EZLogic® 4.0

CONFIGURATION MANUAL

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Getting Started

This guide is for commissioning EZLogic® 4.0 once the control structure has been installed on the conveyor.

Up to 99 SWD modules can be connected in one SWD line. This number does not include accessories, such as NIM / gateway, power feeder modules, cable adapters, and bus termination resistors. In this manual, the SWD NIM, which controls the communication in the line, is an EthernetIP/Modbus TCP module, but other protocol NIM can be used.

Below is a list of abbreviations used in this document:
SWD: SmartWire-DT®
DZC: Dual Zone Controller
ZPA: Zero Pressure Accumulation
PLC: Programmable Logic Controller
NIM: Network Interface Module / coordinator / gateway

Prerequisites

Before connecting to the SmartWire-DT® system, verify the following:

- ☐ A SmartWire-DT® Project Configuration has been created in SWD-Assist for the EZLogic® / SWD control structure from the HyCAD drawings used to manufacture the conveyor.
- ☐ The conveyor mechanicals have been assembled.
- ☐ The electrical services for the control system have been installed and are operational.
- ☐ Power supply and network interface boxes have been mounted on the conveyor.
- ☐ All necessary dual zone controllers, transducers, and SWD components are mounted on the conveyor (see below).

It is critical to visually inspect the control structure before configuring the system to ensure all components will be properly recognized by the software. To achieve this, do the following:

- ☐ Power OFF the system.
- ☐ Visually inspect proper cabling types are installed:
    - SWD data cables = GREEN (5 pin connectors)
    - Power cables = BLACK
    - Safety cables = YELLOW
    - Sensors = GRAY
- ☐ Visually inspect all M12 connections between SWD devices including DZCs, I/O Tees, Multi-Blocks, etc.
- ☐ Verify routing (SWD in /out) and that the connectors are fully seated, locked and properly tightened.
- ☐ Power turned ON.

When ready to connect to the system, gather the following:

- ☐ PC with SWD-Assist
- ☐ USB to RJ45 programming cable (Hytrol PN: 032.642) and required driver for the PC (easy USB driver V2.20)
- ☐ The SmartWire-DT® Project Configuration for the conveyor on the PC

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.

Introduction to SmartWire-DT® system

SmartWire-DT® is EATON's proprietary *fieldbus* network designed to control, monitor and power up several devices connected on a single cable. By definition, "*a fieldbus is a bi-directional digital communication network that enables the connection of multiple field instruments and processes…They carry out control functions and enable monitoring by means of supervision software.*" [1] For configuration purposes, SmartWire-DT® network has to be set up with the SWD-Assist software that will allow you to plan and configure your EZLogic® 4.0 control network.

Figure 1: SmartWire-DT® compatible devices contain an ASIC – *Application Specific Integrated Circuit* – chip which allows intelligent communication on the SmartWire-DT® network. *Courtesy of Eaton Corporation*

EZLogic® 4.0 digital dual zone controllers (Hytrol PN: 032.601) are SmartWire-DT® network devices and additionally they can interface through a NIM with some of the major industrial protocols such as: EthernetIP/Modbus-TCP (Hytrol PN: 032.681), Profibus-DP (Hytrol PN: 032.682), ProfiNET (Hytrol PN: 032.683), EtherCAT (Hytrol PN: 032.684), Powerlink (Hytrol PN: 032.685) and CANopen (Hytrol PN: 032.686).

SmartWire-DT® planning and configuration

Network components

A SmartWire-DT® network for EZLogic® 4.0, consist of the following components:

- Power Supply 110Vac/24Vdc (Hytrol PN: 032.5825)
- PLC controller (must for Hytrol PN: 032.601)
- A SmartWire-DT® NIM (Hytrol PN: 032.681-EthernetIP/Modbus TCP)
- SmartWire-DT® Digital Dual Zone Controllers Network model (Hytrol PN: 032.601)
- And/or SmartWire-DT IO field devices
- SmartWire-DT® cables with connectors, cable adapters, and power feeder modules
- A resistor bus terminator (Hytrol PN: 032.669)

SWD Network Interface Module

"*The communication in SmartWire-DT networks is controlled by what is referred to as a -Network Interface Module-. This module is responsible for the network's configuration, for the exchange of data during operation, and for handling errors.*

NIM' specific tasks include:

- *Checking the network configuration*
- *Detecting the SmartWire-DT modules on the network*
- *Assigning addresses to all the modules on the network*
- *Initializing the modules and configuring their parameters*

- *Controlling cyclical and acyclical data transfers between the NIM and the modules*
- *Providing diagnostic information concerning the SmartWire-DT modules and the network's statuses*

When they are part of a gateway, they transfer data from corresponding SmartWire-DT network to the higher-level PLC via the gateway's field bus interface"[2]

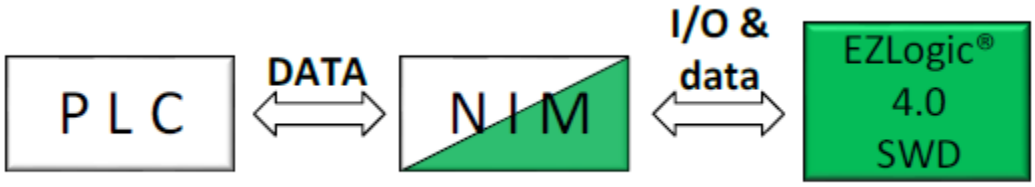


Figure 2: SWD logic data flow between SWD network devices.

Network topology

"*Up to 99 modules* [See Note] *can be connected to a single SmartWire-DT® network…However, the maximum number of modules that can be connected…may be lower depending on the coordinator being used and/or on the total data volume of all the SmartWire-DT modules on the network.*" [2] *Note: The maximum number of SWD devices supported by NIM is 99, but the maximum number of DZC (Hytrol PN: 032.601) Data Profile 2 per NIM is 83. For additional reference see section* New SWD network configuration 5c *and/or* Annex C.

SWD nodes follow up a point-to-point device topology (daisy chain) and the last connected component on the network should be a terminal resistor (Hytrol PN: 032.669). See figure 3.

An SWD network could be up to six hundred meters (600m/2,000ft) length.

