2 CTB.IC.I Issues

### 2.1 CTB.IC.I Issues

Upon arrival to PCW1, we noticed at the Cross-Belt Sorter, a significant number of items stuck in the safety nets. The first item we checked was the CTB.IC.I devices. The design rules outline the proper CTB.IC.I distance as  $1.5 \times$  the cart pitch. The cart pitch = 1200. Design rule distance = 1800mm. This has proven to be a challenge for systems running faster than 1800mm per second. The sorter requires at least 1 second of process time to update the carrier after the carrier has been occupied by an item from the inductions. Therefore, we recommend setting the distance requirement for CTB.IC.I location to sorter speed. The Sorter speed is 2400mm per second, so we set the CTB.IC.I distance to no less than 2400mm from the long belt of the last induction. *Distance I on next page.*

I   Lctb.ic.i	For LS-4000E For LS-4000CB when two-belt-items	Min. 1 x Cp
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Figure 2-1 CTB.IC.I Distance



## 2.2 CTB.IC.I Relocation

All 4 CTB.IC.I devices installed on the sorter were audited.

- CTB.IC.I 1 and 4 were correct.
- CTB.IC.I 2 was set to 1740mm. We moved it to 2400mm.
- CTB.IC.I 3 was set to 2200mm. We moved it to 2600mm.

**!** The customer reported back after CTB.IC.I modifications and the adjustments have made a significant improvement in reducing the number of items landing in the nets.

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## **Out of Specification Items**

## 3 Out of Specification Items

### 3.1 Out of Specification Items

There is a portion of the item sort not within the item characteristics for the equipment design. Jiffy items are being processed using the Dynamic Inductions. This doesn't follow the design characteristics for Dynamic Inductions. Dynamic Inductions view item location using a horizontal axis. Manual Inductions view items using a vertical axis. Jiffy items are not continuously flat on the bottom and can have a thin profile, which the Dynamic Inductions photo-eyes will not always detect correctly.

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## **Inductions**

## 4 Inductions

### 4.1 Induction Operator Issues

Many induction operators need retrained on the proper induction operating procedures. Many items are being induced incorrectly. Placing the weight of an item forward is important. This will keep the item from flipping during the induction process. If the item isn't loaded onto the Sorter correctly at a 30° angle, it will cause other issues in the downstream process. The operators need to use the Induction board to aid in properly inducing the item.

### 4.2 Induction Code Modifications

There are[4] Induction processors installed on the Cross Belt System. Several commissioning test bits were identified in the code and request was made to have them removed. All the test bits were removed from the [4] induction processors. This edit will have no effect on how the system performs.

## 4.3 Induction Activation Clocks

A working activation clock is configured for all inductions. No changes are required unless a variance of 4 or more clocks is identified.

**Table 4-1 Induction Activation Clocks**

Induction	Current Activation Clock	Recommended Activation Clock	Clock Variance	Adjustment
1	11	1	+2	0
2	11	10	-1	0
3	8	7	-1	0
4	3	2	-1	0
5	9	9	0	0
6	1	0	-1	0
7	10	9	+1	0
8	4	1	-3	0
9	4	3	-3	0
10	4	2	-2	0
11	8	8	0	0
12	0	10	-2	0
13	Future			
14	3	3	0	0
15	0	11	-1	0
16	6	5	+1	0
17	2	0	-2	0
18	0	0	0	0
19	7	5	-2	0



