

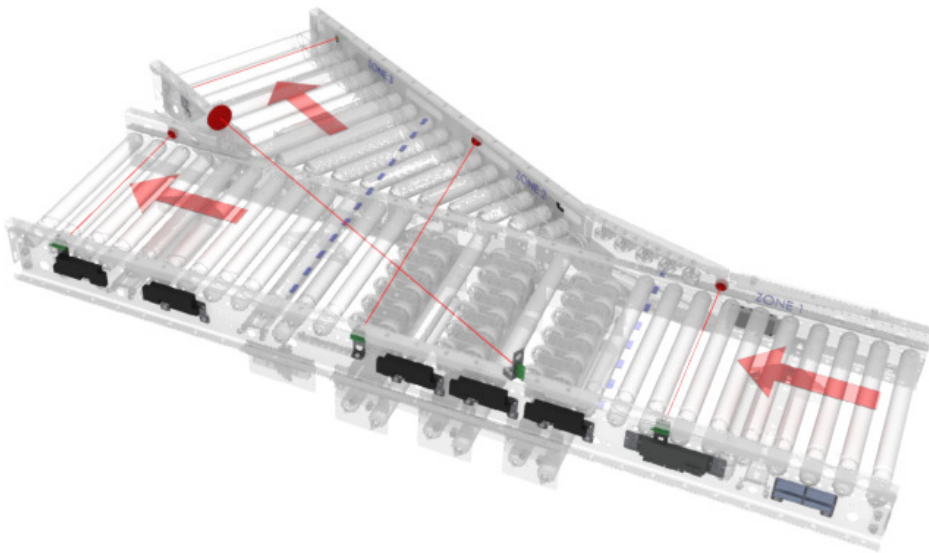


MAINTENANCE MANUAL

SERIES 1000

24VDC MOTORIZED DRIVE ROLLER

1 TO 2 PIVOT WHEEL DIVERT MODULE SECTION





Hilmot Corporation

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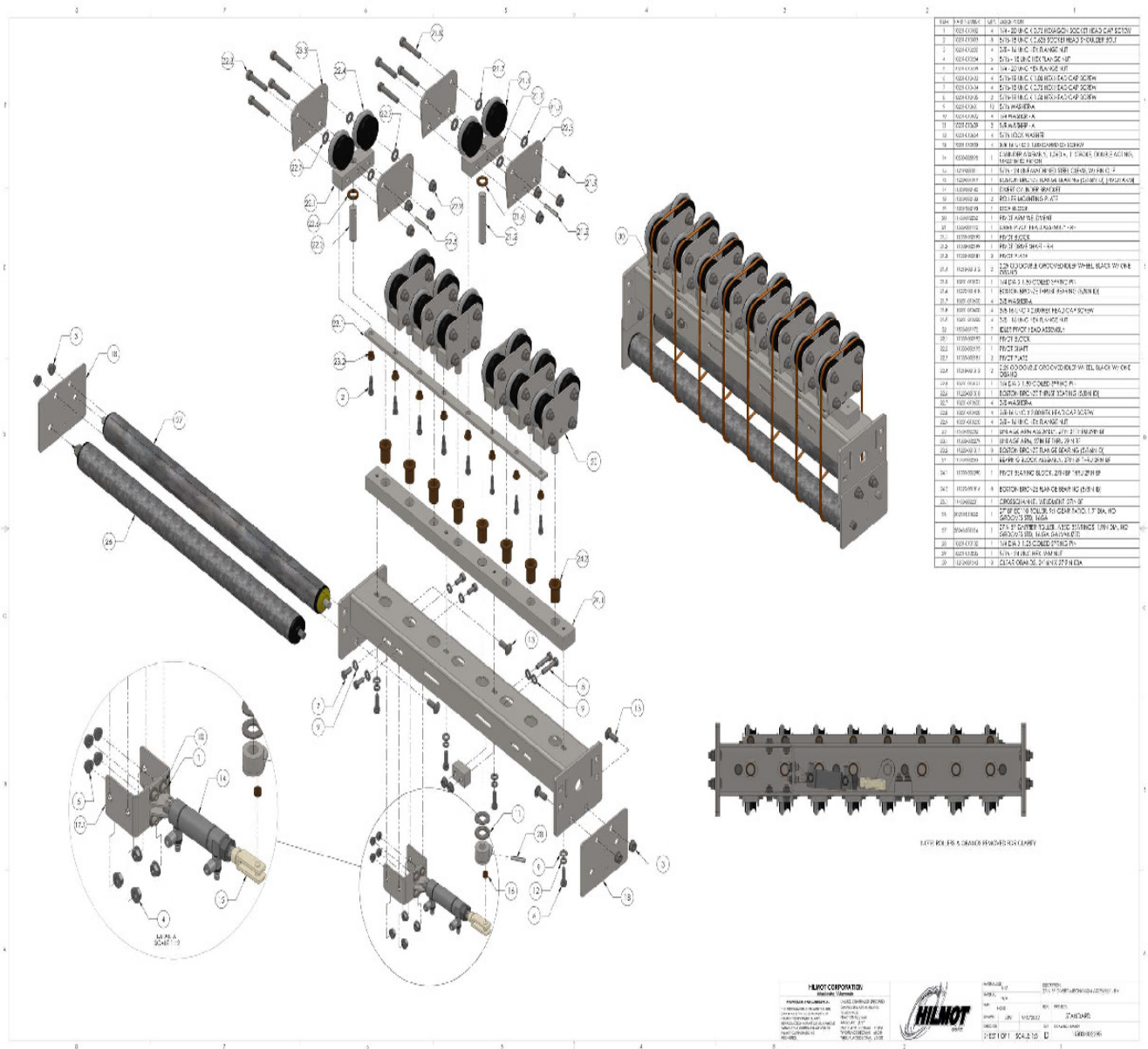
THEORY OF OPERATION

A Hilmot MDR pivot head divert module conveyor with accumulation is composed of several 'zones', just as the intermediate, as shown in **Figure 2** below. There is a 3 or 4 zone mainline, depending on zone size and BF, with a 1 zone spur, which is mechanically and electrically attached to make a module. Zone 2 of the module contains the divert mechanisms, banked in groups of 3 or 4, depending on zone size and BF. Each divert mechanism, shown in **Figure 1** below, is powered by a non grooved MDR, and slaved by Oband to the pivot wheels above. Each pivot wheel is attached to a linkage arm which attaches to a pneumatic cylinder located under the bank's main weldment. All MDRs, as well as the solenoid valve that actuates the divert mechanism's cylinder, are controlled by a Programmable Logic Controller(PLC) with your choice of standard program, or can be wired to a terminal strip for controls by others. **Figure 1a and 1b** show the divert banks in the straight and divert positions. The divert banks can rotate up to 30 degrees. An adjustable stop block allows you to set the max angle of the divert heads.

The standard divert module comes with 1 photoeye per zone, with an option for a jam detect eye crossing the path of diverted product. Smaller Between frame sizes of the divert module can have an additional accumulation zone in the spur, depending on package size. Depending on the programming, the divert can be set up for true zero pressure accumulation or a slug type release. Singulation release allows one product to be released at a time after the downstream zone has cleared. Slug release allows a predetermined amount of product to be released at one time after the downstream zone has cleared. Slug release is a very effective way to increase throughput through programming. The type of release to be used is usually determined at design time. Often a divert module's PLC is run a larger network, and works in conjunction with a scanner(s) and WMS as part of a MDR sorter, consisting of several divert lanes.

