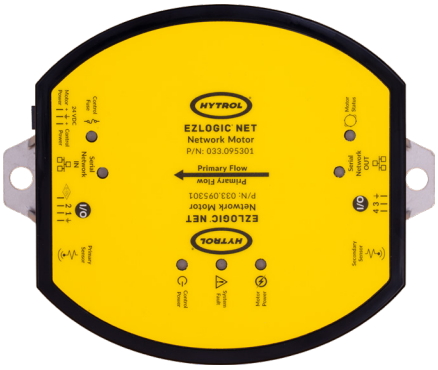
EZLOGIC® NET COMPONENT GUIDE



MODEL	BULLETIN	EFFECTIVE DATE
EZLOGIC® NET	# 759	AUGUST 2025

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1 INTRODUCTION

The EZLogic® NET Smart Conveyor System is a product that is used in material handling conveyance applications. The system is comprised of three main components:

1. **Gateway Master**
2. **Zone Controllers** (Integrated, Non-Integrated)
3. **Transducer**

A typical application consists of some length of roller conveyor (a Branch), divided into Zones. Each Zone has a drive system; either a Zone Controller that controls a Brushless DC (BLDC) motor or an Integrated Network Motor which combines the controller and motor together. Zones communicate via a high-speed network.

The Gateway provides four different functions:

1. It is the system master device that controls all communication traffic
2. It acts as a system monitor to allow for monitoring the operation of the Branch
3. It acts as a device to configure the behavior of the individual Zones
4. It provides an EtherNet/IP fieldbus interface for use with a programmable Logic Controller (PLC).

EZLogic® NET was designed to provide levels of operation ranging from basic speed and direction to advanced sophisticated implementations. Everything your smart conveyor system needs to get started is already built-into the EZLogic® NET system.

You can connect up to 120 motors, or Zones, in series with one E24™ motor per zone. Optionally, you can also connect a PLC to further leverage the networking power of the EZLogic® NET system to provide real-time monitoring and control for automated package tracking, and various other sophisticated control capabilities.

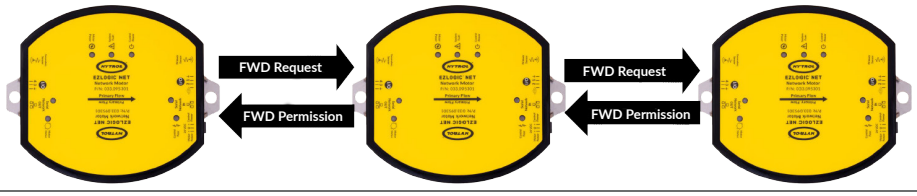
FIGURE 1: E24™ INTEGRATED NETWORK MOTOR (INM)

FIGURE 2: EZLOGIC® NET ZONE CONTROLLER

1.1 KEY TERMS AND CONCEPTS

- **Zone:** A defined conveyor section that contains a mechanism to drive the rollers, either a motor or actuator.
- **Branch:** A conveyor section that consists of a series of Zones with a defined Infeed Zone (upstream), and a Discharge Zone (downstream).
- **Forward (normal) Flow Direction:** Transportation from Infeed to Discharge, with the Gateway located at the Discharge end of the conveyor.
- **Reverse Flow Direction:** Transportation is reversed from Forward Flow ... the Discharge becomes the Infeed and Infeed becomes the Discharge.
- **Gateway Master:** The Gateway Master acts as the master device of the system, and handles all communications within the Branch, as well as individual Zone configurations. There are 2 interfaces available to the user including a Remote Network Device (RND) interface that is accessible via USB, or through the Fieldbus interface.
- **Primary Sensor:** Photoeye input for the downstream edge of a Zone, when configured for the Forward (normal) flow direction.
- **Secondary Sensor:** Photoeye input for the downstream edge of a Zone, when configured for the Reverse flow direction.
- **Smart I/O:** General purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions.
- **Analog Speed Input:** Allows a Zone with motor to be controlled via a 0-10 VDC signal. There is also an analog speed input on the Gateway to control the speed of an entire Branch.
- **Branch Serial Communications:** Serial communications that allows the Gateway to monitor and configure all Zones within a Branch (Gateway-to-Zones).
- **Handshake Communications:** Request, Permission, and Sensor signals that pass between adjacent zones. Allows for zone-to-zone communication for handling package flow (Figure 3).
- **Protective Extra Low Voltage (PELV):** IEC 61140 defines a PELV system as an electrical source in which the voltage cannot exceed 30 Vrms or 60 VDC under normal or single-fault conditions, and its DC common (minus (-) output terminal) is connected to earth ground.
- **EtherNet/IP (EIP):** The Ethernet standard protocol used on the Gateway Master for PLC control of a Branch.
- **Programmable Logic Controller (PLC):** An industrial computer which has been ruggedized and adapted for the control of manufacturing processes.
- **Right/Left Hand System Layout:** The internal network system connects to each Zone via a Serial In and Serial Out connection. Depending upon the application and where Zones are mounted on the conveyor, it may be necessary to rotate a Zone 180° to line up the Serial Out with Serial In. Therefore, the product labels contain information in both orientations for easy readability.

FIGURE 3: HANDSHAKE COMMUNICATIONS



2 COMPONENTS

2.1 GATEWAY MASTER CONNECTIONS

The Gateway Master serves as the primary control unit for managing communication traffic within the system. It functions as the central connection point for zone configuration and operates using an Ethernet/IP network interface to enable networking capabilities. The Gateway Master supports control of up to 120 zones, is equipped with four configurable input/output ports, and includes an analog speed control input for precise operational adjustments.
P/N: 033.095002

FIGURE 4: EZLOGIC® NETWORK GATEWAY MASTER

2.2 ZONE CONTROLLER (INTEGRATED, NON-INTEGRATED)

The non-integrated zone controller is designed for use in tandem with an E24™ motor. It features four configurable input/output ports and includes an analog speed control input for enhanced operational flexibility. The non-integrated zone controller can be used to control 25W to 120W motors (Motor Parameters configurable in EZLogic® OS).
P/N: 033.095201

FIGURE 5: EZLOGIC® NET ZONE CONTROLLER

2.3 INTEGRATED NETWORK MOTOR

The integrated network motor is designed to be a device that integrates the motor and control card into one device. It features four configurable input/output ports and includes an analog speed control input for enhanced operational flexibility.
P/N: 033.095301

FIGURE 6: EZLOGIC® NET INTEGRATED NETWORK MOTOR

2.4 PHOTOEYE OPTIONS AND SPECIFICATIONS

Polarized Retro-Reflective Photoeye:

- **18" Cable with RJ11 connector** (for zones 24" or shorter) – P/N: 033.095411
- **48" Cable with RJ11 connector** (for zones longer than 24") – P/N: 033.095412
- **M8 connector** – P/N: 033.095413
  - **Note:** Requires P/N 033.095468 for connection to INM or NZC.

Diffuse Retro-Reflective Photoeye:

- **18" Cable with RJ11 connector** (for zones 24" or shorter) – P/N: 033.095421
- **48" Cable with RJ11 connector** (for zones longer than 24") – P/N: 033.095422
- **M8 connector** – P/N: 033.095423
  - Note: Requires P/N 033.095468 for connection to INM or NZC.

Photoeye Bracket:

- P/Ns: 913.0400 & 913.0402
  - Suitable for mounting any photoeye.
  - Can be used for both set-high and set-low applications.

FIGURE 7: PHOTOEYE & BRACKET

2.5 COMMUNICATION CABLES FOR ZONE-TO-ZONE COMMUNICATION

The following communication cables are available in various lengths to suit specific zone configurations:

- **12”** – P/N 033.095551
- **18”** – P/N 033.095552
- **24”** – P/N 033.095553
- **30”** – P/N 033.095554
- **36”** – P/N 033.095555
- **48”** – P/N 033.095556
- **60”** – P/N 033.095557
- **72”** – P/N 033.095558
- **84”** – P/N 033.095559

Note: When using with the INM, add 12" to the zone length to determine the appropriate cable length.

Note: Maximum cable length **should not exceed 100 feet** between EZLogic® NET devices.

2.6 WIRING HARNESS

The following wiring harnesses are available for transmitting motor and control power to each zone:

- **10' 5 drops** – P/N 032.095405
- **10' 3 drops** – P/N 032.095403
- **5' 2 drops** – P/N 032.095452
- **4' 1 drop** – P/N 032.095441
- **2' 1 drop** – P/N 032.095421
- **3' Extension** – P/N 032.095300
- **10' Extension** – P/N 032.095000
- **Gender Changer** – P/N 032.095199

2.7 POWER SUPPLY

Offerings:

- EB-095201: EZNET POWER SUPPLY-20A,240V (2 HOT),1PH
- EB-095202: EZNET POWER SUPPLY-40A,230V (2 HOT),1PH
- EB-095203: EZNET POWER SUPPLY-20A,120-240V+N,1PH
- EB-095204: EZNET POWER SUPPLY-40A,120/230V+N,1PH
- EB-095205: EZNET POWER SUPPLY-20A,400-500V,3PH
- EB-095206: EZNET POWER SUPPLY-40A,400-500V,3PH

Model	EB-095201	EB-095202	EB-095203	EB-095204	EB-095205	EB-095206
Input Voltage (Vac)	240 (2 HOT)	240 (2 HOT)	120-240+N	120-240+N	400-500	400-500
Input Current (Amp)	4.4	11.2	8.8-4.4	19.4-11.2	1.8-1.4	2.4-1.9
Inrush Current (Amp)	24	62	24	62	34	22
Motor Output (Amp @ Vdc)	20 @ 24	40 @ 24	20 @ 24	40 @ 24	20 @ 24	40 @ 24
Control Output (Amp @ Vdc)	20 @ 24	20 @ 24	20 @ 24	20 @ 24	20 @ 24	20 @ 24

Enclosure Size: 20x20x10in

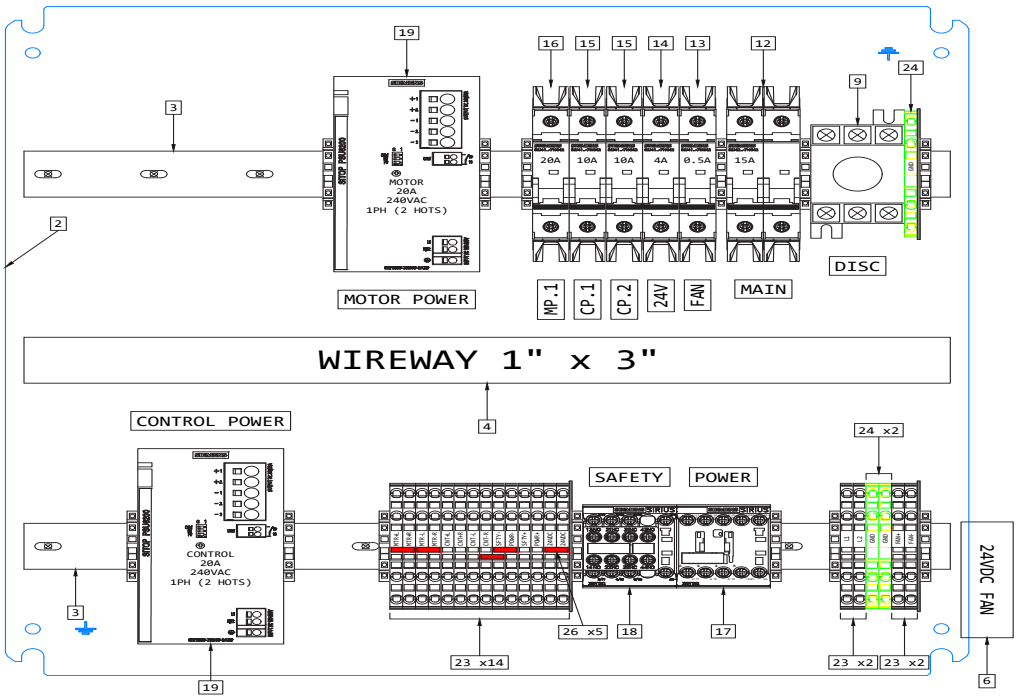
Mounting Kits:

- Standard: SA-098726
- Low Elevation: SA-09880
    - Used in applications where top of roller, TOR, is 32” or less.

UL Certified

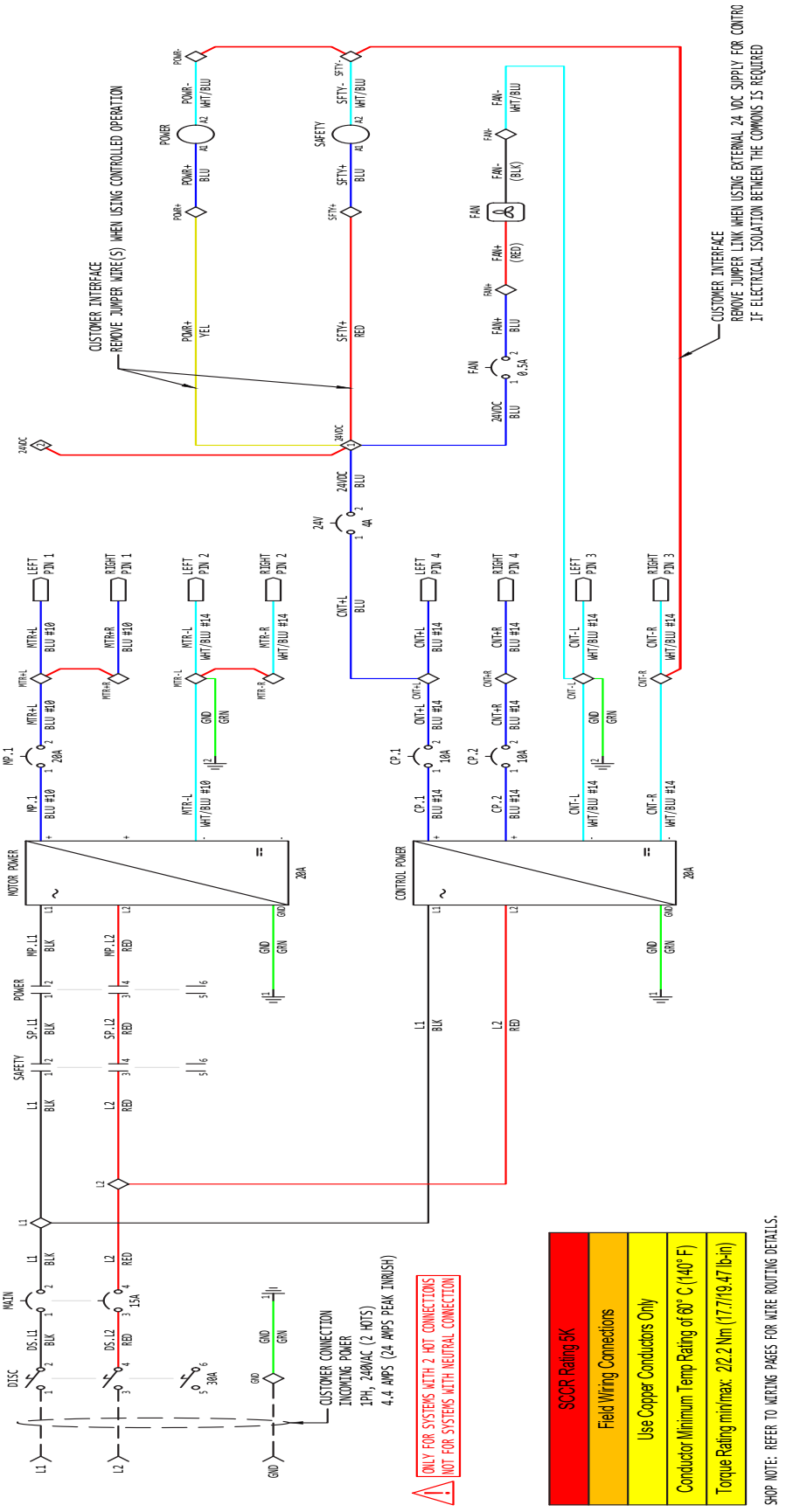
The power supply contains two primary contact relays to control the voltage supply to the BLDC motor power circuit. The first contactor aims to energize and de-energize the BLDC motors supply. The second contactor can “kill” the voltage supply to the BLDC motors supply under an emergency circuit activation. Instructions to use these contactors can be found below the wiring schematics.

EB-095201 DIAGRAMS: ENCLOSURE LAYOUT & BOM

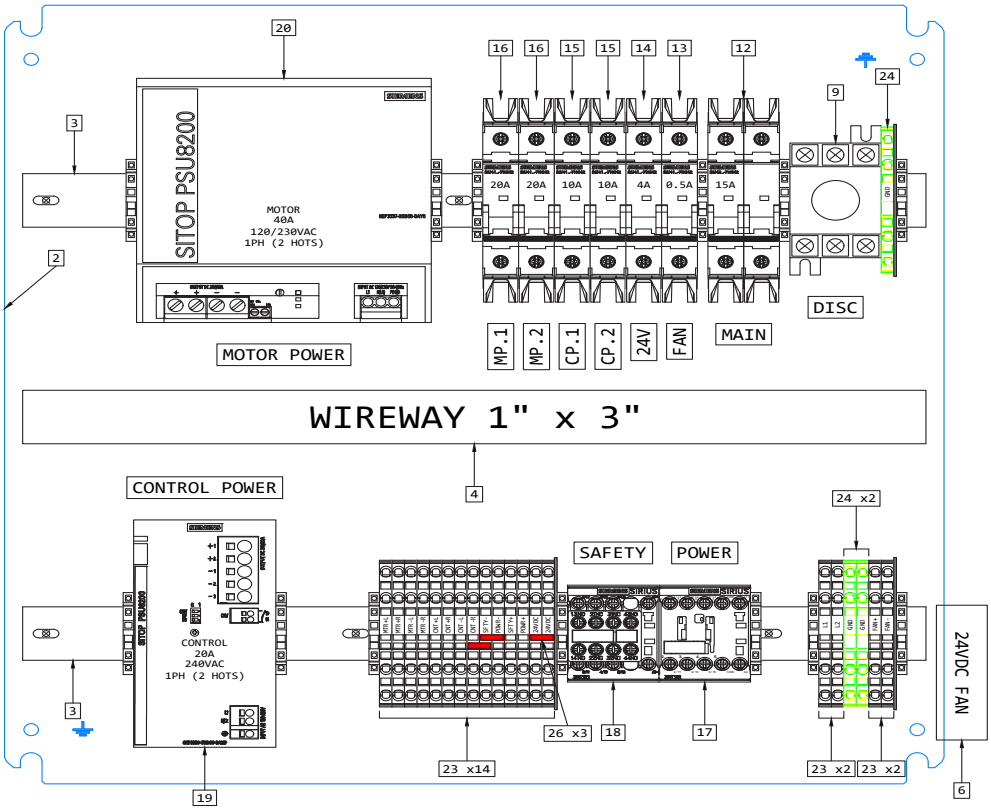


ITEM	QUANTITY	HYTROL PART NUMBER	MANUFACTURER	MANUFACTURER PART NUMBER	DESCRIPTION
1	1	037.001048	HOFFMAN	CDP419 (CSD202010)	ENCLOSURE - 20" X 20" X 10", CUSTOMIZED
2	1	037.001045	HOFFMAN	CP2020	PANEL - 20" X 20"
3	1	036.075	ALLEN-BRADLEY	199-DR1	DIN RAIL - 3.28'LG
4	1.5	941.201360	PANDUIT	F1X3LG6	WIRE DUCT - LIGHT GRAY 1" X 3" X 6'
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127155	SIEMENS	5SJ4218-7HG42	BREAKER - 15 AMP, 2 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	1	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	2	941.622201	SIEMENS	6EP3336-7SB00-3AX0	POWER SUPPLY - 20 AMP, 120VAC
20	-	-	-	-	-
21	13	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	18	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	5	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095201 SCHEMATICS



EB-095202 DIAGRAMS: ENCLOSURE LAYOUT & BOM



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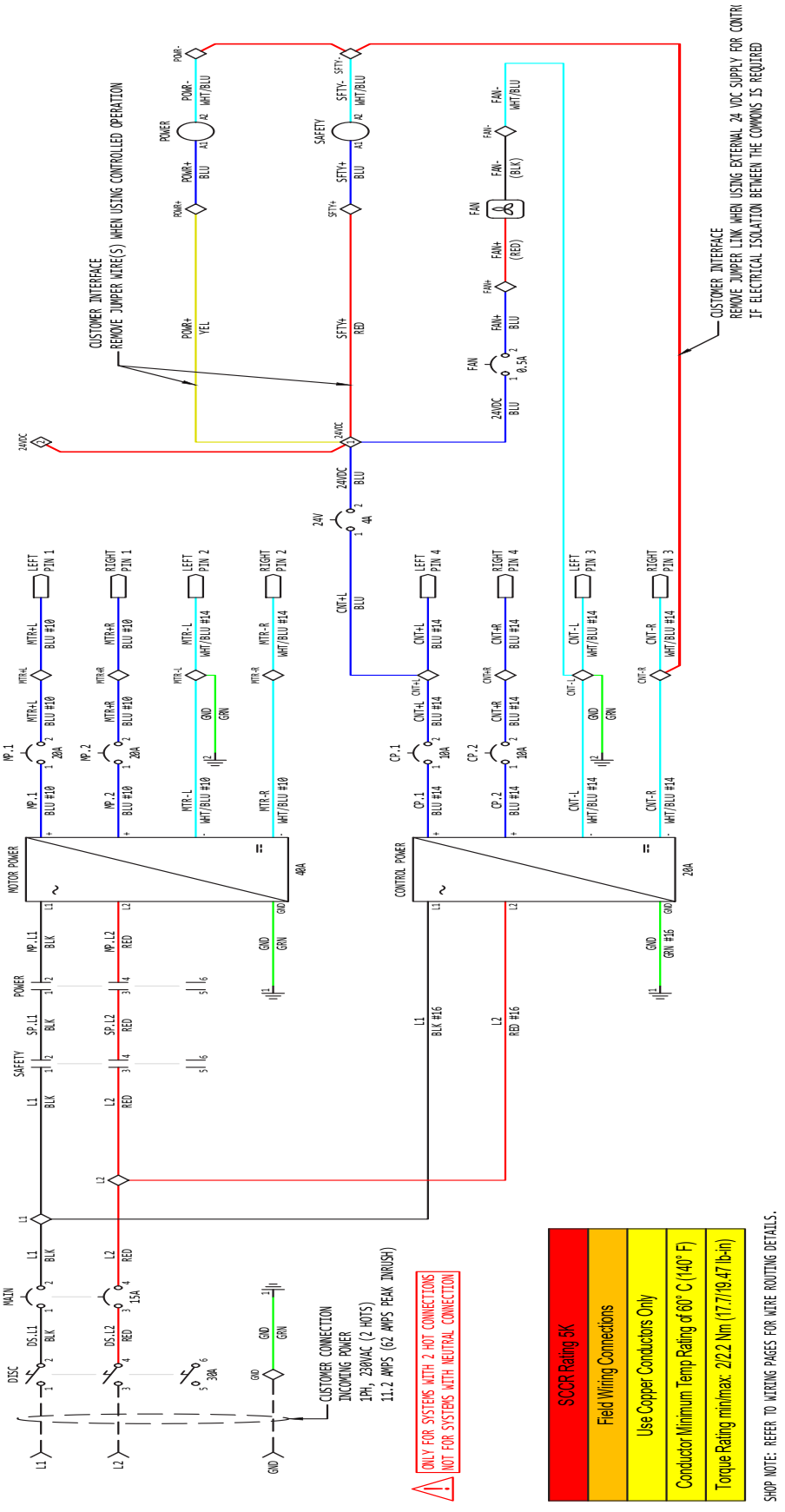
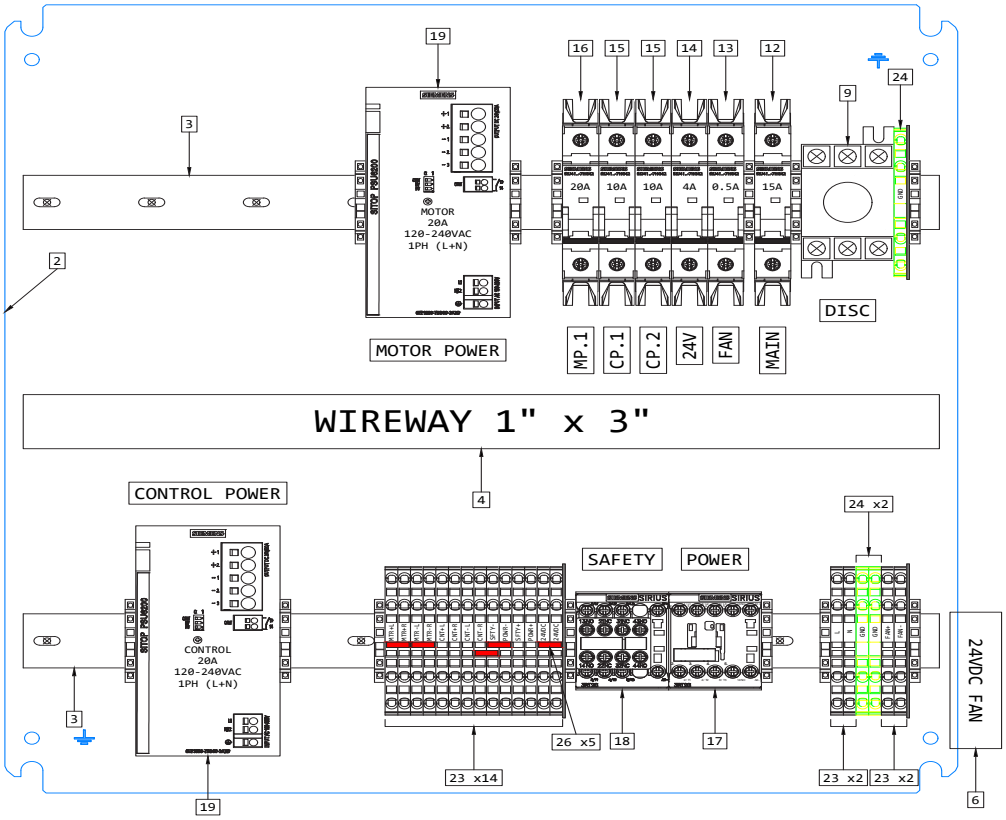
3	1	036.075	ALLEN-BRADLEY	199-DR1	DIN RAIL - 3.28'LG
4	1.5	941.201360	PANDUIT	F1X3LG6	WIRE DUCT - LIGHT GRAY 1" X 3" X 6'
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127155	SIEMENS	5SJ4218-7HG42	BREAKER - 15 AMP, 2 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	2	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	1	941.622201	SIEMENS	6EP3336-7SB00-3AX0	POWER SUPPLY - 20 AMP, 120VAC
20	1	941.622401	SIEMENS	6EP3337-8SB00-0AY0	POWER SUPPLY - 40 AMP, 120VAC
21	13	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	18	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	3	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095202 SCHEMATICS