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## Chute Through Going Wood

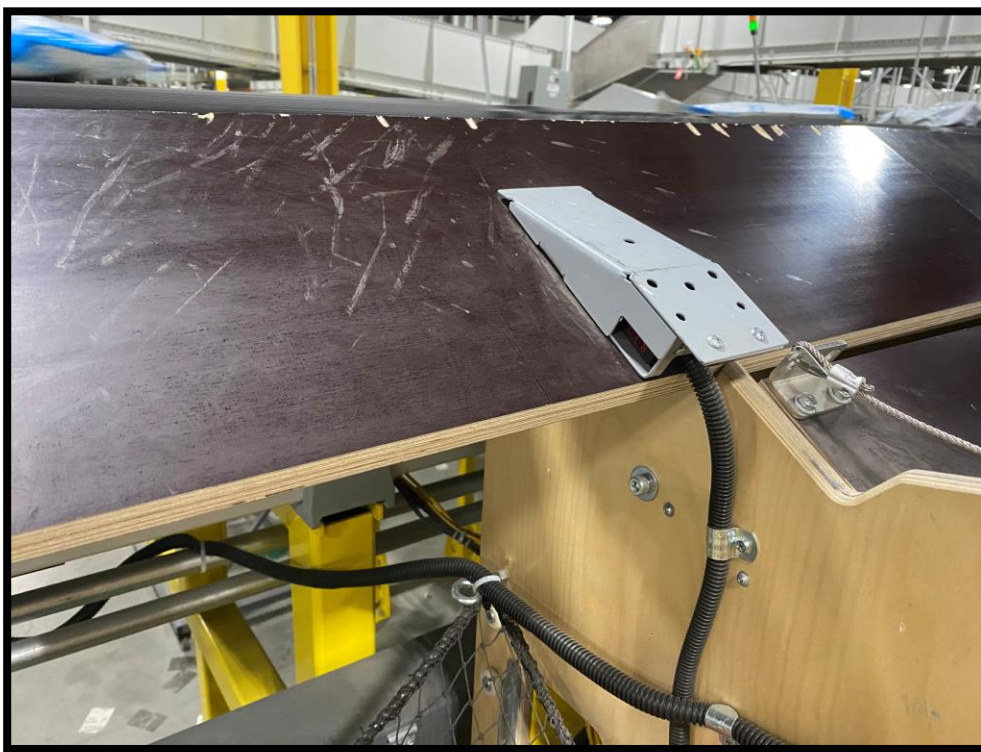
## 5 Chute Through Going Wood

### 5.1 Through Going Wood Catch Point

In the image below, you can see the flipper door bracket is extending above the through-going wood. This is a catch-point for items discharging into the chute.

The Jam photo-eye is within the trajectory path. If the item doesn't catch the top edge of the Jam photo-eye, it can deflect off the side and end up in the net. Relocate the Jam PEC further upstream to the Sorter flow or build a deflector bracket that helps the item glide over the Jam photo-eye bracket.

Figure 5-1 (2 to 1) Chutes Jam Photoeye



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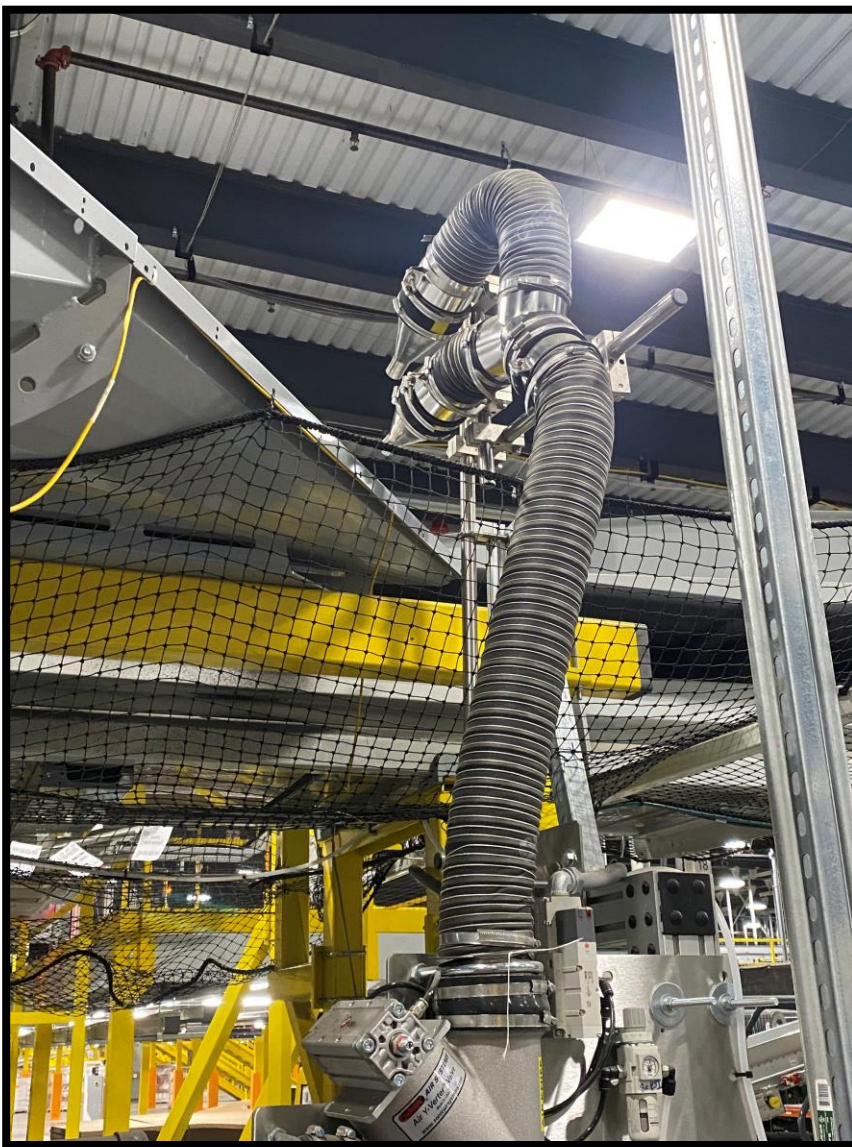
Control Engineering, Inc. Air Knife

## 6 Control Engineering, Inc. Air Knife

### 6.1 Air Knife

The installed Air Knife is a third-party application designed to remove poorly inducted items from locations on the Cross Belt Sorter that don't support discharging, etc. bellows. The Air Knife releases a burst of air to discharge the stuck item down a chute.