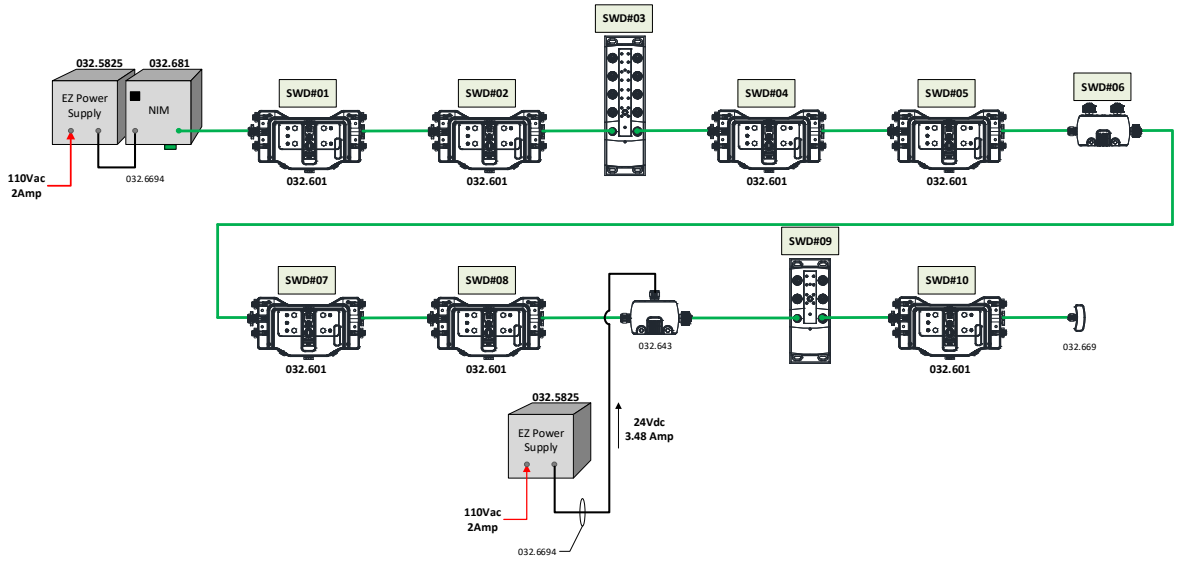


Figure 3: View of an EZLogic® 4.0 SmartWire-DT® network including IO field devices and auxiliary power supply.

IMPORTANT: NIM (Hytrol PN: 032.681) is an EthernetIP/Modbus TCP gateway and this is the only device on the EZLogic® 4.0 - EthernetIP network that requires an IP address.

Physical Media

The SWD network cable specified for EZLogic® 4.0 is a round green five (5) conductors cable with M12 connectors A-Keyed where: pins 1 and 3 carry 24Vdc/0Vdc with a maximum of 4 Amps and pins 2,4 and 5 carry 15Vdc for data and control communications. See table 1.

Pin#	Pin Color	Signal	Current Amps @ 24Vdc
1	Brown	+24 Vdc	4
2	White	Data A	1.6
3	Blue	0 Vdc - GND	4
4	Black	Data B	1.6
5	Gray	Select cable for automatic addressing of the SWD slaves	1.6

Table 1. SmartWire-DT® cable pinout

EZLogic® 4.0 system's design

Follow this procedure and general recommendations to create a new EZLogic® 4.0 accumulation system. EZLogic® 4.0 digital network zone controllers (Hytrol PN: 032.601) operate in conjunction with the NIM (Hytrol PN: 032.681) and a master PLC (EthernetIP) controller. For more information of how to create an EZLogic® 4.0 accumulation system, go to SWD-Assist software configuration section on this document.

Please look for additional technical support if you are not able to configure the PLC communications with SWD network.

1. Identify the mounting side of the zone controllers on the conveyor's channel per unit, it could be left or right when standing at infeed end looking toward discharge end (product flows from infeed to discharge). Figure 4, shows an example with conveyor sections back to back.

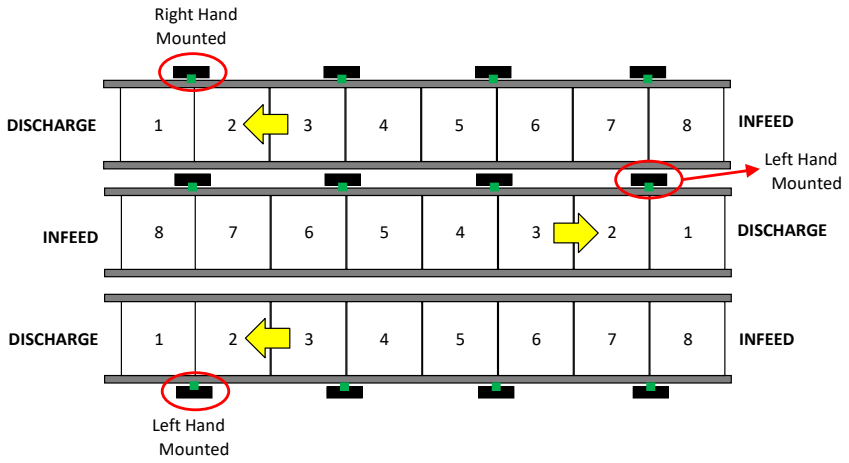


Figure 4: Black squares represent DZCs, Hytrol' standard to number conveyor zones starts at one (1) from the discharge zone.

2. Group zone controllers (DZCs) by physical location and trace SWD wire pathways in a way to minimize the total network length and accommodate the maximum number of SWD devices per NIM.

3. EZLogic® 4.0 zone controller is a "left hand" oriented device, it means that incoming SWD cable comes from left to right and the node addressing numbering increases going away from the NIM. See figure 5.

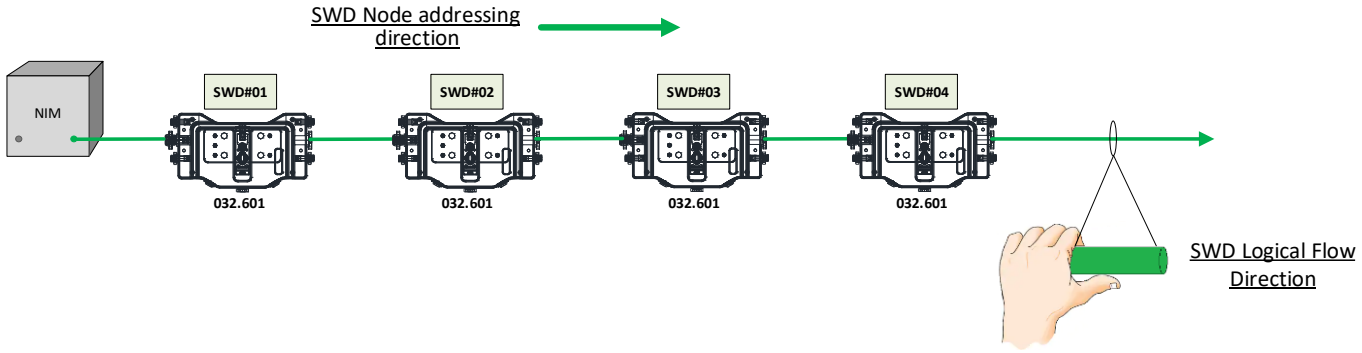


Figure 5: EZLogic® 4.0 digital DZC node addressing. The NIM automatically assigns node addresses for SWD devices. There is no need to assign a *SWD node address* for the NIM.

4. Define a physical location for the main power supply and the NIM, this location would determine the wire paths for the single SWD wire bus and node addressing direction for the SWD devices on the network.

5. Once the NIM's location has been specified for the system, daisy chain the zone controllers along the conveyor system, in some parts of the conveyor the direction of SWD addressing will run on the same direction the product flow, but for other conveyor sections it could be running against product flow. See figure 6.