EB-095203 DIAGRAMS: ENCLOSURE LAYOUT & BOM



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1	1	037.001048	HOFFMAN	CDP419 (CSD202010)	ENCLOSURE - 20" X 20" X 10", CUSTOMIZED
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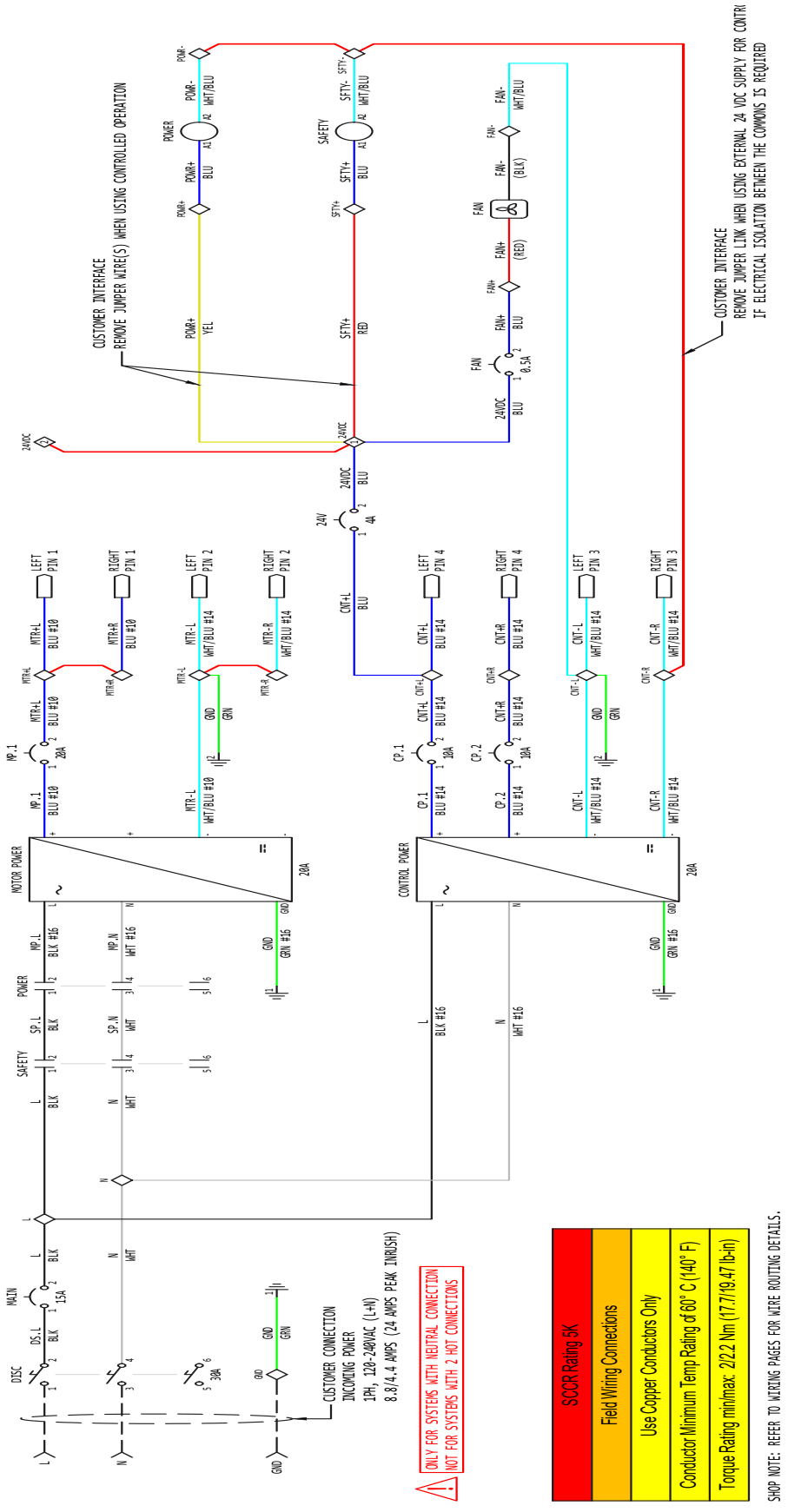
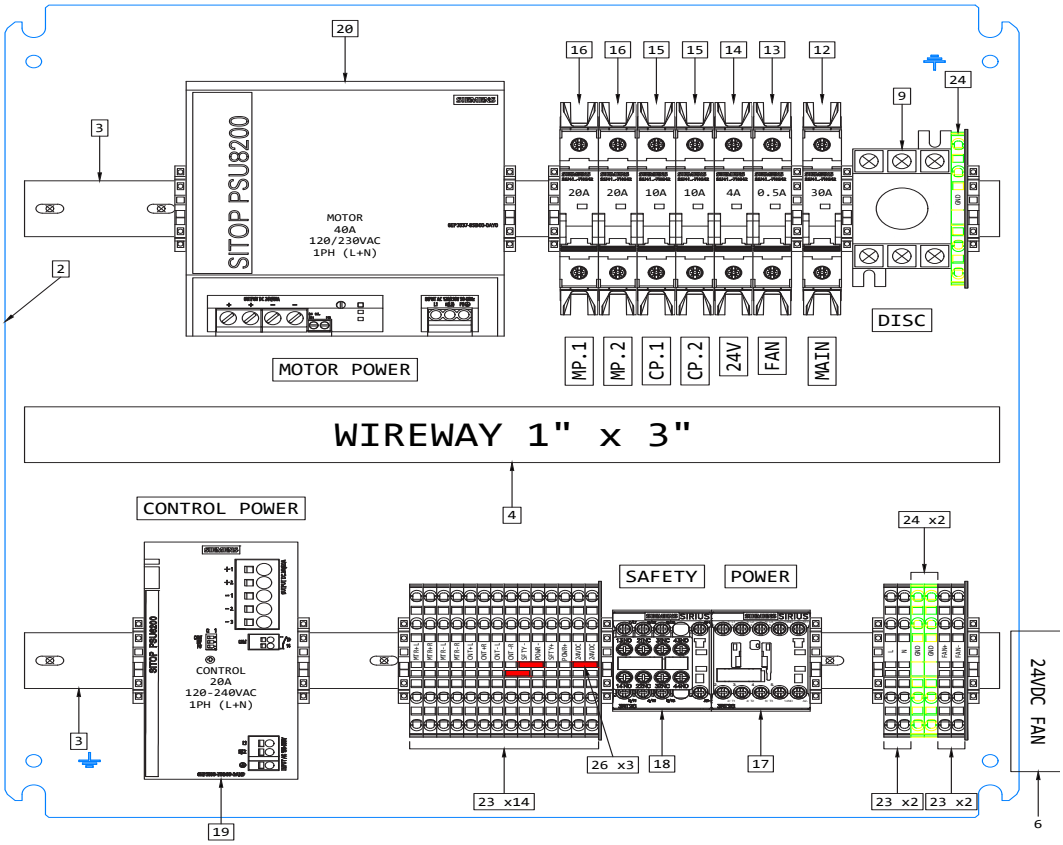
3	1	036.075	ALLEN-BRADLEY	199-DR1	DIN RAIL - 3.28'LG
4	1.5	941.201360	PANDUIT	F1X3LG6	WIRE DUCT - LIGHT GRAY 1" X 3" X 6'
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127154	SIEMENS	5SJ4118-7HG42	BREAKER - 15 AMP, 1 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	1	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	2	941.622201	SIEMENS	6EP3336-7SB00-3AX0	POWER SUPPLY - 20 AMP, 120VAC
20	-	-	-	-	-
21	13	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	18	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	5	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095203 SCHEMATICS



EB-095204 DIAGRAMS: ENCLOSURE LAYOUT & BOM



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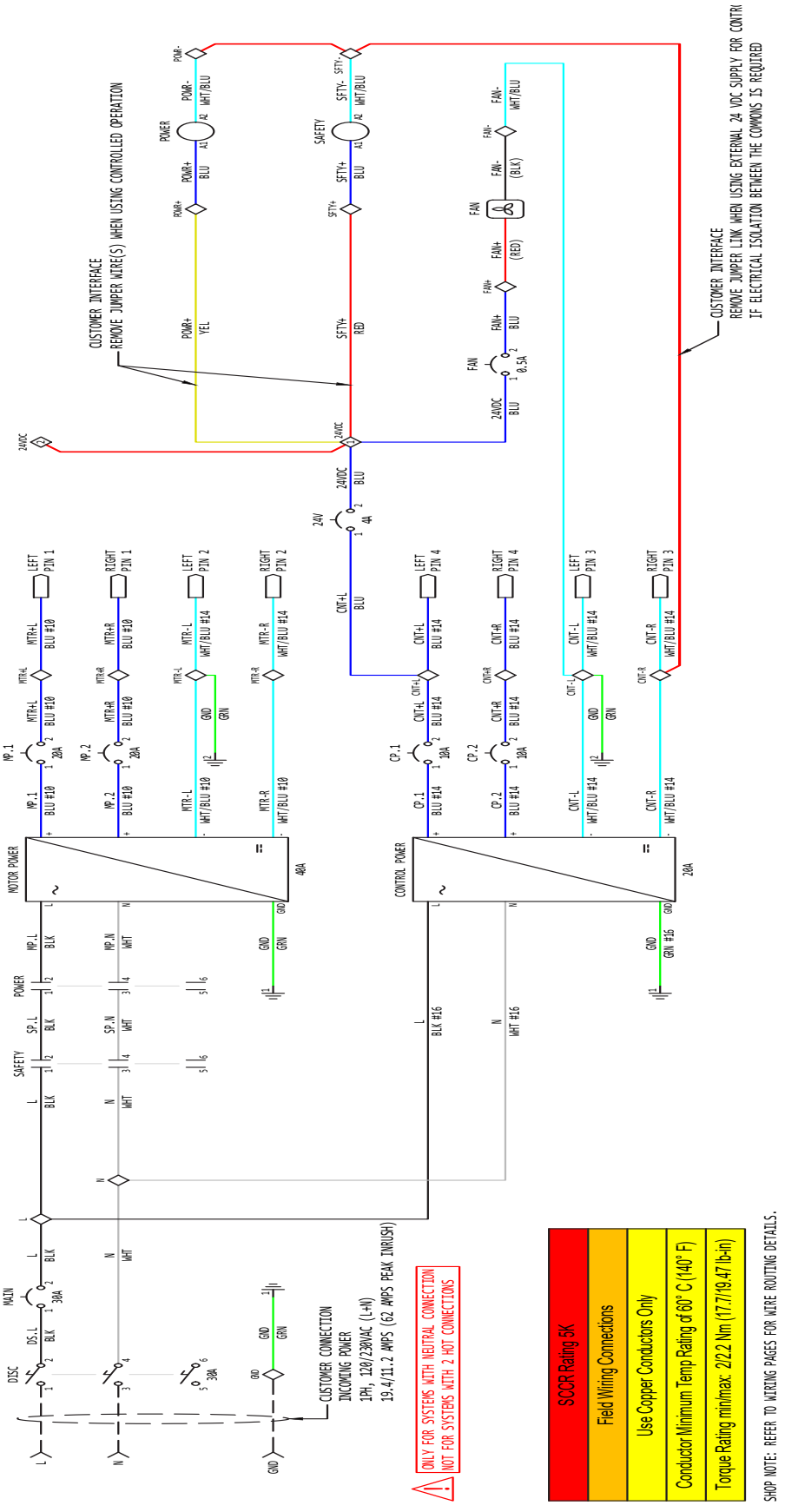
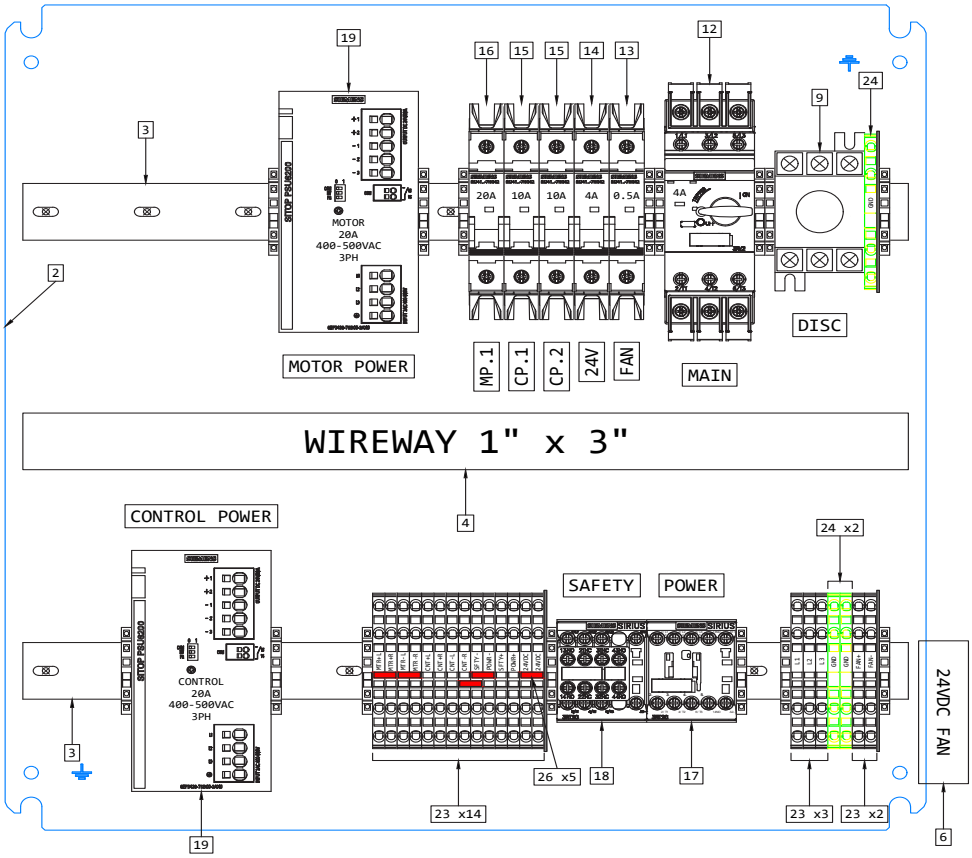
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127304	SIEMENS	5SJ4130-7HG42	BREAKER - 30 AMP, 1 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	2	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	1	941.622201	SIEMENS	6EP3336-7SB00-3AX0	POWER SUPPLY - 20 AMP, 120VAC
20	1	941.622401	SIEMENS	6EP3337-8SB00-0AY0	POWER SUPPLY - 40 AMP, 120VAC
21	13	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	18	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	3	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095204 SCHEMATICS

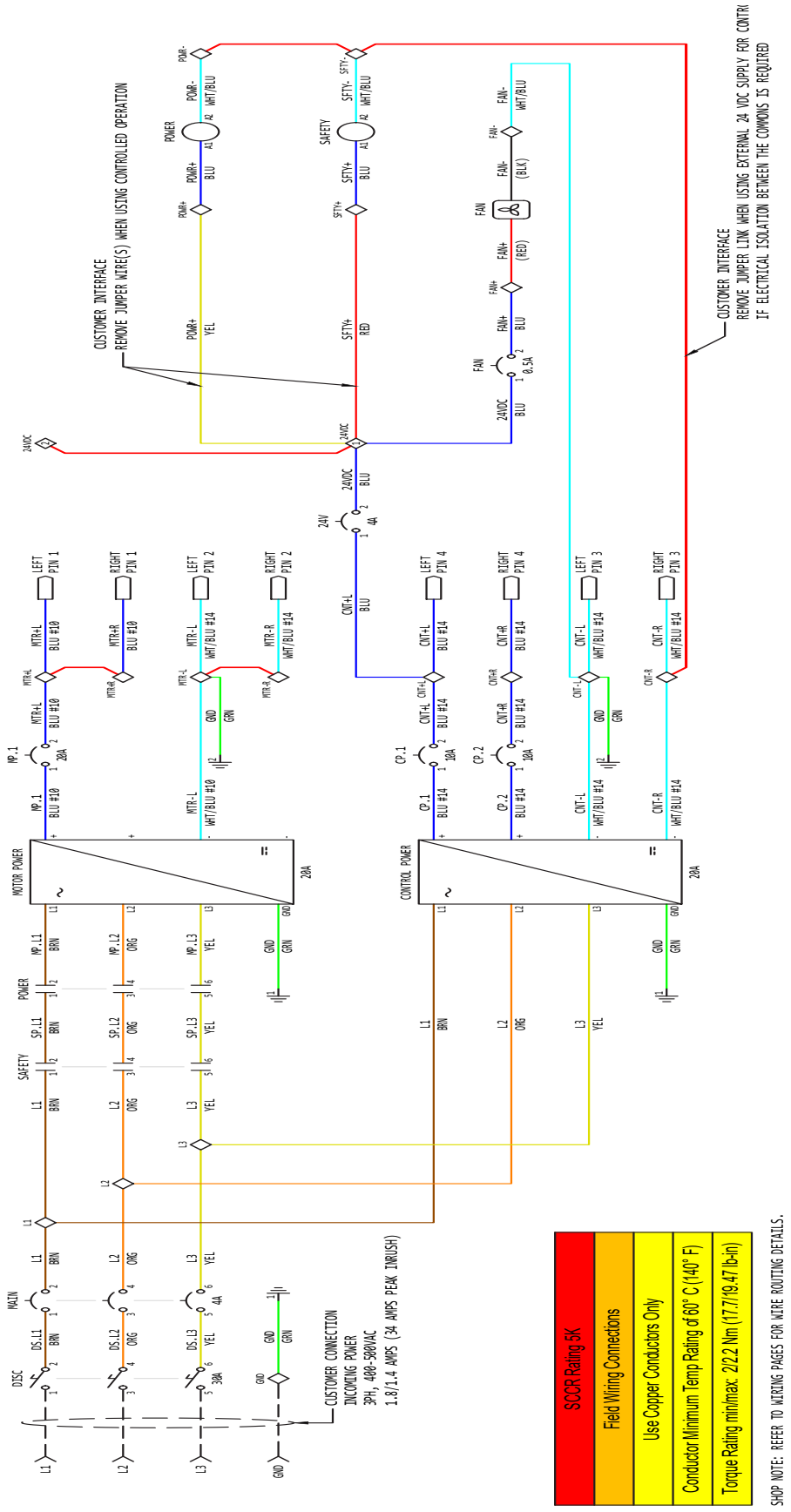


EB-095205 DIAGRAMS: ENCLOSURE LAYOUT & BOM

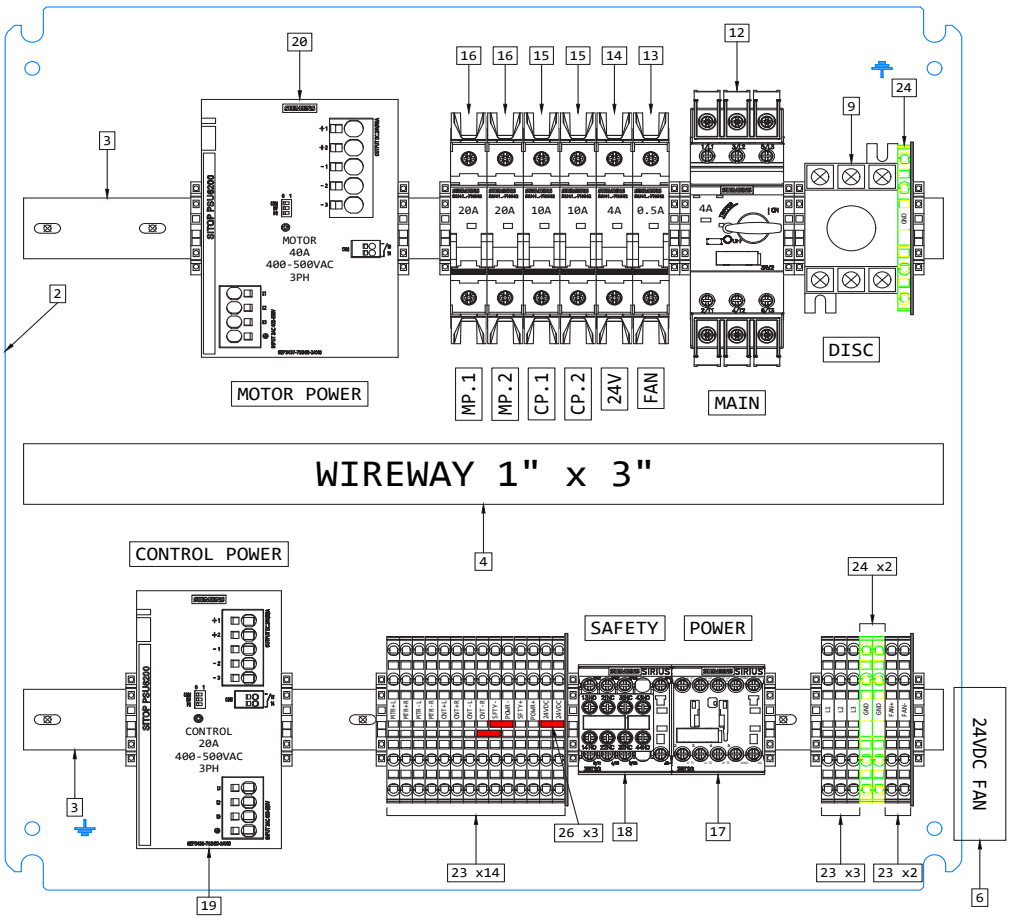


ITEM	QUANTITY	HYTROL PART NUMBER	MANUFACTURER	MANUFACTURER PART NUMBER	DESCRIPTION
1	1	037.001048	HOFFMAN	CDP419 (CSD202010)	ENCLOSURE - 20" X 20" X 10", CUSTOMIZED
2	1	037.001045	HOFFMAN	CP2020	PANEL - 20" X 20"
3	1	036.075	ALLEN-BRADLEY	199-DR1	DIN RAIL - 3.28'LG
4	1.5	941.201360	PANDUIT	F1X3LG6	WIRE DUCT - LIGHT GRAY 1" X 3" X 6'
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127049	SIEMENS	3RV2711-1ED10	BREAKER - 4 AMP, 3 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	1	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	2	941.622203	SIEMENS	6EP3436-7SB00-3AX0	POWER SUPPLY - 20 AMP, 460VAC, 3PH
20	-	-	-	-	-
21	15	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	19	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	5	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095205 SCHEMATICS

