



# EZLogic<sup>®</sup> 4.0 NETWORK MANUAL

**EZ** LOGIC<sup>®</sup>

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# CONTENTS

<b>OVERVIEW</b>	<b>6</b>
• Introduction	6
• What is EZLogic® 4.0?	6
<b>EZLOGIC® 4.0 CONFIGURATION SETTINGS</b>	<b>7</b>
• Configuration/Diagnostic Components	7
• Eaton SWD-Assist (Network Model)	7
• EZLogic® OS Configuration Software – EZLogic® 4.0	9
Remote Connectivity and Navigation Options	10
• EZLogic OS Menu Navigation Bar and Shortcuts Bar	11
File Menu	13
• Load From Defaults	13
• Open	13
• Save Configuration	13
• Exit	13
Configuration Menu	14
• Sleep Timer	14
• Singulate/Slug	14
• Jam Protection Status	15
• Diffuse Sensitivity Setting	15
• Zone Operating Mode	16
• Sensor Configuration	17
• Zone Stop Mode	17
• Accumulation Delay	18
• Loading Zone Function	18
• Unloading Zone Function	18
• Special Logic Function	18
• Cascade Release Timer	19
• Reflex Operation	20
• NBEZ Brake Timer	20
• Zone Kill Mode	20
Controller Menu	22
• Clone	22
• Enabled/Disabled Clone Protection	22
• Diagnostic Information	22
• Performance Data	22
• Historical Data	23
• Zone Status Monitor	23
• Timers	24
DZC Settings Menu	25
• Backup/Restore	25

Cloneable and Non-Cloneable Functions.....	25
SWD Parameter Protect (Non-Cloneable) .....	25
NBEZ Break Zone (Non-Cloneable).....	26
Produced Signal Sources (PSS) (Non-Cloneable) .....	26
Peer Consumed Signals (PCS) (Non-Cloneable).....	27
Zone Control Signals (Non-Cloneable) .....	29
Reverse Operation (Cloneable) .....	30
System Signaling Channels(SSC) (Cloneable) .....	30
SWD Parameters .....	32
Accumulation Control Engine(ACE) Operation.....	32
Logical Placement/Orientation .....	32
Default Product Flow .....	32
Zone Placement .....	33
Zone Control Mode .....	33
Zone Actuation Type.....	33
Zone Stop Signal .....	34
Produced Signal Sources (PSS) .....	35
<b>COMPONENTS .....</b>	<b>36</b>
Main Components.....	36
Zone Controller/transducer Assembly .....	36
Remote Transducer (Sensor) .....	38
Controller Mounting Tee .....	39
EZLogic® 4.0 Power Supply (100W) .....	40
EZLogic® 4.0 Enclosed Network Interface Module (NIM) .....	40
Auxiliary I/O Module.....	42
Auxiliary Photo-eyes .....	43
Auxiliary Fork-Truck Sensor.....	43
NBEZ Wiring Interface Module- Dual Actuator .....	43
Configuration/Diagnostic Components .....	44
USB Programming Cable – EZLogic® 4.0 .....	44
Bluetooth Module – EZLogic 4.0 .....	44
SWD USB Cable to PC Interface .....	44
Cable Components .....	44
Remote transducer/Auxiliary Extension Cables .....	44
SWD Zone Extension Cables.....	45
SWD IO Block Devices .....	46
<b>REMOVAL &amp; INSTALLATION .....</b>	<b>47</b>
• Dual Zone Controller w/transducers .....	47
Dual Zone Controller Removal/Installation .....	47
Dual Zone Controller Removal.....	47

Dual Zone Controller Installation .....	47
• Connecting to External Controls .....	49
Connecting Inputs and Outputs Using the Dual Zone Controller Auxiliary I/O Ports .....	49
Connecting Inputs and Outputs Using the Auxiliary I/O Module .....	50
<b>INSTALLATION &amp; SETUP .....</b>	<b>52</b>
<b>ANNEX.....</b>	<b>53</b>
CONFIGURING A DUAL ZONE CONTROLLER.....	53
With EZLOGIC® OS CONFIGURATION SOFTWARE .....	53
Installing EZLogic® OS on a PC .....	53
Connecting the PC to a Dual Zone Controller .....	54
Dual Zone Controller LED status .....	55

# OVERVIEW

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## • Introduction

This manual describes the installation, operation, configuration, and specifications of the Hytrol EZLogic® 4.0 accumulation system. Please read this material carefully to familiarize yourself with the system and its operation.

### What is EZLogic® 4.0?

EZLogic®, or Electronic Zero-pressure Logic, is a method of zero-pressure control that combines the sensing accuracy of photo-electric sensors with discrete electronic logic control. This system provides all the “intelligence” needed to accurately control the various functions of zero-pressure accumulation on a variety of conveyor models. Reduced noise, higher reliability, higher throughputs, and ease of maintenance are just some of the advantages of the EZLogic® system.

#### ***Zero-pressure accumulation of product***

This is the primary function of the EZLogic® 4.0 system. Cartons or pallets may be stopped on the conveyor without the build-up of line pressure.



The heart of the EZLogic® Accumulation System is the EZLogic® 4.0 dual zone controller (DZC) powered by SmartWireDT® (SWD) communications network. Each controller is equipped with two photo-electric sensors; auxiliary input/output (IO) ports to which photo-electric transducers or other field devices can be used to detect product presence; a microprocessor to evaluate multiple input signals, and technology to distribute signals as data between zone controllers, I/O modules and programmable logic controllers (PLC).

Two types of product sensing are available: A *retro-reflective type* which is used in conjunction with a reflector to reflect light back to the sensor then will detect packages that breaks the beam across the width of the conveyor, and a *diffuse type* senses an object when the light beam is reflected back to the sensor, used to detect packages when a reflector cannot be used.

Figure 1—EZLogic® 4.0 Zone Controller

# EZLOGIC® 4.0 CONFIGURATION SETTINGS

## • Configuration/Diagnostic Components

EZLogic® 4.0 accumulation system is designed to meet the needs of the simplest single-conveyor application, while providing features and functionality important to the most advanced multiple-conveyor systems. EZLogic® 4.0 dual zone controllers supplied on Hytrol accumulation conveyors are shipped with a basic configuration, then it will be required from the user to complete system configuration in accordance to the physical controllers' layout on the conveyor system.

The following software configuration tools are available to set up EZLogic® 4.0 accumulation system with dual zone controllers:

- Eaton SWD-Assist
- EZLogic® OS Configuration software

### Eaton SWD-Assist (Network Model)

EZLogic® 4.0 system operation and functionality depend on the proper communications configuration between zone controllers and SWD devices. In order to execute the accumulation logic along the conveyor system, a trained person should configure and plan the SmartWire-DT® network with SWD-Assist (*available for free download [here](#)*) this software is the primary configuration tool for initial setup because user is able to modify functional parameters for every single conveyor zone (*for more information about SWD network configuration go to Hytrol document H2-MN-NP-002.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf*). See figure 2 for SWD Assist configuration environment:

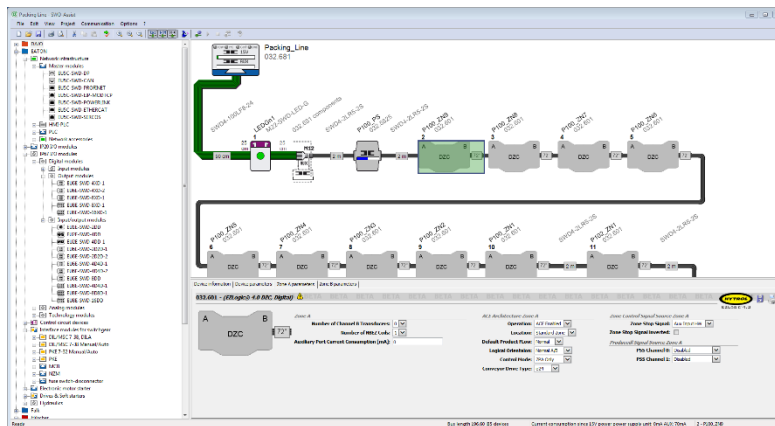


Figure 2: SWD Assist configuration environment

This configuration software is the standard tool for planning, configuration and diagnostic interrogation of SWD data transfer networks; it communicates directly with the Network Interface Module (NIM) via either a direct RS-232 connection or over a LAN via TCP/IP connection.

Look at table 1 with the list of configurable parameters from SWD-Assist per accumulation zone.

Zone parameters	Options and ranges	Description
<b>Number of Channel B Transducers</b>	Range 0 (default) – 4	When the <i>dual-sensor</i> (Hytrol PN: 032.614; 032.615) option is being used with EZLogic® controllers, the controllers must be configured to operate as required by the application. <i>Note: The number of transducers is used to calculate the system's power consumption.</i>
<b>Number of NBEZ Coils</b>	Range 1 (default) – 3	Set the largest number of operative NBEZ drive or brake modules active per cycle (Hytrol PN: 954.02045 or 954.0255) per zone. <i>Note: The number of NBEZ coils is used to calculate the system's power consumption.</i>
<b>Auxiliary Port Current Consumption [mA]</b>	Valid range 0-100mA	Set this value if the auxiliary IO port will be used for monitoring or control of an external device. <i>Note: The set value would be used to calculate the current consumption of the SWD system.</i>
<b>Operation Accumulation Control Engine(ACE) Operation*</b>	<u>ACE Disabled</u> / <u>ACE Enabled</u> (default) / <u>Logic only</u> .	Set the mode of operation of an individual Accumulation Control Engine (ACE).
<b>Location Zone Placement*</b>	<u>Standard Zone</u> (default) / <u>Infeed Zone</u> / <u>Discharge Zone</u>	Use to locate a conveyor zone as an infeed / discharge or standard zone. This enables the creation of separate functional sections of accumulation conveyor to operate from a single NIM.
<b>Default Product Flow*</b>	<u>Normal</u> (default) / <u>Inverted</u>	If product flows in the same direction that SWD node addressing flows, use the <u>Normal</u> set up ( <i>Away from the gateway</i> ). If product flows in the opposite direction that SWD node addressing flows, use the <u>Inverted</u> set up ( <i>Towards the gateway</i> ).
<b>Logical Logical Placement /Orientation*</b>	<u>Normal A/B</u> (default) / <u>Swapped B/A</u>	Logical Placement / Orientation sets the physical I/O used by the ACE. When set to swapped, Zone A hardware (transducer / Actuator / Aux Port) is used by the ACE in Zone B, and Zone B hardware is used by the ACE in Zone A. Set this feature for DZC mounted on inside curve radius.
<b>Control Mode Zone Control Mode*</b>	<u>ZPA Only</u> / <u>PLC Only</u> / <u>PLC Override</u> .	Sets the control mode employed on this individual zone. <i>ZPA Only</i> is traditional EZLogic® operation. <i>PLC Only</i> requires full time PLC control of zone actuation signal. <i>PLC Override</i> enables external control signal from PLC to take over control of the zone while the external signal is active. When the external signal is inactive, EZLogic® <i>ZPA Logic</i> controls the zone. <i>Note: While PLC Override (OVR_CMD) signal is active, ZPA Logic control algorithm is running, but zone actuation is controlled (overridden) by separate PLC signal.</i>
<b>Conveyor Drive Type Zone Actuation Type*</b>	<u>ABEZ</u> , <u>E24</u> , <u>CREZD</u> , <u>NBEZ</u>	Actuation circuits for Digital Control Dual Zone Controllers (Hytrol PN: 032.601). <i>ABEZ</i> – for ¾ watt solenoid valve; <i>E24</i> – for non-integral BLDC commutated actuators; <i>CREZD</i> – for 8 watt coil actuators; <i>NBEZ</i> – for high current electromagnetic coil actuators (9.25 - 9.71 watt).
<b>Zone Stop Signal*</b>	Disabled, Aux Input HW, ... (16 options) etc...	A control input signal to this specific zone that when actuated, causes product flow to accumulate in this zone.
	Zone Stop Signal Inverted (check box option)	Zone Stop signal polarity. If unchecked, it will be active when input signal has been turned on. If checked, it will be active when input signal has been turned off.
<b>PSS Channel 0 Produced Signal Sources(PSS)*</b>	Disabled, ... (13 options)	A Produced Signal Source (PSS) is a signal internal to an ACE which is output in the cyclic data of the producing ACE for consumption by other ACE's. An individual PSS can be 1 of 13 defined signals within the producing ACE. Each ACE can produce up to 4 individual PSS in its cyclic data space
<b>PSS Channel 1 Produced Signal Sources(PSS)*</b>	Disabled, ... (13 options)	

\* User can option to configure these parameters from SWD Assist or from EZLogic® OS

Table 1: SWD Assist zone parameters



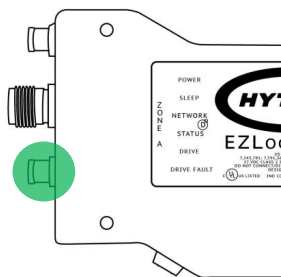
## EZLogic® OS Configuration Software – EZLogic® 4.0

The EZLogic® 4.0 accumulation system offers the user great flexibility in the way the conveyor transports, accumulates, and releases product. It also provides special features to facilitate product loading, unloading, counting, indexing, and many other functions normally requiring external controls devices.

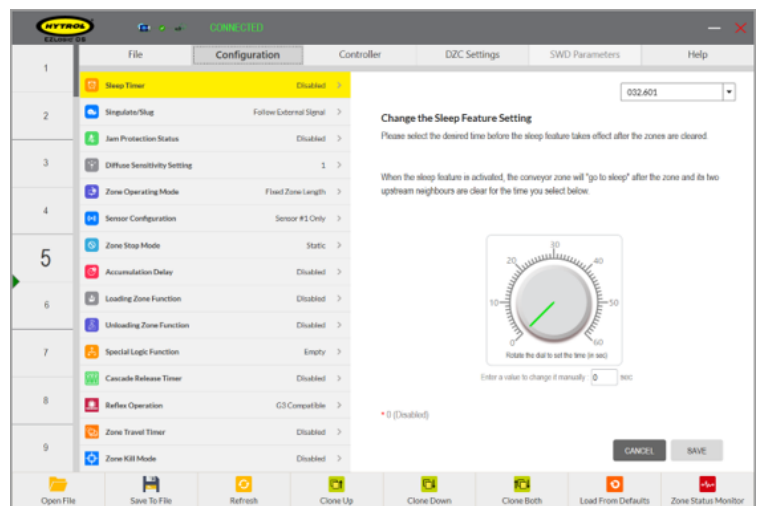
This section describes the individual settings which control the operational behavior of an EZLogic® 4.0 dual zone controller. The EZLogic® OS is the advanced configuration tool for setup, maintenance and diagnostic interrogation of an EZLogic® 4.0 dual zone controller. The settings are independent for each Accumulation Control Engine (ACE) or zone. Once the SWD data transfer network is operational, EZLogic® OS can configure, query and map all DZCs in front of a single NIM from any single DZC. Connection between the programming device running EZLogic® OS and a DZC is either wired over USB cable attached to a laptop computer (*Hytrol PN: 032.637*) or via wireless using Bluetooth (*Hytrol PN: 032.638*) on a mobile device. In both cases, the programming device should be attached to the A side's auxiliary IO port. See figure 3a.

The parameters listed in this section are used to setup the fundamental operation of an ACE (zone). The DZCs may be configured to meet the needs of your system using the EZLogic® OS software. EZLogic® OS also allows the user to save and retrieve configurations, retrieve diagnostic information, and access more advanced options.

Once a controller is configured, the configuration from that controller may be copied to other controllers in the system by using the clone feature of the controller in EZLogic® OS.



a)



b)

Figure 3a) DZC A Side Auxiliary IO Port connection point for programming devices. 3b) Configuration Menu tab on EZLogic® OS.

**NOTE:** Users can use EZLogic® OS software to connect EZLogic® GEN3 or EZLogic® 4.0 with the same installed software. USB communication cables and Bluetooth modules change between models, please refer table 1 to get the proper connectivity accessories.