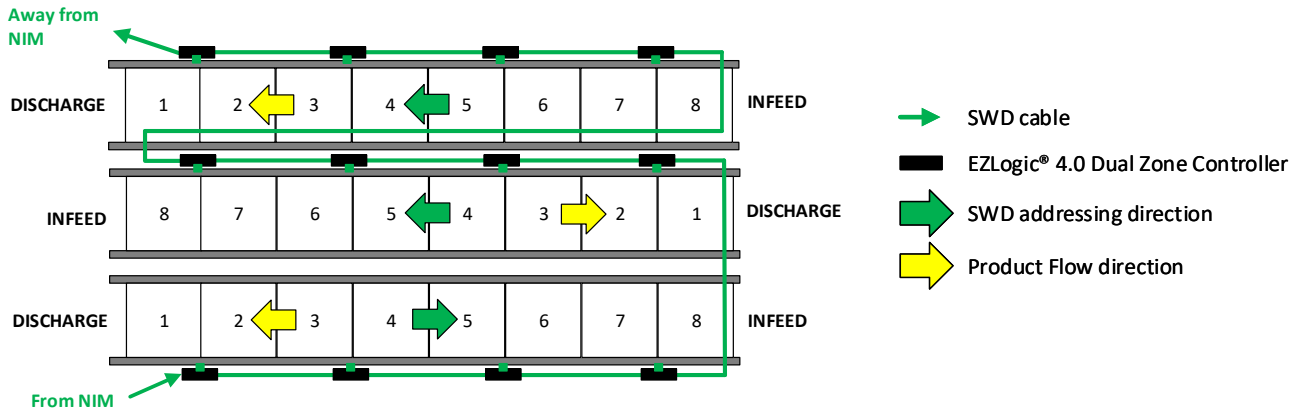


Figure 6: Shows up the wire way for the SWD wire bus.

6. For those cases where zone controllers are installed in the inside radius of the conveyor system, the field bus cable should connect the zone controllers on sequence. See Figure 7.

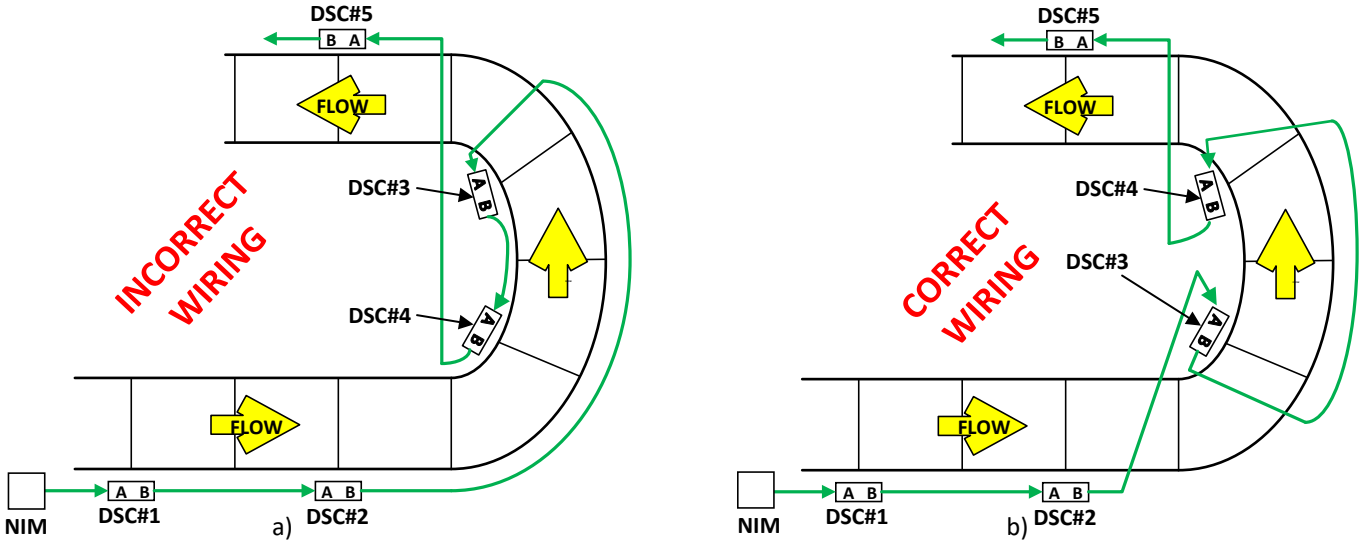


Figure 7: a) Shows a wrong way to daisy chain the zone controllers; b) Shows the right way to daisy chain the zone controllers.

7. The maximum number of SWD devices per SWD network is 99 (*This number is only valid for EthernetIP/Modbus TCP NIM Hytrol PN: 032.681*) or 1000 bytes (*500 input, 496 output bytes*) total data size for the configured NIM (up to *82* DZC -Profile #2, *8 bytes size*- can be configured per NIM, advanced SWD-Assist users can configure Profile #1 *-3 bytes size*- in some DZC to increase this number).

IMPORTANT: EZLogic® main power supply (Hytrol PN: 032.5825) and NIM (i.e. Hytrol PN: 032.681) boxes can be mounted at the infeed or at the discharge side of the conveyor system. Remind that you need a plan to run ethernet cable (CAT5 / CAT6 with RJ45) from the main ethernet switch (control's network) up to the NIM's box and power cables to the main and auxiliary power supplies (Hytrol PN: 032.5825) along the conveyor system.

8. Using fieldbus devices, along the SWD control network, could require from the system's designer to calculate current consumptions per IO Block in order to allocate additional EZLogic® power supplies. For more information about how and where to install auxiliary EZLogic® power supplies plus accessories (Hytrol PN: 032.643 + 032.6441 + 032.6694) refer to SWD-Assist software configuration section of this document.

IMPORTANT: Group all the system power supplies under a common single circuit breaker or main contactor in order to shut down the whole system simultaneously during maintenance / reconfiguration activities.

SWD-Assist software configuration

SWD-Assist is a free software available for downloading from EATON's website at:
http://applications.eaton.eu/sdlc?LX=11&f1=1457&f2=1181&f3=1188

SWD Assist software is used to plan the network layout and to ensure that all the requirements to create a new system should be fulfilled. SWD Assist has an auto-complete wizard function to ensure that all required components and power demand are properly configured and estimated for the system that is intended to be designed or modified.

New SWD network configuration

Once that you have defined a location to install the main power supply and the NIM (refer previous section EZLogic4.0 system's design), you should create an offline SWD Assist file for your conveyor system, then you can download this configuration into the SWD NIM to make your system functional. Follow the next steps to create a new SWD Assist file:

1. After you have installed SWD Assist at your computer, verify that the software's project region and standards have been set in accordance with your preferences. This is, go to the Options/Project Settings menu and open it. See figure 8.

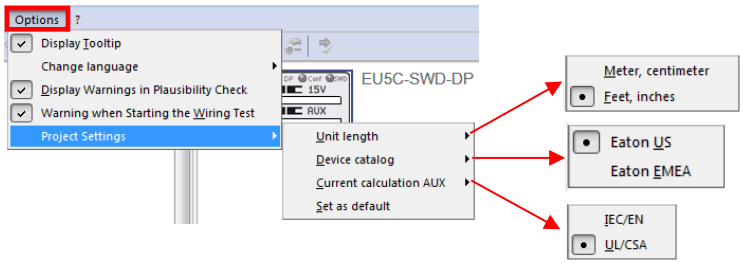


Figure 8: User will setup preferences in accordance with its region and local regulations.

2. Create a new SWD Assist file; then on the project's tree look for the *HYTROL/EZLogic® Network accessories*' folder, select, drag and drop part number *032.681 + accessories*, over the EU5C-SWD-DP box at the component' screen side on the right. See figure 9.