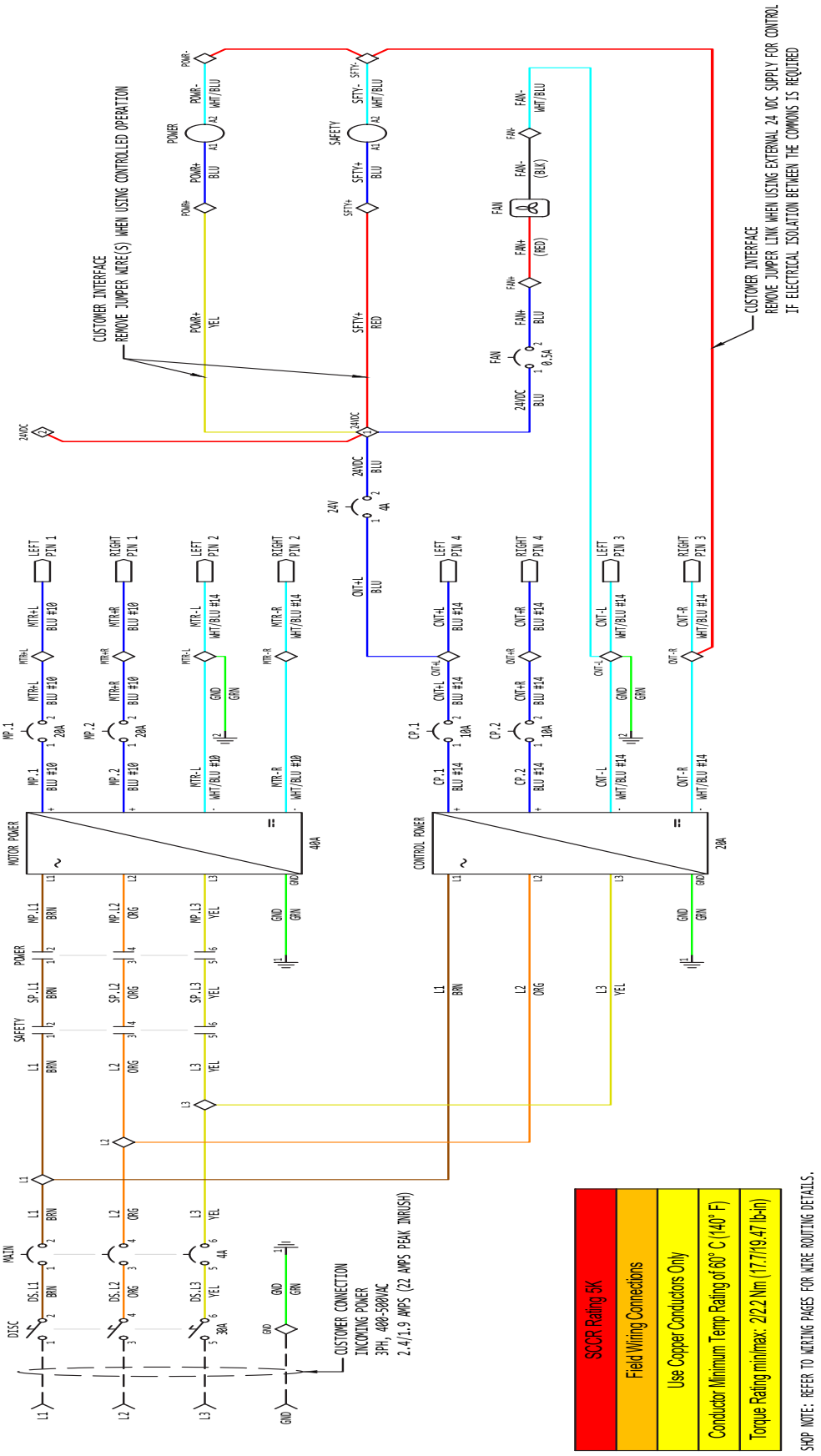


EB-095206 DIAGRAMS: ENCLOSURE LAYOUT & BOM



ITEM	QUANTITY	HYTROL PART NUMBER	MANUFACTURER	MANUFACTURER PART NUMBER	DESCRIPTION
1	1	037.001048	HOFFMAN	CDP419 (CSD202010)	ENCLOSURE - 20" X 20" X 10", CUSTOMIZED
2	1	037.001045	HOFFMAN	CP2020	PANEL - 20" X 20"
3	1	036.075	ALLEN-BRADLEY	199-DR1	DIN RAIL - 3.28'LG
4	1.5	941.201360	PANDUIT	F1X3LG6	WIRE DUCT - LIGHT GRAY 1" X 3" X 6'
5	1.5	941.200160	PANDUIT	C1LG6	WIRE DUCT COVER - LIGHT GRAY, 1" X 6'
6	1	941.207031	SANYO-DENKI	9RA0824G40021	AXIAL FAN - 80MM 24VDC 200MA
7	2	941.207003	QUALTEK	09325-F/45	FAN FILTER ASSY - 80MM
8	2	TC-003201	HYTROL	TC-003201	.&.EZNET WIRING HARNESS - 19"LEADS
9	1	037.002009	EATON	R5A3030U	DISCONNECT SWITCH - 30 AMP, NON-FUSED
10	1	941.141112	EATON	SF320SH5X5	DISCONNECT SHAFT - 12"
11	1	037.002007	EATON	SHR00N12	HANDLE FOR R5 DISCONNECT SWITCH
12	1	941.127049	SIEMENS	3RV2711-1ED10	BREAKER - 4 AMP, 3 POLE, C CURVE
13	1	941.127P54	SIEMENS	5SJ4105-7HG42	BREAKER - .5 AMP, 1 POLE, C CURVE
14	1	941.127044	SIEMENS	5SJ4104-7HG42	BREAKER - 4 AMP, 1 POLE, C CURVE
15	2	941.127104	SIEMENS	5SJ4110-7HG42	BREAKER - 10 AMP, 1 POLE, C CURVE
16	2	941.127204	SIEMENS	5SJ4120-7HG42	BREAKER - 20 AMP, 1 POLE, C CURVE
17	1	941.642014	SIEMENS	3RT2018-1BB41	CONTACTOR - 16 AMP, 24VDC COIL
18	1	941.642024	SIEMENS	3RT2018-1BB44-3MA0	SAFETY CONTACTOR - 16 AMP, 24VDC COIL
19	1	941.622203	SIEMENS	6EP3436-7SB00-3AX0	POWER SUPPLY - 20 AMP, 460VAC, 3PH
20	1	941.622403	SIEMENS	6EP3437-7SB00-3AX0	POWER SUPPLY - 40 AMP, 460VAC, 3PH
21	15	941.510033	EATON	XBAES35N	TERMINAL BLOCK END RETAINER - SLIM
22	0.4	941.510001	PHOENIX	UCT-TM 6	TERMINAL NAME PLATE - UTC-TM6
23	19	941.540700	EATON	XBPT4D22	4 POLE TERMINAL BLOCK - SIZE 4
24	3	941.540800	EATON	XBPT4D22PE	4 POLE GROUND TERMINAL BLOCK - SIZE 4
25	3	941.540751	EATON	XBACPT4D22	4 POLE TERMINAL BLOCK ENDCOVER - SIZE 4
26	3	941.510702	EATON	XBAFBS26	TERMINAL BLOCK 2-POLE JUMPER - ST 4

EB-095206 SCHEMATICS



2.8 ACCESSORIES

The Bluetooth module enables wireless connectivity between a user and a Gateway Master, allowing branch configuration adjustments via the EZLogic® NET OS mobile app.
P/N: 033.095538

A programming cable is used to connect a PC or Bluetooth Module's USB port to the configuration port of any Gateway Master. It is required for configuring all features of the controller and Gateway Master, as well as for customizing factory default settings.
P/N: 033.095537

Electrical Specifications				
Current Consumption	Min	Max	Typ	Unit
	-	0.5	0.02 (@24V)	A

Mechanical Specifications	
IP Rating	IP20
Dimensions	3.63" x 2" x 0.8"
Weight	66.25g

BLE Specifications	
Outdoor Range (Line of Sight)	100m
Indoor Range (Obstructed)	30m

NOTE:
The range of the module can vary depending on interference factors such as building's construction, RF noise, and other environmental conditions.

Setup
1. Connect external 24V power supply
2. Connect to EZLogic® NET Gateway using USB A to USB Mini B data cable
3. Connect to module using EZLogic® NET mobile app

LED Status		
Pattern	**Color**	**Status**
Blink	Blue	Bluetooth Ready
Solid	Green	Bluetooth Connected, Gateway Found
Blink	Blue, Red	Bluetooth Connected, Gateway Missing
Solid	Red	Error

Troubleshooting	
No LED	Check that the voltage supply is correct and that the connection is fully seated.
Error	• Reset the device by holding the reset button for 1 second. • Alternatively, reset by disconnecting power for 3 seconds.
Gateway Missing	• Check that the USB A to USB Mini B cable's connections are fully seated. • Try a different USB A to USB Mini B data cable.
Bluetooth Connection Fails	• Check that the LED status shows the device is ready. • Check that Bluetooth permissions are enabled in the EZLogic® NET mobile app. • Try to minimize the distance from the device.

FIGURE 8: BLUETOOTH MODULE

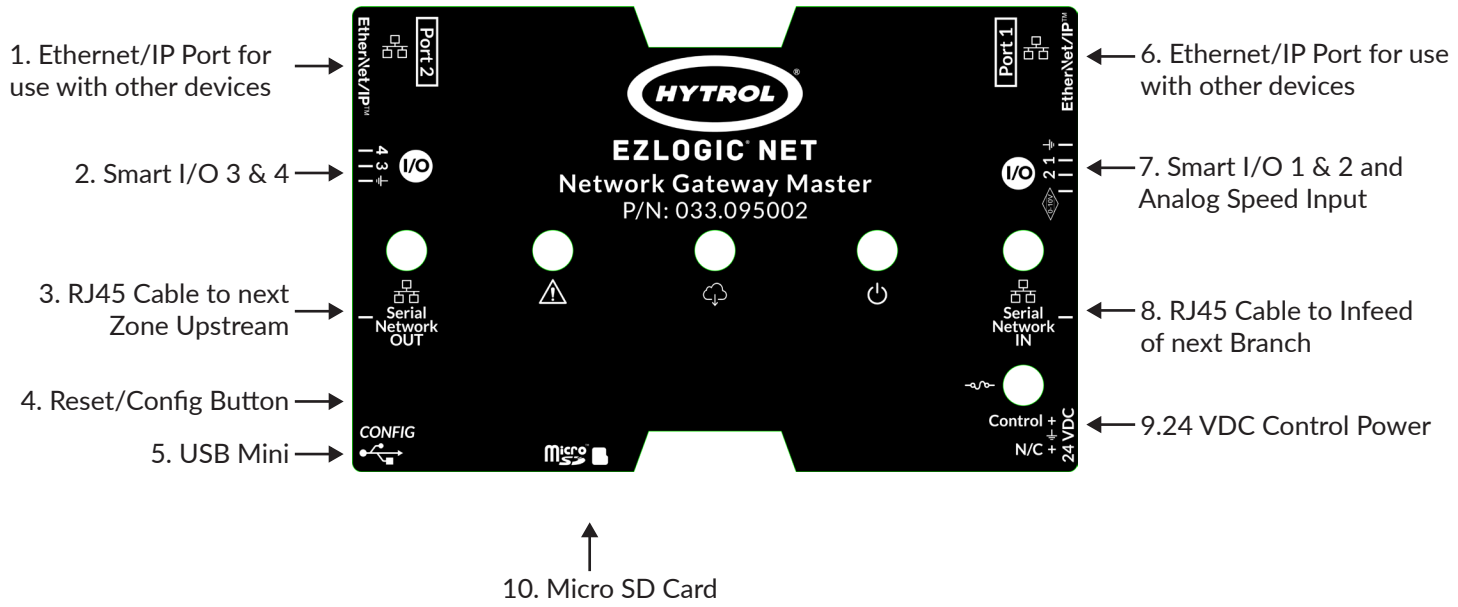
FIGURE 9: PROGRAMMING CABLE

3 INSTALLATION

Use this manual to install and configure an EZLogic® NET system with a minimum of 1 zone and a maximum of 120 zones per gateway.

3.1 GATEWAY MASTER CONNECTIONS

FIGURE 10: EZLOGIC® NETWORK GATEWAY MASTER



1) EtherNet/IP Fieldbus RJ-45 Connection: This port is part of the internal 2-port Ethernet switch. This port is for connection to another Gateway Master (daisy-chaining Gateways), or any EtherNet/IP device.

1.1 RJ45, 8P8C, CAT6 (or better), Ethernet cable

2) Smart I/O 3 & 4 Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions.

2.1 Phoenix Contact, Screwless-Leg Spring, 3-position plug, P/N 18813398

3) Serial Network OUT Connection: This is meant to connect to the next Zone upstream. Zone Controllers are daisy-chained together in series.

***3.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

4) Reset Configuration Button: This is a recessed button for two functions:

1) Press to reset the Gateway and Branch to factory defaults.
2) Press and hold (3) seconds to force the Gateway to copy firmware and configuration data from the SD card.

5) Mini USB Connection: Connection for EZLogic® OS to configure the system.

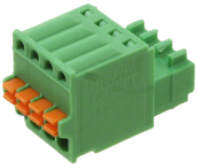
5.1 Any USB 2.0 A-Male to Mini-B Cable P/N 033.095537

6) EtherNet/IP Fieldbus RJ-45 Connection: This port is part of the internal 2-port Ethernet switch.

***6.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

7) Smart I/O 1 & 2 and Analog Speed Input Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions. The Analog Speed Input uses a 0-10 VDC analog signal to control the motor speed of a Zone.

7.1 Phoenix Contact, Screwless-Leg Spring, 4-position plug, P/N 1881341



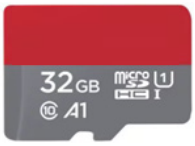
8) Serial Network IN Connection: This is meant to connect to the next Zone downstream. Zone Controllers are daisy-chained together in series.

*__8.1__ RJ45, 8P8C, CAT6 (or better), Ethernet cable

9) Control Power Input: 24 VDC power for the control and Smart I/O.

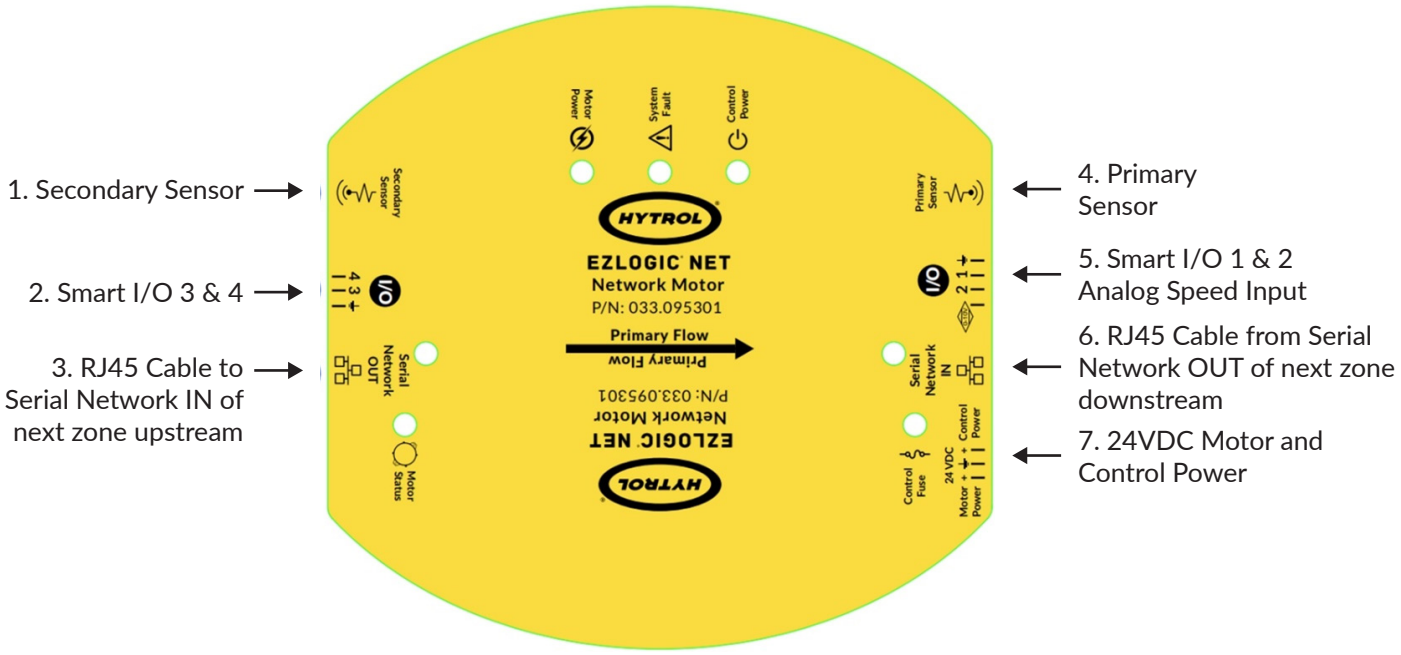
9.1 Molex P/N 172256-3103
Used with Ultra-Fit Crimp Terminals 18-16 AWG
0.38 µm Gold (Au) Plating P/N 172253-6011,
0.76 µm Gold (Au) Plating P/N 172253-6012, or
Tin (Sn) Plating P/N 172253-7023

10) Micro SD Card: Storage for firmware and configuration information.



3.2 NETWORK MOTOR CONNECTIONS

FIGURE 11: EZLOGIC® NET INTEGRATED NETWORK MOTOR



1) Secondary Sensor Connection: Photoeye input for the downstream edge of a Zone, when configured for the Reverse Flow Direction.

A. Pinout:
   I. Pin 1: N/C
   II. Pin 2: 24 VDC
   III. Pin 3: N/C
   IV. Pin 4: GND
   V. Pin 5: Sensor Input
   VI. Pin 6: N/C

1.1 RJ11, 6P4C, 24 VDC, PNP industry-standard

2) Smart I/O 3 & 4 Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions.

2.1 Phoenix Contact, Screwless-Leg Spring, 3-position plug, P/N 18813398

3) Serial Network OUT Connection: This is meant to connect to the next Zone upstream. Zone Controllers are daisy-chained together in series.

***3.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

4) Primary Sensor Connection: Photoeye input for the downstream edge of a Zone, when configured for the Forward (Normal) Flow Direction.

A. Pinout:
   I. Pin 1: N/C
   II. Pin 2: 24 VDC
   III. Pin 3: N/C
   IV. Pin 4: GND
   V. Pin 5: Sensor Input
   VI. Pin 6: N/C

5.1 RJ11, 6P4C, 24 VDC, PNP industry-standard

5) Smart I/O 1 & 2 and Analog Speed Input Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions. The Analog Speed Input uses a 0-10 VDC analog signal to control the motor speed of a Zone.

5.1 Phoenix Contact, Screwless-Leg Spring, 4-position plug, P/N 1881341

6) Serial Network IN Connection: This is meant to connect the next Zone downstream. Zone Controllers are daisy chained together in series. NOTE: If this is the discharge zone of a branch, the Serial Network IN connection should be connected to the Serial Network OUT connection of the Gateway.

***6.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

7) Motor and Control Power Input: 24VDC power for the motor, control, and Smart I/O

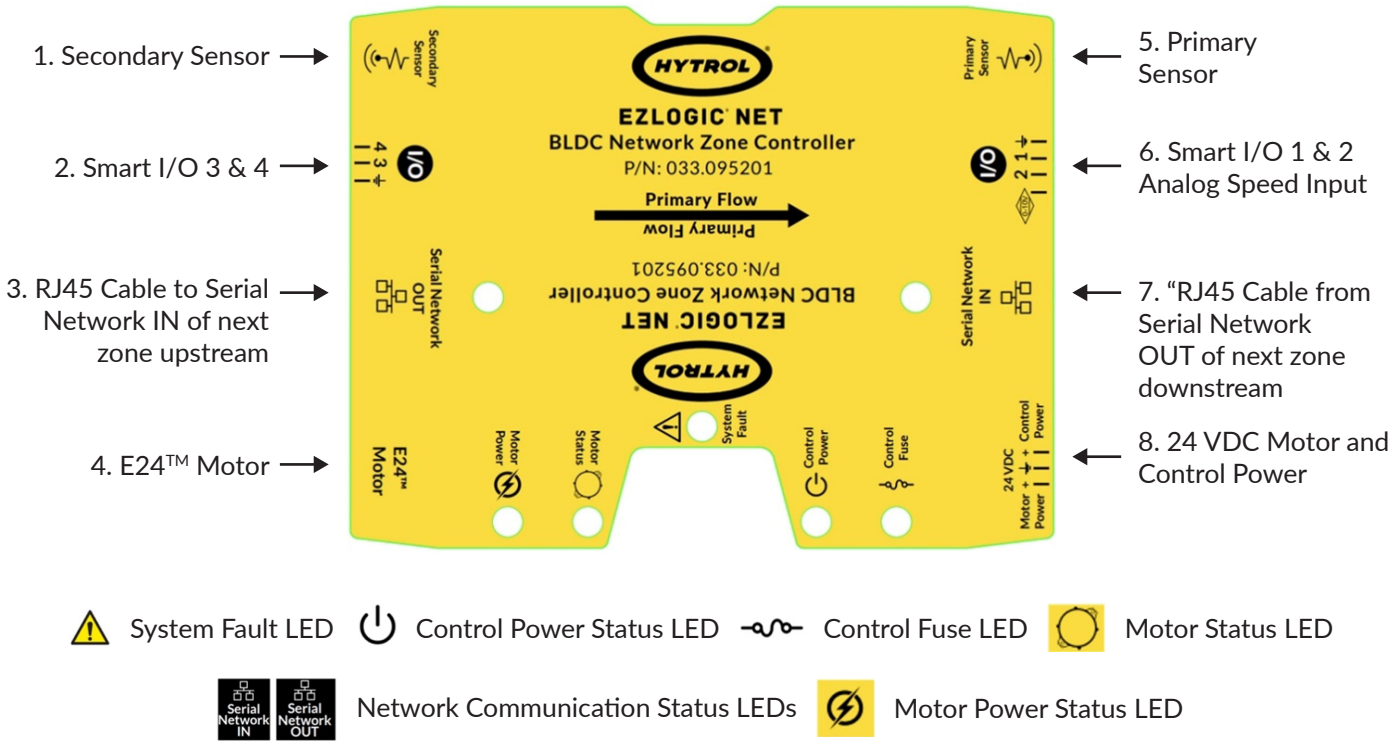
7.1 Molex P/N 172256-3103
Used with Ultra-Fit Crimp Terminals 18-16 AWG
0.38 µm Gold (Au) Plating P/N 172253-6011, 0.76 µm Gold (Au) Plating P/N 172253-6012, or Tin (Sn) Plating P/N 172253-7023

*CAUTION!