Models	USB communication cable	Bluetooth Module
EZLogic® Gen3	032.537	032.538
EZLogic® 4.0	032.637	032.638

Table 2: EZLogic® OS connectivity accessories

## Remote Connectivity and Navigation Options

At first time software execution, a screen will come up asking the user to select the EZLogic® module to configure, check the box for Dual Zone Controller (DZC) this option corresponds to EZLogic® 4.0 zone controllers (offline example). Figure 4:



Figure 4: Select Dual Zone Controller (DZC). Offline configuration option

After user clicks on SELECT button the configuration screen will come up:

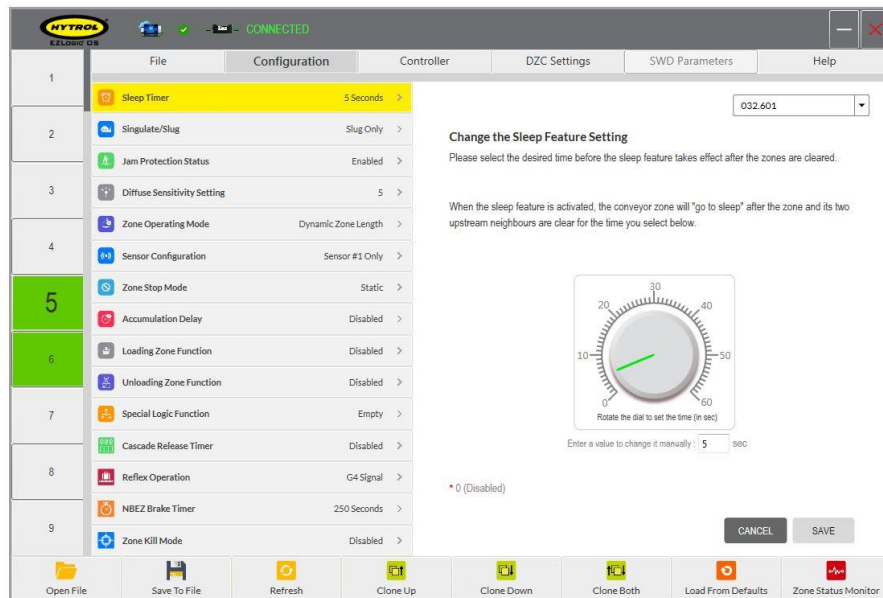

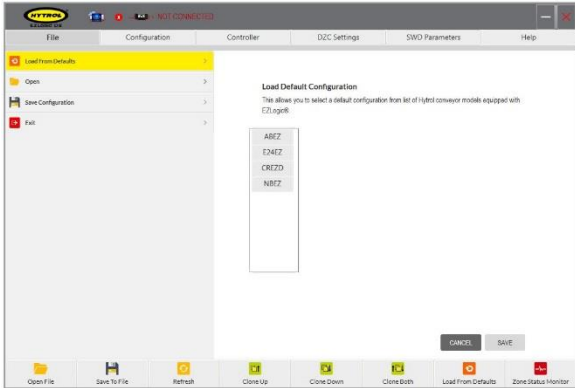
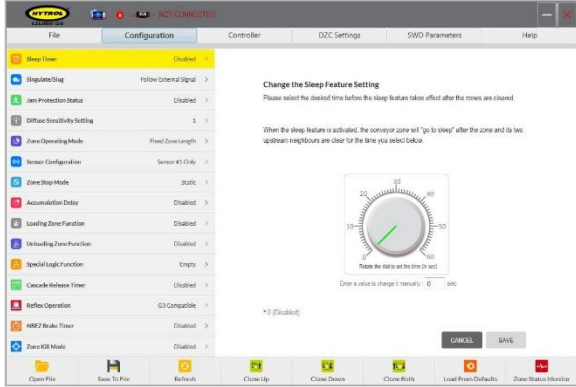
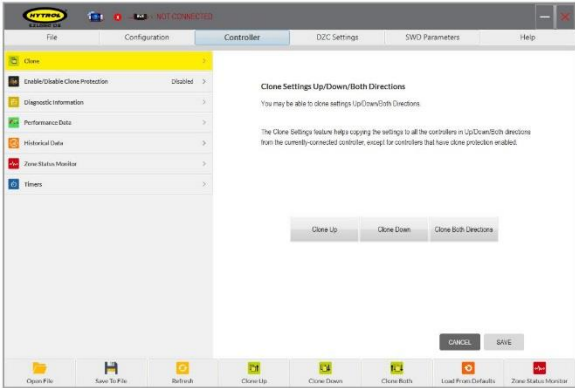


Figure 5: EZLogic OS File Menu screen. CONNECTED

## EZLogic OS Menu Navigation Bar and Shortcuts Bar

From the top screen section user can access five (5) configuration menus described on table 3. See below:

Menu	Screen Overview
<b>Menu Navigation Bar:</b>	 <p>The navigation bar shows the HYTROL EZLOGIC OS logo, a status indicator (NOT CONNECTED), and five menu buttons: File, Configuration, Controller, DZC Settings, and SWD Parameters. A Help button is also present on the right.</p>
<b>File:</b> <ul style="list-style-type: none"> <li>Load from Defaults</li> <li>Open</li> <li>Save Configuration</li> <li>Exit</li> </ul>	 <p>The File menu screen displays a list of options on the left: Load From Defaults, Open, Save Configuration, and Exit. The main area shows the 'Load Default Configuration' dialog, which allows selecting a default configuration from a list of hybrid conveyor models (ABEZ, EZMTZ, CRZTD, NBEZ). Buttons for CANCEL and SAVE are at the bottom right.</p>
<b>Configuration:</b> <ul style="list-style-type: none"> <li>Sleep Timer</li> <li>Singulate/Slug</li> <li>Jam Protection Status</li> <li>Diffuse Sensitivity Setting</li> <li>Zone Operating Mode</li> <li>Sensor Configuration</li> <li>Zone Stop Mode</li> <li>Accumulation Delay</li> <li>Loading Zone Function</li> <li>Unloading Zone Function</li> <li>Special Function Logic</li> <li>Cascade Release Timer</li> <li>Reflex Operation</li> <li>NBEZ Break Timer</li> <li>Zone Kill Mode</li> </ul>	 <p>The Configuration menu screen shows a list of settings on the left, including Sleep Timer, Singulate/Slug, Jam Protection Status, Diffuse Sensitivity Setting, Zone Operating Mode, Sensor Configuration, Zone Stop Mode, Accumulation Delay, Loading Zone Function, Unloading Zone Function, Special Function Logic, Cascade Release Timer, Reflex Operation, NBEZ Break Timer, and Zone Kill Mode. The main area displays the 'Change the Sleep Feature Setting' dialog, which includes a slider for 'Sleep Time' and a 'Time to sleep' value. Buttons for CANCEL and SAVE are at the bottom right.</p>
<b>Controller:</b> <ul style="list-style-type: none"> <li>Clone</li> <li>Enabled/Disabled Clone Protection</li> <li>Diagnostic Information</li> <li>Performance Data</li> <li>Historical Data</li> <li>Zone Status Monitor</li> <li>Timers</li> </ul>	 <p>The Controller menu screen displays a list of options on the left: Clone, Enable/Disable Clone Protection, Diagnostic Information, Performance Data, Historical Data, Zone Status Monitor, and Timers. The main area shows the 'Clone Settings Up/Down/Both Directions' dialog, which includes a 'Clone Up' button, a 'Clone Down' button, and a 'Clone Both Directions' button. Buttons for CANCEL and SAVE are at the bottom right.</p>

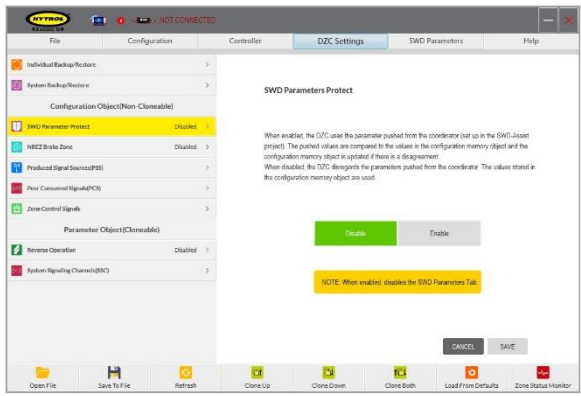
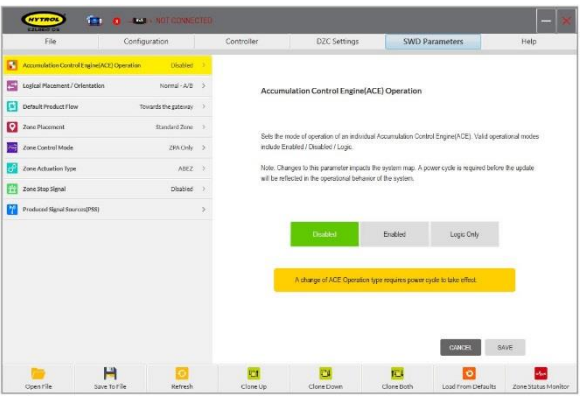
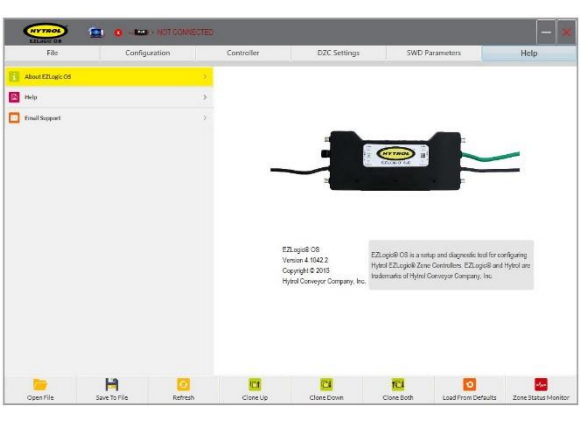

<p><b>DZC Settings:</b></p> <ul style="list-style-type: none"> <li>Individual Backup/Restore</li> <li>System Backup/Restore</li> <li>SWD Parameters Protect</li> <li>NBEZ Brake Zone</li> <li>Produced Signal Sources (PSS)</li> <li>Peer Consumed Signals (PCS)</li> <li>Zone Control Signals</li> <li>Reverse Operation</li> <li>System Signaling Channels (SSC)</li> </ul>	
<p><b>SWD Parameters:</b></p> <ul style="list-style-type: none"> <li>Accumulation Control Engine(ACE) Operation</li> <li>Logical Placement / Orientation</li> <li>Default Product Flow</li> <li>Zone Placement</li> <li>Zone Control Mode</li> <li>Zone Actuation Type</li> <li>Zone Stop Signal</li> <li>Produced Signal Sources (PSS)</li> </ul>	
<p><b>Help:</b></p> <ul style="list-style-type: none"> <li>About EZLogic OS</li> <li>Help</li> <li>Email Support</li> </ul>	
<p><b>Shortcuts Bar:</b></p> 	

Table 3: Navigation Bars

## File Menu

### Load From Defaults

This allows you to select a default configuration from list of Hytrol conveyor models equipped with EZLogic®. The available preloaded configurations are:

Conveyor Model	Description
ABEZ	Air Belt EZLogic® Zone
E24EZ	E24® EZLogic® Zone
CREZD	Chain Roller EZLogic® Zone Drive
NBEZ	Narrow Belt EZLogic® Zone

Table 4: Preloaded default settings for EZLogic® 4.0

### Open

Retrieves an existing EZLogic® configuration file to open. EZLogic® configuration file extension is \*.ezl. *In order to open an offline configuration, you should not be connected to a controller. After you select the \*.ezl file to open, click on Save button to load the zone configuration into EZLogic OS.*

### Save Configuration

Stores a new EZLogic® configuration file on the programming device. EZLogic® configuration file extension will be \*.ezl

### Exit

This option will finish the user's software session.

# Configuration Menu

## Sleep Timer

Conveyor zones that have not seen any carton activity for a selected period may be set to “*go to sleep*” or stop driving, until activity is detected, reducing system noise and component wear and reducing energy consumption. When this feature is enabled, the EZLogic® 4.0 dual zone controller will stop the zone rollers from turning if no cartons are detected for a set time. The zone “*wakes up*” when product is detected in one of the two adjacent upstream zones or by the zone where the transducer is located. This feature increases roller life while reducing noise and energy consumption.

The time between when the zone transducer and its upstream neighbors last detect a carton and when the zone “*goes to sleep*” may be set to zero (disabled) to 60 seconds with EZLogic® OS. The controller’s default setting is five seconds.

## Singulate/Slug

The EZLogic® 4.0 system provides two primary modes of operation: singulation mode and slug mode. For the singulation mode the cartons are held in their respective zones until the zone immediately downstream is clear. And for the slug mode cartons are not separated when traveling down the conveyor or when they are released. These operation modes are described on detail below.

### Follow External Signal (default)

With this setting selected, the zone will follow the state of a slug control signal, if present, as provided through the auxiliary I/O port or signal communications (*refer Zone Control Signals section of this document*). If there is no active slug control signal the zone will default to singulation mode. If the input is active, the zone will operate in slug mode.

### Singulation Only

Singulation mode provides individual carton control during transport and accumulation. Each carton is assigned a “zone” as it accumulates on the conveyor. Upon release, the cartons are held in their respective zones until the zone immediately downstream is clear. The cartons are thus separated, or “singulated” as they are released and/or transported.



Figure 7: Singulation Mode

With this setting selected, the zone will operate in singulation mode, regardless of the status of the slug control signal.

### Slug Only

Slug mode provides dense accumulation and high throughput when individual carton control is not required. Cartons are not separated when traveling down the conveyor or when they are released from the conveyor. Zero pressure is still provided during the accumulation cycle, but only as the cartons arrive at the proper “stopping point.”

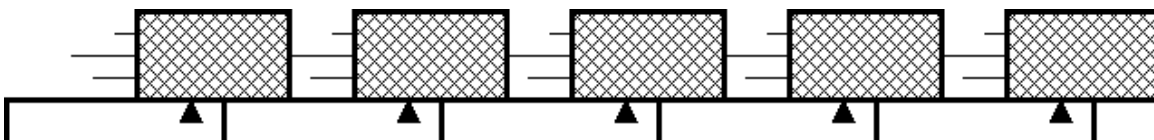


Figure 8: Slug Mode

With this setting selected, the zone will operate in slug mode, regardless of the status of the slug control signal.

This setting may be used with all the dual zone controllers in a chain to cause the conveyor to operate in slug mode all the time, eliminating the need for the optional slug control signal.

*NOTE: All dual zone controllers in a chain may be set to the same singulate/slug setting, or any combination of dual zone controllers may be set to follow, singulate, or slug. This provides great flexibility in controlling the way cartons flow on the conveyor. For example, a portion at the discharge end of the conveyor may be set to slug mode to provide a high through-put of boxes for a short time, while the rest of the conveyor may be set to singulate mode, giving greater control of individual cartons.*

### **Jam Protection Status**

When the conveyor is set to run in *slug mode* (set as *Follow External Signal* or *Slug Mode*), if a carton becomes jammed on the conveyor, *EZLogic® 4.0* will detect the jam and accumulate cartons upstream from the jam. This prevents product pile-up until the jam is cleared.

This function enables or disables the fixed five second Jam Timer for a zone. This feature helps prevent product pile-up if a carton becomes jammed on the conveyor. If the conveyor is operating in *slug mode* and a carton becomes jammed, the zone that is detecting the jammed carton will allow five seconds for the carton to move on; if the carton is still present after five seconds, then the zone controller sends a signal to the upstream zone to accumulate any incoming product *until the jam is cleared*. The “jammed” zone continues to drive to clear the jam. Once engaged, diagnostic code is generated as well as an LED fault indication. The default factory setting for this function is “*Enable Jam Protection*”.

### **Diffuse Sensitivity Setting**

The diffuse versions of the EZLogic® 4.0 transducers (sensors) detect objects by bouncing an infrared light beam off the object back to the sensor. The ability of the module to detect objects varies greatly with the reflectivity (color, shininess) of the object and the distance from the sensor.

Standard diffuse sensors have eight different attenuation settings, numbered one (maximum attenuation) to eight (no attenuation). The default attenuation setting is five.

The actual maximum distance at which an object will be detected at a given attenuation setting is dependent upon the color, surface texture, and shininess, as well as the angle of the reflecting surface to the sensor. The following charts show the nominal maximum distance to detect a 90% reflectance object (clean white paper) at each attenuation setting, and the maximum distance to detect various objects at attenuation setting 5.

**NOTE:** These numbers are for reference only. The actual distance will vary depending on the actual object being detected.

DIFFUSE ATTENUATION SETTING	NOMINAL DISTANCE TO A WHITE PAPER TARGET
1	48"
2	39"
3	31"
4	24"
5	20"
6	15"
7	12"
8	9"

OBJECT	NOMINAL DISTANCE TO OBJECT AT ATTENUATION SETTING 5
White Paper	20"
Brown Cardboard Box	18"
Brown Cardboard with Clear Plastic Tape	54"
Powder-Painted Metal (green)	24"

Table 5: Diffuse sensitivity ranges

The proper setting to use must be determined at installation with the actual product being conveyed and with any “background” objects, which must NOT be detected, in place.