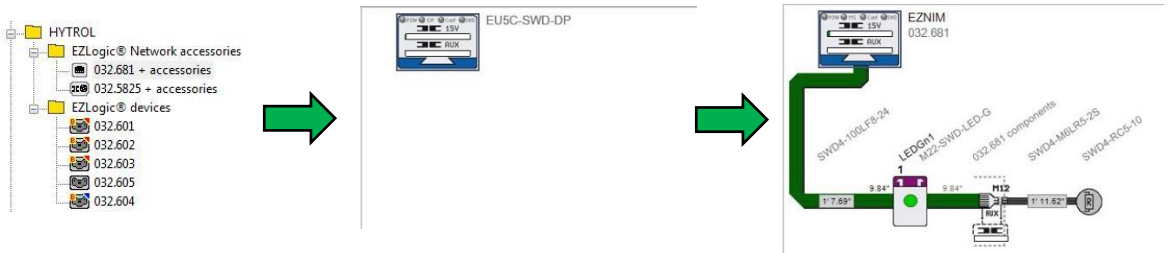


Figure 9: Drag and drop 032.681 over EU5C-SWD-DP BOX to replace it.

IMPORTANT: Hytrol PN: 032.681 includes:

(1) One EU5C-SWD-EIP-MODTCP	(1) One M22-SWD-LED-G
(2) One SWD4-100LF8-24	(1) One SWD4-M6LR5-2S

3. Configure the SWD NIM as follows:
   a) **Device information:** Set up the device name (*default EZNIM*), this will be the *first* prefix used for your AB-PLC tag list.

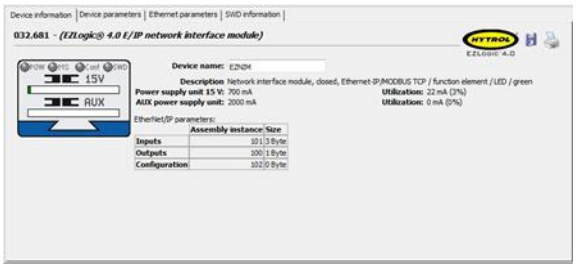


Figure 10: Select a proper device name to match on the PLC's configuration.

   b) **Device parameters:** Set up the AUX voltage field from 24V to 27V and *check box* Replacement during operation permissible (*leave SWD Baud rate at 250kBaud)*

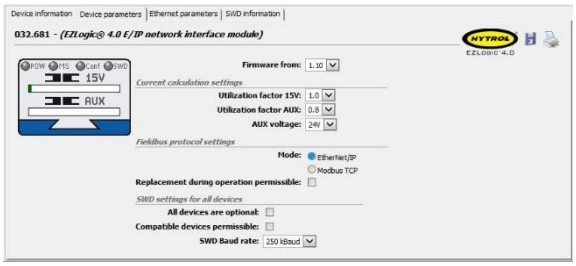


Figure 11: Device parameters tab for SWD coordinator.

   c) **Ethernet parameters:** Set up IP Address, Subnet mask and Standard gateway addresses for the NIM.

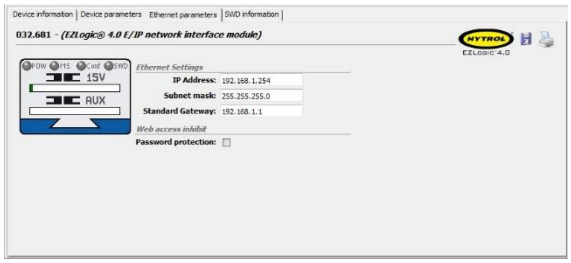


Figure 12: For Hytrol PN# 032.681 would be necessary to configure a unique IP address for the whole EZLogic4.0 system.

4. Add the SWD devices to your system configuration following the same arrangement of how they are connected to the network starting with the first device after the SWD NIM.
5. If the first SWD device is an EZLogic4.0 module (i.e. 032.601) configure this as follows:
   a) Select, drag and drop at the desired position the EZLogic4.0 module from the *HYTROL/EZLogic® devices* folder on the configuration view at the right side of the screen.
   b) **Device information tab:** Set up the *Device name* (*default DZCnx*), this will be the *second* prefix used for your AB-PLC tag list.
   c) **Device parameters tab:** Select the data *Profile* that you prefer, Profile 1 Standard ZPA (*limited number of monitoring signals – 3 input bytes size*) or Profile 2 with PLC Control (*default - full PLC monitoring and control signals – 6 input bytes plus 2 output bytes size*)
   d) **Zone A parameters & Zone B parameters tabs:** At these tabs user can make basic configuration of the EZLogic4.0 zone controller. Table of available parameters per controller side for configuration are:

Zone parameters *	Options and ranges	Description
Number of Channel B Transducers	Range 0 (default) – 4	When the *dual-sensor* (*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. *Note: The number of transducers is used to calculate the system's power consumption*.
Number of NBEZ Coils	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. *Note: The number of NBEZ coils is used to calculate the system's power consumption*.
Auxiliary Port Current Consumption [mA]	Valid range 0-100mA;	Set this value if the auxiliary IO port will be used for monitoring or control of an external device. *Note: The set value would be used to get the current consumption of the SWD system.*
Operation	*ACE Disabled* / *ACE Enabled* (*default*) / *Logic only*.	Set the mode of operation of an individual Accumulation Control Engine (ACE).
Location	*Standard Zone (default)* / *Infeed Zone* / *Discharge Zone*	Used to define a 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.
Default Product *FLow*	*Normal (default)* / *Inverted*	If product flows in the same direction that SWD node addressing flows, use the *Normal* set up. If product flows in the opposite direction that SWD node addressing flows, use the *Inverted* set up
Logical *Orientation*	*Normal A/B (default)* / *Swapped B/A*	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
Control Mode	*ZPA Only* / *PLC Only* / PLC Override.	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.*
Conveyor Drive Type	ABEZ, E24, CREZD, NBEZ	Actuation circuits for Digital Control Dual Zone Controllers (*Hytrol PN: 032.601*). ABEZ – for ¾ watt solenoid valve; E24 – for non-integral BLDC commutated actuators; CREZD – for 8 watt coil actuators; NBEZ – for high current electromagnetic coil actuators (9.25 - 9.71 watt).
Zone Stop Signal	Disabled, Aux Input HW, … *(16 options)* etc...	A control input signal to a specific zone that when actuated, causes product flow to accumulate in that 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.
PSS Channel 0	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 signals in its cyclic data space
PSS Channel 1	Disabled, … *(13 options)*	
** User can option to configure these parameters from SWD Assist or from EZLogic® OS*		

Table 2: DZC available parameters from SWD Assist.

Going on-line and uploading from an operational SWD network

Follow these steps to connect to the system through the SWD NIM and retrieve an already existing configuration.

1. Use the RJ45 (Hytrol PN: 032.642) cable to connect the USB port of the computer to the NIM.
2. Open a new instance of SWD Assist.
3. Click on the Communications View menu's option

   There are two ways to access through Communications View: on the tool bar and under the View tab. See figure 13.