Although the Serial Network ports use a standard CAT6, RJ-45 Ethernet cable, be advised that these ports are NOT used for Ethernet communications. These ports should ONLY be used for connection to adjacent Zones within an EZLogic® NET system.

3.3 ZONE CONTROLLER CONNECTIONS

FIGURE 12: ZONE CONTROLLER CONNECTIONS



1) Secondary Sensor Connection: Photoeye input for the downstream edge of a Zone, when configured for the Reverse Flow Direction.

A. Pinout:
   I. Pin 1: N/C
   II. Pin 2: 24 VDC
   III. Pin 3: N/C
   IV. Pin 4: GND
   V. Pin 5: Sensor Input
   VI. Pin 6: N/C

1.1 RJ11, 6P4C, 24 VDC, PNP industry-standard

2) Smart I/O 3 & 4 Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions.

2.1 Phoenix Contact, Screwless-Leg Spring, 3-position plug, P/N 18813398

3) Serial Network OUT Connection: This is meant to connect to the next Zone upstream. Zone Controllers are daisy-chained together in series.

***3.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

4) Motor Connection: Motor connection for any E24™ motor. The motor contains this plug. It is listed here for reference.

4.1 Molex, Ultra-Fit, 10-pos plug
P/N: 172258-3110

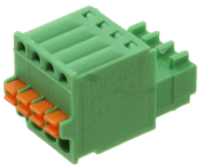
5) Primary Sensor Connection: Photoeye input for the downstream edge of a Zone, when configured for the Forward (Normal) Flow Direction.

A. Pinout:
   I. Pin 1: N/C
   II. Pin 2: 24 VDC
   III. Pin 3: N/C
   IV. Pin 4: GND
   V. Pin 5: Sensor Input
   VI. Pin 6: N/C

5.1 RJ11, 6P4C, 24 VDC, PNP industry-standard

6) Smart I/O 1 & 2 and Analog Speed Input Connections: General-purpose, 24 VDC I/O, that can be used as an extension of a PLC, or configured to one of several built-in functions. The Analog Speed Input uses a 0-10 VDC analog signal to control the motor speed of a Zone.

6.1 Phoenix Contact, Screwless-Leg Spring, 4-position plug, P/N 1881341



7) Serial Network IN Connection: This is meant to connect the next Zone downstream. Zone Controllers are daisy chained together in series. NOTE: If this is the discharge zone of a branch, the Serial Network IN connection should be connected to the Serial Network OUT connection of the Gateway.

***7.1** RJ45, 8P8C, CAT6 (or better), Ethernet cable

8) Motor and Control Power Input: Motor and Control Power Input: 24VDC power for the motor, control, and Smart I/O

8.1 Molex P/N 172256-3103

Used with Ultra-Fit Crimp Terminals 18-16 AWG

0.38 µm Gold (Au) Plating P/N 172253-6011, 0.76 µm Gold (Au) Plating P/N 172253-6012, or Tin (Sn) Plating P/N 172253-7023

*CAUTION!

Although the Serial Network ports use a standard CAT6, RJ-45 Ethernet cable, be advised that these ports are NOT used for Ethernet communications. These ports should ONLY be used for connection to adjacent Zones within an EZLogic® Net system.

*CAUTION!

Although the Serial Network ports use a standard CAT6, RJ-45 Ethernet cable, be advised that these ports are NOT used for Ethernet communications. These ports should ONLY be used for connection to adjacent Zones within an EZLogic® NET system.

CAUTION!

Power must be applied with proper polarity to avoid potentially damaging the system. All EZLogic® NET wiring harnesses will have grey overmolds on the end connector. The EZLogic® NET wiring harnesses should never be connected to a previous generation of EZLogic® wiring harness (Figure 9),

FIGURE 13: GREY/BLACK HARNESS CONNECTION

CAUTION!

Do not cross wiring of the communication cables. The left side of the zone must connect to the adjacent zone on the left, and the right side of the zone must connect to the adjacent zone on the right.

IMPORTANT!

When adjacent zones are operating from separate power supplies, connect their DC grounds. However, do not connect their positive voltage pins together.

NOTE:

The direction of motor rotation is defined as viewed from the back side of the motor with the shaft extending away from the viewer.

3.4 24 VDC INPUT CONNECTION HEADER

CAUTION!
Power must be applied with proper polarity to avoid potentially damaging the controller. Follow the pinout shown below.

CAUTION!
Apply power after all other connections have been made.

EZLogic® NET operates from 22 to 28 VDC power. Two power inputs are provided, such that motor power can be disconnected, typically with an Emergency Stop control (E-Stop), without disconnecting the logic:

1. **Control Power:** This input provides power to the Zone communications as well as the Smart I/O.
2. **Motor Power:** This input provides power only to the motor.

FIGURE 14: EZLOGIC® NET ZONE CONTROLLER POWER INPUT

Dual Power Supply for each Control and Motor:
In this scenario, two power supplies are used. One is for the Control (which includes the microprocessor and Smart I/O power), and the other is only for the Motor. This allows for the internal network communications to continue in the event that motor power is lost or intentionally removed. A PLC, for example, can still obtain Zone information in this scenario

IMPORTANT!
When adjacent zones are operating from separate power supplies, connect their DC grounds. However, do not connect their positive voltage pins together.

3.5 FIELDBUS CONNECTIONS

Two RJ45 jacks are provided for Fieldbus connections to an EtherNet/IP-compatible device (typically a PLC). These connections are wired as an Ethernet switch and can be used to daisy-chain from one Gateway to the next.

3.6 BRANCH BLOCK DIAGRAM

Two RJ45 jacks are used to daisy chain the connection from Zone-to-Zone.

FIGURE 15: ZONE-TO-ZONE WIRING - DETAIL VIEW

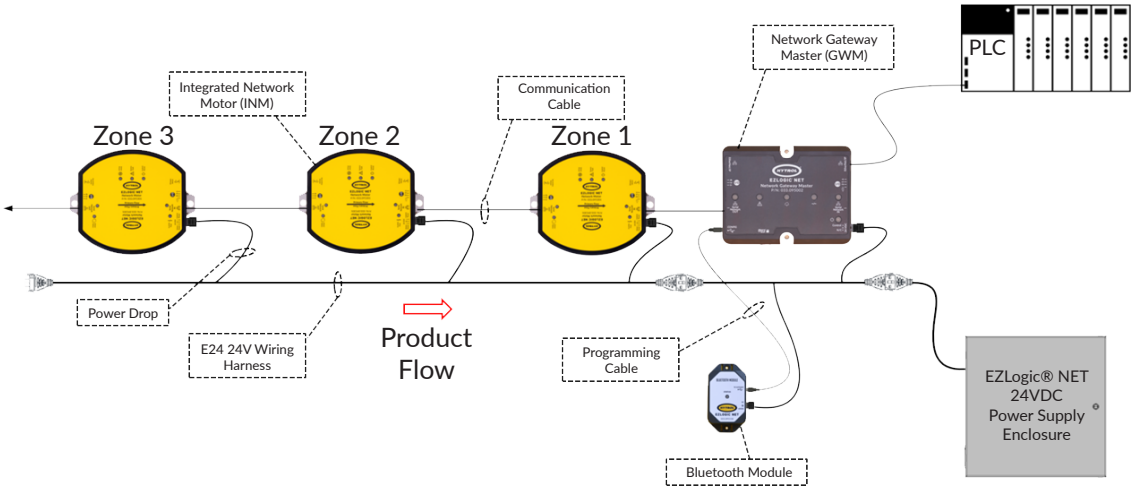


FIGURE 16: ZONE-TO-ZONE WIRING - BRANCH VIEW

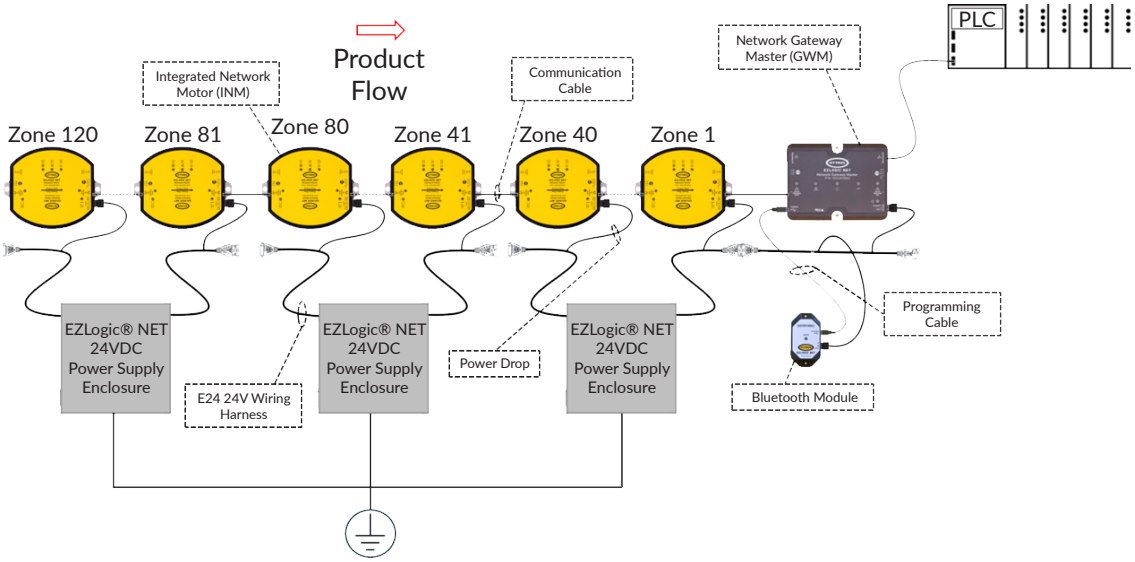
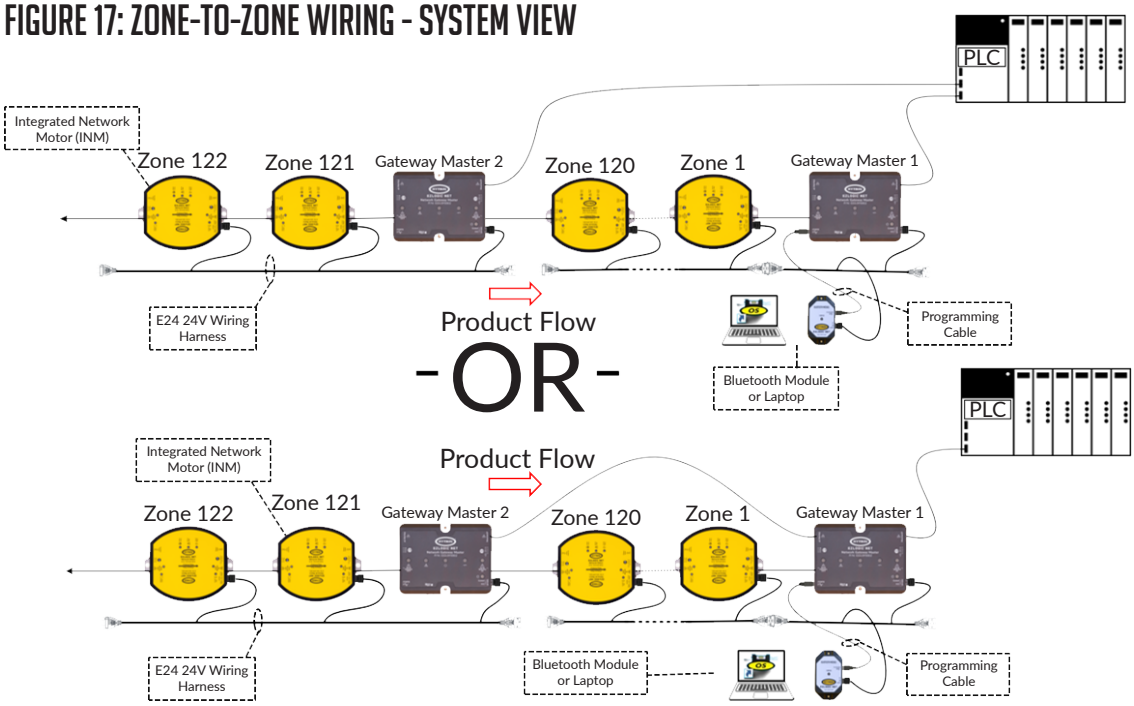


FIGURE 17: ZONE-TO-ZONE WIRING - SYSTEM VIEW



CAUTION!

Do not cross wiring of the communication cables. The left side of a Zone must connect to the adjacent zone on the left, and the right side of the zone must connect to the adjacent zone on the right. Zones should be connected as shown above.

CAUTION!

Although the Serial Network ports use a standard RJ45, 8P8C, CAT6 Ethernet cable, be advised that these ports are NOT used for Ethernet communications. These ports should ONLY be used for connection to adjacent Zones within an EZLogic® NET system.

NOTE:

There is a maximum cable length of 100ft to ensure high speed communications amongst the serial communications.

3.7 USB CONNECTION

A mini-USB connection is provided on the Gateway Master, for product firmware updates and system configuration via EZLogic®OS.

3.8 ZONE COUNT

At power-up, Zone Controllers are automatically enumerated beginning with Zone #1 (connected to the Gateway), and then moving upstream. The Gateway can be configured to either “Auto Detect” the zone count or the zone count can be manually entered. Auto detection allows the zone count to be automatically adjusted as zones are added or removed from a branch. Manual configuration allows the user to input the total expected number of zones and EZLogic® NET will verify if the actual number zones discovered matches the manual input value. This can be used to alert if a connection is broken in the network.

3.9 SD CARD

A micro SD Card is provided to store the complete configuration of a Branch. The card contains both firmware for the devices on the Branch, and also each Zone’s specific configuration. Should a Gateway fail, simply remove its SD Card and insert it into a new Gateway. Hold the Reset button for (3) seconds, and the new Gateway will copy the SD Card contents into memory (Reference Figure 4 for reset button location). The Branch will perform as expected.

3.10 FIRMWARE UPDATES

PROCEDURE

When a new firmware version is released, the process to update a Branch is simple:

1. Insert the SD card into a PC
2. Copy the ‘EZLogicNET-update.mec’ file onto the card and overwrite the existing file.
3. With power OFF, insert the SD card into the Gateway.
4. Now power up the Branch, and the blue Update Status LED on the Gateway will illuminate while the update is in process.
5. When the update is complete, the Branch will begin operating per its configuration.

*NOTE: All components in a Branch will be updated with this new version of firmware. The existing firmware contained in a particular component will be overwritten.

Also, if you ever must replace one of the components in a Branch, that device will automatically be updated with the firmware from the Gateway. So for example, if you had to replace a Zone Controller:

1. Swap the damaged card for a different one
2. Press the Reset button to force a reboot of the Branch. The blue Update Status LED on the Gateway will illuminate while the Zone Controller update is in process.
3. When the update is complete, the Branch will begin operating per its configuration.

Optionally, you could also power down the Branch prior to swapping the Zone Controller.

3.11 GATEWAY/MASTER SD CARD SETUP

Required Tools

- diskpart[2]

SDCard Support

The sdcard must be formatted with VFAT or FAT32[3]. Sdcards must either be 4GB or less or must be partitioned with a single primary partition that is 4GB or less. The easisest way to ensure the SD Card is formatted correctly is to use an "HC" type card which will always be formatted with FAT32.

Partitioning

If using an SD Card that is not supported, you will need to partition the card to have a single primary partition <= 32GB in size as follows.

WARNING!

This will destroy all data on your card. Make sure you are selecting the correct drive and ensure that there is no data that you care about on the card!

NOTE:

A Gateway should not be operated without an SD Card in its respective port.

- Open diskpart, type ***diskpart*** into windows search bar and then right clock on the command and select "Run as administrator".
- Type ***list disk*** and then press <enter>. This will list all disks on the computer.
- Type ***select disk N*** and then press <enter> where N is the number of your sdcard in the list.
- Type ***clean*** and then press <enter>
- Type ***create partition primary size=4000*** and then press <enter>
- Type ***format fs=fat32 quick*** and then press <enter>

The card should now be ready to use.

[2] https://learn.microsoft.com/en-us/windows-server/administration/windows-commands/diskpart
[3] https://learn.microsoft.com/en-us/windows/win32/fileio/filesystem-functionality-comparison

3.12 APPLICATION INFORMATION

**Note: The following information is provided as a guide, to aid in system application development. Actual results regarding motor performance, stopping distance, etc., depends on the nature and quality of the load, motor-to-roller transmission coupling, motor sheave, belt or o-ring tension, quality of the roller bearings, roller surface material, ambient temperature, etc. Therefore, the overall system design is the responsibility of the customer.*

- A Branch is made up of at least (1) Zone Controller/Network Motor and a Gateway Master.
- Identify the proper direction of rotation for each motor to move packages from the upstream (infeed) end of the conveyor to the downstream (discharge) end … depends on motor mounting orientation.
- The motor is typically placed in the middle of the zone.
- The Primary Sensor is used as a product detection input signal when package flow is in the primary flow direction
- The Secondary Sensor is used as a product detection input signal when package flow is in the reversed direction respective to the primary flow.
- The photoeye sensor should be a 24 VDC PNP, where the output is 24 VDC when a package is detected.
- The recommended photoeye sensor placement is typically ~6” at <100 fpm, with respect to the downstream edge of the zone. The sensor position is determined by factors such as the speed and weight of the object. Heavier loads at higher speeds require greater distance to stop moving.
- Maximum load current of the Transducer should be <150 mA.
- Mount the control where there is adequate heatsink and no strain on the cable connections.
- Maximum load current of the Smart I/O is 300 mA.
- Operating Temperature range:

Control Temperature Limits		
Condition	Minimum Ambient	Maximum Ambient
Operating (control mounted on metal)	-4°F (-20°C)	122°F (50°C)

3.13 GATEWAY LOCATION INFORMATION

- Gateways should always be connected to the discharge end of the branch.
- There should be no more than 100ft. of cable between the discharge zone and the gateway.
- Each Gateway can communicate to up to 120 Integrated Network Motors or Zone Controllers in a daisy chain topology.
- In applications of transfers, merges, PPD's, etc. an additional Gateway may be required for correct logic and handshaking signals to be passed.
- In cases where there are multiple conveyor sections (with their own respective infeed and discharge zones) on one Branch, "breaking" the logic chain may be needed to get the infeed and discharge zones to operate as such . An example of this application would be a trunk line with takeaway fingers.
    - "Breaking" the logic chain can be done by assigning the following Smart I/O:
        - For the zone you intend to be the infeed zone, set the zone's Transportation Mode to Singulate, Slug, or ZIP. Then, for the same zone, configure a Smart I/O channel to be a Forward Request/Reverse Permission Input. Set this configuration to Active Low. This will send a Request signal to the zone even when product is not present so that this zone does not fall asleep. Product will still accumulate normally under this condition.
        - For the zone intended to be the discharge zone of a conveyor section, within a Branch with multiple conveyor sections, set the zone's Transportation Mode to Singulate, Slug, or ZIP. Then, for the same zone, configure a Smart I/O channel to be a Zone Stop. This will send a Request signal to the zone even when product is not present.
            - This configuration set up is valid for a discharge zone of a conveyor section that will be connected to another conveyor section's infeed zone. This set up is not valid for the discharge zone of the complete conveyor branch. For the discharge zone of the entire branch, see below.
        - For the zone intended to be the discharge zone of the conveyor branch, no Smart I/O assignment is required. Simply set the Transportation Mode to Singulate, Slug, or ZIP and the conveyor section should act as intended.

- The following applications will use the set-up instructions previously outlined. It should also be noted that when wiring a system with multiple conveyor sections in one Branch, on Gateway, the communication cables will be routed from the discharge of one conveyor section to the infeed of the next.

FIGURE 18: TRUNK LINE WITH TAKEAWAY FINGERS APPLICATION

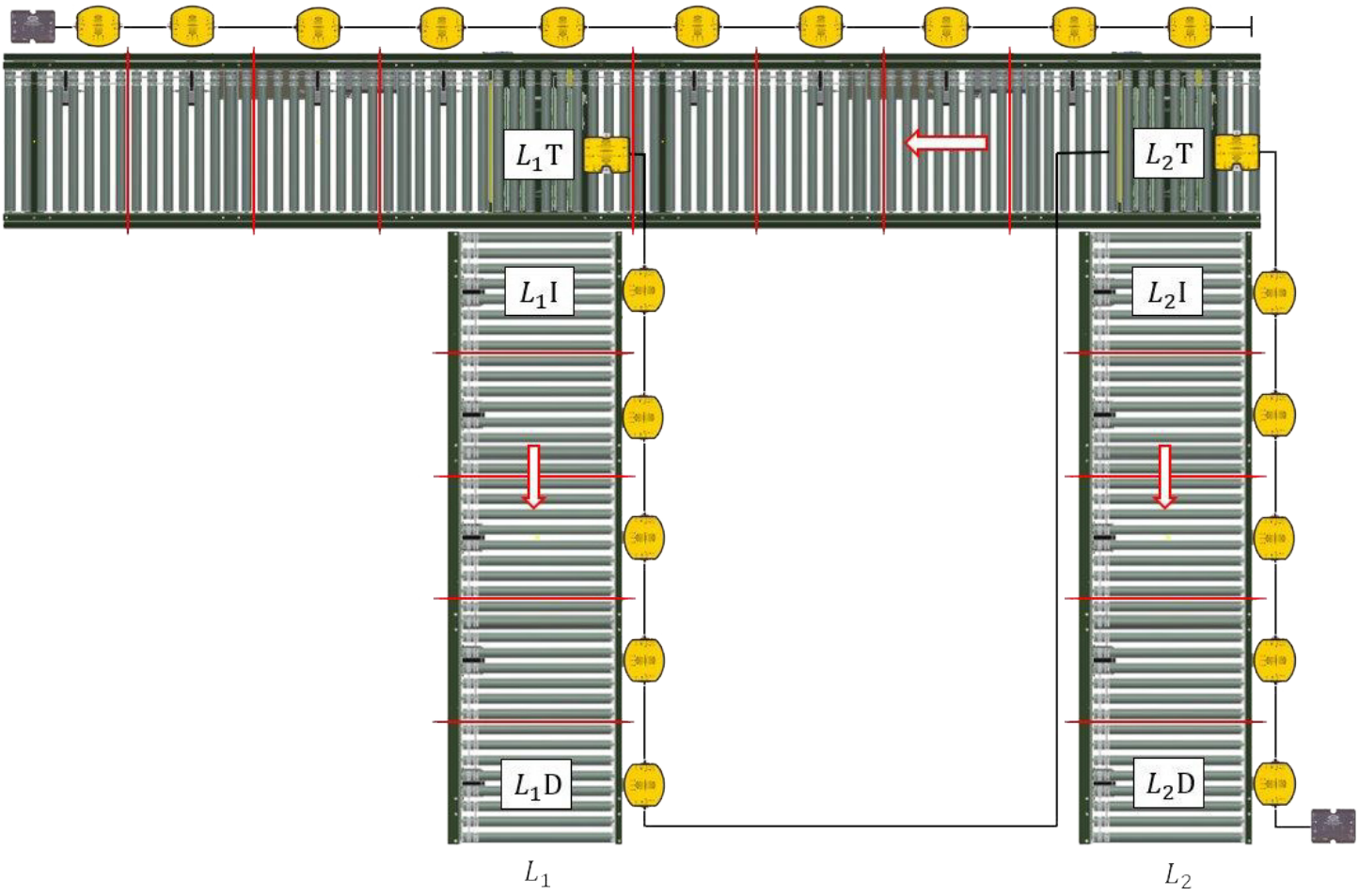
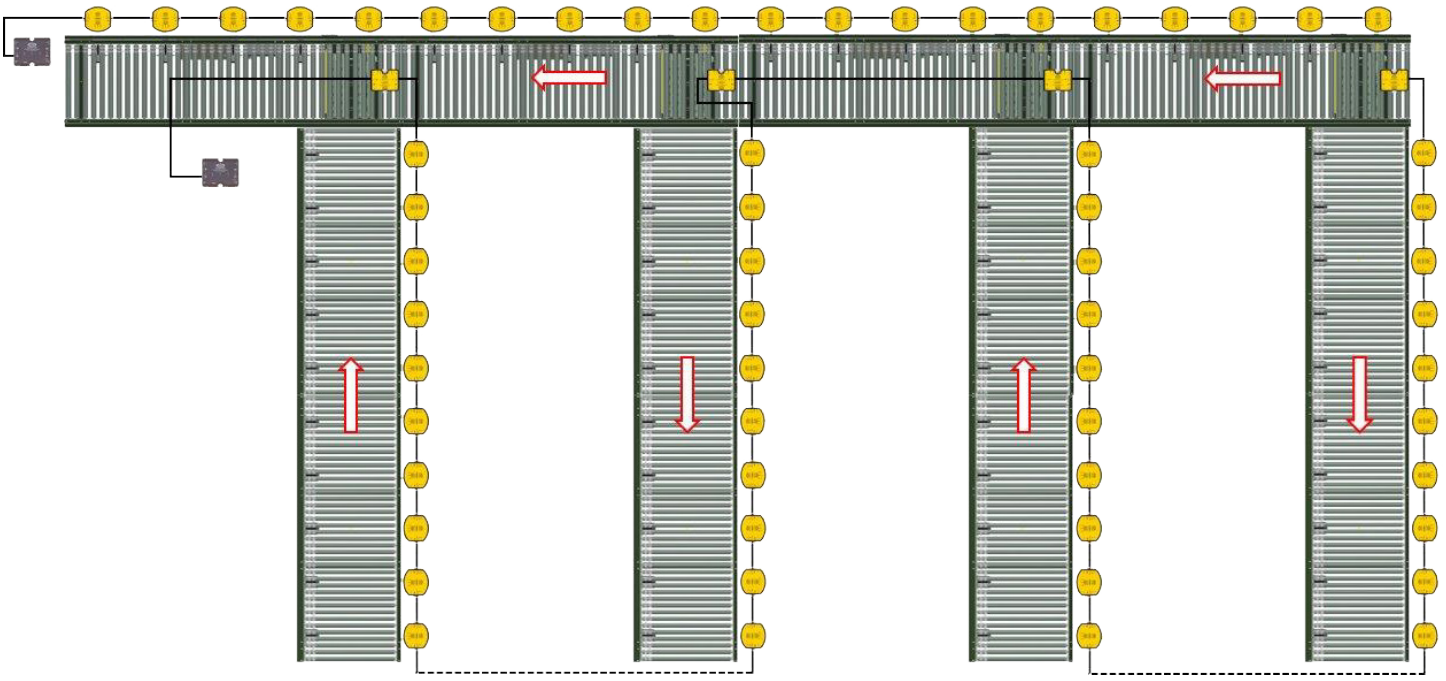