## Zone Operating Mode

The EZLogic® dual zone controllers may be set to operate in “fixed zone length” or “dynamic zone length” while the conveyor is running in singulation mode.

### Fixed Zone Length (default)

When the zone operating mode is set to “fixed zone length” each carton is assigned one mechanical zone (the zone length determined by the mechanical “build” of the conveyor) as it is transported and accumulated. The zone length must be longer than the longest carton to be conveyed. When cartons are transported or released, a gap equal to the length of one mechanical zone is created between the cartons. See figure 9.

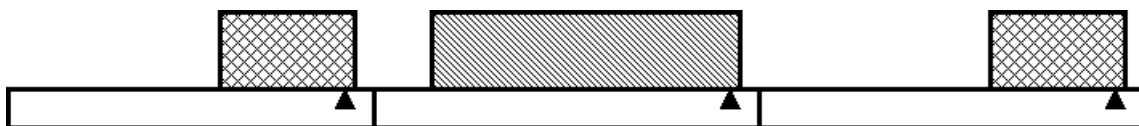


Figure 9 — Fixed Zone Length

### Dynamic Zone Allocation

When the zone operating mode is set to “dynamic zone length” EZLogic® uses a process known as “dynamic zone allocation” to adjust the zone length to fit the carton being conveyed.

The mechanical zone length (determined by the mechanical “build” of the conveyor) becomes the “base” zone length when using dynamic zone allocation. Each carton is assigned enough “base” zones to accommodate its



length. For example, if the conveyor is built up using 12-inch “base” zones, a 9-inch box will be assigned one “base” zone, or 12 inches, while a 21-inches box will be assigned two “base” zones, or 24-inches. The cartons are thus allocated the proper number of “base” zones as required by the cartons.

As cartons are transported or released, a gap equal to the length of one “base” zone is created between the cartons, regardless of the carton length.

*NOTE: If the dual zone controller is operating in “slug mode,” dynamic zone allocation is not required and is disabled.*

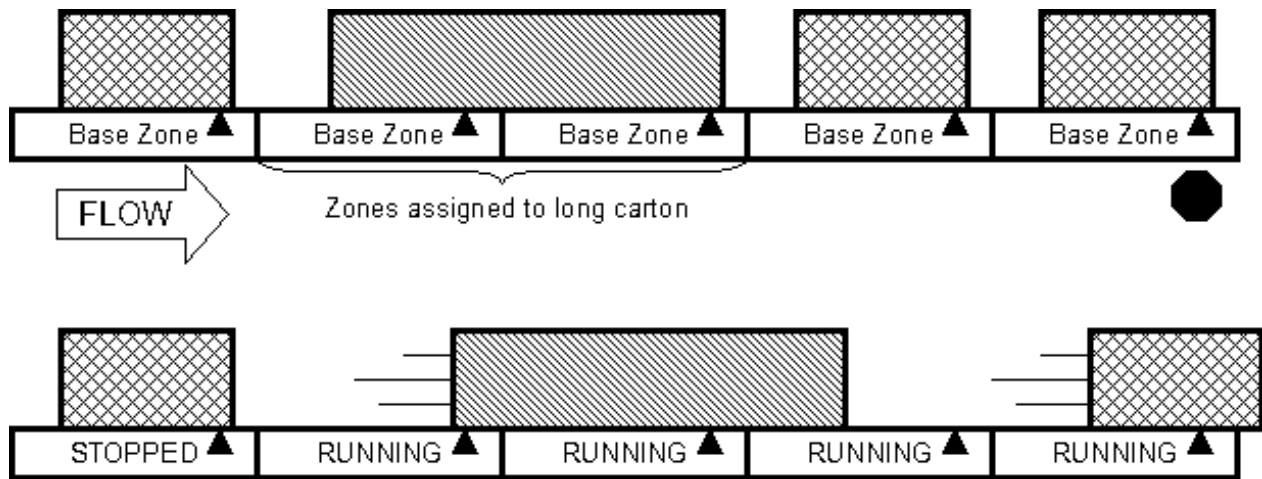


Figure 10 — Dynamic Zone Allocation

## Sensor Configuration

A feature that adds flexibility to the EZLogic® 4.0 accumulation system is the use remote transducers and the remote “dual sensor” option. This option allows two or up to three sensors (Hytrol PN: 032.614 or 032.615) to be used with Zone A or Zone B of a dual zone controller. When using dual sensors, Zone A or Zone B of the dual zone controller may be configured to use only one of the two sensors, or it may be set up so that if **EITHER Sensor #1 OR Sensor #2** is blocked a carton is considered “detected”. It may also be configured, so that **BOTH Sensor #1 AND Sensor #2** must “see” the carton before it is “detected.”

This setting is configured at the factory and does not normally require re-configuration.

## Zone Stop Mode

### Static (Normal Zone Stop Mode)

By default, an active “zone stop” signal to Zone A or Zone B of a dual zone controller causes that controller to stop the zone whenever a carton is detected in the zone. If the zone stop signal is active the stopped carton will be held. When the zone stop signal becomes inactive the carton is released; that is, the zone is restarted to advance the carton (if there is not a carton occupying the adjacent downstream zone). This zone stop mode is known as static zone stop mode.

### Count Mode

In counting zone stop mode, the user selects a desired number of cartons to release any time the zone stop signal is “cycled” from active to inactive and back to active. As long as the zone stop signal is active the cartons are held. When the zone stop signal is momentarily cycled to “inactive” the zone controller will release the number of cartons selected and stop the next coming carton. For example, if the zone stop count mode is set for “1 box release” one carton will be released when the signal is cycled.

*NOTE: Go to SWD Parameters menu in order to configure the Zone Stop Mode control signal.*

## Accumulation Delay

The accumulation delay can be set to operate in two ways. “*Delay Zone Accumulation*” will cause a zone to drive 1.8 seconds after normal accumulation would have occurred, it may be used to “crowd” cartons on the conveyor. “*Delay During Transport Only*” inhibits normal singulation of cartons during transport but does not inhibit normal product accumulation. Both provide a singulated release of cartons. The default setting for the accumulation delay is Disabled.

## Loading Zone Function

The loading zone function is a “smart” timer function. When this function is enabled in Zone A or Zone B of a dual zone controller, if a load is placed in the zone and is detected by the sensor of that zone, the dual zone controller will stop the rollers from turning in the zone and signal the immediate upstream zone to hold back any incoming loads for a user- selectable time, 0 (disabled) to 60 seconds, in 1 second increments. This allows time for the fork truck (or other loading mechanism) to position and pull clear of the load before the conveyor attempts to advance the load down the conveyor.

The zone controller can distinguish a load being placed on the conveyor from a load that is already being transported by the conveyor and only triggers the loading zone function for loads placed on the conveyor.

The loading zone function may be used in an infeed zone or any intermediate zone of the conveyor and may be cloned to all zones in the conveyor to allow for “random access” loading.

## Unloading Zone Function

When this feature is enabled, if an accumulated load is removed from the conveyor manually, the zone where the load is removed and the zone immediately upstream from the removed load will delay driving for a set time, 0 (disabled) to 60 seconds, in 1 second increments, allowing the load to be safely removed before the next load advances. This feature is ideal for pallet-handling conveyors where loads are routinely removed from the conveyor with a fork truck. By using the built-in delay, unloading zones may be created without any extra controls. Every zone on the conveyor may be set to use the delay, making it possible to unload from any zone safely.

The unloading zone function is implemented only when a load is removed from the conveyor. If a load is driven out of a zone because of a zone stop signal being removed or during normal transport, there is no delay in zone start-up.

## Special Logic Function

Custom standard logic functions have been developed and can be enabled to expand the capabilities of the EZLogic® 4.0 system. There are eight standard logic functions (Empty – default), however, other functions are periodically released as they are developed. These functions will be listed in EZLogic® OS in the Special Logic Function under the “Standard” tab. The EZLogic® 4.0 dual zone controller may be configured with up to four standard or custom logic functions.

## Standard Functions

The following are the standard logic functions built into the EZLogic® 4.0 dual zone controllers:

- **Delay Upstream Zone Release** – When the zone is blocked and then becomes clear, the upstream zone is “held” and released when the millisecond timer expires. If there is no product present in the upstream zone when the timer starts, but a product arrives in the upstream zone before the timer expires, it will be stopped and held for the remainder of the timer duration.
- **High Performance Brake Pulse** – Momentarily stops the downstream zone as a carton passes a zone controller. The timer is in milliseconds. Used with gravity accumulation conveyors (GEZ) to slow the momentum of a carton.

- **High Speed Accumulation** – As cartons accumulate, the drive of the immediate upstream zone is removed, providing a “dead” zone so that the *next carton can coast* to a more controlled stop with less impact on previously accumulated cartons. This function also provides a “cascade release” of the cartons if desired.
- **PE (Photo-Eye) Off Delay** - This function, when used in conjunction with an auxiliary I/O module (Hytrol PN: 032.632), provides the user with an active output if the zone sensor of the dual zone controller detects a carton. When the carton is no longer detected, the signal remains active for the duration of the chosen delay. For example, if the function were set up with a delay of 2 seconds, the output would remain active for 2 seconds after the carton has cleared the sensor.

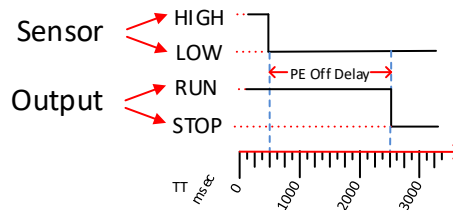


Figure 11: Timing for PE Off Delay

- **PE (Photo-Eye) On Delay** - This function, when used in conjunction with an auxiliary I/O module (Hytrol PN: 032.632), provides the user with an output if the zone sensor of the dual zone controller detects a carton for more than a chosen delay. For example, if the function were set up with a delay of 500 milliseconds, a carton would have to be detected by the zone controller for more than 500 milliseconds before the output would become active. The output becomes inactive when the carton is no longer detected.

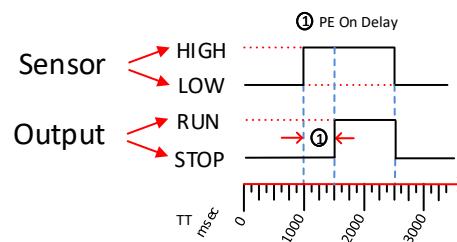


Figure 12: Timing for PE On Delay

- **Brake Pulse** - When the EZLogic® 4.0 system is used with gravity conveyors to control product flow it is important to control the momentum of the cartons as they travel down the conveyor. The pulse function momentarily applies a brake to passing cartons to reduce this momentum. The function may be used in any or all zones of the gravity conveyor, as required.
- **Slide Through Accumulation** – If a carton attempts to accumulate but slides past the zone controller, the zone will remain stopped until the downstream zone clears.
- **Smart Singulate** – This function will hold the upstream zone back while current zone is expecting a carton. The upstream zone will hold until the current zone sees a carton or until the timer expires (default is 5 seconds).

If after configuration of one or more standard logic functions has been finished user requires to modify a time setting for any particular function, then go to the *Controller menu* of EZLogic® OS and access the Timers option for individual modification.

## Cascade Release Timer

Normally when cartons are released from a conveyor operating in *slug mode* all cartons are released simultaneously. This often results in cartons being back-to-back as they exit the conveyor.

The cascade release function introduces a delay in the release of each zone from the discharge end upstream. This delay creates a separation of cartons similar to singulation, except that the space between the cartons is

based on the length of the time delay (0-2500 msec) rather than the zone length. By using a short delay, a small gap may be created, which can improve carton travel through curves and merges. A longer delay can create larger gaps for other operations.

The cascade release function also reduces maintenance on the conveyor by decreasing the amount of shock loading on the drive components during product release start-up. By releasing the cartons sequentially rather than simultaneously there is less stress placed on belts, chains, etc.

## Reflex Operation

This function sets the operating mode of the Polarized Reflex transducer. The function provides the return signal strength of the light from the reflector. A stronger signal equates to a better aligned eye. This is intended to be a preventative maintenance feature to be used as both an alignment aid as well as provide a diagnostic feedback via SWD communications direct to the PLC (\_XC\_ChA / \_XC\_ChB) that an eye is not optimally aligned. The default setting is Gen3 Compatible where no signal data is returned to the DZC from the transducer. Gen4 Signal returns status to the DZC from the transducer. Gen4 Alignment returns signal data to the DZC from the eye and uses the transducer's yellow LED as an alignment aid.

LED STATE	SIGNAL STATUS
STEADY ON	BEAM COMPLETE / NO OBJECT DETECTED
FAST FLASH	MODERATE BEAM RETURN SIGNAL
SLOW FLASH	WEAK BEAM RETURN SIGNAL
STEADY OFF	BEAM BLOCKED / OBJECT DETECTED

Table 6: Transducer's LED status

## NBEZ Brake Timer

Sets the amount of time in seconds the NBEZ conveyor brake module (*Hytrol PN: 032.02055*) signal will be generated. Default zero longest 250 seconds. Setting zero seconds means that this feature will be disabled.

## Zone Kill Mode

This is an alternative to the loading and unloading zone functions. A signal may be given to the zone controller by an external control source, such as a photo-eye set to detect the presence of a fork truck, a "dry" contact signal or a PLC command -Refer section *Connecting Inputs and Outputs Using the Auxiliary I/O Module (Hytrol PN: 032.632)* for additional information- providing a positive control of the zones instead of the timer approach used by the Loading Zone and Unloading Zone functions.

In high-speed applications, the Zone Kill Mode function may be used to improve stopping control at the discharge end of a conveyor. By providing a "dead" zone at the end of the conveyor the function can greatly reduce problems caused by carton "drift" during accumulation. This function has two options to be configured Active Kill and Active Run (*Default-Disabled*)

### Active Kill

This function is triggered by an auxiliary input signal to the dual zone controller. When this function is programmed into Zone A or Zone B of a dual zone controller and the auxiliary input is active, the following two things occur:

1. The dual zone controller immediately stops the drive in the zone it controls.

2. The dual zone controller sends a signal to the adjacent upstream dual zone controller to stop and hold any incoming cartons.

#### **Active Run**

This function is triggered by an auxiliary input signal to the dual zone controller. When this function is programmed into Zone A or Zone B of a dual zone controller and the auxiliary input is off, the following two things occur:

1. The dual zone controller immediately stops the drive in the zone it controls.
2. The dual zone controller sends a signal to the adjacent upstream dual zone controller to stop and hold any incoming cartons.

# Controller Menu

## Clone

The Clone Settings feature helps copying the settings to all the controllers in Up/Down/Both directions from the currently connected controller (*local controller*), except for controllers that have clone protection enabled.

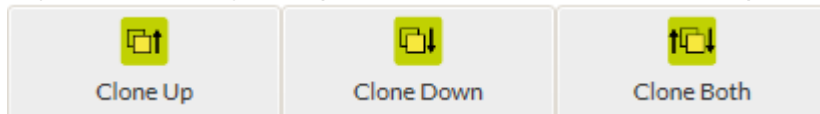


Figure 13: Cloning direction

## Enabled/Disabled Clone Protection

This menu option toggles between enabling and disabling the clone protection feature of the zone controller. When clone protection is enabled a zone controller cannot be changed by a clone command sent by another zone controller. This prevents critical settings in a zone controller from being accidentally changed. The zone controller will pass the clone command on the other controllers in the chain. The zone controller may still be configured directly.