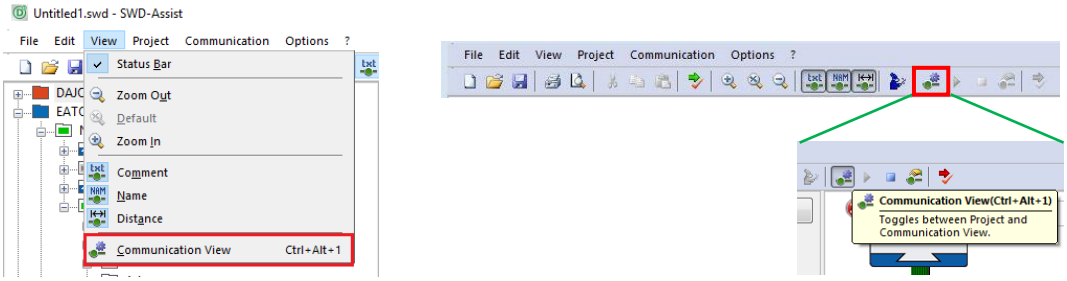


Figure 13: Communication view access short cuts on SWD

4. Under Communication View screen, go to Interface option and select the COM port assigned for the USB programming cable (Hytrol PN: 032.642).

   If there is not any COM port configured on the Interface option, make sure the driver for the USB port has been installed properly. If the driver has been correctly installed and the cable is properly attached to your computer, the COM port will appear on the computer's list of connected devices.

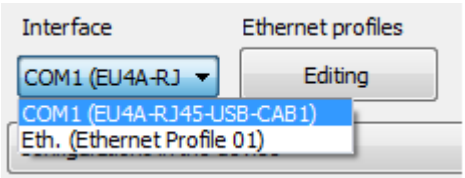


Figure 14: Interface com port for cable Hytrol PN: 032.642.

5. Click the *Online* button to go online with the system.

Figure 15: Online command button.

After an online connection has been established, select the SWD NIM object on the left top corner (032.681) of the network view section, look under the *Device Information* tab to see the NIM feedback status. See figure 16 and for the feedback modes messages see attached table on Annex A section.

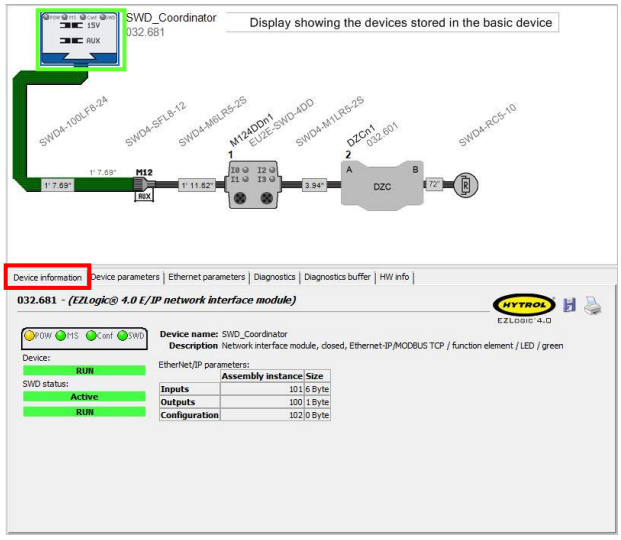


Figure 16: SWD Coordinator view screen

6. In the Target configuration box of the *Communication View*, click Device => PC to *upload* the configuration to the SWD Assist project from NIM.

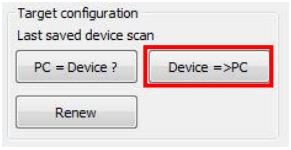


Figure 17: Target configuration section view.

7. Exit *Communication View* make click on this icon  or press *Ctrl + Alt + 1* on the keyboard. Exiting *Communication View* toggles back to *Project View*, which allows modifications to be made to the offline configuration.

> **ATTENTION:** If step 6 was not completed, no configuration will be present after exiting *Communication View*.

8. Click on the Auto Complete Wizard icon  then SWD-Assist will auto populate the project's configuration with the required accessories (and cables). A *report output* window will pop up after the auto complete procedure has been finished.

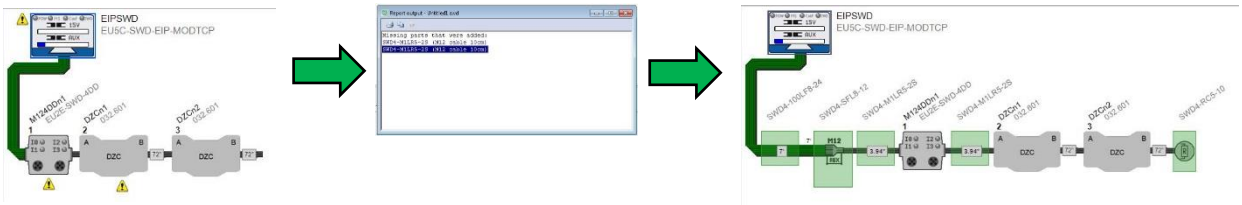


Figure 18: a) System before Auto Complete execution; b) Report Output window; c) Complete system after Auto Complete is done, on this image it is possible to see added components to the system highlighted on green.

9. Switch back to Communications View by using the icon or pressing *Ctrl + Alt + 1*.
10. Click *Online* to connect to the system.
11. In the *Planned configuration Loaded project* section, click on the PC => Device button to *download* the modified project configuration to the NIM device.

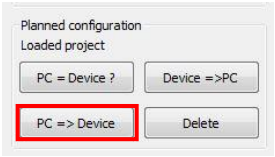


Figure 19: Planned configuration section view.

> **ATTENTION:** There must not be any active data communication between the control system (PLC) and the SmartWire-DT® modules when the configuration is being updated. If necessary, disconnect the field bus connection between the NIM and the controller (PLC)

12. Once the new configuration has been *downloaded* into the NIM, click on the *Status display on* icon to go into Wiring test mode.

Wiring test mode.

13. To activate Wiring test mode click on the icon on the tool's bar, read the warning message window, then click *OK* to proceed.

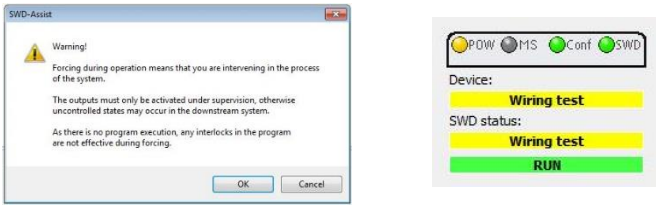


Figure 20: Planned configuration section view.

After Wiring test mode has been activated, you should be able to test the conveyor system for operation. *Note: All actuators such as solenoid valves, E24 motors or NBEZ modules and photo eye transducers should be mounted and connected in order to test the conveyor system under Wiring test mode.*

Download a new SWD configuration into the NIM

If the NIM has been previously loaded with a SWD network configuration, but the user requires to load a different configuration follow the next steps:

1. Go online with the SWD network (steps 1 to 5 of the *Going on-line and uploading from an operational SWD network* procedure)
2. Under Communication view screen click the Delete button to flush out the existing configuration stored on the NIM device.

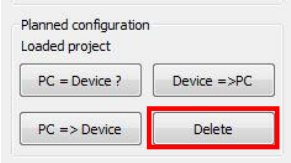


Figure 21: Planned configuration.