FIGURE 19: TRUNK LINE WITH TAKEAWAY AND FEEDER FINGERS



L_1T:
- Transportation Mode: Disabled
- Control strands with I/O or PLC

L_1I:
- Transportation Mode: Sing/Slug
- Smart I/O: Fwd Request Input; Active Low

L_1D:
- Transportation Mode: Sing/Slug
- PLC or Smart I/O: Zone Stop

*L*2T:
- Transportation Mode: Disabled
- Control strands with I/O or PLC

L_2I:
- Transportation Mode: Sing/Slug
- Smart I/O: Fwd Request Input; Active Low

L_2D:
- Transportation Mode: Sing/Slug

4 REFERENCE TABLES & GRAPHS

This section provides reference tables for all of the user-configurable features through EZLogic®OS.

4.1 APPLICATION INFORMATION

TABLE 1: GATEWAY MASTER CONFIGURATION

Parameter:	Description:	Settings:
Branch Zone Count	Defines the number of Zones in a Branch. If set to zero then the Branch will operate with whatever number of Zones it finds, otherwise a fault will be generated if the number of Zones discovered does not match this Branch Zone Count value.	**Min:** 0 **Max:** 120 **Default:** 0 = Auto-Detect
Branch Reverse Flow	This feature reverses the Branch package flow direction. The installation of the Secondary Sensor is required for proper operation, as it will be the downstream sensor.	**Min:** Forward **Max:** Reverse **Default:** Forward
Smart I/O 1	See Table 6: Gateway Master Smart I/O Assignment Options	**Default:** Network Input
Smart I/O 2		**Default:** Network Input
Smart I/O 3		**Default:** Network Input
Smart I/O 4		**Default:** Network Input
DHCP Enable	Enable Dynamic Host Configuration Protocol (DHCP) for automatic configuration of the EtherNet/IP. Disable this option for manual, static configuration.	**Min:** Disabled **Max:** Enabled **Default:** Disabled
Net Static IP Address	Contains the manual configuration of the IP address when DHCP is disabled.	**Default:** 192.168.1.2
Net Static Netmask Address	Contains the manual configuration of the Netmask address when DHCP is disabled.	**Default:** 255.255.255.0
Net Static Gateway Address	Contains the manual configuration of the Gateway address when DHCP is disabled.	**Default:** 192.168.1.1

4.2 TRANSPORTATION MODES

TABLE 2: TRANSPORTATION MODES

Parameter:	Description:	Settings:
Transportation Mode	The Transportation Mode can be set at the Branch level (applied to all Zones) or for each individual Zone: • **Dsbl (Disable):** Zone motor is disabled. To prevent automatic Branch operation following a loss of power, this mode prevents the Branch from automatically starting. • **Kill:** Zone activity is immediately stopped and the motor is driven to hold position. • **Slug:** Zone mode where the Zone is set to run and does not control spacing between objects. If the downstream Zone is in accumulation, then the object will be held. • **ZIP:** Zone operation mode that increases throughput (at the cost of assuring objects never touch) by allowing a second object to enter a Zone once the first object has been transported to the downstream-edge photoeye sensor. Note that the end result is a gap between objects equal to the Zone length less the object length. • **Sing (Singulate):** A transportation technique that assures that objects are separated (i.e. "singulated") by some minimum distance. This Zone operation mode ensures objects never touch and that there is one object per zone. Also known as Zero Pressure Accumulation (ZPA). • **Run:** Zone runs under all circumstances, without regard to the photoeye sensors.	Dsbl Kill Slug ZIP Sing Run **Default:** Dsbl

4.3 ZONE CONFIGURATION

TABLE 3: ZONE CONFIGURATION OPTIONS

Parameter:	Description:	Settings:
Motor Speed	Controls the Zone speed in % of full scale. This setting is dependent upon the Motor Selection. See Table 4: Motor Performance Specifications for more configuration information. ***NOTE:** The speed of the Zone can also be controlled locally by a 0-10 VDC analog signal (Speed In of the I/O connector on the Zone Controller). The signal must be over 0.5 VDC to enable analog speed control. **Voltage** / **Operation** <0.5 VDC: All Zones operate at configured speed 0.5 to 9.0 VDC: All Zones' speed is proportional to the input within the full range of the motor selected >9.0 to 24 VDC: All Zones operate at full speed	**Min:** 0 % **Max:** 100 % **Default:** 100 %
Transportation Mode	See Table 2: Transportation Modes	

Zone Reverse	The normal flow of direction moves packages from infeed to discharge (towards the Gateway). This feature reverses package flow. ***NOTE:** The installation of the Secondary Sensor is required for proper operation. The Secondary Sensor will then be the downstream sensor.	**Min:** Forward **Max:** Reverse **Default:** Forward
Zone Hold	When in Slug, ZIP, or Singulate, this feature will hold the package that is detected by the photoeye sensor.	**Min:** Off **Max:** On **Default:** Off
Zone Half-Speed	This feature is meant to help prevent certain top-heavy objects from tipping over by reducing the transport speed to half, if the object is not guaranteed to make it through the Zone without needing to stop based on the situation when the object enters a Zone. When enabled in Singulate or ZIP mode, if the downstream Zone is not empty at the time that an object is entering, then the target speed is cut in half for the duration of this object in the Zone.	**Min:** Off **Max:** On **Default:** Off
Local Speed Inhibit	When active, this causes the local analog input to be ignored and makes the speed of the Zone to the default network speed.	**Min:** Off **Max:** On **Default:** Off
Current Limit	Defines the maximum allowable motor current. Reducing the current will correspondingly reduce the available torque. This setting is dependent upon the Motor Selection. See Table 4: Motor Performance Specifications for more configuration information.	**Min:** 1.0 A **Max:** 7.5 A **Increment:** 0.1 A **Default:** 4.0 A
Jam Protection Timer	When a Zone is discharging a box (that is, the motor is running) and the box remains at the downstream sensor for longer than the defined timeout period.	Min: 1 sec Max: 30 sec Default: 2
Parameter:	**Description:**	**Settings:**
Lost Box Timer	When an object leaves the upstream Zone but does not reach the downstream sensor within the defined timeout period, the Zone will consider the box lost and once again give permission upstream.	**Min:** 1 sec **Max:** 30 sec **Default:** 2 sec
Loading Zone Function	When in Singulate mode, the Zone holds an object placed at (as opposed to being transported to) the downstream-edge sensor for a fixed time delay, the idea being to allow placement of a box without the zone running and interfering with the placement mechanism.	**Min:** 0 sec (Disabled) **Max:** 60 sec **Default:** 0 sec
Unloading Zone Function	When in Singulate mode, this feature holds off the upstream for a fixed amount of time after an object leaves (exits or is grabbed from) its downstream-edge sensor, to allow a mechanism to grab a box without the zone running.	**Min:** 0 sec (Disabled) **Max:** 60 sec **Default:** 0 sec
Cascade Slug Release	A feature for Slug mode where there is a delay releasing held objects, and the idea is to insert a bit of space between objects. When an object that is being held (is accumulated) is to be released, there is a delay between starting the motor and giving permission to the upstream zone.	**Min:** 0 msec (Disabled) **Max:** 2500 msec **Increment:** 10 msec **Default:** 0 msec
Accumulation Delay Timer	When in Singulate mode, this feature ensures an object passes a specific sensor point by delaying accumulation for a defined time period. Often used on incline conveyors, to allow a package to travel for a short time after detected by the Zone sensor.	**Min:** 0 msec (Disabled) **Max:** 2500 msec **Increment:** 10 msec **Default:** 0 msec

Continued >>

Transport Delay Timer	When in Slug mode, this feature delays giving upstream permission until one of the following occur: • The delay timer expires • OR, the downstream sensor is triggered This is to occur only when the downstream zone is running (and not if the downstream zone is holding, or accumulated).	**Min:** 0 msec (Disabled) **Max:** 2500 msec **Increment:** 10 msec **Default:** 0 msec
Smart I/O 1	See Table 6: Zone Smart I/O Assignment Options	**Default:** Motor Running Output
Smart I/O 2		**Default:** FwdPerm/ RevReq Output
Smart I/O 3		**Default:** FwdReq/ RevPerm Output
Smart I/O 4		**Default:** Network Input
Motor Type	Defines the type of motor for the zone. See Table 4: Motor Performance Specifications for more configuration information.	25W Motor 48W Motor 60W Motor 80W Motor 100W Motor 120W Motor **Default:** 60W Motor
Sleep Timer	When an object leaves a Zone (passes the downstream zone sensor), and there are no upstream objects that result in the motor needing to run, then the motor continues to run a short "motor run-on time" period, the idea being to handle any stray objects that might be present.	**Min:** 0 sec (Disabled) **Max:** 60 sec **Default:** 2 sec
Parameter:	**Description:**	**Settings:**
Run Delay Time	This timer delays a Zone from running after its upstream Zone requests entrance. When a Zone is accepting an object, it will not run until the Run Delay timer has expired or the Lost Box Timer expires. This feature was designed to handle an L-merge, whereby a box is pushed onto another lane, and that Zone must wait until the upstream zone has enough time to fully push the box into the Zone. It acts like a simplified transfer mechanism.	**Min:** 0 msec (Disabled) **Max:** 2500 msec **Increment:** 10 msec **Default:** 0 msec
Sensor Invert	This feature will invert the output signal from the proximity sensors. This allows the use of Light-On or Dark-On sensors.	**Min:** Off **Max:** On **Default:** Off (an active-high sensor signal indicates a package is detected)
Motor Rotation Direct Invert	This feature will invert the normal motor rotational direction. **NOTE:** The direction of rotation is defined as viewed from the back side of the motor with the shaft extending away from the viewer.	**Min:** Off **Max:** On **Default:** Off (motor rotates clockwise when viewing the back side, shaft facing away from viewer)

Continued >>

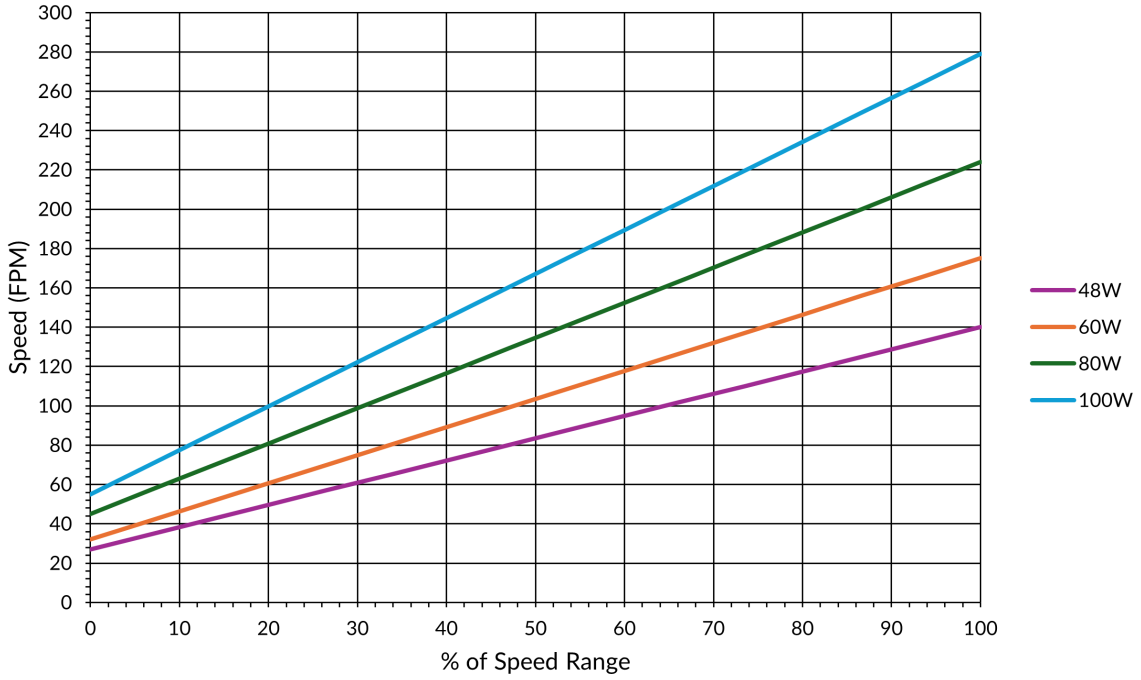
Startup Current Limit	Defines the maximum allowable motor current when starting the motor from a complete stop. Reducing the current will correspondingly reduce the available torque. This setting is dependent upon the Motor Type. See Table 4: Motor Performance Specifications for more configuration information.	**Min:** 1.0 A **Max:** 9.0 A **Increment:** 0.1 A **Default:** 9.0 A
Startup Current Time	Defines the time duration that the Startup Current Limit will be active. After this time, the regular Current Limit will take effect. For example, a motor can be configured to operate at 4.0 A for 2.5 sec to initially get started, and then the current limit would switch to 2.0 A.	**Min:** 1.0 sec **Max:** 3.0 sec **Increment:** 0.1 sec **Default:** 2.0 sec
Overload Current	Defines the current level threshold that you determine is when O-Ring slip occurs.	**Min:** 0.2 A **Max:** 15 A **Increment:** 0.1 A **Default:** 1.2 A
Reset	This is the current level threshold where you want the O-Ring Slip notification to clear.	**Min:** 0.2 A **Max:** 15 A **Increment:** 0.1 A **Default:** 1.0 A
Overload Time	This is the time that the motor current must be equal to, or greater than the O-Ring Slip Current, then the notification bit is set. An example: • O-Ring Slip Current Limit = 1.9 A • O-Ring Slip Clear Current Limit = 1.7 A • O-Ring Slip Current Limit Time = 10 sec • If the motor current is equal to or greater than 1.9 A, the 10 sec timer starts counting. • If the motor current falls below 1.9 A, then the timer will reset. • If the motor current stays above 1.9 A, the timer will continue to count and if it reaches 10 sec, then you'll get the O-Ring Slip notification. Once you have reached this point, the motor current must fall below 1.7 A to clear the notification.	**Min:** 0 sec (Disabled) **Max:** 30 sec **Increment:** 1 sec **Default:** 5 sec

4.4 MOTOR PERFORMANCE

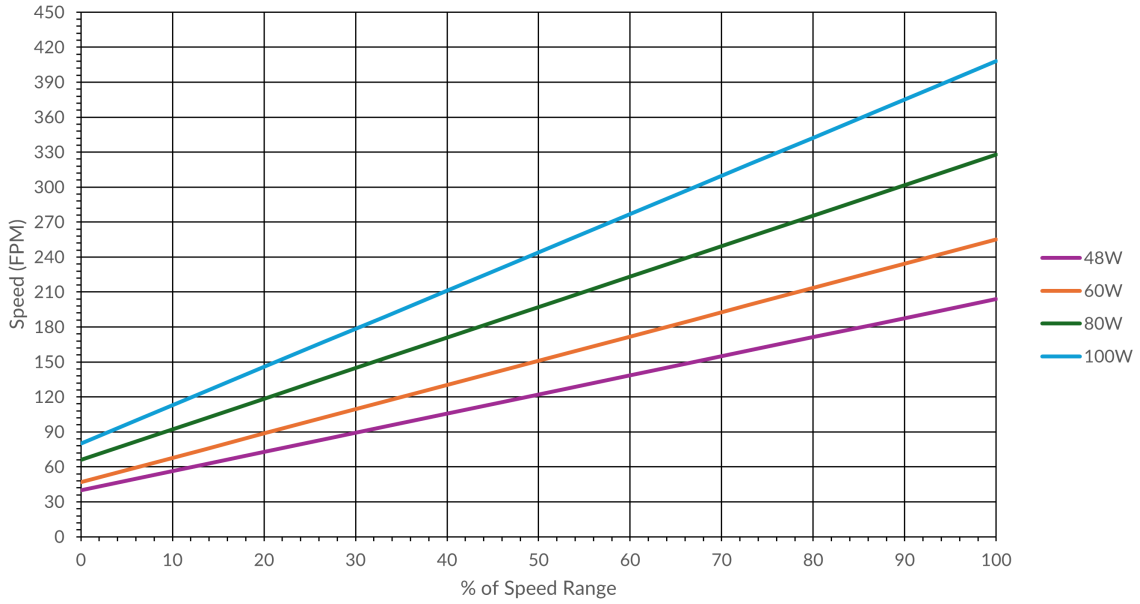
TABLE 4: MOTOR PERFORMANCE SPECIFICATIONS

Output Power (W)	Speed Range (RPM)	Speed Range - Std Spool (FPM)	Speed Range - Spd Up Spool (FPM)	Rated Torque (in-lbf)	Current Limit Configuration Range (A)
25	70-350	35-175	51-255	8	1.0-3.0
48	56-280	28-140	41-204	15	1.0-4.0
60	70-350	35-175	51-255	15	1.0-5.0
80	93-450	46-224	67-328	15	1.0-6.0
100	112-560	56-279	82-408	15	1.0-7.0
120	140-700	70-349	102-510	15	1.0-7.5

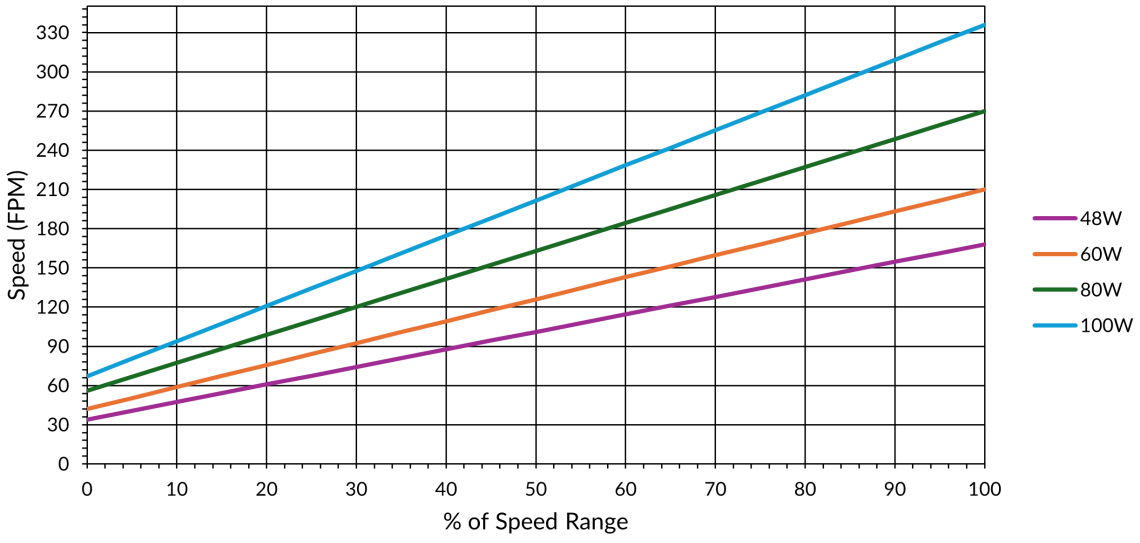
GRAPH 1: STANDARD SPOOL



GRAPH 2: SPEED UP SPOOL



GRAPH 3: BZ'S



4.5 GATEWAY MASTER SMART I/O ASSIGNMENT OPTIONS

TABLE 5: GATEWAY MASTER SMART I/O ASSIGNMENT OPTIONS

Parameter	Description
Local Speed Inhibit In	When active, this signal causes the local analog input to be ignored and the Zone speed reverts back to the default network speed.
Branch OpMode: Forced Run In	When active, this signal will change the respective OpMode on all Zones in a Branch.
Branch OpMode: Kill In	When active, this signal will change the respective OpMode on all Zones in a Branch.
Branch OpMode: Slug In	When active, this signal will change the respective OpMode on all Zones in a Branch.
Branch OpMode: ZIP In	When active, this signal will change the respective OpMode on all Zones in a Branch.
Branch OpMode: Sing (ZPA) In	When active, this signal will change the respective OpMode on all Zones in a Branch.
Branch Reverse In	When active, this signal will cause all Zones in the Branch to operate in Reverse Package Flow. When inactive, the Branch will operate in Forward Package Flow.
Network In	This function provides a general-purpose input that can be used as an extension to a PLC.
Supply Out	This signal is always active with the intent of providing 24 VDC power to an external device. This output can source 300 mA.
Branch No Fault Out	This signal is active when there are no faults reported in the Branch.
Network Output Bit 0	These (4) options provide general-purpose outputs that can be used as an extension to a PLC. There are (4) bits available, so any Smart I/O configured to the same output “Bit” number will change state accordingly. For example, Smart I/O 1 & 2 could be assigned to Network Output Bit 3. When “Bit 3” is toggled, Smart I/O 1 & 2 will change state.
Network Output Bit 1	
Network Output Bit 2	
Network Output Bit 3	
Branch Reverse Out	This signal mirrors the state of the Branch Reverse Input above.