## Diagnostic Information

Variable	Description	Units
24V SWD Bus Undervolt	Zone Controller SWD Bus under voltage	GOOD/BAD
24V Aux/Xdcr Rail Overcurrent	Zone Cotroller Auxiliary or Transducer overcurrent	GOOD/BAD
24V Ext Act Undervolt	Zone Controller External Actuator under voltage	GOOD/BAD
Jammed	Zone box jammed	GOOD/BAD
Actuator Open	Zone actuator Open Circuit	GOOD/BAD
Actuator SCP	Zone actuator Short Circuit Protection	GOOD/BAD
Brake Open	Zone brake Open Circuit	GOOD/BAD
Brake SCP	Zone brake Short Circuit Protection	GOOD/BAD
Internal Actuator Fault	Zone internal actuator faulted	GOOD/BAD
ChA Alignment	Zone Transducer ChA Aligned	GOOD/BAD
ChB Alignment	Zone Transducer ChB Aligned	GOOD/BAD

Table 7: Diagnostic Data Table

## Performance Data

Variable	Description	Units
DZC_Runtime	Zone Controller Up time since power on	days, hr:min:sec
DZC_Temperature	Zone Controller PCB Temperature	oC
24V Rail	Zone Controller VCC Power Rail	Volts
24F Rail	Zone Controller VCC Fused Rail	Volts
24 EXT	External Power Rail Voltage	Volts
Detections	Zone transducer detection counter	#Events
Actuations	Zone actuator actuation counter	#Events
Actuator Runtime	Zone actuator Runtime	days, hr:min:sec
Actuator Current	Zone actuator current	mA
Actuator Temperature	Zone actuator temperature	oC
Actuator Overloads	Zone actuator overload counter	#Events

Table 8: Performance Data Table

## Historical Data

Variable	Description	Units
Runtime	Zone Controller total Runtime -- life time	days, hr:min:sec
Minimum Temperature	Zone Controller Min temperature recorded -- life time	oC
Maximum Temperature	Zone Controller Max temperature recorded -- life time	oC
Minimum 24V Rail	Zone Controller Min 24V Power Rail recorded -- life time	Volts
Maximum 24V Rail	Zone Controller Max 24V Power Rail recorded -- life time	Volts
Detections	Zone Transducer detection counter -- life time	#Events
Actuations	Zone actuator activation counter -- life time	#Events
Actuator Runtime	Zone actuator Runtime -- life time	days, hr:min:sec

Table 9: Historical Data Table

## Zone Status Monitor

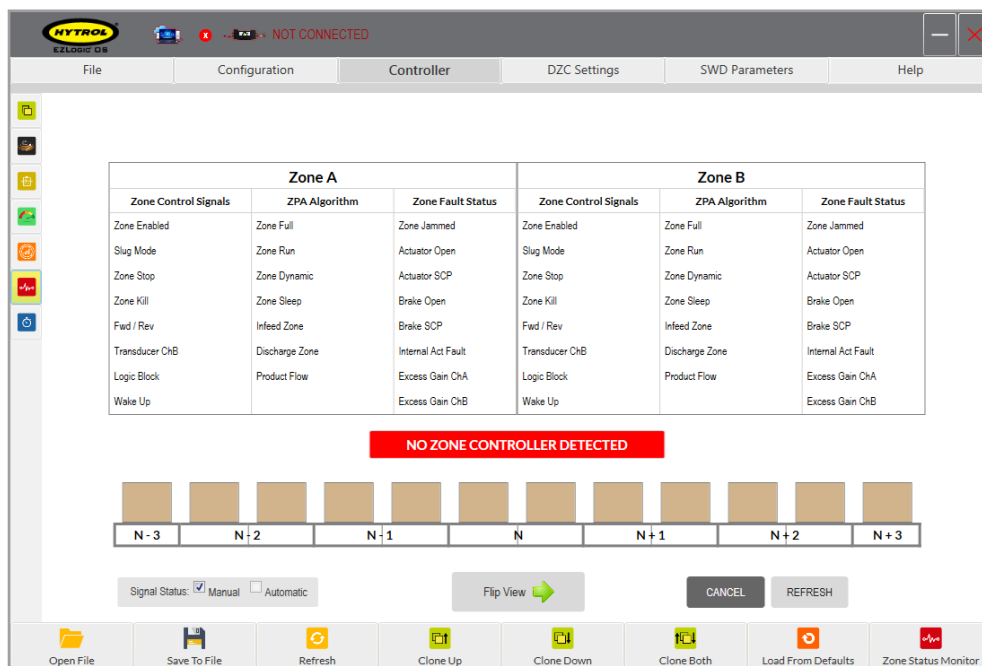


Figure 14: Zone Status Monitor

# Timers

This screen allows you to modify the timer values of the loaded on Special Logic Function at the Configuration Menu (Standard and/or Custom).

Welcome to the Standard Special Logic Configuration Installer

This installer allows you to select special logic functions that will modify the behaviour of your EZLogic Zone Controller. For a description of each function, mouse hover onto the instruction icon.

Selected Special Logic Functions

Timer Value (in ms)

Slide Through Accumulation ⓘ

500

High Speed Accumulation ⓘ

400

Smart Singulate ⓘ

300

PE On Delay ⓘ

250

CANCEL

SAVE

a)

Special Logic Timers

This screen allows you to modify the timer values of the loaded special logic functions.

NOTE: The timer value is rounded by its relevant multiplier.

Standard Special Logic Functions

Block #	Loaded Functions	Timer Value (in Milliseconds)
0	Slide Through Accumulation	500
1	High Speed Accumulation	400
2	Smart Singulate	300
3	PE On Delay	250

Custom Special Logic Functions

Block #	Loaded Functions	Timer Value (in Milliseconds)
0	Empty	0
1	Empty	0
2	Empty	0
3	Empty	0
4	Empty	0

EXPORT

CANCEL

SAVE

b)

Figure 15: a) Configuration screen to set up Special Logic Function timers (Configuration Tab); b) After function creation timer configuration screen



## DZC Settings Menu

In this menu, the user could be able to configure special communications between remote controllers and interlock control signals without the need to reprogram the PLC.

*NOTE: Communication's profile selection between PLC and Dual Zone Controllers must be configured with SWD Assist during system layout. For additional information refer H2-MN-NP-002.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf*

### Backup/Restore

These procedures are required in order to execute future configuration restoration (plug&play EZLogic® modules). The backup procedure will store EZLogic® 4.0 module's configuration on the adjacent dual zone controller's retentive memory one to one. These procedures should be started manually on EZLogic® OS and the system's execution will be completely automatic. The scope of these procedures executes by unit (individual) or by group (system) and no additional user intervention would be required other than trigger process start. For additional reference consult guide H2-GD-NP-006.1.0\_EZ40\_AP\_DZC\_Replacement.pdf

Backup function: "The DZC first resets the device configuration space in the neighboring DZC. This prevents a restoring DZC from using invalid or incomplete data in case the backup process is interrupted. The DZC then proceeds to write all eight memory spaces to its neighbor. Upon successful completion, the DZC finally writes its device configuration to its neighbor. This marks the stored data as valid for later restoration by another DZC."

Restore function: "When a restore is performed, the DZC first reads the device configuration space in the neighboring DZC. If the identifying details match (SWD device type and SWD address) then the DZC will proceed to read all eight memory spaces from the neighbor and updates its memory spaces accordingly.

### Individual Backup/Restore

Initiates individual Backup/Restore of connected DZC. This operation will only be performed on the DZC communicating directly with EZLogic® OS.

### System Backup/Restore

Initiates system Backup/Restore procedure from the connected DZC. This operation can be initiated at any DZC and will propagate until there are no more devices.

## Cloneable and Non-Cloneable Functions

Clone function is an EZLogic® 4.0 feature that allows the parameter data table from a connected source to be passed to and retained in all modules in any given dual zone controller's chain. Clone procedure could be executed in three directions Up (upstream), Down (downstream) and/or Both (upstream and downstream) starting from the connected zone controller.

Downstream and Upstream refer to the direction that SWD addressing increases (refer section *Default Product Flow* of this document) different from previous EZLogic® models, the only available option to prevent propagation of a clone command is disabling clone protection per zone (refer section *Enable/Disable Clone Protection* of this document) for the zone controllers you want to protect against cloning.

### SWD Parameter Protect (Non-Cloneable)

When *enabled*, the DZC uses the parameter pushed from the NIM (set up in the SWD-Assist project). The pushed values are compared to the values in the configuration memory object then it will be updated if there is a disagreement.

When *disabled*, the DZC disregards the parameters pushed from the coordinator (from the SWD-Assist project). Then values stored in the configuration memory object are used.



**ATTENTION:** Disabling protection for a specific dual zone controller will overwrite basic set up parameters coming from SWD Assist configuration tool. Refer next section SWD Parameters Tab for additional information.

### NBEZ Break Zone (Non-Cloneable)

Enables / Disable NBEZ brake signaling in actuator cable. NOTE: Requires Zone Actuation Type = NBEZ. When enabled, diagnostic codes associated with the Brake circuit (*Hytrol PN: 032.02055*) are active.

### Produced Signal Sources (PSS) (Non-Cloneable)

“A Produced Signal Source (PSS) is a signal produced by an individual ACE in the cyclic data frame. Each ACE can produce up to 4 signals. The source for a PSS can be one of 13 signals available to the producing ACE. Most are internal logic signal with the ability to echo a PLC produced signal to the ACE.” *For additional information refer Hytrol guide H2-GD-NP\_007.1.0\_EZ40\_Peer\_to\_Peer\_Signaling\_in\_EZLogic4.00.pdf*

In other words, the Produce Signal Source channels is a memory space to make accessible special status bits between zone controllers functioning over the same SWD Network. PSS bits can be consumed on the Peer Consumed Signal channels (PCS) and/or on the PLC communications memory.

Besides configuration for the Produced Signal Sources from this tab menu, it is also possible to configure the Aux IO Port Output (default setting Zone Beam). Available options for these settings are:

EZLogic OS	SWD Assist	Description
Disabled	Disabled	Disabled
Zone Drive	Zone Drive	Zone driving status
Zone Beam	Zone Beam	Zone transducer status
Up1 Drive	Up1 Drive	Upstream zone driving status
Up1 Beam	Up1 Beam	Upstream zone transducer status
Dn1 Drive	Dn1 Drive	Downstream zone driving status
Dn1 Beam	Dn1 Beam	Downstream zone transducer status
Q0 CMD	PLC Q0	PLC digital output (tag suffix _Q0_CMD). <i>NOTE: Available just for DZCs with <u>Profile 2 ZPA</u> with <u>PLC Control</u> selected on SDW Assist</i>
Q1 CMD	PLC Q1	PLC digital output (tag suffix _Q1_CMD). <i>NOTE: Available just for DZCs with <u>Profile 2 ZPA</u> with <u>PLC Control</u> selected on SDW Assist</i>
Q2 CMD	PLC Q2	PLC digital output (tag suffix _Q2_CMD). <i>NOTE: Available just for DZCs with <u>Profile 2 ZPA</u> with <u>PLC Control</u> selected on SDW Assist</i>
Q3 CMD	PLC Q3	PLC digital output (tag suffix _Q3_CMD). <i>NOTE: Available just for DZCs with <u>Profile 2 ZPA</u> with <u>PLC Control</u> selected on SDW Assist</i>
Logic Block Out	Logic Block Out	Logic signal generated by the special logic functions
Block / Stopped	Blocked & Stopped	Zone full AND completely stopped
Aux Input	Aux In HW	AuxIOPort input status

Table 10: PSS configuration cross reference table

Also, the Produced Signal Sources (PSS) are available to the PLC input communications memory. See cross reference and PLC tag suffix table 11:

PLC tag suffix	Description
A_PSS_Ch0	Zone A – Produced System Signal – Ch.0
A_PSS_Ch1	Zone A – Produced System Signal – Ch.1
A_PSS_Ch2	Zone A – Produced System Signal – Ch.2
A_PSS_Ch3	Zone A – Produced System Signal – Ch.3
B_PSS_Ch0	Zone B – Produced System Signal – Ch.1
B_PSS_Ch1	Zone B – Produced System Signal – Ch.2
B_PSS_Ch2	Zone B – Produced System Signal – Ch.3
B_PSS_Ch3	Zone B – Produced System Signal – Ch.4

Table 11: PSS available cyclic data memory by DZC

NOTE: PSS Channel 1 (*\_PSS\_Ch0*) and PSS Channel 2 (*\_PSS\_Ch1*) can be changed ONLY from Produced Signal Sources(PSS) screen under SWD Parameters tab or from SWD Assist configuration tool Zone parameters tabs of the DZC, by default these two PSS are Disabled. Refer table 12.

PSS Channel	Default Setting
Channel 1	Disabled
Channel 2	Disabled
Channel 3	Zone Beam
Channel 4	Zone Drive

Table 12: PSS default configuration

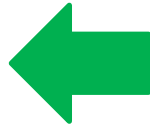
## Peer Consumed Signals (PCS) (Non-Cloneable)

“A Peer Consumed Signal is an explicit defined signal in the cyclic data stream for consumption by an individual Accumulation Control Engine (ACE). The definition consists of the ACE producing the signal to be consumed and the signal (1 of 12 available) to be consumed. This construct is used to define a signaling channel. The memory space where the PCS is defined imply point to multipoint or point to point type signaling. Conceptually, signaling channels are like the Gen3 IOP channels in providing peer to peer signaling without a PLC.”

“A Peer Consumed Signal is a specific signal in the cyclic data frame, defined to be consumed for input into the distributed logic control block of an individual logic engine...*A PCS enables an individual ACE to consume a specific signal produced by another ACE in real time...*”

In other words, Peer Consumed Signals (PCS) is a group of status bits accessible for every zone controller from the SWD communications bus. In order to be able to read the status bits user should provide a zone controller sequential ID. Refer table 13.

Peer Consumed Signals (PCS)
PCS Channel 1
PCS Channel 2
PCS Channel 3
PCS Channel 4



Options per Channel	Description
Disabled	Disabled
PSS Channel 1	Produced Signal Source Channel 1*
PSS Channel 2	Produced Signal Source Channel 2*
PSS Channel 3	Produced Signal Source Channel 3*
PSS Channel 4	Produced Signal Source Channel 4*
Box_FBK	Zone Beam Status
Run_FBK	Zone Drive Status
XC_ChA	Zone Transducer Channel A
XC_ChB	Zone Transducer Channel B
ACT_IN	Actuator Input Status
AUX_IN	Auxiliary Input Status
DIV_ID1	Divert ID 1 Status
DIV_ID2	Divert ID 2 Status

a)

b)

Table 13: a) Available PCS channels; b) Available options for configuration

### Example:

Dual Zone Controller SeqID15 needs to get Zone Beam status from SeqID3 to use this signal as zone Wake Up and Block / Stopped from SeqID7 to be used as Zone Stop. To do this, follow the next procedure:

1. Go to SeqID3 zone controller configuration mode and configure PSS Channel 3 with Zone Beam (default configuration for PSS Channel 3) status
2. Go to SeqID7 zone controller configuration mode and configure PSS Channel 4 with Block / Stopped status
3. Go to SeqID15 zone controller configuration mode and configure PCS Channel 1 with PSS Channel 3 from SeqID3 and configure PCS Channel 2 with PSS Channel 4 from SeqID7
4. For same controller SeqID15 configure Wake Up Signal with PCS Channel 1 and Zone Stop Signal with PCS Channel 2.

PRODUCER	
SeqID	3
PSS Channel 3: Zone Beam	

PSS Channel 3:

PRODUCER	
SeqID	7
PSS Channel 4: Block / Stopped	

PSS Channel 4:

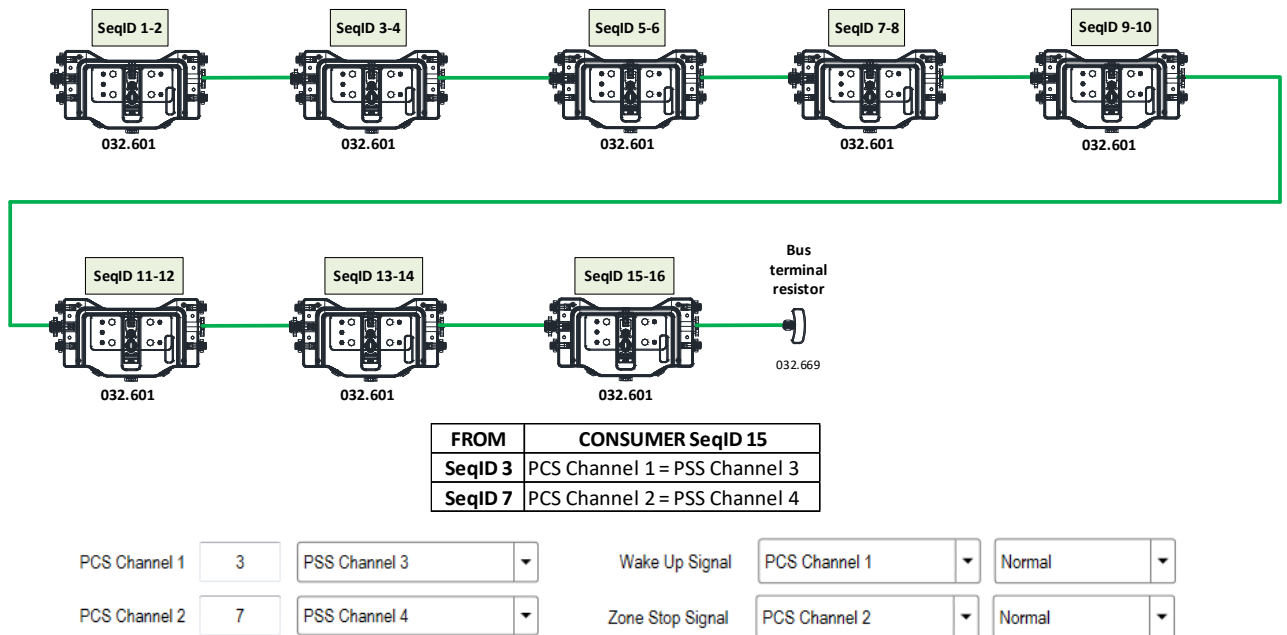


Figure 16: PCS configuration example

## Zone Control Signals (Non-Cloneable)

Zone Control Signals are auxiliary input signals to the ZPA control algorithm of an ACE. The source and polarity of the active state for each of these signals is selectable between Normal or Inverted independent of the source signal itself. Refer table 14.