3. SWD network devices currently communicating over the network will be displayed inside a purple square. And a message at the right side of the NIM would be like:

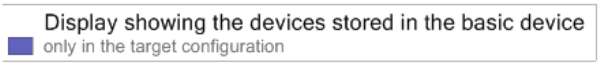


Figure 22: Target configuration.

4. Follow steps 6 to 11 from procedure described on section Going on-line and uploading from an operational SWD network of this user manual.

Replacing a DZC on a running SWD network

Follow this procedure in order to replace a damaged or non-functional Dual Zone Controller from an existing running SWD network.

1. Shut down the SWD network power
2. Remove the zone controller that will be replaced.
3. Insert a functional zone controller to replace the old controller.
4. Turn SWD network power on and wait for a couple of minutes, until the SWD network boot process has finished.
5. Go online with SWD-Assist to the SWD network under configuration
6. Confirm that the SWD network is running. As far as, the zone controller has a different serial number you should see a warning sign under the replaced zone controller.

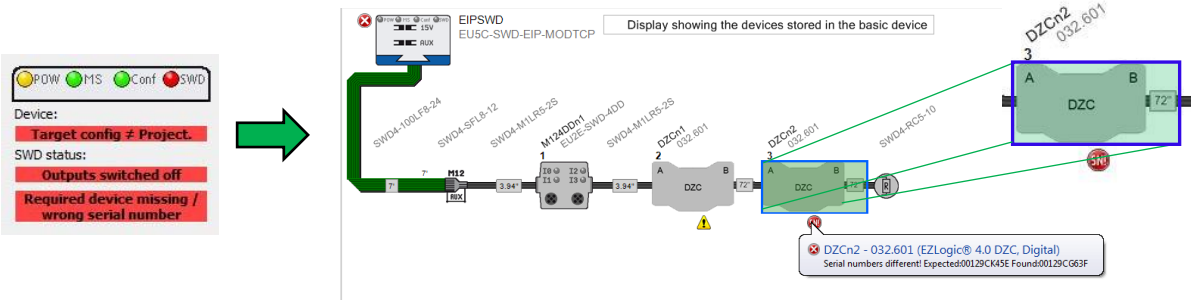


Figure 23: DZC serial mismatch number

7. In order to make your system functional, click on the Renew button to accept the zone controller replacement. After renewal process has finished, the system will resume to normal operation.

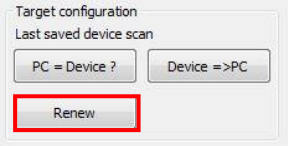


Figure 24: Renew button on Target configuration.

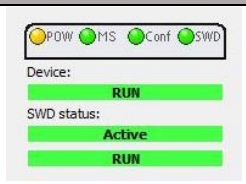
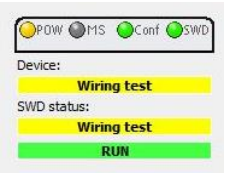
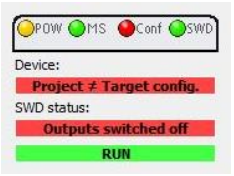
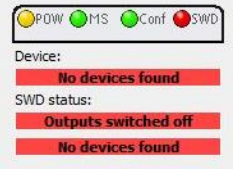
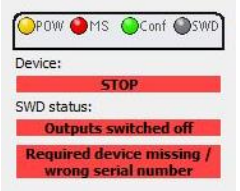
Adding a new SWD device on a running SWD network

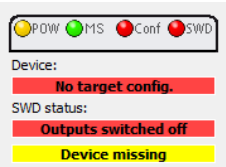
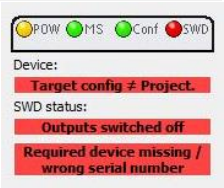
Adding a new SWD device on a running network can be done “offline”, follow the next steps:

1. Before you add a SWD device, *upload* the existing configuration to your PC from the NIM device.
2. Turn the power down for the SWD network.
3. Disconnect the communications wire bus at the point where you need to insert the new SWD device. And plug the new SWD device to your SWD network.
4. If you have finished to insert all new SWD devices turn the power up for the SWD network.
5. Follow procedure Going on-line and uploading from an operational SWD network to get the new configuration uploaded from the NIM.

Annex A

NIM system status

Status	Description
	**Status #1** **Device: RUN** .- NIM' special protocol is communicating **SWD status: Active / RUN** .- The SWD network is active and running
	**Status #2** **Device: STOP** .- NIM' special protocol is not communicating **SWD status: Outputs switched off / RUN** .- Device outputs have been turned off, but there are SWD network devices still communicating each other
	**Status #3** **Device: Waiting for planned config**.- NIM's configuration has been deleted and is waiting for a new configuration. **SWD status: Outputs switched off / RUN** .- Device outputs have been turned off, but there are SWD network devices still communicating each other
	**Status #4** **Device: Wiring test** .- NIM has been set to Wiring test Mode **SWD status: Wiring test / RUN** .- Device outputs will be forced manually, SWD network devices communicating each other
	**Status #5** **Device: Project ≠ Target config.** .- PC configuration does not match NIM configuration. **SWD status: Outputs switched off / RUN** .- Device outputs have been turned off, but there are SWD network devices still communicating each other
	**Status #6** **Device: No devices found** .- No SWD network devices found on the network **SWD status: Outputs switched off / No devices found** .- Device outputs have been turned off, no SWD network devices found on the network
	**Status #7** **Device: STOP** .- NIM' special protocol is not communicating **SWD status: Outputs switched off / Required device missing / wrong serial number** .- Device outputs have been turned off; one or more devices are missing on the SWD network, serial number of one or more devices don't match to the stored configuration on the NIM.

Status	Description
	**Status #8** **Device: No target config. -** NIM' special protocol is not communicating **SWD status: Outputs switched off / Device missing .-** Device outputs have been turned off, no SWD network devices found on the network
	**Status #9** **Device: Target config Project.** .- NIM' special protocol is communicating **SWD status: Outputs switched off / Required device missing / wrong serial number** .- The SWD network is active and running
	**Status #10** **Device: RUN/Connection inactive** .- NIM' special protocol is not communicating. **MS** indicator turned off **SWD status: Active / RUN** .- Device outputs have been turned off, but there are SWD network devices still communicating each other
	**Status #11** **Device: RUN**- NIM's configuration has been deleted and is waiting for a new configuration. **MS** indicator turned RED **SWD status: Active / RUN** .- Device outputs have been turned off, but there are SWD network devices still communicating each other

SWD Coordinator status messages button.