4.6 ZONE SMART I/O ASSIGNMENT OPTIONS

TABLE 6: ZONE SMART I/O REASSIGNMENT OPTIONS

IMPORTANT!

All Smart I/O inputs and outputs, except the Analog Speed Input, are PNP only and are active at 18 VDC or higher. The maximum current available per output is 300 mA.

Parameter:	Description:
Forward Permission / Reverse Request In	Forward (normal) Flow Permission In from downstream: This signal grants permission to discharge from this zone. Reverse Flow Request In from upstream: This signal is a request to enter this zone. ***Note:** The Zone Controller will logically OR this Smart I/O signal with the normal zone-to-zone Permission/Request signal.
Forward Request / Reverse Permission In	Forward (normal) Flow Request from upstream: This signal is a request to enter this zone. Reverse Flow Permission from upstream: This signal grants permission to discharge from this zone. ***Note:** The Zone Controller will logically OR this Smart I/O signal with the normal zone-to-zone Permission/Request signal.
Primary Sensor In	This input will be logically OR'd with the input signal from the physical Primary Sensor.
Secondary Sensor In	This input will be logically OR'd with the input signal from the physical Secondary Sensor.
Motor Run In	When active, this signal will force the motor to run, regardless of the state of the Primary or Secondary Sensors, or the Transportation Mode selected.
Zone Kill In	When active, this signal will stop the motor immediately, and place the motor in Zero Motion Hold (ZMH).
Zone Hold In	When active, this signal will hold objects when they reach the downstream sensor.
Local Speed Inhibit In	When active, this signal causes the local analog input to be ignored and the zone speed reverts back to the default network speed.
Network In	This function provides a general-purpose input that can be used as an extension to a PLC.
Forward Permission / Reverse Request Out	Forward (normal) Flow Permission to upstream: This signal grants permission for entry into this zone. Reverse Flow Request to upstream: This signal is a request to discharge from this zone. ***Note:** The Zone Controller will logically OR this Smart I/O signal with the normal zone-to-zone Permission/Request signal.

Continued >>

Parameter:	Description:
Forward Request / Reverse Permission Out	Forward (normal) Flow Request to downstream: This signal is a request to discharge from this zone. Reverse Flow Permission to upstream: This signal grants permission to enter this zone. *__Note:__ The Zone Controller will logically OR this Smart I/O signal with the normal zone-to-zone Permission/Request signal.
Upstream Sensor Out	This signal is active when the upstream-edge sensor (based on Branch flow) is active. • Forward (normal) Flow: Secondary Sensor • Reverse Flow: Primary Sensor
Downstream Sensor Out	This signal is active when the downstream-edge sensor (based on Branch flow) is active. • Forward (normal) Flow: Secondary Sensor • Reverse Flow: Primary Sensor
Supply Out	This signal is always active with the intent of providing 24 VDC power to an external device. This output can source 300 mA.
Zone No Fault Out	This signal is active when there are no faults reported in the Zone.
Motor Running Out	This signal is active when the motor is running.
Object Held Out	This signal is active when an object is held, for any reason, at the downstream-edge sensor (based on Branch flow). • Forward (normal) Flow: Primary Sensor • Reverse Flow: Secondary Sensor
Network Output Bit 0	These (4) options provide general-purpose outputs that can be used as an extension to a PLC. There are (4) bits available, so any Smart I/O configured to the same output “Bit” number will change state accordingly. For example, Smart I/O 1 & 2 could be assigned to Network Output Bit 3. When “Bit 3” is toggled, Smart I/O 1 & 2 will change state.
Network Output Bit 1	
Network Output Bit 2	
Network Output Bit 3	
Pneumatic Control Out	This function provides a 24VDC signal to emulate the output of a pneumatic control.

5 EZLOGIC® OS

5.1 USING EZLOGIC® OS

For more information using the EZLogic® OS, please consult the EZLogic® Reference Guide.

6 PLC CONFIGURATION

6.1 GENERIC ETHERNET MODULE

Follow these steps to connect to and configure the EZLogic® NET Gateway as a generic Ethernet module to communicate with a PLC:

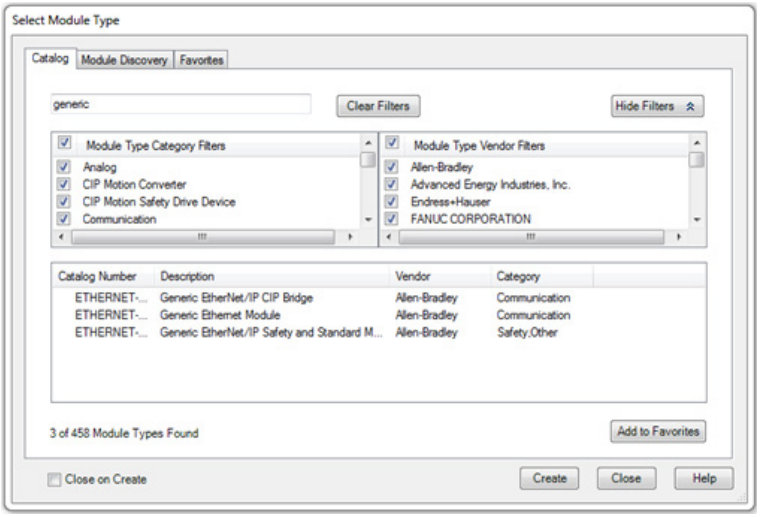
1. Connect and configure a PLC for EtherNet/IP connectivity to the EZLogic® NET Gateway. The following steps demonstrate a PLC test program using the RSLogix 5000/ Studio 5000 Logix Designer application for an Ethernet network consisting of an Allen-Bradley® CompactLogix PLC (1769-L16ER-BB1B) connected to an Ethernet module on the EZLogic® NET Gateway.

2. Click the File menu and choose New. Select the processor in the Type field.

3. Give the new controller a name and click OK.

4. Right-click Ethernet at the bottom left of the Controller Organizer (the expandable left pane) and choose a New Module. Search and select Generic Ethernet Module.

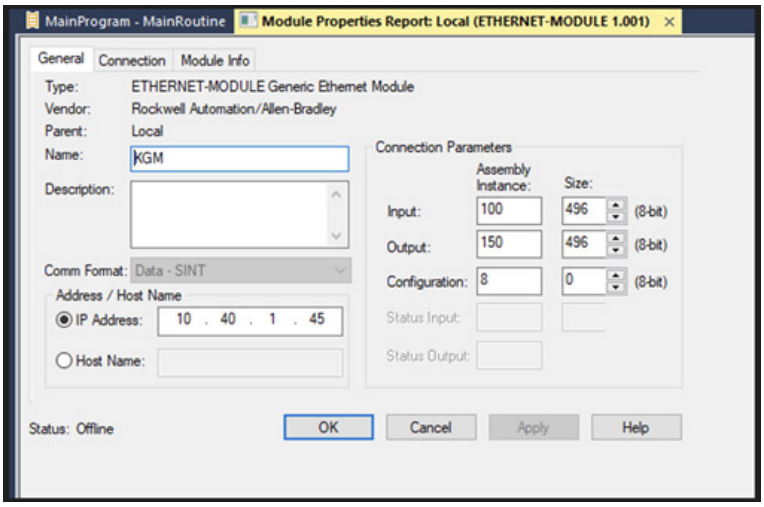
FIGURE 20: CHOOSE A NEW MODULE



5. Change Input and Output size to 496, the communication format to Data - SINT and the IP Address of the module.

6. Set the Assembly Instance Input to 100, the Assembly Instance Output to 150 and the Configuration to 8.

FIGURE 21: COMPLETED MODULE



7. Controller scope level tags will be created with the same name as the module.

6.2 INSTALLING AND USING THE EDS FILE

Follow these steps to connect and configure EZLogic® NET to a PLC using the proper Electronic Data Sheet (EDS) file.

1. Connect and configure a PLC for EtherNet/IP connectivity to the EZLogic® NET Gateway. The following steps demonstrate a PLC test program using the RSLogix 5000/ Studio 5000 Logix Designer application for an Ethernet network consisting of an Allen-Bradley® CompactLogix PLC (1769-L16ER-BB1B) connected to an Ethernet module on the EZLogic® NET Gateway.

2. Click the File menu and choose New. Select the processor in the Type field.

3. Give the new controller a name and click OK.

4. Install the EDS file using the EDS Hardware Installation Tool included with Logix Designer. Open the EDS Hardware Installation Tool and select "Register a single file" and then select the desired EDS file. See the figures below for details on installing this file. Do not edit the contents of this file.

FIGURE 22: EDS HARDWARE INSTALLATION TOOL

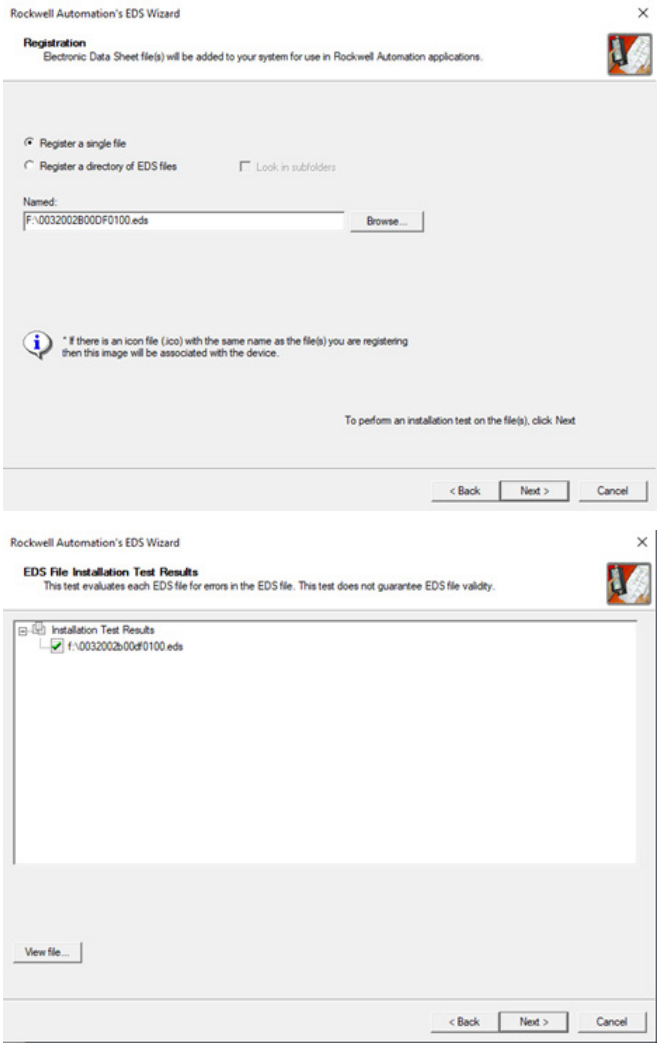
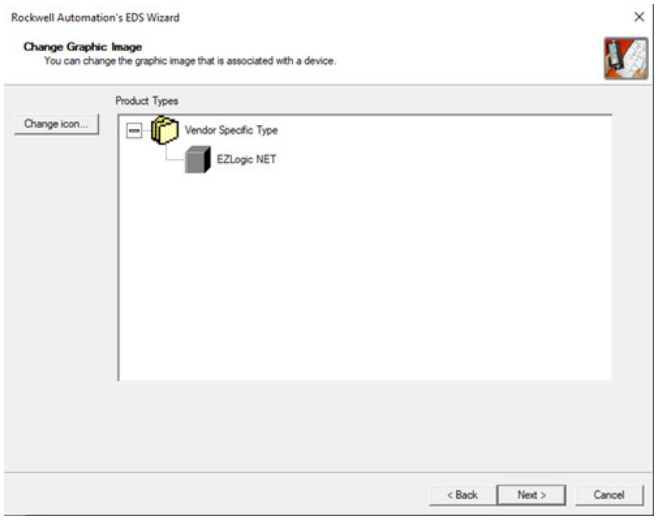


FIGURE 23: EDS HARDWARE INSTALLATION TOOL SUCCESS



5. Right-click Ethernet at the bottom left of the Controller Organizer (the expandable left pane) and choose a New Module. Search for and select " EZLogic® NET". This option will only appear if the EDS file was properly installed in the previous steps. Enter the desired name and IP address for this Gateway.

FIGURE 24: SELECT EZLOGIC® NET AFTER SUCCESSFUL EDS INSTALL

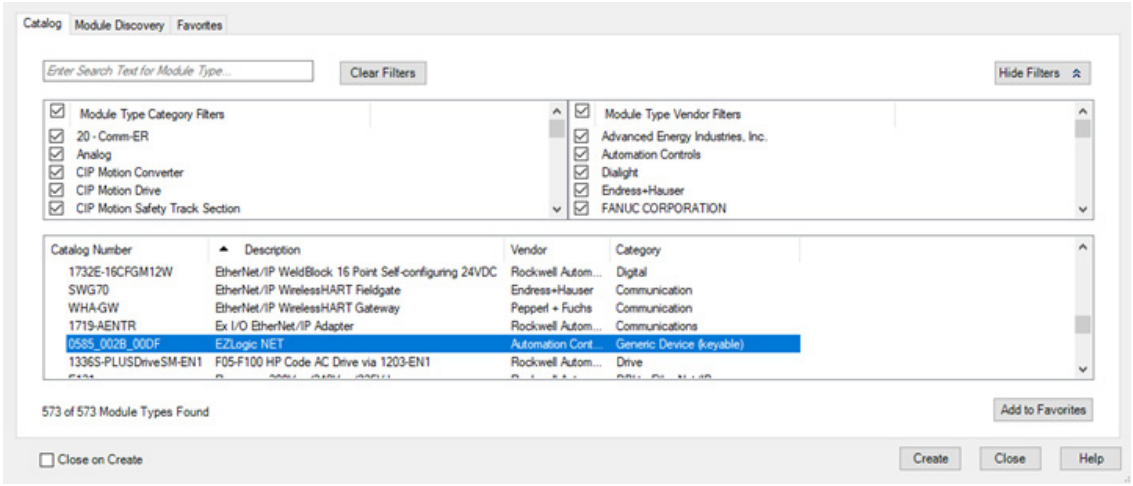
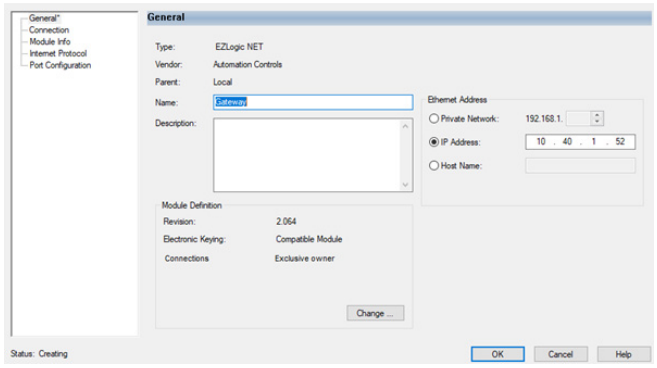


FIGURE 25: EZLOGIC® NET IN ETHERNET DEVICES (STUDIO 5000)



6.3 ETHERNET/IP IMPLICITS MAP

TABLE 7: ETHERNET/IP IMPLICIT INPUTS MAP

<table>
<tr><th colspan="3">Instance 100
Implicit Inputs</th></tr>
<tr><th>Location</th><th>Function</th><th>Description</th></tr>
<tr><td>0</td><td>Status</td><td>
<table>
<tr><th colspan="2">Status</th></tr>
<tr><td>Bit 0</td><td>Future</td></tr>
<tr><td>Bit 1</td><td>Future</td></tr>
<tr><td>Bit 2</td><td>Future</td></tr>
<tr><td>Bit 3</td><td>Future</td></tr>
<tr><td>Bit 4</td><td>Future</td></tr>
<tr><td>Bit 5</td><td>Future</td></tr>
<tr><td>Bit 6</td><td>Future</td></tr>
<tr><td>Bit 7</td><td>Future</td></tr>
</table>
</td></tr>
<tr><td>1
2
--
120</td><td>Zone 1
Zone 2
--
Zone 120</td><td>
<table>
<tr><th colspan="2">Zone: Group 1 Data</th></tr>
<tr><td>Bit 0</td><td>Package In Zone</td></tr>
<tr><td>Bit 1</td><td>Accumulated Output (Block & Stop)</td></tr>
<tr><td>Bit 2</td><td>Primary Sensor</td></tr>
<tr><td>Bit 3</td><td>Secondary Sensor</td></tr>
<tr><td>Bit 4</td><td>Motor State Bit 0</td></tr>
<tr><td>Bit 5</td><td>Motor State Bit 1</td></tr>
<tr><td>Bit 6</td><td>Motor State Bit 2</td></tr>
<tr><td>Bit 7</td><td>Fault</td></tr>
</table>
<table>
<tr><th colspan="2">Motor State Definition</th><th>Running</th><th>Braking</th><th>Holding</th><th>Coasting</th><th>Stalled</th><th>Disabled</th></tr>
<tr><td>Bit 0</td><td>Motor State Bit 0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>Bit 1</td><td>Motor State Bit 1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>Bit 2</td><td>Motor State Bit 2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>121
122
--
240</td><td>Zone 1
Zone 2
--
Zone 120</td><td>
<table>
<tr><th colspan="2">Zone: Group 2 Data</th></tr>
<tr><td>Bit 0</td><td>Smart I/O Input #1</td></tr>
<tr><td>Bit 1</td><td>Smart I/O Input #2</td></tr>
<tr><td>Bit 2</td><td>Smart I/O Input #3</td></tr>
<tr><td>Bit 3</td><td>Smart I/O Input #4</td></tr>
<tr><td>Bit 4</td><td>Motor In Current Limit</td></tr>
<tr><td>Bit 5</td><td>Box Jam</td></tr>
<tr><td>Bit 6</td><td>Zone Overload Warning</td></tr>
<tr><td>Bit 7</td><td>Smart I/O Fault</td></tr>
</table>
</td></tr>
</table>

Continued >>

241 **242** -- **360**	Zone 1 Zone 2 -- Zone 120	**Zone: Group 3 Data** Bit 0 – Request Output Asserted Bit 1 – Permission Output Asserted Bit 2 – Motor Fault Bit 3 – Control Voltage Out of Range Bit 4 – Motor Voltage Out of Range Bit 5 – Future Bit 6 – Over Temperature Bit 7 – Bad Temperature Sensor
361 **362** **363**	Gateway Future Future	**Gateway Data** Bit 0 – Smart I/O Input #1 Bit 1 – Smart I/O Input #2 Bit 2 – Smart I/O Input #3 Bit 3 – Smart I/O Input #4 Bit 4 – Communications Timeout Bit 5 – Smart I/O Fault Bit 6 – Future Bit 7 – Future

TABLE 8: ETHERNET/IP IMPLICIT OUTPUTS MAP

Instance 150 Implicit Outputs		
Location	**Function**	**Description**
0	Control	**Control** Bit 0 – Future Bit 1 – Future Bit 2 – Future Bit 3 – Future Bit 4 – Future Bit 5 – Future Bit 6 – Future Bit 7 – Future

Continued >>

1 **2** **--** **120**	Zone 1 Zone 2 -- Zone 120	**Zone: Group 1 Data**
		Bit 0 — OpMode Bit 0
		Bit 1 — OpMode Bit 1
		Bit 2 — OpMode Bit 2
		Bit 3 — OpMode Bit 3
		Bit 4 — Zone Reverse
		Bit 5 — Zone Hold
		Bit 6 — Local Speed Inhibit
		Bit 7 — Zone Half Speed

OpMode Definition		Configured State	Disabled	Slug	Zone Kill	Motor Run	Singulate	ZIP	Future	Future
Bit 0	OpMode Bit 0	0	1	0	1	0	1	0	1	0
Bit 1	OpMode Bit 1	0	0	1	1	0	0	1	1	0
Bit 2	OpMode Bit 2	0	0	0	0	1	1	1	1	0
Bit 3	OpMode Bit 3	0	0	0	0	0	0	0	0	1

121 **122** **--** **240**	Zone 1 Zone 2 -- Zone 120	**Zone: Group 2 Data**
		Bit 0 — Speed in %
		Bit 1 — |
		Bit 2 — |
		Bit 3 — |
		Bit 4 — |
		Bit 5 — |
		Bit 6 — |
		Bit 7 — Future

241 **242** **--** **360**	Zone 1 Zone 2 -- Zone 120	**Zone: Group 3 Data**
		Bit 0 — Smart I/O Net Bit 0
		Bit 1 — Smart I/O Net Bit 1
		Bit 2 — Smart I/O Net Bit 2
		Bit 3 — Smart I/O Net Bit 3
		Bit 4 — Future
		Bit 5 — Future
		Bit 6 — Future
		Bit 7 — Future

Continued >>

361 362 363	Gateway Future Future	

Gateway Data	
Bit 0	Smart I/O Net Bit 0
Bit 1	Smart I/O Net Bit 1
Bit 2	Smart I/O Net Bit 2
Bit 3	Smart I/O Net Bit 3
Bit 4	Future
Bit 5	Future
Bit 6	Future
Bit 7	Future

7 DIAGNOSTICS & TROUBLESHOOTING

7.1 FEEDBACK LEDs

See below for table of LED status:

TABLE 9: GATEWAY STATUS LED DEFINITIONS

LED	Conditions Detected	LED Behavior
Control Power Status	Voltage in Range	Solid Green
	Undervoltage	1 Red Flash
	Overvoltage	2 Red Flashes
Upstream/Downstream Communications	No issues detected	Solid Green
	Data Sent/Received	1 Green blink
	Comms Timeout	1 Red Flash
System Fault	No issues detected	Solid Green
	Branch Zone Count Mismatch	1 Red Flash
	Firmware Update Failure	2 Red Flashes
	PLC Comms Loss	3 Red Flashes
	Smart I/O #1 Fault	4 Red Flashes
	Smart I/O #2 Fault	5 Red Flashes
	Smart I/O #3 Fault	6 Red Flashes
	Smart I/O #4 Fault	7 Red Flashes
	IP Address Conflict	8 Red Flashes
	Zone Faulted	1 Amber Flash
	Configuration Write Fault	2 Amber Flashes
System Update	No issues detected	Solid OFF
	Gateway Firmware Update in Process	Solid Blue
	Branch Firmware Update in Process	1 Blue flash
	SD Card Write Success	One iteration of 3 Blue flashes

TABLE 10: ZONE STATUS LED DEFINITIONS

LED	Conditions Detected	LED Behavior
Control Power Status	Voltage in range	Solid Green
	Undervoltage	1 Red Flash
	Overvoltage	2 Red Flashes
Motor Power Status	Voltage in range	Solid Green
	Undervoltage	1 Red Flash
	Overvoltage	2 Red Flashes
	No power detected	3 Red Flashes
Motor Status	No issues detected	Solid Green
	In current reduction mode	Solid Amber
	Motor Fault (Internal to Motor or cable)	1 Red Flash
	Motor Stalled	2 Red Flashes
	Motor Overspeed	3 Red Flashes
	Motor Over Temperature	10 Red Flashes
Upstream/Downstream Communication	No issues detected	Solid Green
	Data Sent/Received	1 Green blink
	Comms Timeout	1 Red Flash
System Fault	No issues detected	Solid Green
	Smart I/O #1 Fault	1 Red Flash
	Smart I/O #2 Fault	2 Red Flashes
	Smart I/O #3 Fault	3 Red Flashes
	Smart I/O #4 Fault	4 Red Flashes
	Box Jam	5 Red Flashes
	Board Over Temperature	7 Red Flashes
	Bad Board Temperature Sensor	8 Red Flashes
	O-Ring Slip Detected	1 Amber Flash