Zone Control Signals	EZLogic OS	Description
Slug Control Signal	Disabled	Disabled
Zone Stop Signal*	Aux Input	Zone stop signal plugged to the zone's AuxIOPort
Zone Kill Signal	Logic Block Output	Logic signal generated by the special logic functions
Directional Signal	Transducer ChB	Channel B transducer HW signal
Transducer Channel B	SSC Slug Control	System Signaling Channel - Slug Control
Logic block Signal	SSC Direction	System Signaling Channel – Direction Control
Wake Up Signal	SSC Zone Kill	System Signaling Channel – Zone Kill Control
	SSC Channel 1	System Signaling Channel 1
	SSC Channel 2	System Signaling Channel 2
	SSC Channel 3	System Signaling Channel 3
	PCS Channel 1	Peer Consumed Signal - Channel 0
	PCS Channel 2	Peer Consumed Signal - Channel 1
	PCS Channel 3	Peer Consumed Signal - Channel 2
	PCS Channel 4	Peer Consumed Signal - Channel 3
	Q0 CMD	PLC digital output (tag suffix _Q0_CMD)
	Q1 CMD	PLC digital output (tag suffix _Q1_CMD)
	Q2 CMD	PLC digital output (tag suffix _Q2_CMD)
	Q3 CMD	PLC digital output (tag suffix _Q3_CMD)

Table 14: ZCS available options

\* Zone Stop Signal configuration is available from the SWD Assist configuration tool or SWD Parameters menu.

For cross connecting two independent conveyor zones in order to create a seamless accumulation lane, user should configure Zone Stop Signal for the upstream (discharge) zone and Wake Up Signal for the downstream (infeed) zone. *For additional information consult technical document EZLOGIC® 4.0 Application Note Cross connecting two independent sections of accumulation conveyor by Steven Rees February 17, 2020.*

Default signal assignments for consumption are:

Zone Control Signal	Default Signal Consumed
Zone Stop Signal	Auxiliary Input (Hardware)
Slug Control Signal	SSC Slug Control
Direction Control Signal	SSC Direction Control
Zone Kill Signal	SSC Zone Kill
Transducer ChB Signal	ChB Transducer HW
Logic Block Signal	Logic Block Output
Wake Up Signal	Disabled

Table 15: ZCS default signal

## Reverse Operation (Cloneable)

Enable / Disabled Reverse operation of the ZPA algorithm (this function enables only the reverse accumulation logic, not the physical or mechanical actuator operation). Forward / Reverse is control by the Direction Control Signal. Requires dual transducers (Hytrol PN: 032.614 or 032.615) for operation and overrides Sensor Operation setting. Forward operation uses Channel 1 and Reverse operation uses Channel 2, notice that it is not necessary to reconfigure the Sensor Configuration setting available under the Configuration software menu. Directional operation is independent of Default Product Flow; but the standard transducer should be located at the zone discharge side and second sensor should be located at the zone infeed side. For additional information refer H2-REF-NP-004.1.2\_EZLogic4\_Reverse\_Configuration.pdf document.

## System Signaling Channels (SSC) (Cloneable)

A system signaling channel or SSC is an explicitly defined signal in the cyclic data stream for consumption by multiple Accumulation Control Engines (ACEs). Each ACE has 6 channels available for definition of an explicitly defined consumed signal. These are *defined in the parameter memory space* for each individual ACE and therefore can be cloned. This property makes them System Signaling Channels (SSC).

SSC Channel
SSC Slug Signal
SSC Direction
SSC Zone Kill
SSC Channel 1
SSC Channel 2
SSC Channel 3



Options per Channel	Description
Disabled	Disabled
PSS Channel 1	Produced Signal Source Channel 1*
PSS Channel 2	Produced Signal Source Channel 2*
PSS Channel 3	Produced Signal Source Channel 3*
PSS Channel 4	Produced Signal Source Channel 4*
Box_FBK	Zone Beam Status
Run_FBK	Zone Drive Status
XC_ChA	Zone Transducer Channel A Status
XC_ChB	Zone Transducer Channel B Status
ACT_IN	Actuator Input Status
AUX_IN	Auxiliary Input Status
DIV_ID1	Divert ID 1 Status
DIV_ID2	Divert ID 2 Status

Table 16: SSC Channel Configuration

## SWD Parameters

During EZLogic® 4.0 system design and configuration stages described on SWD Assist (refer manual *H2-MN-NP-002.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf*) designer should set up basic functionality and behavior per conveyor zone, all this before system' start-up. After configuration has been downloaded into the NIM, advanced users should be able to modify some basic functions using the EZLogic® OS configuration software.

Before configuring any of these settings, disable the SWD Parameter Protect (refer previous section of this manual) on the Controller's menu, this will transfer to EZLogic® OS the permissions to modify these settings for the currently connected DZC.



**ATTENTION:** Disabling protection for a specific dual zone controller will overwrite basic set up parameters coming from SWD Assist configuration tool.

### Accumulation Control Engine(ACE) Operation

An Accumulation Logic Engine or ACE (also known as Accumulation Control Engine) is the core ZPA (Zero Pressure Accumulation) for an individual zone. There are exceptions where one half of the dual zone controller could be disabled; this is, on conveyor sections with an odd number of zones the last DZC on the chain is controlling just a single zone, in this case the second half of the dual zone controller would be disabled. Available options Disable or Enabled. *Selecting Logic Only option will not have any effect on the controller's configuration.*

### Logical Placement/Orientation

Sets the physical IO used by the ACE. When sets to swapped, Zone A hardware (transducer / Actuator / Aux Port) is used by the ACE in Zone B, and zone B hardware is used by the ACE in Zone A. Modify this feature for DZC mounted on inside curve radius. See figure 18 and table 17 for reference.

### Default Product Flow

If product flows in the same direction that SWD node addressing flows (*"Left Hand Thumb's rule"*), then use the *Normal\** set up (Away from the gateway). If product flows in the opposite direction that SWD node addressing flows, then use the *Inverted\** set up (Towards the gateway). See figure 18 and table 17 for reference.

\* SWD Assist configuration option

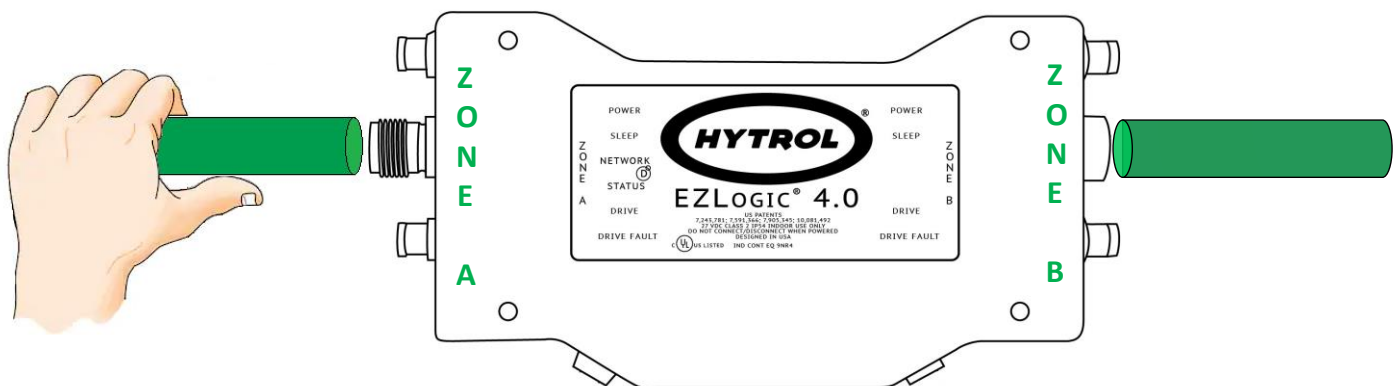


Figure 17: Node addressing flow direction



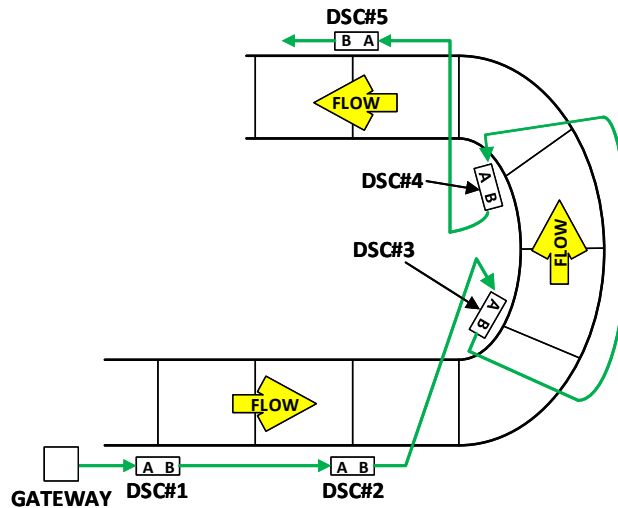


Figure 18: Configuration example

Dual Zone Controller	Logical Placement/Orientation	Default Product Flow
DSC#1	Normal – A/B	Away from the gateway
DSC#2	Normal – A/B	Away from the gateway
DSC#3	Swapped – B/A	Towards the gateway
DSC#4	Swapped – B/A	Towards the gateway
DSC#5	Normal – A/B	Away from the gateway

Table 17: DZC configuration Logical Placement/Orientation and Product Flow

## Zone Placement

Used to define a zone as an Infeed Zone, Discharge Zone or Standard Zone. This enables the creation of separate functional sections of accumulation conveyor to operate from a single NIM.

## Zone Control Mode

Sets the control mode employed on this individual zone. ZPA Only is traditional EZLogic® operation. PLC Only requires full time PLC control of zone actuation signal. PLC Override enables external control signal from PLC to take over control of the zone while the external signal is active. When the external signal is inactive, EZLogic® ZPA Logic controls the zone.

Note: While PLC Override (OVR\_CMD) signal is active, ZPA Logic control algorithm is running, but zone actuation is controlled (overridden) by separate PLC signal. For additional information refer manual H2-MN-NP-001.1.0\_EZLogic4.0\_AB\_PLC\_Comms\_MN.pdf

## Zone Actuation Type

Actuation circuits for Digital Control Dual Zone Controllers (Hytrol PN: 032.601). Set this parameter in accordance with the zone actuator that fits better for your conveyor system.

Zone Actuation Type	Power Demand
ABEZ	0.75 watt solenoid actuators
E24EZ	Non-integral BLDC commutated actuators (E24™/E24i™ controls cards)
CREZD	8.0 watt solenoid actuators
NBEZ	9.25-9.71 watt High current solenoid actuators

Table 18: Zone Actuation Type

## Zone Stop Signal

The Zone Stop Signal can be configured initially from the SWD Assist configuration tool (refer manual *H2-MN-NP-002.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf*) or from the EZLogic OS programming software (disabled SWD Parameter Protect). A control input signal to this specific zone that, when actuated, causes product flow to accumulate in this zone. User can select from eighteen (18) different options, refer table 19 for cross references between EZLogic® OS and SWD Assist configuration tools:

EZLogic® OS	SWD Assist	Description
Disabled	Disabled	Disabled
Aux Input	Aux Input HW	Zone stop signal plugged to the zone's AuxIOPort
Logic Block Output	Logic Block Out	Logic signal generated by the special logic functions
Transducer ChB	Xdcr ChB HW	Channel B transducer HW signal
SSC Slug Control	<b>SCS</b> Slug Mode	System Signaling Channel – Slug Control
SSC Direction	<b>SCS</b> Direction	System Signaling Channel – Direction Control
SSC Zone Kill	<b>SCS</b> Zone Kill	System Signaling Channel – Zone Kill Control
SSC Channel 1	<b>SCS</b> Channel 1	System Signaling – Channel 1
SSC Channel 2	<b>SCS</b> Channel 2	System Signaling – Channel 2
SSC Channel 3	<b>SCS</b> Channel 3	System Signaling – Channel 3
PCS Channel 1	PCS Channel <b>0</b>	Peer Consumed Signal - Channel 1
PCS Channel 2	PCS Channel <b>1</b>	Peer Consumed Signal - Channel 2
PCS Channel 3	PCS Channel <b>2</b>	Peer Consumed Signal - Channel 3
PCS Channel 4	PCS Channel <b>3</b>	Peer Consumed Signal - Channel 4
Q0 CMD	PLC Q0	PLC digital output (tag suffix <b>_Q0_CMD</b> )
Q1 CMD	PLC Q1	PLC digital output (tag suffix <b>_Q1_CMD</b> )
Q2 CMD	PLC Q2	PLC digital output (tag suffix <b>_Q2_CMD</b> )
Q3 CMD	PLC Q3	PLC digital output (tag suffix <b>_Q3_CMD</b> )

Table 19: Available configuration settings for the Zone Stop Signal

**Hytrol's Tip:** To create a Zone Stop at the discharge zone without PLC intervention or peer communications plug to the Aux IO Port on the discharge zone a 4-Pin extension cable and short circuit brown and white cables. If no extension cable is available check Zone Stop Signal as *Inverted*.

## Produced Signal Sources (PSS)

A Produced Signal Source (PSS) is a signal internal to an ACE which is output in the cyclic data of the producing ACE for consumption by other ACEs. An individual PSS can be 1 of 13 defined signal within the producing ACE. Each ACE can produce up to 4 individual signals in its cyclic data space.

From here the user can configure individually PSS Channel 1 and/or PSS Channel 2 (initially Disabled). For more details refer [Produced\\_Signal Sources](#) on the previous section of this manual.

# COMPONENTS

The EZLogic® accumulation system is made up of several physical components that work together to provide you with a simple, yet powerful control system for your zero-pressure conveyor. These components may be divided into the following categories:

- Main components
- Auxiliary components
- Configuration/diagnostic components
- Cable components

## Main Components

Main Components are those parts of the EZLogic® 4.0 system that are essential for conveyor operation and provide most of the functionality of the system. These parts include the zone controller/transducer assembly, power supply and the Network Interface Module (NIM).

### Zone Controller/transducer Assembly

The DZC/transducer assembly is the heart of the EZLogic® 4.0 accumulation system. There is one assembly located between two mechanical zones of any EZLogic® 4.0-equipped conveyor. It consists of three components:

- EZLogic® 4.0 dual zone controller
- Two Transducers (sensors)
- Controller Mounting Tee

### EZLogic® 4.0 Dual Zone Controller

The core of the EZLogic® 4.0 accumulation system is the EZLogic® 4.0 dual zone controller. The dual zone controller operates as two independent accumulation modules which share a common power and communications platform that uses microprocessor technology to monitor various inputs from adjacent dual zone controllers and from outside sources, process that information based on certain parameters, provide the proper output to control the drive status of the zone, and to communicate status information to the other zone controllers. The EZLogic® 4.0 accumulation system is powered by SmartWire-DT® Data Transfer Technology.