Annex B

Powering sequences for EZLogic® 4.0 conveyor systems

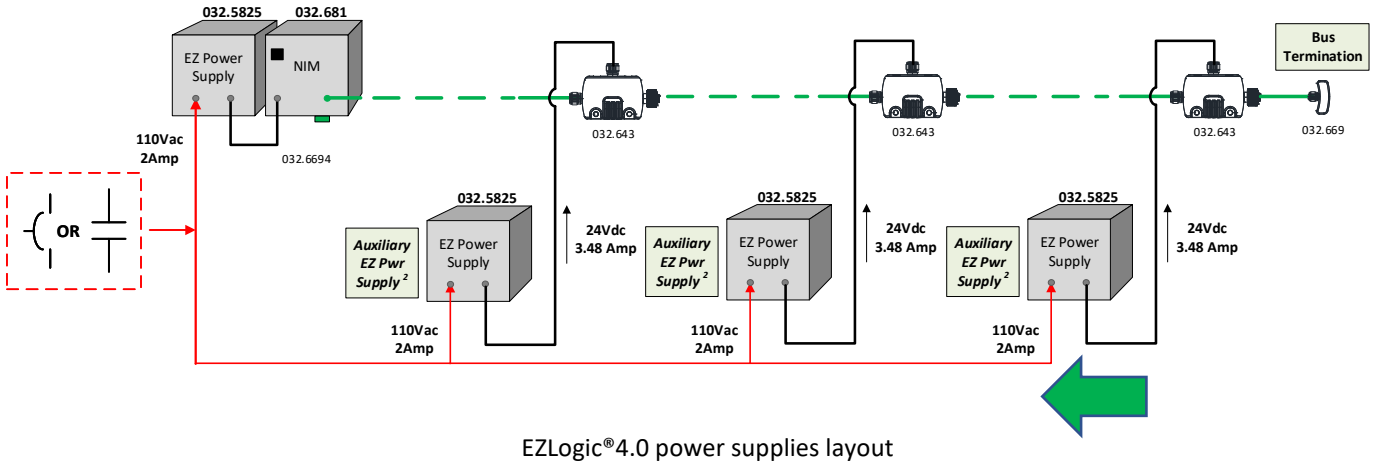
During commissioning, maintenance or troubleshooting of any EZLogic® 4.0 conveyor system it is mandatory to follow this powering sequence procedure in order to protect the integrity and well function of the SWD devices.

First time power on

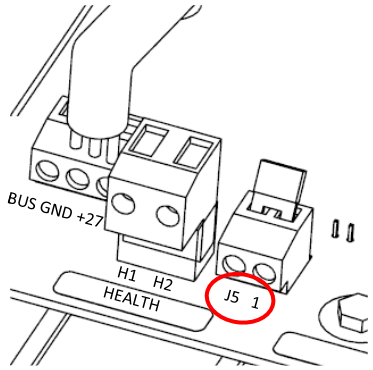
1. Confirm all SWD connectors have been properly plugged in for every device on the network.
2. If you cannot turn on the whole system from a single circuit breaker or main contactor, first turn on the furthest power supply on the system and power up the remaining power supplies under sequence going toward the power supply next to the NIM. See figure *EZLogic® 4.0 power supplies layout*.

Power shut down

3. If you cannot turn off the whole system from a single circuit breaker or main contactor, first turn off the furthest power supply on the system and power down the remaining power supplies under sequence going toward the power supply next to the NIM. See figure *EZLogic® 4.0 power supplies layout*.



EZLogic®4.0 power supplies layout



In order to reduce electric noise and retro feed voltage to the SmartWire network, user must remove jumper J5 inside every EZLogic® auxiliary power supply (Hytrol PN: 032.5825). *NOTES: Do not remove jumper J5 for the main EZLogic® power supply (Hytrol PN: 032.5825) next to the NIM. It is recommended that EZLogic® power supplies don't be feed from the safety electric circuit.*

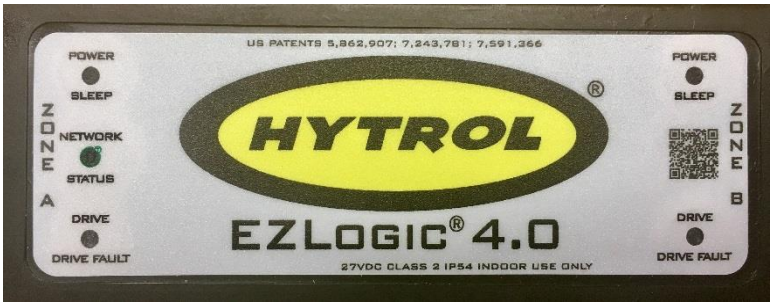
Annex C

Cyclic Communications Data Tables (SWD Assist)