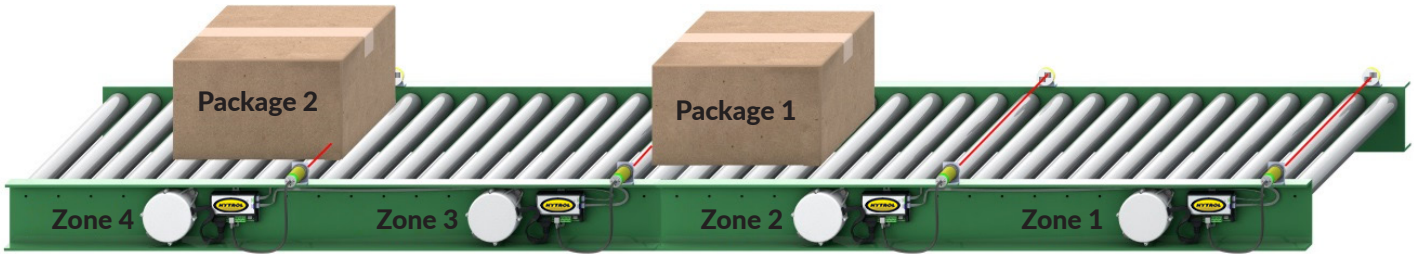
7.2 FAULTS

TABLE 11: ZONE FAULT LIST

Parameter	Description
Motor Stalled	Motor is stalled when it is commanded to run and falls below 30 RPM.
Motor Fault (Illegal HES State)	There is a fault internal to the motor or motor cable.
Control Bus Undervoltage	When the Control Power supply voltage is less than 22 VDC.
Control Bus Overvoltage	When the Control Power supply voltage is greater than 28 VDC.
Motor Bus Undervoltage	When the Motor Power supply voltage is less than 22 VDC.
Motor Bus Overvoltage	When the Motor Power supply voltage is greater than 28 VDC.
Communications Timeout	Communication between Zone Controllers was temporarily lost.
Board Overtemperature	Over temperature on the Zone Controller.
Bad Board Temp Sensor	Bad Temperature Sensor on the Zone Controller

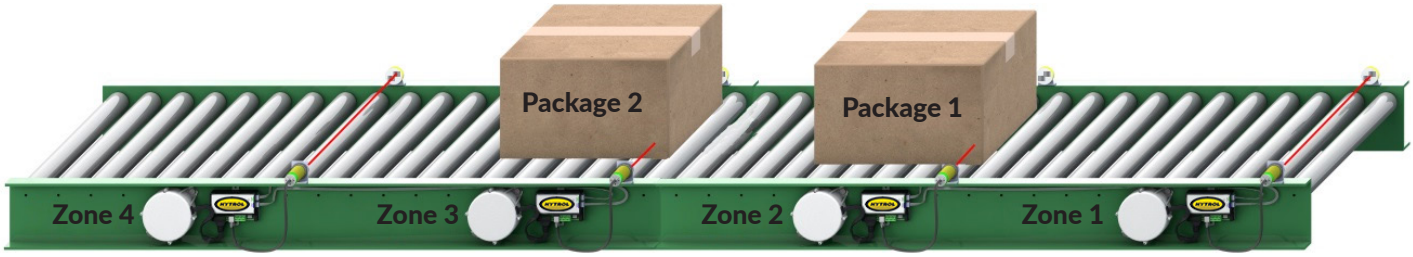
APPENDIX A: TRANSPORTATION MODES

FIGURE 26: A.1 DELAY DURING TRANSPORT (SLUG TRANSPORTATION ONLY)



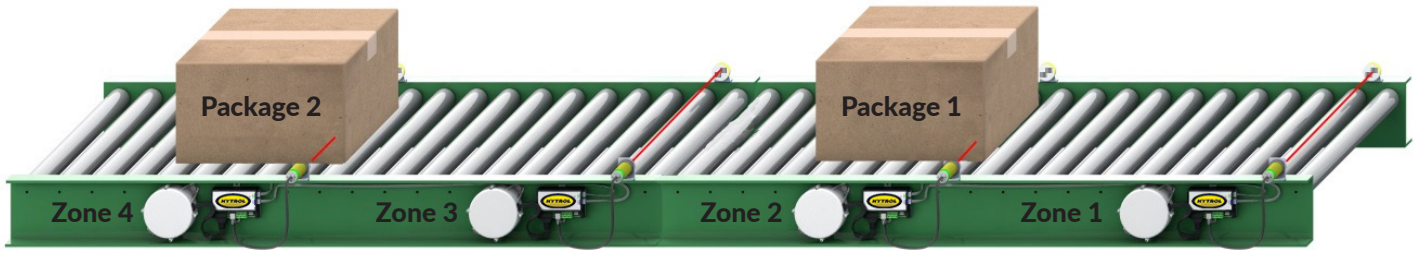
When Zone 2 (configured with Delay During Transport) has determined Package 1 has entered the zone (cleared Zone 3 sensor as shown) it will give permission to Zone 3 after a user defined delay or when Package 1 hits Zone 2 sensor.

FIGURE 27: A.2 DELAY ZONE ACCUMULATION (SINGULATE TRANSPORTATION ONLY)



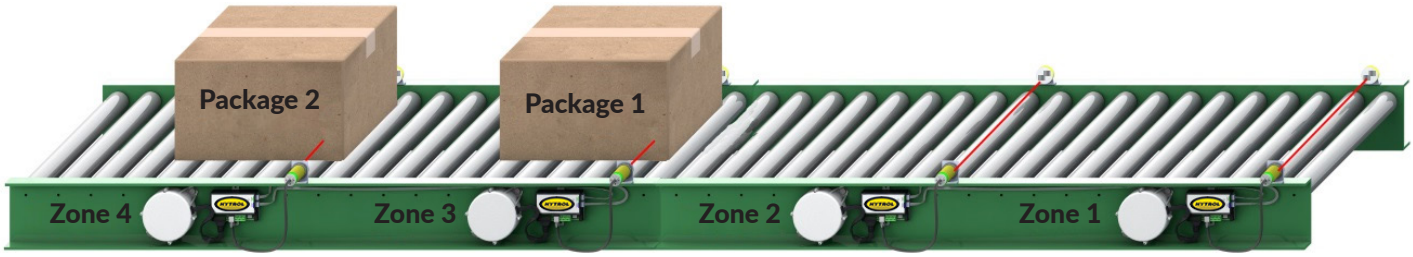
When Zone 3 does not have permission to release, and Package 2 is detected by the sensor in Zone 3 (where it would normally be stopped) a user defined delay occurs before Package 2 is stopped. Often used in incline applications to make sure the package is past the sensor before stopping. This helps so that the Zero Motion Hold feature will actively hold the package in position and not retrigger the sensor.

FIGURE 28: A.3 HALF SPEED (SINGULATE AND ZIP MODES)



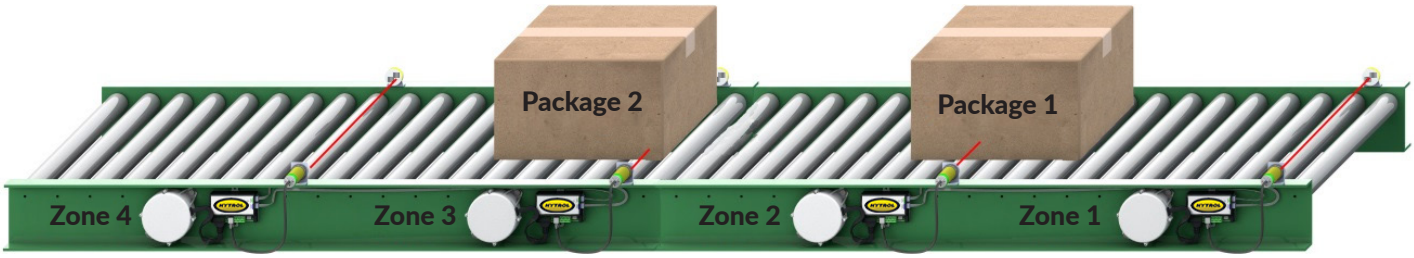
Due to Package 1 not out of Zone 2 and Package 2 requesting permission to enter Zone 3, Zone 3 will go to Half Speed. This feature improves high-speed transporting of top heavy packages to minimize tipping when accumulation occurs.

FIGURE 29: A.4 LOADING ZONE (SINGULATE MODE ONLY)



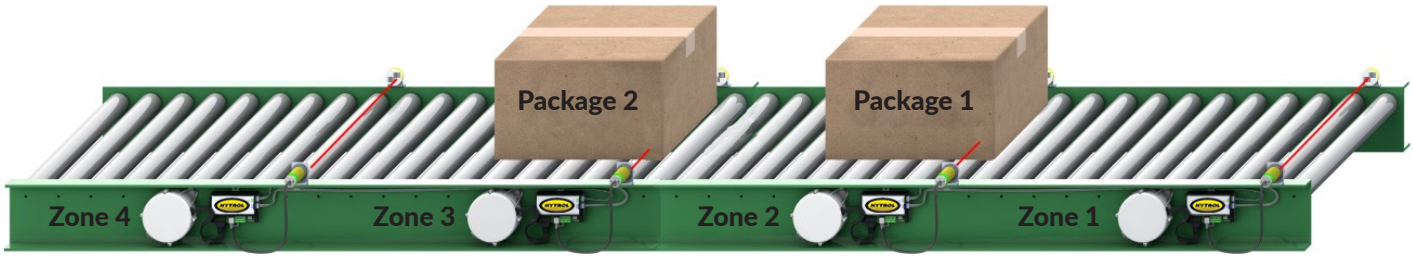
When Package 1 is placed onto Zone 3 and detected, Zone 3 will not send Package 1 for a user defined delay. Also, permission from Zone 4 is given when Zone 3 sensor is cleared.

FIGURE 30: A.5 SINGULATE (SINGULATE MODE)



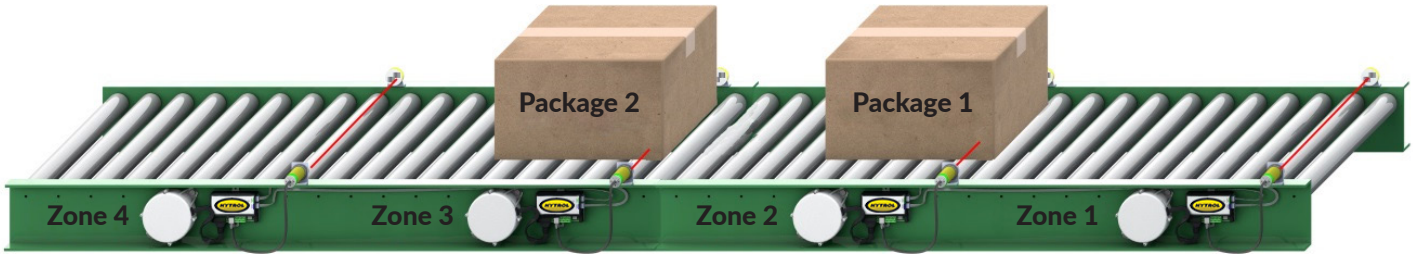
Package 2 will be held in Zone 3 and not allowed to enter Zone 2 until Package 1 has cleared the Zone 2 sensor.

FIGURE 31: A.6 SLUG (SLUG MODE)



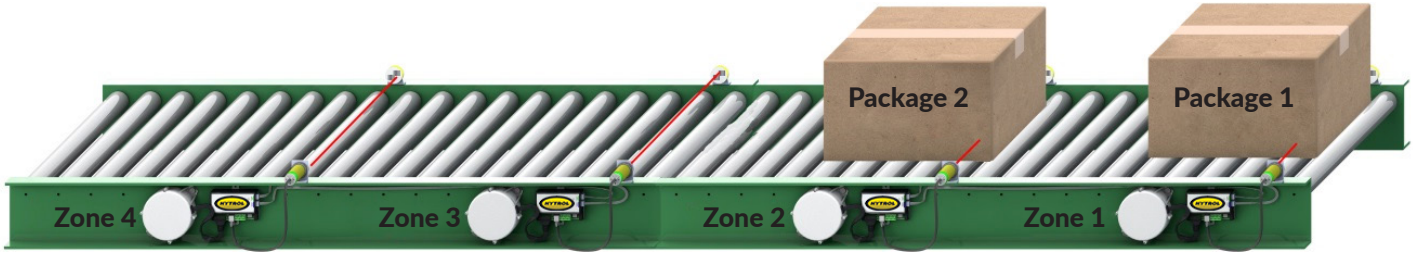
All zones will run in this mode if the Sleep Timer has not expired, however if Zone 2 is in accumulation it will stop Zone 3.

FIGURE 32: A.7 SLUG CASCADE RELEASE DELAY



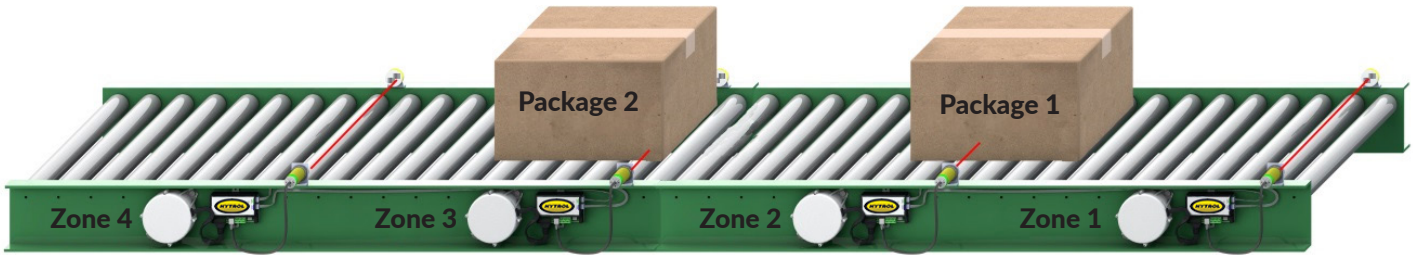
When Zone 2 is given permission to release Package 1, a user defined delay occurs before permission is given to Zone 3 to release. If Package 1 clears Zone 2 before the user defined delay, permission will be given to Zone 3 to release.

FIGURE 33: A.8 UNLOADING ZONE



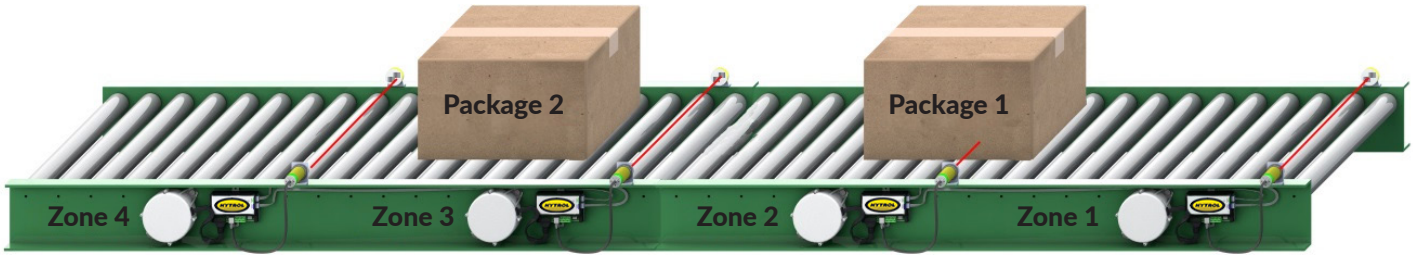
Package 1 when removed from Zone 1, does not provide permission to Zone 2 to release Package 2 for a user defined delay.

FIGURE 34: A.9 ZIP (TRANSPORTATION MODE)



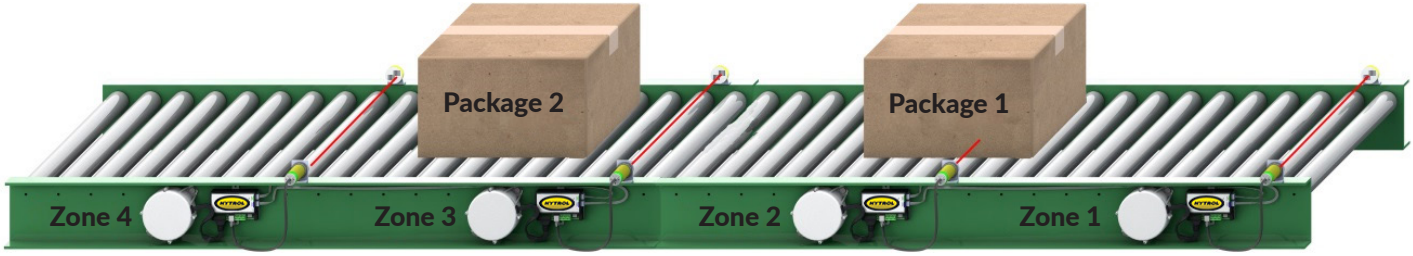
Zone 3 will have permission to release Package 2 into Zone 2 once Package 1 has hit zone 2 sensor.

FIGURE 35: A.10 ZONE HOLD (SINGULATE, ZIP, AND SLUG MODES)5



If Zones 2 and 3 were put into Zone Hold, Package 2 will be held in Zone 3 when it is detected by the Zone 3 sensor. Zone 2 would attempt to hold Package 1, however depending on Package 1 position at the time it may be pulled into Zone 1.

FIGURE 36: A.11 ZONE KILL

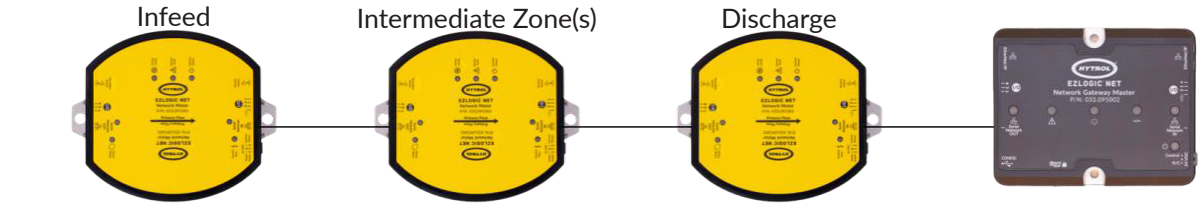


If Zones 2 and 3 were put into Zone Kill, Package 1 and Package 2 would be stopped in their respective positions. However, Package 1 may be pulled into zone 1 based on its position.

APPENDIX B: APPLICATION EXAMPLES

The following includes suggested practice for implementing various material handling equipment into conveyor systems:

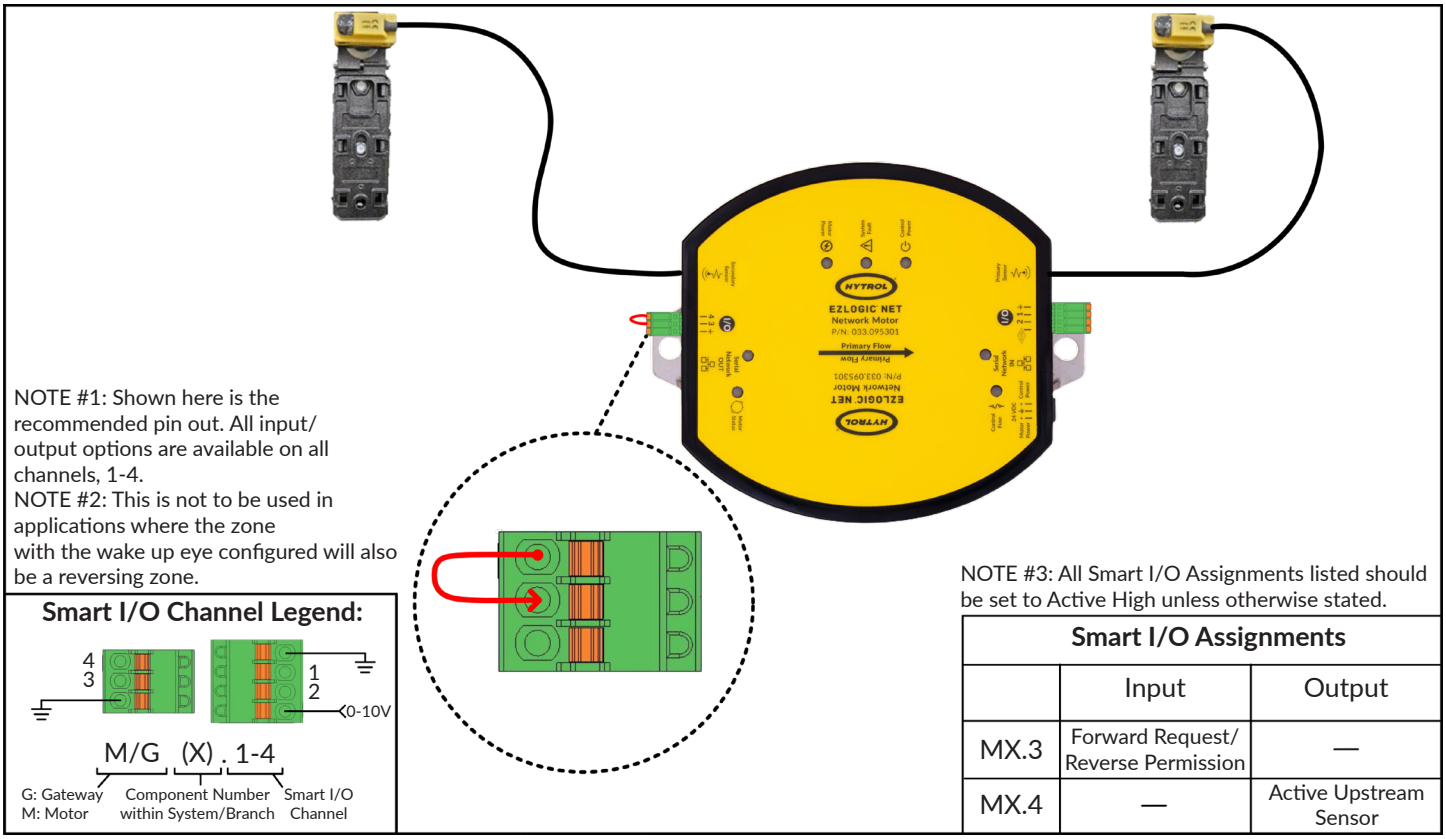
FIGURE 37: B.1 INFEED ZONE



Infeed Zone Smart I/O:
Smart I/O #: Forward Request Input;
Active Low

This will set the zone to always running, allowing it to always be ready to accept product

FIGURE 38: B.2 WAKE UP EYE



Smart I/O Assignments		
	Input	Output
MX.3	Forward Request/ Reverse Permission	—
MX.4	—	Active Upstream Sensor

- Used to “wake up” the infeed zone when product is entering the conveyor
- The standard use case would be with a retro-reflective or diffuse photoeye, but many other transducers can be used