Figure 6-1 Controls Engineering, Inc. Air Knife





## 6.2 Air Knife Chute

The Air Knife Chute illustrates the inefficiencies in the air purge process. During the discharge process, some items won't discharge properly and move on the sorter in a non-preferred manner. Some items relocate to an unoccupied carrier, which later in the induction process, will receive an item. Now the carrier has [2] items on it. Or the item is relocated to an occupied carrier and the carrier has [2] items on it. This process is adding to the number of items landing in the safety nets. Take notice to the number of shipping labels removed from items by the Air Knife illustrated in **Figure 6-2**. This will increase the number of No Reads at the Scanner Tunnels.

Figure 6-2 Air Knife Chute



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## Chutes

## 7 Chutes

### 7.1 Offset Adjustments

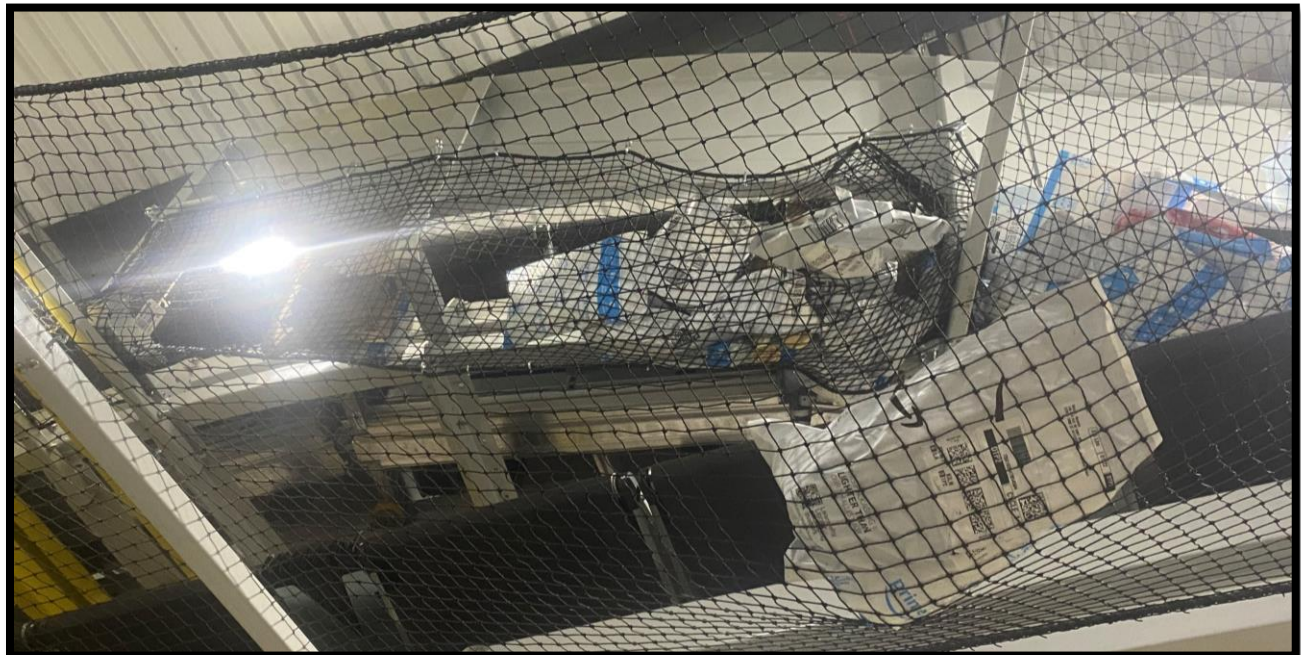
Chute destination S010601 Bypass Lane was not discharging correctly. A correction the CTB.DC273 offset was required.

Original Offset = [1447] Carriers and 3 clocks.