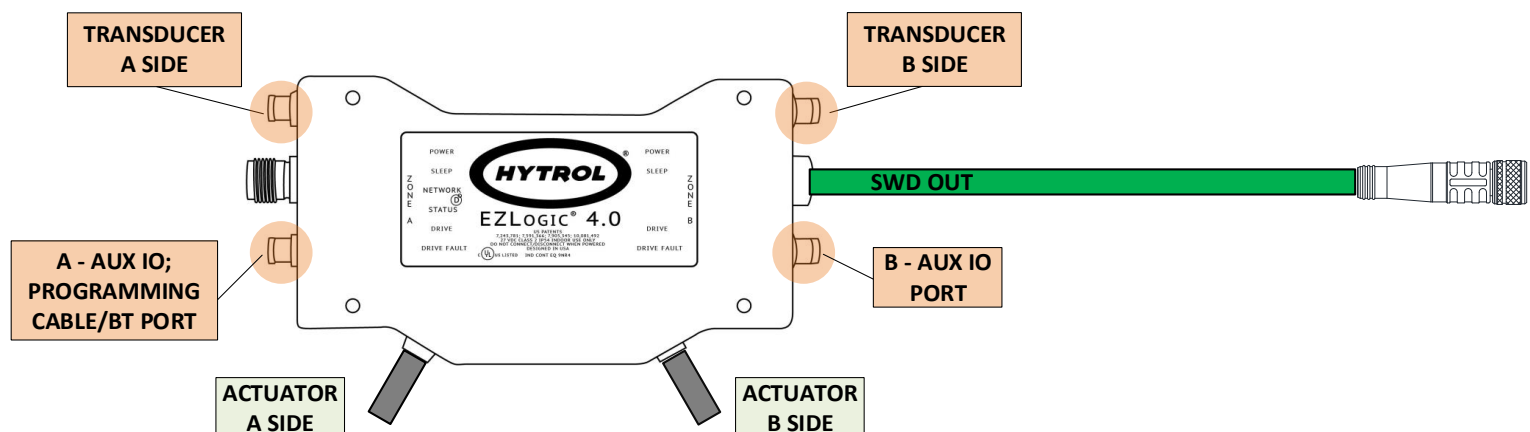


Figure 19: Dual Zone Controller hardware overview

Dual Zone Controller hardware features:

Part	Description
Transducer Port	Male M8-4 pin (zones A and B)
Auxiliary IO Port	Male M8-4 pin (zones A and B)
Actuator cord	Female M8-3 pin 90 degrees connector - 27 inches length (zones A and B)
SWD Left Port	Male M12-5 pin A-Keyed
SWD Right Cord	Female M12-5 pin A-Keyed 71 inches length cord

Table 20: Dual Zone Controller connectors and cords

EZLogic® 4.0 dual zone controllers can operate in one of two topologies:

**Network system topology** is implemented if a PLC is required. There is a Network Interface Module (NIM) through which the PLC exchanges process data over a field bus like Ethernet/IP (ex. Hytrol PN: 032.681). It supports the entire catalog of SWD components available in the SWD-Assist Configuration utility. This enables additional IO to be added to the network where EZLogic® and IO share a single control network under PLC control. The SWD-Assist Configuration utility generates the required Planned Configuration for establishment of the SmartWire-DT® Data Transfer backbone by a SWD Coordinator.

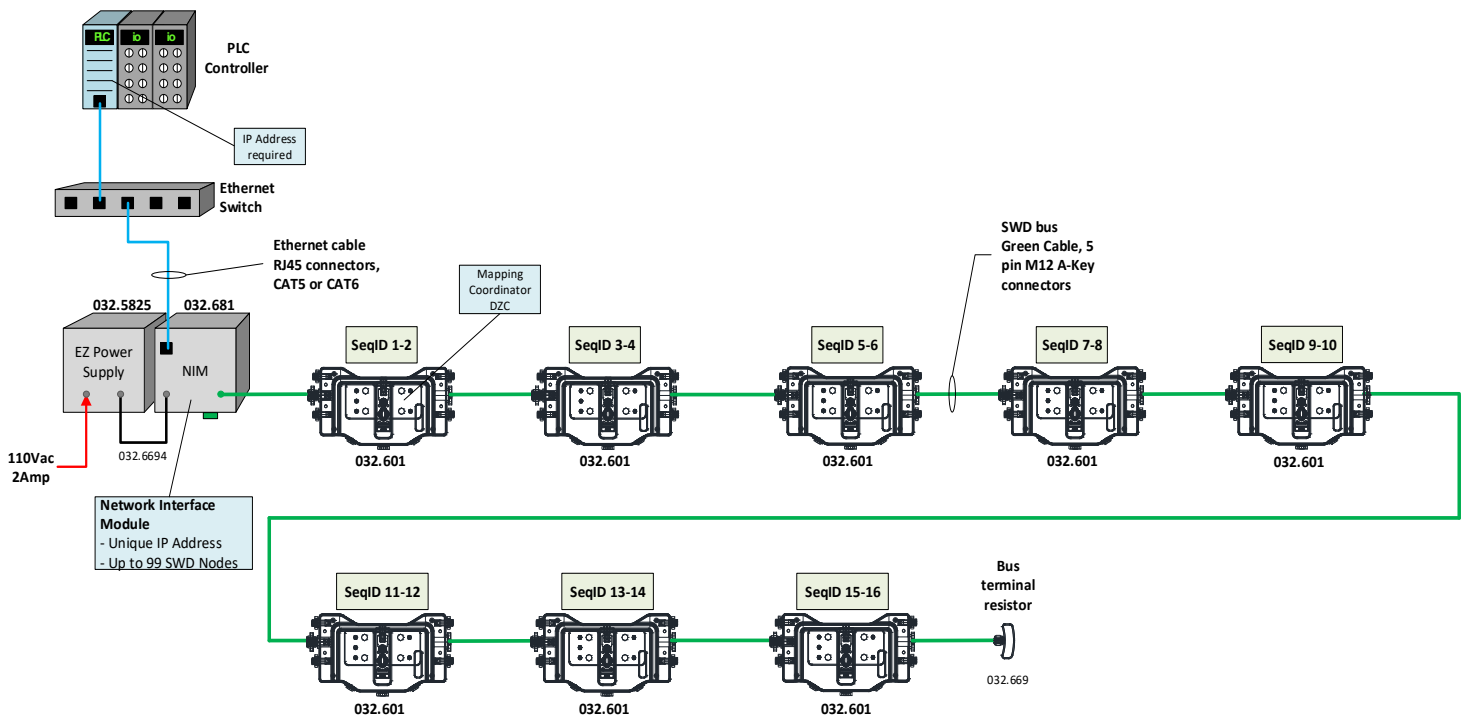
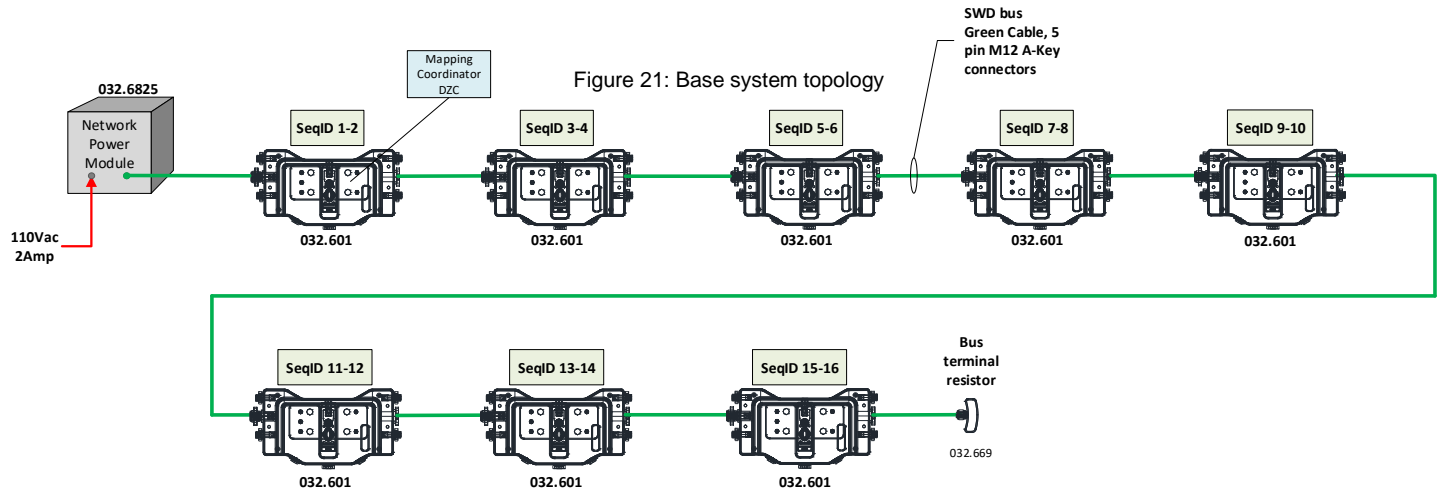


Figure 20: Network system topology

**Base topology** is implemented if a PLC is not required to be connected to the DZCs. “A system employing Base topology consists of Dual Zone Controllers and Network Power Module. A Network Power Module is an EZLogic 4.0 power supply with an embedded Standalone Coordinator. This enables data exchange between DZCs executing EZLogic 4.0 accumulation control.”\* This module auto-generates a Planned Configuration for establishment of the SmartWire-DT® Data Transfer backbone upon which the zero-pressure accumulation control algorithm operates. Set up and configuration of EZLogic® 4.0 is performed using the EZLogic® OS configuration tool.

**Note \*:** EZLogic 4.0 Specification-Project 3 Annex Section 4.1



**Digital ON/OFF control** actuator type supports control for common actuation circuits. The overload thresholds and drive signaling are selectable based on the type of actuation circuit connected. Refer to section *SWD Parameters/Zone Actuation Type* of this document for additional information.

### Remote Transducer (Sensor)

The transducer is the product-sensing portion of the dual zone controller/transducer assembly. Commonly called the sensor, current remote transducers available for the EZLogic® 4.0 accumulation system are photoelectric devices. The remote transducers are designed to mount separately from the dual zone controller. They plug to a dual zone controller input or sensor port, standard transducer extension cords are 24 inches long. By using extension cables (refer section *Remote transducer/Auxiliary Extension Cables* of this user manual), a remote transducer may be mounted several inches away from the dual zone controller if necessary.

There are two sensing types currently available:

**Polarized reflex**, or “retro-reflective” type transducers (*Hytrol PN: 032.611*) are used in conjunction with a reflector to detect product. Cartons passing between the transducer and the reflector interrupt a beam of light. This interruption indicates to the EZLogic® 4.0 dual zone controller that a carton is present.

**Adjustable diffuse** transducers (*Hytrol PN: 032.612*) detect cartons by bouncing an infrared light beam off the carton and back to the transducer. These transducers may be used when a reflector interferes with some other operation, such as loading or unloading. The sensitivity of adjustable diffuse transducers may be adjusted to best detect cartons without detecting objects away from the conveyor. This setting can be cloned along the conveyor to ensure all transducers are set up the same without requiring manual adjustment of each individual transducer.

A special type of remote transducer incorporates a tee connection to allow for **dual transducer** operation. These transducers (*Hytrol PN: 032.614 or 032.615*) may be used to reliably sense oddly shaped or sized objects, or as “problem solvers” in other applications, such as reversing.

All transducers are mounted in brackets that provide alignment adjustment in both vertical and horizontal directions, making precise sensor alignment and special angled mountings possible.



Figure 22: Polarized Reflex Transducer PN: 032.611

### Controller Mounting Tee

The controller mounting tee is a molded feature on part attached to the back of the DZC that provides the means to attach the DZC to conveyor frame. It mounts to the conveyor through a T-slot in the conveyor frame. No tools required. This allows for easy, fast, and flexible assembly and/or replacement of components.



Figure 23: Controller mounting tee

## EZLogic® 4.0 Power Supply (100W)

Limited voltage/ limited current 100 watts 27VDC power supply, which means, if the output load is equal or greater than 100W, the power supply will cut off power to the load. If load exceeds 100W, the power supply will continually monitor the load, until it's below the limit and automatically resume operation. EZLogic available power supplies have been enclosed inside an extruded aluminum housing (*Hytrol PN: 032.5825 Network systems and 032.6825 Base systems*). Indicator LEDs include AC input / DC output and SWD network indicator status (*just for Hytrol PN: 032.6825*).



Figure 24: Power Supply 032.5825

During layout design of the EZLogic® system at SWD Assist connected components power demand could require installing auxiliary power supplies along the system, in this case user should insert a SWD Power Feed Module (*Hytrol PN: 032.643*) over the SWD data/power bus. See next figure for details:

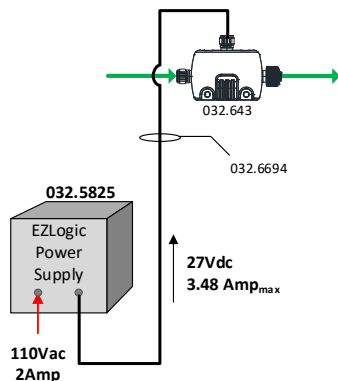


Figure 25: Auxiliary EZLogic power supply and SWD power feed module

**NOTE:** To attach the SWD Power Feed Module to the conveyor channel it could be required to order the following accessories:

- I/O Device Cable – double ended- 1ft (0.3m), black Hytrol PN: 032.6694
- Clip mount Hytrol PN: 032.6441
- IOTB mounting bracket Hytrol PN: PT-207362

## EZLogic® 4.0 Enclosed Network Interface Module (NIM)

The function of the Network Interface Module (NIM) is to establish the SmartWire-DT Data Transfer frame enabling an exchange of data among the connected SWD stations. The default Configuration Profile for each detected SWD station is used to define the size of the frame in the Planned Configuration. The actual configuration collected during the power on sequence is used to create both the Target and Planned Configurations.

The Network Interface Module (NIM) with M12 connections for power in, data / power out, field bus and diagnostic port of gateway comes in an extruded aluminum housing. The NIM is an SWD coordinator plus Ethernet I/P (*Hytrol PN: 032.681*) field bus interface for Networked EZLogic® 4.0 Systems. The M12 male bulkhead connection accepts DC voltage to power the NIM from EZLogic® 4.0 power supply (*Hytrol PN: 032.5825*), the bulkhead M12 female connector feeds power and SWD data to the connected SWD stations.



Connectors include:

- M12-4Pin– 24VDC Input (male bulkhead, Hytrol recommends cable *Hytrol PN: 032.6694*)
- M12-5Pin – Female – SWD Power / Data (female bulkhead)
- RJ45 - Female – NIM DIAG / SWD Configuration (Capped, used cable *Hytrol PN: 032.642* for configuration and diagnostics)
- RJ45 – Female - E/IP Field bus (Capped)



Figure 26: Connection and power ports  
032.681

## Auxiliary Components

Auxiliary components provide a way for EZLogic® 4.0 to be interfaced with various external control devices, such as switches, relays, PLCs, etc., to receive control inputs and provide control outputs. The following is a list of available auxiliary components:

- Auxiliary I/O Module (Hytrol PN: 032.632)
- Auxiliary Photo-eyes (Hytrol PN: 032.691, 032.692, 032.614, 032.615)
- Auxiliary Fork Truck Sensor (Hytrol PN: 032.694)
- NBEZ Wiring Interface Module- Dual Actuator (Hytrol PN: 032.5317)

*NOTE: Except for the NBEZ Dual Actuator Wiring Adapter, all auxiliary components plug into any EZLogic® 4.0 dual zone controller through the controller's auxiliary port.*

### Auxiliary I/O Module

The auxiliary I/O module (Hytrol PN: 032.632) is used to provide additional inputs and outputs to/from an EZLogic® 4.0 dual zone controller. The module has two ends, one end on the auxiliary IO module has a micro M8 connector 4 pins that plugs to the auxiliary port of the “A” side or “B” side of the zone controller. The other end is a six- wire “pigtail” or with Male M12 connector (Hytrol PN: 032.6321). These wires may be connected to external control devices to achieve the various IO options.



Figure 27: Auxiliary IO Module Hytrol PN: 032.632

The auxiliary I/O module can accept two types of input signals:

**Standard (dry contact) type input** is any “dry contact” type signal source, such as a toggle switch or relay contact, which may be used to provide this non-isolated input signal. No power source is required to operate this input. For more information refer section *Connecting to External Controls* of this manual.

**Isolated (voltage) type input** will accept a DC voltage signal as an input to the zone controller. Many PLCs send voltage signals to devices they control (PNP/Sourcing output). By using the isolated (voltage) type input option the auxiliary IO module provides, extra relays or expensive “relay type” PLC output cards can be avoided. This input operates with an 15-24 VDC signal for On-State (3.5 mA minimum) and 0-5VDC for OFF State (1mA maximum). For more information refer section *Connecting to External Controls* of this manual.

Both types of input signals accepted by the auxiliary IO module are interpreted by default as “Zone Stop Signal” on the side that they are connected to.

The zone controller may be configured to interpret these inputs as one of the following Zone Control Signals, refer sections *DZC Settings/Zone Control Signals* and *SWD Parameters/Zone Stop Signal* for configuration:

- Slug Control Signal
- Zone Stop Signal (*default*)
- Zone Kill Signal
- Directional Signal
- Transducer Channel B
- Logical Block Signal (“Special Function” Inputs)
- Wake Up Signal

NOTE: User has the option to monitor the status of any of these physical inputs through the PLC communications (Profile 2) link. Refer PLC tag input \_AUX\_IN.