FIGURE 39: B.3 REVERSING ZONE

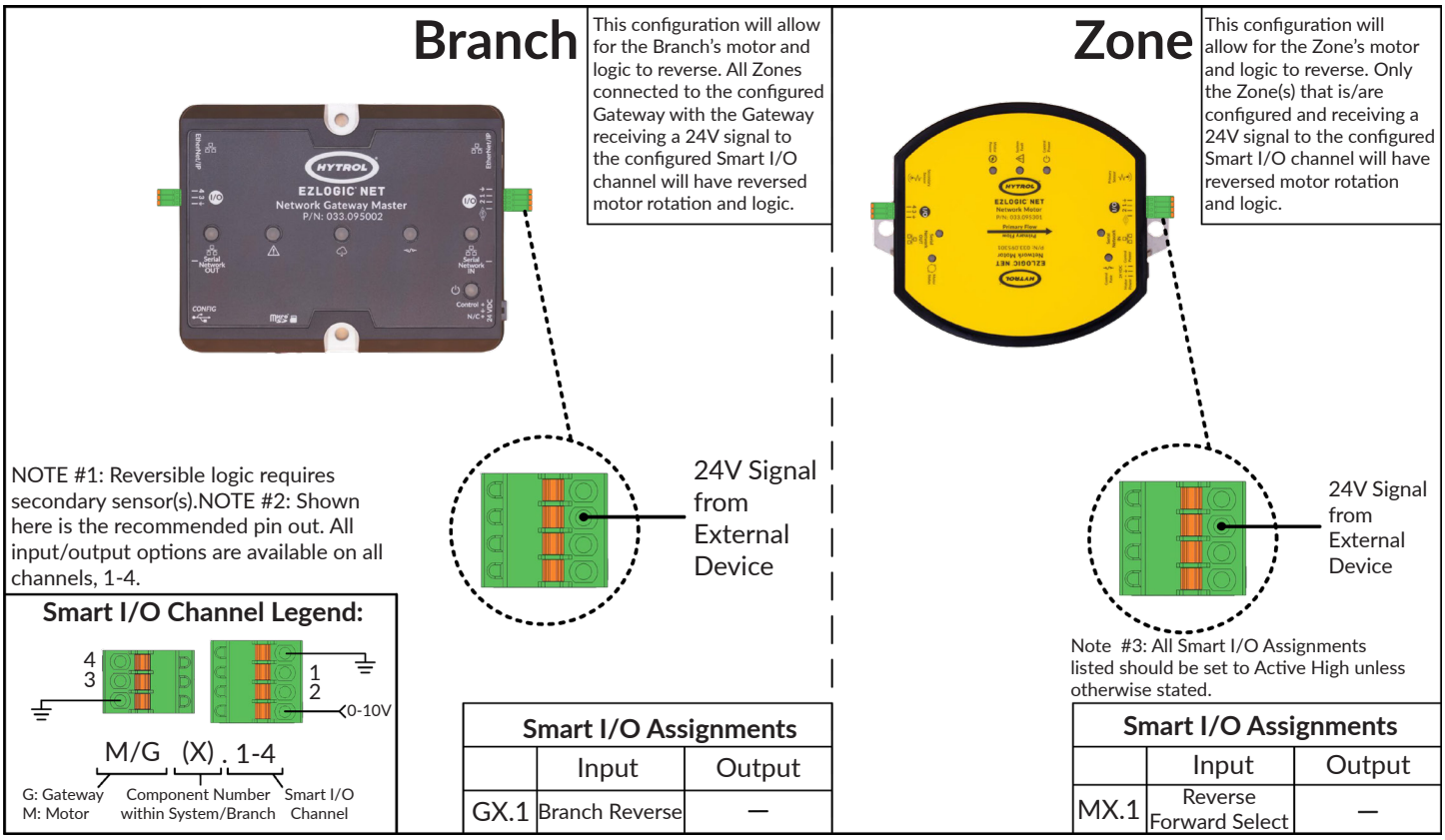
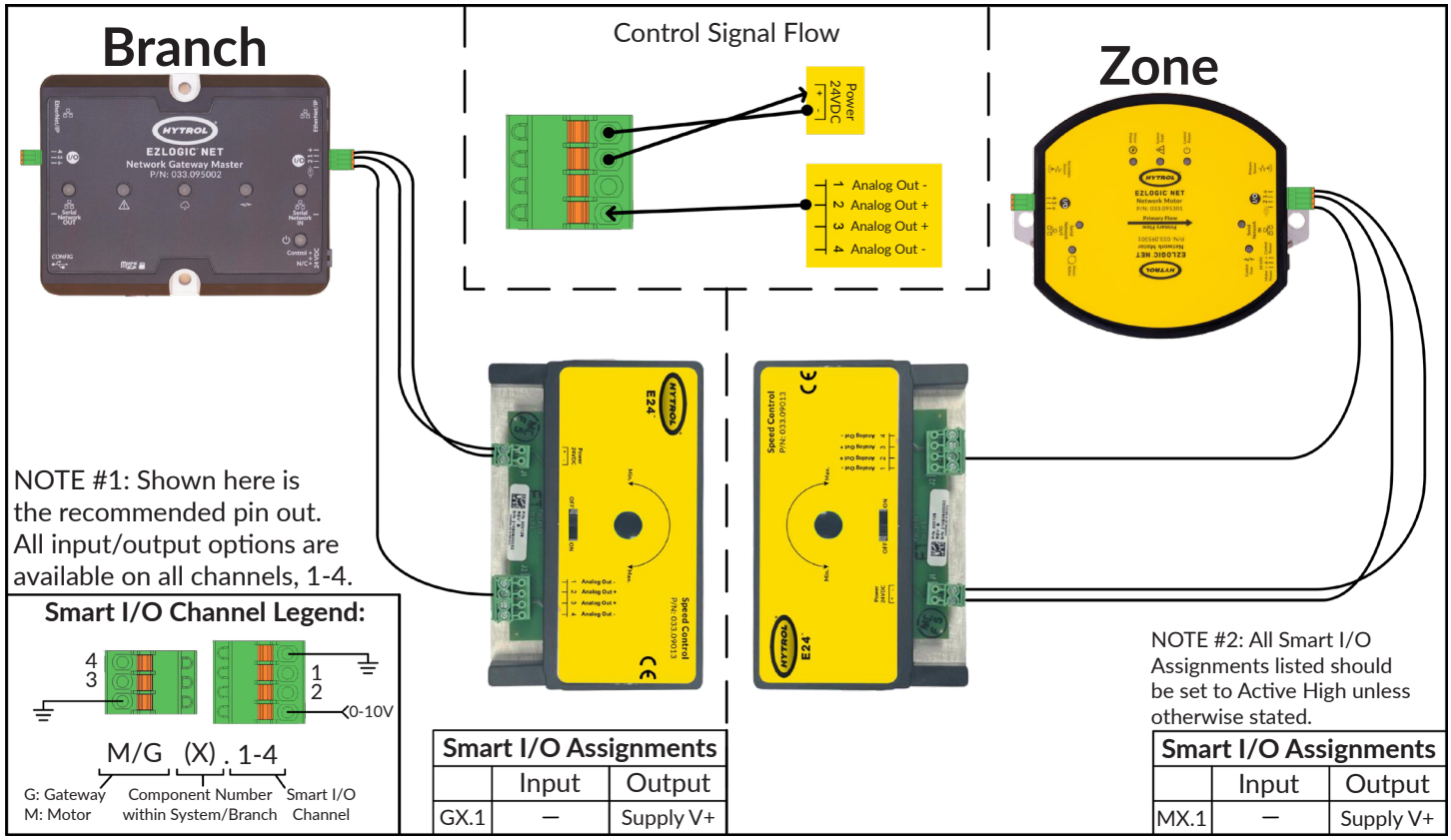


FIGURE 40: B.4 SPEED CONTROL



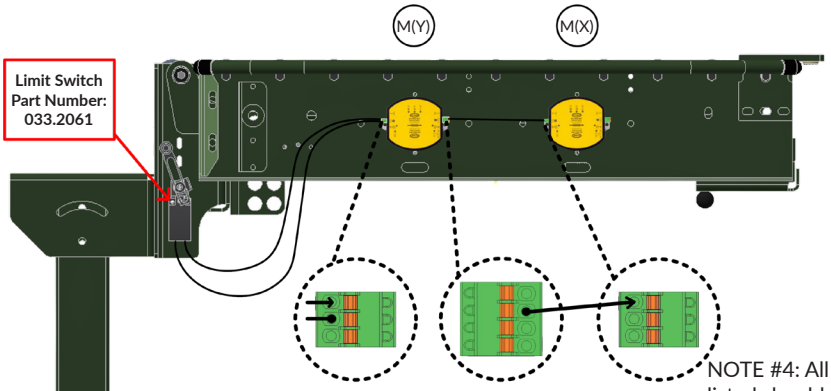
Smart I/O Assignments		
	Input	Output
GX.1	—	Supply V+

Smart I/O Assignments		
	Input	Output
MX.1	—	Supply V+

This should be used when the end user would like to control a motor's or group of motors' speed without changing their configuration in EZLogic® OS or using the mobile app.

FIGURE 41: B.5 GATE

Control Signal Flow:
M(X).4 → M(Y).1
M(Y).4 → Limit Switch
M(Y).3 → Limit Switch

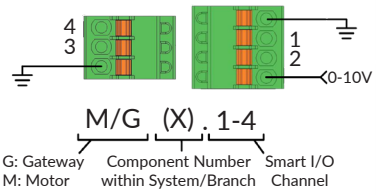


Transportation Mode for motor M(X) should be Disabled. Transportation Mode for motor M(Y) should be Forced Run.

NOTE #1: Shown here is the recommended pin out. All input/output options are available on all channels, 1-4.
NOTE #2: The Limit Switch depicted contains both 1 NO and 1 NC Contact.
NOTE #3: Refer to "2&3 Wire Sensor" Datasheet for Limit Switch wiring.

NOTE #4: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.

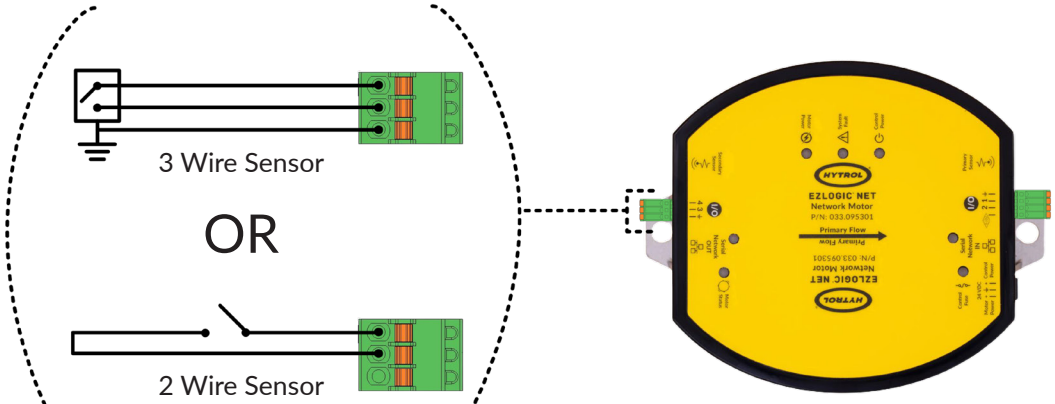
Smart I/O Channel Legend:



Smart I/O Assignments		
	Input	Output
M(X).4	Motor Run Select	—
M(Y).1	—	Motor Running
M(Y).3	—	Supply V+
M(Y).4	Zone Kill Select; Active Low	—

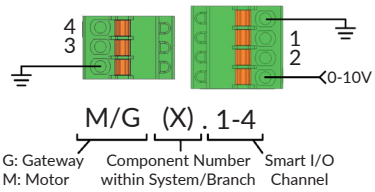
This is the suggested setup for applications that use Gates. In this setup, the Gate does not accumulate product.

FIGURE 42: B.6 2 & 3 WIRE SENSORS



NOTE #1: The sensors used in this diagram have PNP outputs. NOTE #2: Shown here is the recommended pin out. All input/output options are available on all channels, 1-4.

Smart I/O Channel Legend:

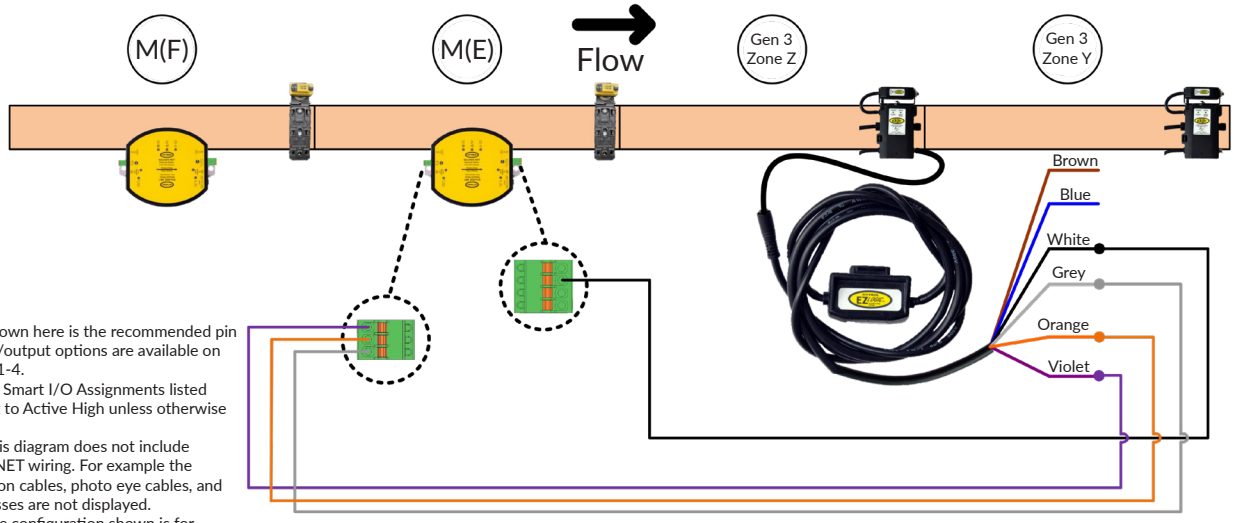


NOTE #3: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.

Smart I/O Assignments		
	Input	Output
M(X).4	—	Supply V+

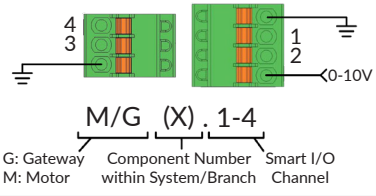
This configuration should be used in cases where the end user would like to integrate auxiliary devices into the EZLogic® NET system. This could include photoeyes, proximity sensors, stack lights, limit switches, etc.

FIGURE 43: B.7 EZLOGIC® NET TO GEN 3 (SINGULATE)



NOTE #1: Shown here is the recommended pin out. All input/output options are available on all channels, 1-4.
NOTE #2: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.
NOTE #3: This diagram does not include all EZLogic® NET wiring. For example the communication cables, photo eye cables, and wiring harnesses are not displayed.
NOTE #4: The configuration shown is for Singulation transport only. Slug transportation has a different configuration.

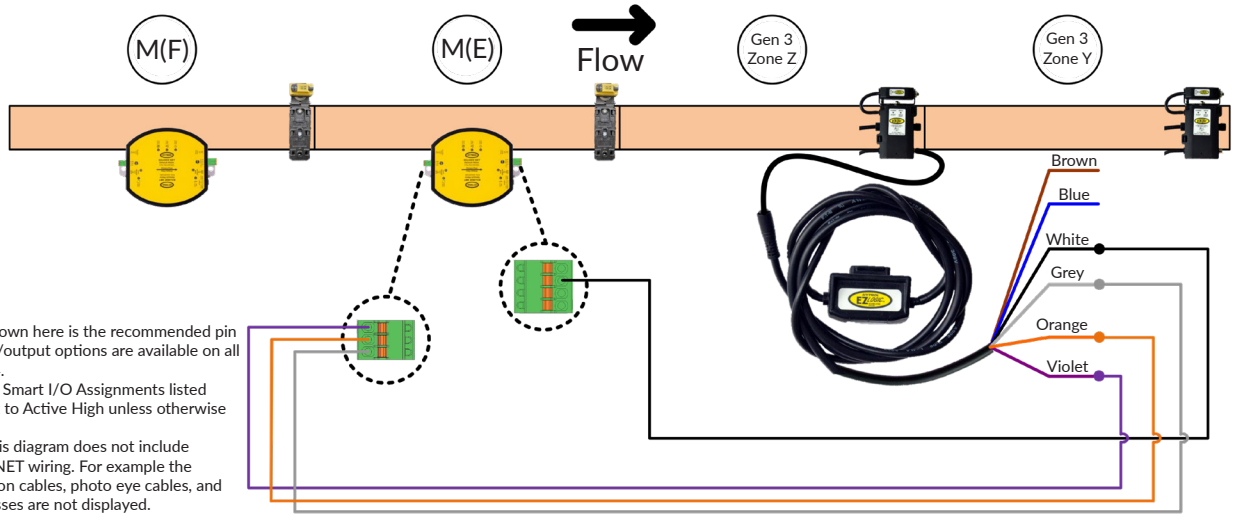
Smart I/O Channel Legend:



Gen 3 Zone Controller Auxiliary I/O Modes		
	Input	Output
Gen 3 Zone Z	Zone Wake-up	Photo-eye Beam Status

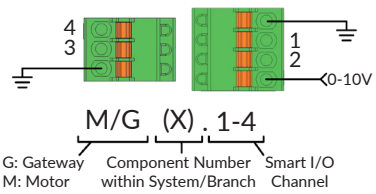
Smart I/O Assignments		
	Input	Output
ME.1	—	Active Downstream Sensor
ME.3	—	Supply V+
ME.4	Forward Permission/ Reverse Request; Active Low	—
ME.≡	—	—

FIGURE 44: B.8 EZLOGIC® NET TO GEN 3 (SLUG)



NOTE #1: Shown here is the recommended pin out. All input/output options are available on all channels, 1-4.
NOTE #2: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.
NOTE #3: This diagram does not include all EZLogic® NET wiring. For example the communication cables, photo eye cables, and wiring harnesses are not displayed.
NOTE #4: The configuration shown is for Slug transport only. Singulate transportation has a different configuration.

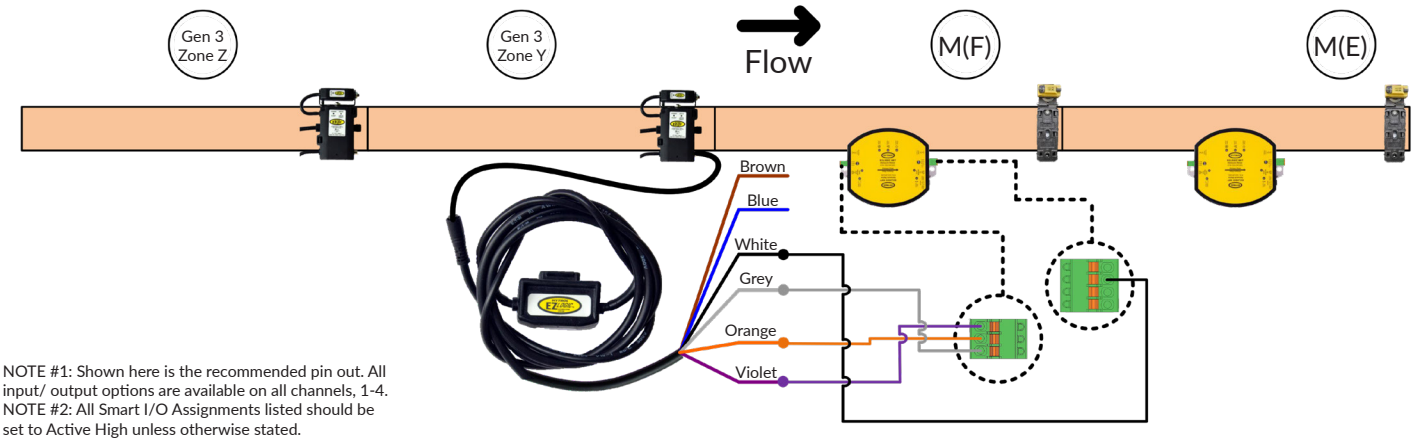
Smart I/O Channel Legend:



Gen 3 Zone Controller Auxiliary I/O Modes		
	Input	Output
Gen 3 Zone Z	Zone Wake-up	Zone Blocked and Stopped

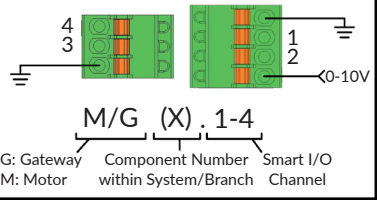
Smart I/O Assignments		
	Input	Output
ME.1	—	Active Downstream Sensor
ME.3	—	Supply V+
ME.4	Forward Permission/ Reverse Request; Active Low	—
ME.≡	—	—

FIGURE 45: B.9 GEN 3 TO EZLOGIC® NET (SLUG)



NOTE #1: Shown here is the recommended pin out. All input/ output options are available on all channels, 1-4.
NOTE #2: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.
NOTE #3: This diagram does not include all EZLogic® NET wiring. For example the communication cables, photo eye cables, and wiring harnesses are not displayed.
NOTE #4: The configuration shown is for Slug transportation only. Singulate transportation has a different configuration.

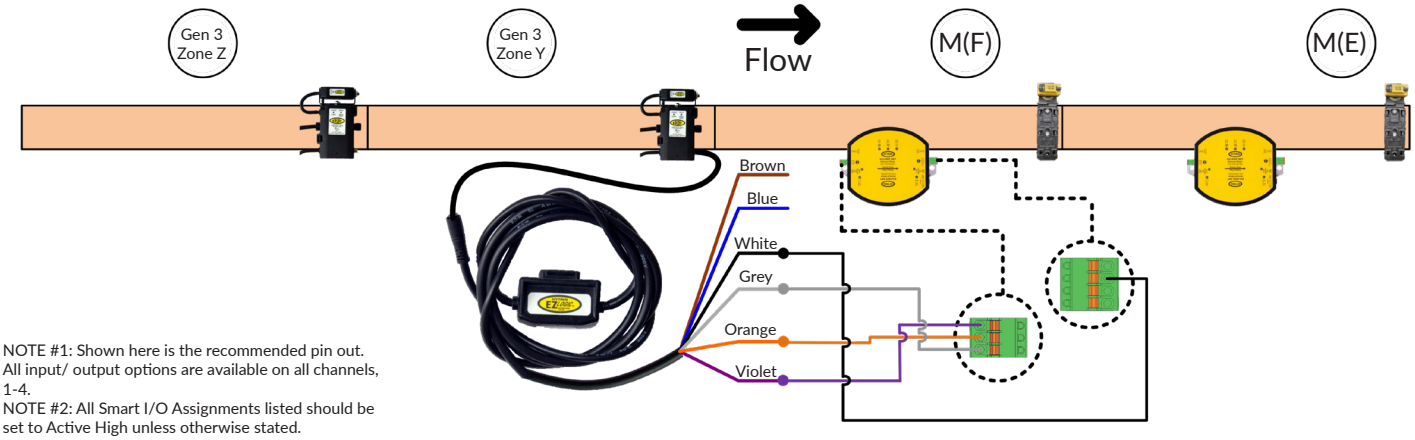
Smart I/O Channel Legend:



Gen 3 Zone Controller Auxiliary I/O Modes		
	Input	Output
Gen 3 Zone Y	Zone Stop	Photo-eye Beam Status

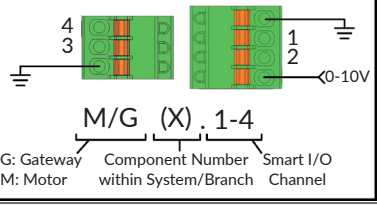
Smart I/O Assignments		
	Input	Output
MF.1	—	OBT Held
MF.3	—	Supply V+
MF.4	Forward Request/ Reverse Permission	—
MF.☰	—	—

FIGURE 46: B.10 GEN 3 TO EZLOGIC® NET (SINGULATE)



NOTE #1: Shown here is the recommended pin out. All input/ output options are available on all channels, 1-4.
NOTE #2: All Smart I/O Assignments listed should be set to Active High unless otherwise stated.
NOTE #3: This diagram does not include all EZLogic® NET wiring. For example the communication cables, photo eye cables, and wiring harnesses are not displayed.
NOTE #4: The configuration shown is for Singulate transportation only. Slug transportation has a different configuration.

Smart I/O Channel Legend:



Gen 3 Zone Controller Auxiliary I/O Modes		
	Input	Output
Gen 3 Zone Y	Zone Stop	Photo-eye Beam Status

Smart I/O Assignments		
	Input	Output
MF.1	—	Active Downstream Sensor
MF.3	—	Supply V+
MF.4	Forward Request/ Reverse Permission	—
MF.☰	—	—

NOTES

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