Modified Offset = [1446] Carriers and 3 clocks

Dummy	d640		CTBDC272	S010602	d641	BYP
S010601	d642	BYP	CTBDC273	Dummy	d643	

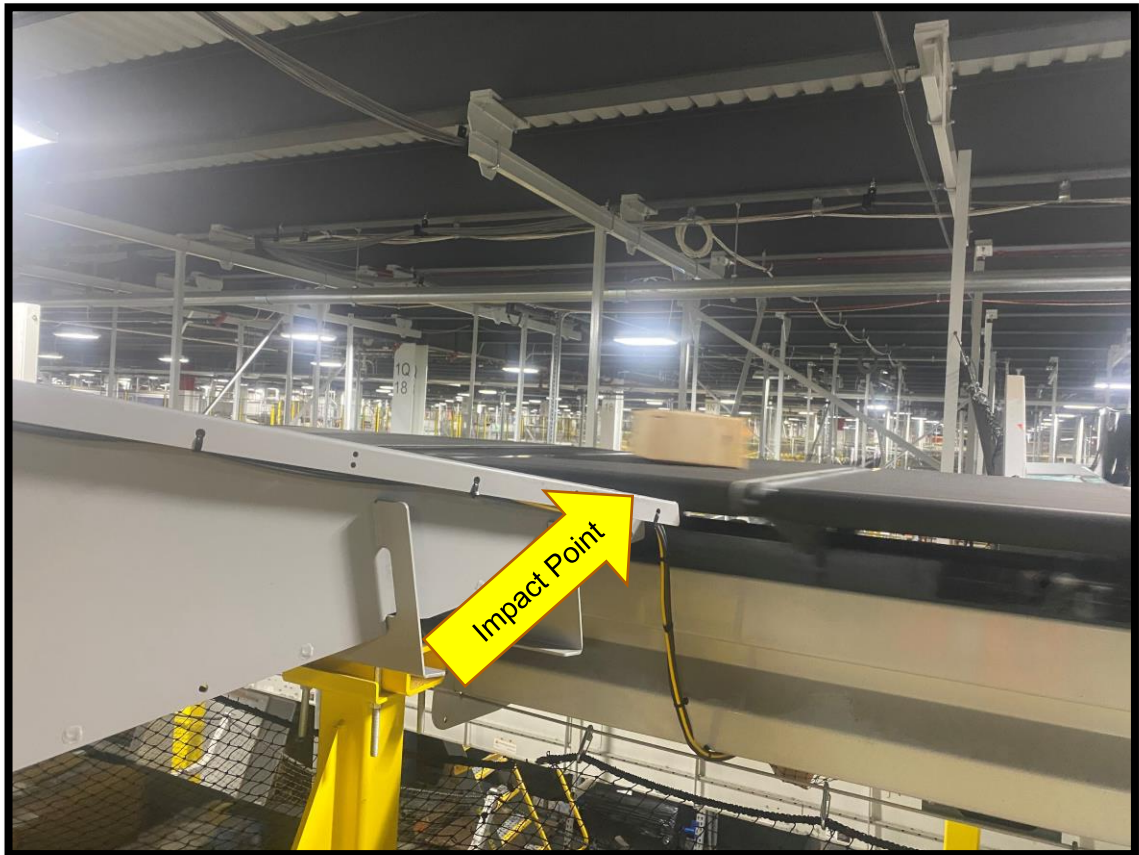
Figure 7-1 Bypass S010601 Items in the Net



## 7.2 High-Capacity Chute Hood Design

The chute hoods are working well, but isn't tolerant for inappropriately placed items. The chute hood design has an incline on the inlet side of the chute. The incline reduces trajectory speed and has the capabilities of deflecting an item with inefficient item placement. This will increase the potential for poorly inducted items to land in the nets.

Figure 7-2 High-Capacity Chute Hood





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## **Site Visit Summary**

## 8 Site Visit Summary

### 8.1 Site Visit Summary

A site visit was requested by Amazon PCW1 to investigate why so many items are discharging into the Cross Belt Safety Nets, to remove commissioning test bits from the induction processors, and investigate the chute mis-sorts.

After a thorough investigation, it was determined 2 CTB.IC.I devices were not installed in the correct location on the Cross Belt Sorter. After relocating the CTB.IC.I's to the correct location, items discharging into the safety nets was reduced. An offset adjustment was required for Bypass Lane S010601. The investigation determined all the induction offsets are correct and didn't need modified. The following items are also contributing to item discharging into the safety nets:

- The Jam Photoeye location on the 2 to 1 Chutes
- The Air Knife inefficiencies.
- Out of specification items being processed.
- Jiffy's being processed on the Dynamic Inductions.
- Redesign High-Capacity Chute Hood

Correct the tasks mentioned and there will be significant reduction in items discharging into the safety nets.

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## **Assessment Engineers**

## 9 Assessment Engineers

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