**Solid State Relay type output**, the auxiliary I/O module can provide a solid-state relay output (Normally Open contact) from a dual zone controller to an external device. Up to 27 VDC, 80mA current can be passed through this contact output to signal a PLC or other device. By default, the EZLogic® 4.0 dual zone controller output configuration is disabled, but it may be configured to provide several signals through the module. Refer table 10 at *DZC Settings/Produced Signal Sources (PSS)* section of this document.

### Auxiliary Photo-eyes

Auxiliary photo-eyes are specially configured sensors that connect to the auxiliary port of an EZLogic® 4.0 dual zone controller. These transducers are powered from the auxiliary port and provide an input to the DZC when they detect an object. The zone controller may be configured to interpret this input as any of the input signals listed for the auxiliary IO module, such as the “zone wake-up” signal. Hytrol PN: 032.691 zone wake up eye-polarized reflex and Hytrol PN: 032.692 zone wake up eye-diffuse

Auxiliary photo-eyes are used to “wake up” the infeed zone of pallet conveyors and may be used in other applications. Polarized retro-reflective and diffuse sensing versions are available.

Hytrol PN: 032.614 Transducer – Dual Polarized Reflex

Hytrol PN: 032.615 Transducer – Dual Standard Diffuse

### Auxiliary Fork-Truck Sensor

Auxiliary fork truck sensors (Hytrol PN: 032.694) are long-range diffuse sensors that connect to the auxiliary port of an EZLogic® 4.0 dual zone controller. These transducers are powered from the auxiliary port and provide an input to the DZC when they detect a fork truck. The sensing range is preset to 80 inches. The DZC may be configured to interpret this input as any of the input signals listed for the auxiliary IO module, such as the “zone stop” signal or Special Logic Function input for the Zone Kill function.

### NBEZ Wiring Interface Module- Dual Actuator

The NBEZ wiring interface module – dual actuator-adapter (Hytrol PN: 032.5317) is a tee cable used for connectivity of two or more drive and/or brake modules on the NBEZ model. The adapter connects to the actuator output cord of the EZLogic® 4.0 dual zone controller to give the required signal command to the drive and/or brake modules.



Figure 28: Dual actuator tee cable. Hytrol PN: 032.5317

# Configuration/Diagnostic Components

## USB Programming Cable – EZLogic® 4.0

The USB Programming cable for EZLogic® 4.0 configuration software provides access to the full feature set of the EZLogic® 4.0 dual zone controller. The cable connects to the auxiliary port of Zone A on the dual zone controller and provides an interface to a Windows PC through an available USB port. (Hytrol PN: 032.637)

## Bluetooth Module – EZLogic 4.0

The Bluetooth module - EZLogic 4.0 (Hytrol PN: 032.638) provides a wireless connection point for a mobile Bluetooth enabled device running the mobile version of EZLogic® OS. The module plugs onto the auxiliary IO port of Zone A on the dual zone controller.

## SWD USB Cable to PC Interface

The SWD USB Cable PC Interface (Hytrol PN: 032.642) provides access to configuration of the Network Interface Module – NIM through the RJ45 - DIAG port of the NIM (ex. Hytrol PN: 032.681) and to an available USB port on a Windows PC with SWD Assist.

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## Cable Components

### Remote transducer/Auxiliary Extension Cables

These cables come in various lengths and are terminated with male and female 8mm, 4-pin “nano” style push-on connectors. They may be used when connecting to remote-type transducers. They also may be used with auxiliary components that connect to the auxiliary port of a zone controller.

Micro connector M8-4Pin extension cables (double-ended) can be used on EZLogic® 4.0:

Hytrol Part Number	Description
032.565	4-Pin Nano extension cable – 15.7” LG
032.567	4-Pin Nano extension cable – 39.3” LG
032.568	4-Pin Nano extension cable – 78.7” LG

Table 21: Dual Zone Controller connectors and cords

Micro connector M8-3Pin actuator extension cables can be used on EZLogic® 4.0:

Hytrol Part Number	Description
032.013	EZ-Logic Solenoid Extension cable – 2 meters LG, double ended
032.0131	EZ-Logic Solenoid Extension cable – 2 meters LG, double ended
032.0133	EZ-Logic Solenoid Extension cable – 2 meters LG, 1-90D / 1-Strt
032.0134	EZ-Logic Sol Ext Cable work w/2 E24 MTR

Table 22: Dual Zone Controller connectors and cords

### SWD Zone Extension Cables

These cables come in various lengths and are terminated with male and female M12-5Pin A-Keyed style connectors. The color of the cable between connectors is green.

Description	Hytrol PN	Manufacturer PN
SMARTWIRE-DT BUS CABLE - RAW, PER FOOT (800ft-spool)	032.659	SWD4-XXXLR5
EXTENSION CABLE - 10CM,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.6591	SWD4-M1LR5-2S
EXTENSION CABLE - 30CM,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.6592	SWD4-M3LR5-2S
EXTENSION CABLE - 60CM,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.6593	SWD4-M6LR5-2S
EXTENSION CABLE - 1M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.660	SWD4-1LR5-2S
EXTENSION CABLE - 1.5M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.6605	SWD4-1M5LR5-2S
EXTENSION CABLE - 3M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.661	SWD4-3LR5-2S
EXTENSION CABLE - 2M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.662	SWD4-2LR5-2S
EXTENSION CABLE - 4M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.664	SWD4-4LR5-2S
EXTENSION CABLE - 5M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.665	SWD4-5LR5-2S
EXTENSION CABLE - 10M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.667	SWD4-10LR5-2S
EXTENSION CABLE - 20M,5 PIN M12 M-F ROUND SMARTWIRE, GREEN IN COLOR	032.668	SWD4-20LR5-2S
FIELDWIREABLE - FEMALE M12 CONNECTOR	032.6691	SWD4-SF5-67
FIELDWIREABLE - MALE M12 CONNECTOR	032.6692	SWD4-SM5-67
I/O DEVICE CABLE - DOUBLE ENDED,1 FT (0.3M), BLACK	032.6694	SWD4-M3LR5-1-2S

Table 23: SWD extension cables

## SWD IO Block Devices

In between EZLogic® 4.0 dual zone controllers, advanced users can insert different SWD IO Blocks to collect and control field devices of a PLC control network.

Description	Hytrol PN	Manufacturer PN
SWD BLOCK MODULE - 8 I/O,4 M12 I/O SOCKETS	032.64108	EU8E-SWD-8DD
SWD BLOCK MODULE - 16 I/O,8 M12 I/O SOCKETS	032.64116	EU8E-SWD-16DD
SWD POWER FEED MODULE	032.643	EU1S-SWD-PF1-2
SWD T-CONNECTOR - 2 I/O,1 M12 I/O SOCKETS	032.64102	EU1E-SWD-2DD
SWD T-CONNECTOR - 4 I/O,2 M12 I/O SOCKETS	032.64104	EU2E-SWD-4DD
SWD T-CONNECTOR - 2 INPUTS,1-M12 SOCKETS	032.64011	EU1E-SWD-2DX
SWD T-CONNECTOR - 2 INPUTS, 2-M12 SOCKETS	032.64012	EU2E-SWD-2DX
SWD T-CONNECTOR - 4 INPUTS, 2-M12 SOCKETS	032.64013	EU2E-SWD-4DX
SWD BLOCK MODULE - 8 INPUTS,4-M12 SOCKETS EXTERNAL PS (Check Description)	032.64021	EU6E-SWD-8DX
SWD BLOCK MODULE - 16 INPUTS, 8-M12 SOCKETS EXTERNAL PS (Check Description)	032.64022	EU8E-SWD-16DX
SWD T-CONNECTOR - 4 OUTPUTS, 4-M12 SOCKETS 500MA EXTERNAL 24V FEEDER UNIT	032.64031	EU6E-SWD-4XD-1
SWD T-CONNECTOR - 4 OUTPUTS,4-M12 SOCKET 2A EXTERNAL 24V FEEDER UNIT	032.64032	EU6E-SWD-4XD-2
SWD T-CONNECTOR - 8 OUTPUTS, 4-M12 SOCKETS 500MA EXTERNAL 24V FEEDER UNIT	032.64033	EU6E-SWD-8XD-1
SWD BLOCK MODULE - 8 OUTPUTS,8-M12 SOCKETS 500MA EXTERNAL 24V FEEDER UNIT	032.64041	EU8E-SWD-8XD-1
SWD BLOCK MODULE - 16 OUTPUTS,8-M12 SOCKETS 500MA, EXTERNAL 24V FEEDER UNIT	032.64042	EU8E-SWD-16XD-1
SWD T-CONNECTOR - 2 INPUTS / 2 OUTPUT ,4 M12 I/O SOCKETS 500MA, EXTERNAL 24V FEEDER UNIT	032.641021	EU6E-SWD-2D2D-1
SWD T-CONNECTOR - 2 INPUTS / 2 OUTPUT ,4 M12 I/O SOCKETS 2A, EXTERNAL 24V FEEDER UNIT	032.641022	EU6E-SWD-2D2D-2
SWD T-CONNECTOR - 4 I/O,2 M12 I/O SOCKETS	032.641041	EU2E-SWD-4DD-1
SWD T-CONNECTOR - 4 INPUTS / 4 OUTPUT ,4 M12 I/O SOCKETS 500MA, EXTERNAL 24V FEEDER UNIT	032.641042	EU6E-SWD-4D4D-1
SWD T-CONNECTOR - 4 INPUTS / 4 OUTPUT ,4 M12 I/O SOCKETS 2A, EXTERNAL 24V FEEDER UNIT	032.641043	EU6E-SWD-4D4D-2
SWD T-CONNECTOR - 4 INPUTS / 4 OUTPUT ,8 M12 I/O SOCKETS 500MA, EXTERNAL 24V FEEDER UNIT	032.641044	EU8E-SWD-4D4D-1
SWD T-CONNECTOR - 8 INPUTS / 8 OUTPUT ,8 M12 I/O SOCKETS 500MA, EXTERNAL 24V FEEDER UNIT	032.641045	EU8E-SWD-8D8D-1

Table 24: SWD IO Block Devices

# REMOVAL & INSTALLATION

Hytrol zero-pressure accumulation conveyors equipped with the EZLogic® 4.0 system are pre-assembled at the factory. The proper setup procedure varies from conveyor model to conveyor model. The information in this manual refers to typical installations and, while accurate, may not be complete. Please refer to the installation and maintenance manual for your specific conveyor model for information about the physical setup of your conveyor.

Plug-in connections and “snap-together” mounting

EZLogic® 4.0 dual zone controllers, and accessory components are all provided with sealed plug-in connectors for robustness and true “plug and play” convenience. In addition, DZCs and auxiliary components mount to the conveyor without tools, allowing for quick installation and component replacement.

## • Dual Zone Controller w/transducers

Normally, the EZLogic® 4.0 dual zone controller w/transducers are installed at the factory and require no further installation, other than plugging together SmartWire cables between sections. If zone controller installation or removal is necessary, such as for faulty component replacement, the following procedures should be used.

### Dual Zone Controller Removal/Installation

EZLogic® 4.0 dual zone controllers cannot be removed and installed without disturbing the cabling. The procedure for removal and installation of the EZLogic® 4.0 dual zone controller is as follows:



**ATTENTION:** Before you take off or insert any SmartWire-DT device component from/to an energized/operating line, shut the power down for the whole system, otherwise some components could suffer permanent damage. For more information review Annex B.

### Dual Zone Controller Removal

Follow the shut-down procedure described on document *H2-MN-NP-XXX.1.0\_EZLogic4.0\_SW\_D\_Configuration\_EN.pdf* ANNEX B section. Then:

1. Disconnect the zone output cable from the air valve or other zone actuation device by pulling straight on the right-angle connector of the zone output cable on both Zone A and Zone B. **NOTE:** do not twist this connection!
2. Disconnect the transducer cable from both Zone A and Zone B of the dual zone controller by pulling straight on the straight M8 connector. **NOTE:** do not twist this connection!
3. Disconnect the green SmartWire cable from the dual zone controller you are removing and from the upstream dual zone controller twisting the ¼-turn knurled connector.
4. Gently lift on the dual zone controller until tee mounting block reaches the top of the T-slot opening on the accumulation channel. Pull on the dual zone controller until it is free from the channel. **NOTE:** The SmartWire cabling may be secured to the channel using cable ties. Carefully remove the cable ties before completely removing the dual zone controller from the channel.

### Dual Zone Controller Installation

1. Align the tee mounting block on the back of the dual zone controller with the tee slot and rectangular hole in the accumulation channel.

2. Insert the dual zone controller into both openings until the controller is flush with the channel.
3. Push down on the dual zone controller until the controller is secured to the channel.
4. Connect the transducer cables to the appropriate port on Zone A and Zone B.
5. Connect the actuator cables from Zone A and Zone B to the appropriate actuating device corresponding to that zone.
6. Connect the SmartWire cable from the downstream dual zone controller (if applicable) to the threaded connector on the dual zone controller. Then connect the SmartWire cable to the upstream dual zone controller.
7. Secure cables as necessary using cable ties.
8. Reapply power to your system. Follow *First time power* procedure described on document H2-MN-NP-XXX.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf ANNEX B section.
9. Both SWD-Assist and EZLogic® OS will recognize that a new dual zone controller has been introduced to the existing configuration. Refer H2-MN-NP-XXX.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf section Replacing a DZC on a running SWD network



## • Connecting to External Controls

This section describes how to connect external control devices, such as switches to a zone controller using the auxiliary port of the zone controller. For information about connecting to external controls using the SmartWire control wiring system, refer to H2-MN-NP-002.1.0\_EZLogic4.0\_SWD\_Configuration\_EN.pdf.

### Connecting Inputs and Outputs Using the Dual Zone Controller Auxiliary I/O Ports

EZLogic 4.0 Dual Zone Controllers are equipped with one auxiliary IO port per side and this is an IO connectivity option for users to monitor input sensor status or command an actuator remotely without PLC.

The auxiliary IO port comes with one digital input (AUX\_IN) and one digital output (AUX\_CMD – Profile 2) per port that can be connected to external devices. See following diagrams indicating electrical connections and the M8-4pin pin-out configuration.

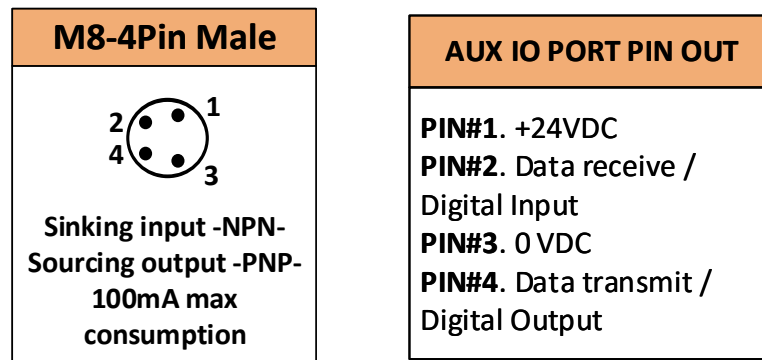


Figure 29: Auxiliary IO Port pin-out

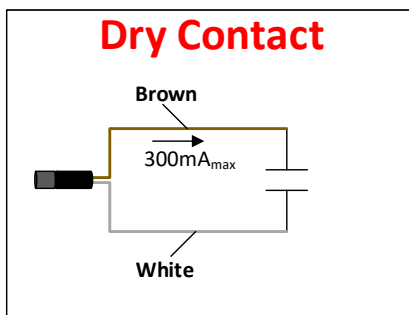


Figure 30: Dry contact connection

- **Dry Contact:** Brown (Pin#1) and White (Pin#2) used when the external signal is a “dry contact” type non-isolated input. A “dry contact” device can be a mechanical limit switch, a power supply health status, zone stop switch, a foot switch or a push button contact.

- **PNP Sensor:** Auxiliary IO port can supply power (up to 300mA) to an external sensor (PNP type sensor). An external sensor could be a photo-electric sensor, inductive proximity switch, etc.

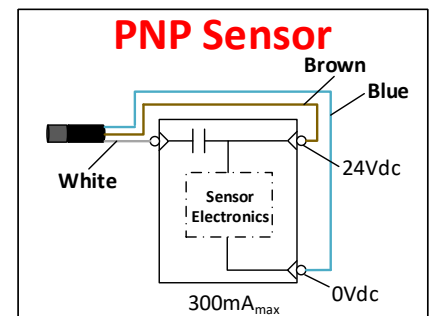


Figure 31: PNP Sensor

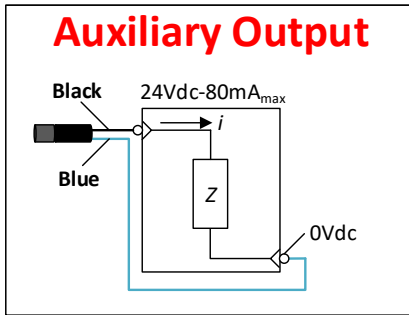


Figure 32: Auxiliary output port

- **Auxiliary Output:** The auxiliary IO port's output can supply power to an external actuator 24Vdc and a maximum of 80mA (1.92 watts max). Actuator device can be a low power solenoid valve, solid state relay, LED pilot light, etc.