Data Type	Base PLC TAG	Alias PLC TAG	Description (SWD Assist)	PROFILE
Bit	Input_BYTE[0].0	A_ALG_EN	Zone A - Control Algorithm - Enabled	Profile 1&2
Bit	Input_BYTE[0].1	B_ALG_EN	Zone B - Control Algorithm - Enabled	Profile 1&2
Bit	Input_BYTE[0].2	DZC_STAT	DZC Distributed Control Algorithm Active	Profile 1&2
Bit	Input_BYTE[0].3	EXPS_FBK	24 Volt External Actuator Power Status	Profile 1&2
Bit	Input_BYTE[0].4	DIAG	Group Diagnostics	Profile 1&2
Bit	Input_BYTE[0].5	Input_BYTE[0].5	SPARE??	Profile 1&2
Bit	Input_BYTE[0].6	PRSNT	Device Present	Profile 1&2
Bit	Input_BYTE[0].7	SUBST	Universal module	Profile 1&2
Bit	Input_BYTE[2].0	A_PSS_Ch0	Zone A - Produced System Signal - Ch 0	Profile 1&2
Bit	Input_BYTE[2].1	A_PSS_Ch1	Zone A - Produced System Signal - Ch 1	Profile 1&2
Bit	Input_BYTE[2].2	A_PSS_Ch2	Zone A - Produced System Signal - Ch 2	Profile 1&2
Bit	Input_BYTE[2].3	A_PSS_Ch3	Zone A - Produced System Signal - Ch 3	Profile 1&2
Bit	Input_BYTE[2].4	B_PSS_Ch0	Zone B - Produced System Signal - Ch 0	Profile 1&2
Bit	Input_BYTE[2].5	B_PSS_Ch1	Zone B - Produced System Signal - Ch 1	Profile 1&2
Bit	Input_BYTE[2].6	B_PSS_Ch2	Zone B - Produced System Signal - Ch 2	Profile 1&2
Bit	Input_BYTE[2].7	B_PSS_Ch3	Zone B - Produced System Signal - Ch 3	Profile 1&2
Bit	Input_BYTE[3].0	A_BOX_FBK	Zone A, Transducer Logic State	Profile 2
Bit	Input_BYTE[3].1	A_RUN_FBK	Zone A, Actuator Logic State	Profile 2
Bit	Input_BYTE[3].2	A_OL_BLDC	Zone A, Overload State BLDC	Profile 2
Bit	Input_BYTE[3].3	A_OVR_FBK	Zone A, PLC Override Status	Profile 2
Bit	Input_BYTE[3].4	B_BOX_FBK	Zone B, Transducer Logic State	Profile 2
Bit	Input_BYTE[3].5	B_RUN_FBK	Zone B, Actuator Logic State	Profile 2
Bit	Input_BYTE[3].6	B_OL_BLDC	Zone B, Overload State BLDC	Profile 2
Bit	Input_BYTE[3].7	B_OVR_FBK	Zone B, PLC Override Status	Profile 2
Bit	Input_BYTE[4].0	A_XC_ChA	Zone A, Transducer Excess Gain, Ch A LSB	Profile 2
Bit	Input_BYTE[4].1	Input_BYTE[4].1	Zone A, Transducer Excess Gain, Ch A MSB	Profile 2
Bit	Input_BYTE[4].2	A_XC_ChB	Zone A, Transducer Excess Gain, Ch B LSB	Profile 2
Bit	Input_BYTE[4].3	Input_BYTE[4].3	Zone A, Transducer Excess Gain, Ch B MSB	Profile 2
Bit	Input_BYTE[4].4	A_ACT_IN	Zone A, Actuator Status Signal	Profile 2
Bit	Input_BYTE[4].5	A_AUX_IN	Zone A, Auxilary Input Siganl	Profile 2
Bit	Input_BYTE[4].6	A_DV_ID1	Zone A, Divert Match ID 1	Profile 2
Bit	Input_BYTE[4].7	A_DV_ID2	Zone A, Divert Match ID 2	Profile 2
Bit	Input_BYTE[5].0	B_XC_ChA	Zone B, Transducer Excess Gain, Ch A LSB	Profile 2
Bit	Input_BYTE[5].1	Input_BYTE[5].1	Zone B, Transducer Excess Gain, Ch A MSB	Profile 2
Bit	Input_BYTE[5].2	B_XC_ChB	Zone B, Transducer Excess Gain, Ch B LSB	Profile 2
Bit	Input_BYTE[5].3	Input_BYTE[5].3	Zone B, Transducer Excess Gain, Ch B MSB	Profile 2
Bit	Input_BYTE[5].4	B_ACT_IN	Zone B, Actuator Status Signal	Profile 2
Bit	Input_BYTE[5].5	B_AUX_IN	Zone B, Auxilary Input Siganl	Profile 2
Bit	Input_BYTE[5].6	B_DV_ID1	Zone B, Divert Match ID 1	Profile 2
Bit	Input_BYTE[5].7	B_DV_ID2	Zone B, Divert Match ID 2	Profile 2
Bit	Output_BYTE[0].0	A_Q0_CMD	Zone A, Auxiliary Logic Input Signal Q0	Profile 2
Bit	Output_BYTE[0].1	A_Q1_CMD	Zone A, Auxiliary Logic Input Signal Q1	Profile 2
Bit	Output_BYTE[0].2	A_Q2_CMD	Zone A, Auxiliary Logic Input Signal Q2	Profile 2
Bit	Output_BYTE[0].3	A_Q3_CMD	Zone A, Auxiliary Logic Input Signal Q3	Profile 2
Bit	Output_BYTE[0].4	A_OVR_CMD	Zone A, PLC Override Enable Signal	Profile 2
Bit	Output_BYTE[0].5	A_RUN_CMD	Zone A, PLC Actuator Run Signal	Profile 2
Bit	Output_BYTE[0].6	A_FWD_CMD	Zone A, PLC Forward Reverse Signal	Profile 2
Bit	Output_BYTE[0].7	A_AUX_CMD	Zone A, PLC Aux Port Output Signal	Profile 2
Bit	Output_BYTE[1].0	B_Q0_CMD	Zone B, Auxiliary Logic Input Signal Q0	Profile 2
Bit	Output_BYTE[1].1	B_Q1_CMD	Zone B, Auxiliary Logic Input Signal Q1	Profile 2
Bit	Output_BYTE[1].2	B_Q2_CMD	Zone B, Auxiliary Logic Input Signal Q2	Profile 2
Bit	Output_BYTE[1].3	B_Q3_CMD	Zone B, Auxiliary Logic Input Signal Q3	Profile 2
Bit	Output_BYTE[1].4	B_OVR_CMD	Zone B, PLC Override Enable Signal	Profile 2
Bit	Output_BYTE[1].5	B_RUN_CMD	Zone B, PLC Actuator Run Signal	Profile 2
Bit	Output_BYTE[1].6	B_FWD_CMD	Zone B, PLC Forward Reverse Signal	Profile 2
Bit	Output_BYTE[1].7	B_AUX_CMD	Zone B, PLC Aux Port Output Signal	Profile 2

Annex D

DZC LED patterns



Power/Sleep – Light Green

Network Status – Green

Drive/Drive Fault – Red/Amber

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	Input power low 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 / DRIVE FAULT	STATUS INDICATION
ON Steady (Red)	Zone drive active (zone running)
OFF Steady	Zone drive stopped (no fault)
1 Flash (Red/Amber) in 4 seconds	Hardware fault (zone stopped)
2 Flash (Red/Amber) in 4 seconds	Input power over voltage (zone stopped)
3 Flash (Red/Amber) in 4 seconds	Input power under voltage (zone stopped)
4 Flash (Red/Amber) in 4 seconds	Wiring fault (zone stopped)
5 Flash (Red/Amber) in 4 seconds	DZC 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)

Annex E

SWD Assist device error codes (SWD Assist *v2.75*)

Diagnostic Fault	Code	Description
Power Supply Low Volts, Internal	2	Low voltage on primary bus VCC (M12-5 SWD cable)
Power Supply Low Volts, Actuator	48	Low voltage on external actuator VCC
Overload/Short circuit, supply Aux / Xdcr	35	Fused VCC supplying Auxiliary / Transducer connectors
Zone A, Open Coil Primary Actuator	54	Presence / Absence of primary actuator load
Zone B, Open Coil Primary Actuator	55	Presence / Absence of primary actuator load
Zone A, Overload/Short in Primary Actuator	56	Overload / Short when Primary Coil energized
Zone B, Overload/Short in Primary Actuator	57	Overload / Short when Primary Coil energized
Zone A, Open Coil Secondary Actuator	58	Presence / Absence of secondary actuator load (NBEZ)
Zone B, Open Coil Secondary Actuator	59	Presence / Absence of secondary actuator load (NBEZ)
Zone A, Overload/Short in Secondary Actuator	60	Overload / Short when Secondary Coil energized (NBEZ)
Zone B, Overload/Short in Secondary Actuator	61	Overload / Short when Secondary Coil energized (NBEZ)
Zone A, Internal Fault	62	Hardware Fault Status Indicator (BLDC /MDR)
Zone B, Internal Fault	63	Hardware Fault Status Indicator (BLDC /MDR)
Zone A, Product Flow Jammed	49	ZPA fault condition active
Zone B, Product Flow Jammed	50	ZPA fault condition active
Zone A, Marginal Gain, Transducer	64	Transducer signal level below optimal (on equipped models)
Zone B, Marginal Gain, Transducer	65	Transducer signal level below optimal (on equipped models)
Zone A, Motor Under/Overspeed	66	Motor running at speed outside the speed setpoint tolerance (BLDC/MDR)
Zone B, Motor Under/Overspeed	67	Motor running at speed outside the speed setpoint tolerance (BLDC/MDR)
Zone A, Motor Stall	68	Motor output energized and motor not turning (BLDC/MDR)
Zone B, Motor Stall	69	Motor output energized and motor not turning (BLDC/MDR)
Zone A, Overtemperature	70	Motor controller temperature high (BLDC/MDR)
Zone B, Overtemperature	71	Motor controller temperature high (BLDC/MDR)

References

1. Foundation Fieldbus
Fourth Edition
By Ian Verhappen and Augusto Pereira

2. SmartWire-DT The System
05/15 MN05006002Z-EN
5th edition, 2015 edition date 05/15
By Heribert Einwag and Rene Wiegand

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