**NOTE:** The default output of the zone controller through the auxiliary IO module is a “transducer” or “photo-eye” output status (Zone Beam), active (“contact closed”) when an object is detected by the zone controller’s transducer. The dual zone controller auxiliary IO port’s output may be configured to provide other types of output signals. Refer to the DZC Settings/Produced Signal Sources(PSS) section of this manual for more information about configuring the Auxiliary Port Output signal.

## Connecting Inputs and Outputs Using the Auxiliary I/O Module

To install the auxiliary IO module:

1. The auxiliary IO module has two cables, one is terminated by a connector and plugs into the auxiliary port of EZLogic® 4.0 dual zone controller, either Zone A or Zone B. Locate the dual zone controller where an input is required, Zone A or Zone B.
2. If necessary, configure the zone controller for the desired input and/or output using a PC and EZLogic® OS Configuration software.
3. Connect the required wire pair(s) to the external control device. Important! Make sure that the correct signal type is connected to the correct wire pair(s). See connection options:

The other is terminated with a six-wire “pigtail.” These wires are divided into three pairs. Each pair is used for a different type signal:

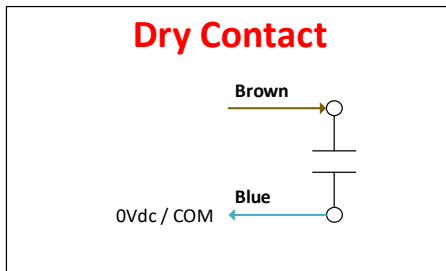


Figure 33: Dry contact input mod. 032.632

- **Brown and Blue**—Used when the external signal is a “dry contact” type non-isolated input.

- **White and Gray**—Used when the external signal is “voltage” type isolated input. This input is considered “active” by the zone controller when an 18-30 VDC signal is placed across these wires.

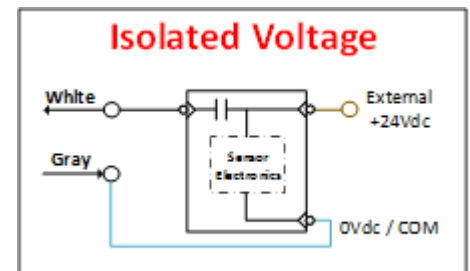


Figure 34: Isolated voltage input mod. 032.632

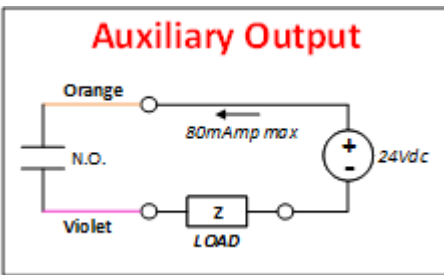


Figure 35: Output Solid State  
mod. 032.632

- Orange and Violet—Used to provide an isolated output to an external device. This output is a solid-state relay, or “dry contact” type, rated for up to 30 VDC, 80mA maximum.

By default, an active input to the auxiliary IO module on either the “brown and blue” pair or the “white and gray” pair is interpreted by the zone controller as a Zone Stop Signal. The zone controller may be configured to interpret this signal as another type of input, such as “slug mode.” Refer to the DZC Settings/ Zone Control Signals section of this manual for more information about configuring the auxiliary input signal.

4. Plug the other cable of the auxiliary IO module to auxiliary port of Zone A or Zone B of the dual zone controller.
5. Mount the auxiliary IO module to the conveyor accumulation channel (or other provided mounting), if desired, by snapping the module into the square hole in the channel.

**NOTE:** The default output of the zone controller through the auxiliary IO module is a “transducer” or “photo-eye” output status (Zone Beam), active (“contact closed”) when an object is detected by the zone controller’s transducer. The dual zone controller auxiliary IO port’s output may be configured to provide other types of output signals. Refer to the DZC Settings/Produced Signal Sources(PSS) section of this manual for more information about configuring the Auxiliary Port Output signal.

# INSTALLATION & SETUP

This section describes the basic installation and set-up of the components required for the Networked topology of EZLogic® 4.0. A PLC connects to individually addressed NIMs over an Ethernet IP field bus. The NIM facilitates communication services for up to 99 SWD stations (not DZCs) behind a single IP address of the E/IP Gateway.

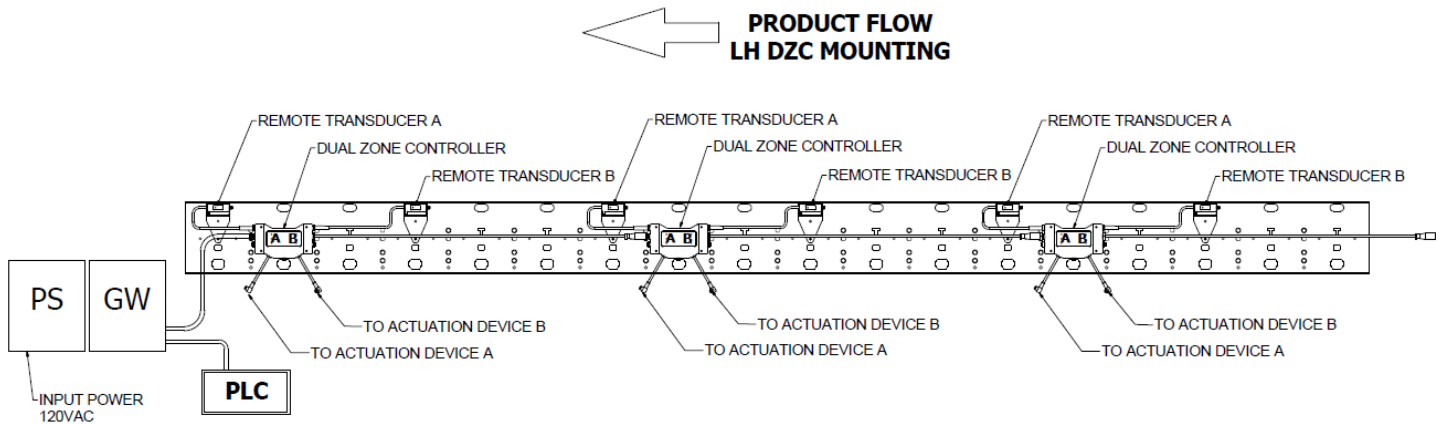


Figure 36: NIM module installed on the conveyor discharge side

When the controller mounting has been specified on the left-hand side of the conveyor when standing at the infeed end looking toward the discharge end, the Gateway will need to be located at the discharge end. Connection of the Gateway to the dual zone controller chain will always be at the Side A communication port of the dual zone controller. With controllers on left-hand side, the logic algorithm operates from Side B to Side A.

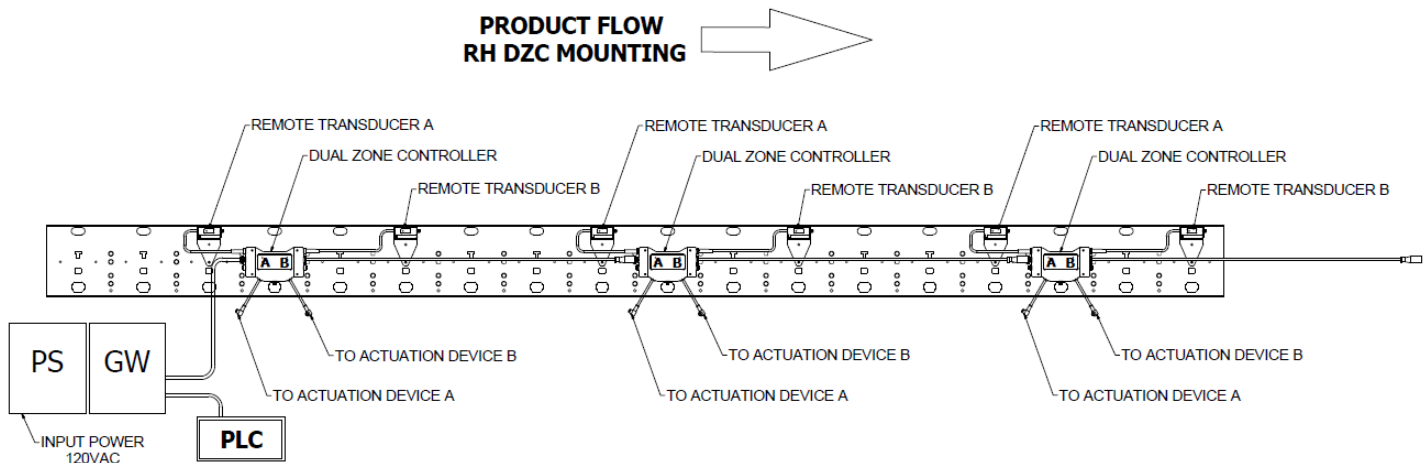


Figure 37: NIM module installed on the conveyor infeed side

Similarly, when the controller mounting has been specified on the right-hand side of the conveyor when standing at the infeed end looking toward the discharge end, the Gateway will need to be located at the infeed end. Connection of the Gateway to the dual zone controller chain will remain at the Side A communication port of the dual zone controller. With controllers on right-hand side, the logic algorithm operates from Side A to Side B.

# ANNEX

## CONFIGURING A DUAL ZONE CONTROLLER

### With EZLOGIC® OS CONFIGURATION SOFTWARE

#### Installing EZLogic® OS on a PC

The USB adapter cable (*Hytrol PN: 032.637*) used with the EZLogic® OS configuration software provides access to the full feature set of the EZLogic® 4.0 dual zone controller. The cable connects to the auxiliary port of Zone A of a dual zone controller and provides an interface to a Windows PC through an available USB port. The EZLogic® OS configuration software can also access the feature set wirelessly with the use of a Bluetooth module (*Hytrol PN: 032.638*) that connects to the auxiliary port of Zone A of an EZLogic® 4.0 dual zone controller.

The EZLogic® OS configuration software comes packaged with the USB programming cable. To install EZLogic® OS on your PC:

1. If the EZLogic® OS setup program does not automatically start, use Windows explorer to navigate to the thumb drive and double-click "*EZLogicOS4-4.1042.2.msi*".
2. The installation welcome screen will be displayed.
3. Follow the on-screen instructions.

The EZLogic® OS software comes packaged with the PC programming cable. To install EZLogic® OS on your PC:

1. Insert the EZLogic® OS thumb drive into an available USB port on your PC.
2. Launch the installation package from your downloaded location.
3. The installation welcome screen will be displayed with the Software License Agreement. Please agree and click "Install".

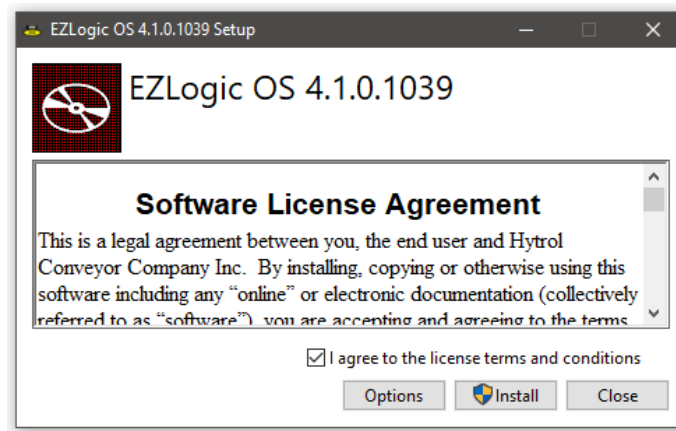


Figure 38: EZLogic® OS Installation Welcome Screen

4. After successfully installing the required software, installation complete screen will be shown. Close the setup window. This will create a shortcut on the desktop and programs menu.

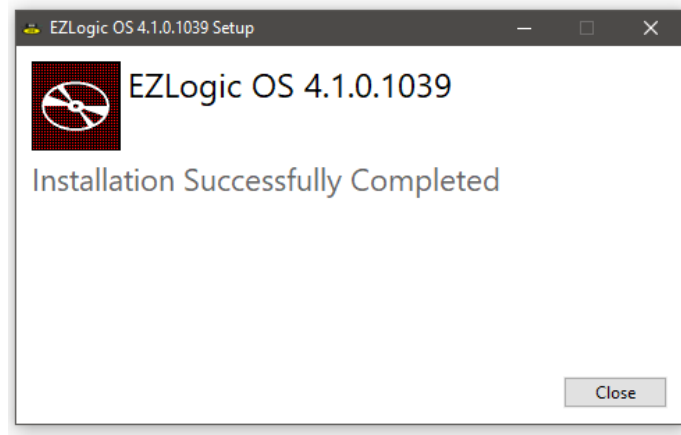


Figure 39: EZLogic® OS Installation Complete Screen

### **Connecting the PC to a Dual Zone Controller**

After installing the EZLogic® OS configuration software, connect the USB adapter cable to an available USB port on the PC. NOTE: The USB driver for the programming cable must be installed before plugging in the cable for the first time. Depending on your PC operative system select between CP210xVCPInstaller\_x64 or CP210xVCPInstaller\_x86

Connect the other end of the USB adapter cable to the auxiliary port of Zone A of the dual zone controller.

## Dual Zone Controller LED status

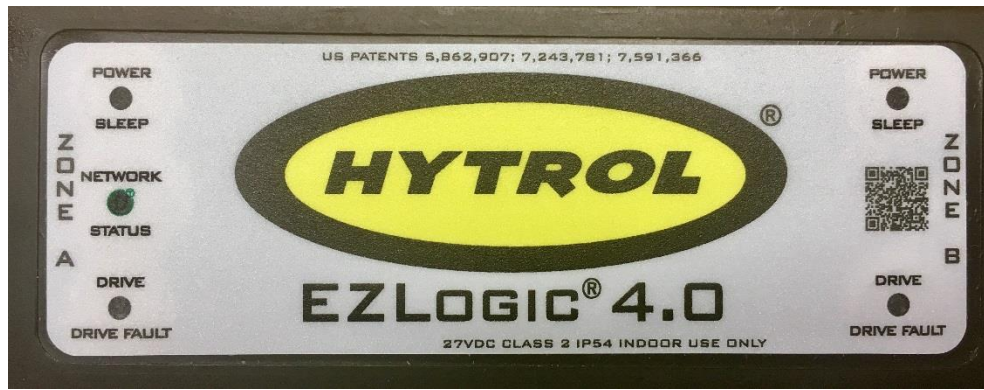


Figure 40: EZLogic® 4.0 Dual Zone Controller faceplate  
Power – Light Green  
Network – Green  
Drive - Red

POWER SLEEP	STATUS INDICATION
ON Steady	Normal supply voltage range
OFF Steady	No power to device
1 Flashes in 4 seconds	Sleep timer expired in current zone
2 Flashes in 4 seconds	Jam condition exist in current zone
4 Flashes in 4 seconds	Low supply voltage (less than 20Vdc)
NETWORK STATUS	STATUS INDICATION
ON Steady	Module connected with NIM
Slow Flash (0.5 sec 50% DC)	Module not connected with NIM
Moderate Flash (1.3 sec On, 0.3 sec Off)	SWD mapping coordinator identification
Fast Flash (0.2 sec 50% DC)	Module diagnostic fault condition
DRIVE FAULT	STATUS INDICATION
ON Steady (Red)	Zone drive active (zone running)
OFF Steady (Red)	Zone drive stopped (no fault)
1 Flash (Red/Amber) in 4 seconds	HW Fault (zone stopped)
2 Flash (Red/Amber) in 4 seconds	Input over voltage (zone stopped)
3 Flash (Red/Amber) in 4 seconds	Input under voltage (zone stopped)
4 Flash (Red/Amber) in 4 seconds	Wiring fault (zone stopped)
5 Flash (Red/Amber) in 4 seconds	Over temperature (zone stopped)
6 Flash (Red/Amber) in 4 seconds	Extreme over current (zone stopped) poly fuse
ON steady (Amber)	Over current (zone running, current limited)
Flicker (Amber/ Red)	Motor start under load (zone running)

Table 25: Dual Zone Controller LED Status



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**EFFECTIVE August 2021**