Figure 1: Divert Mechanism Exploded View

SERIES 1000, PIVOT HEAD DIVERT MODULE



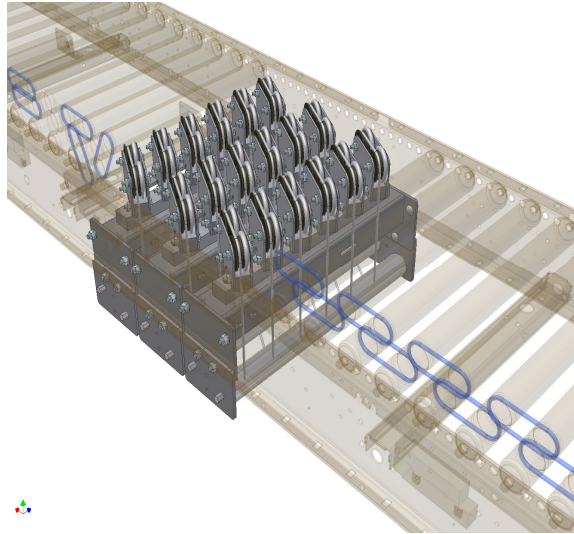


Figure 1a: Divert Mechanism Exploded View Divert Position

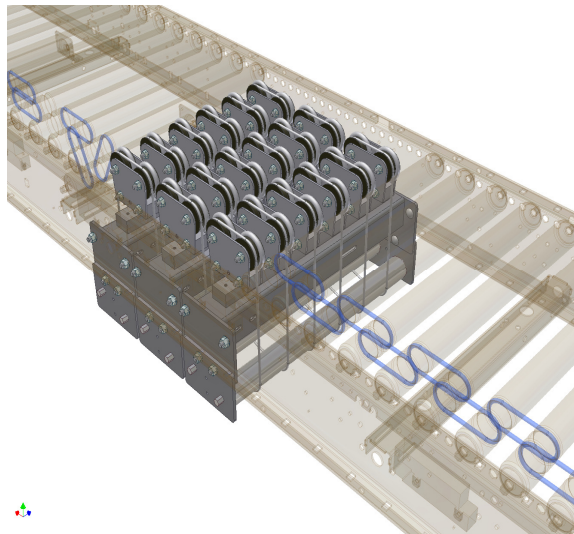


Figure 1b: Divert Mechanism Exploded View Straight Position

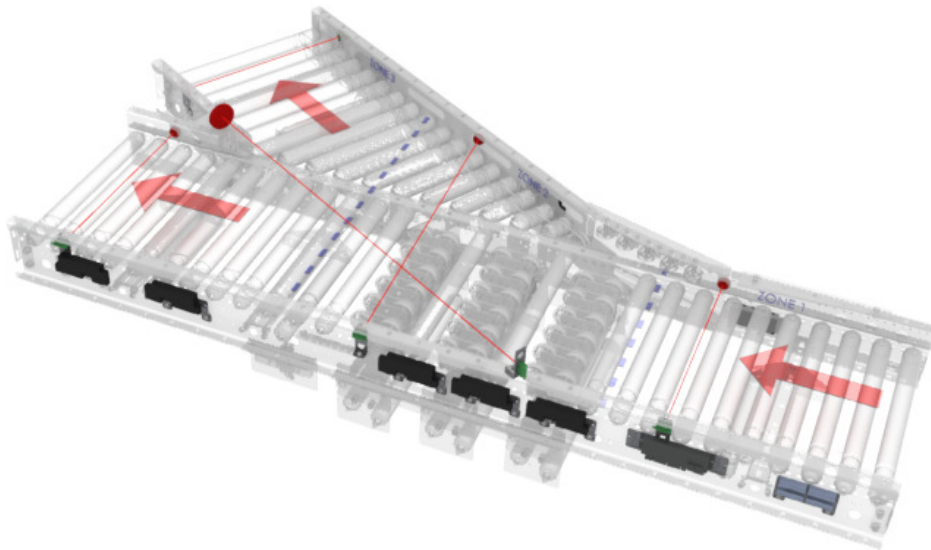


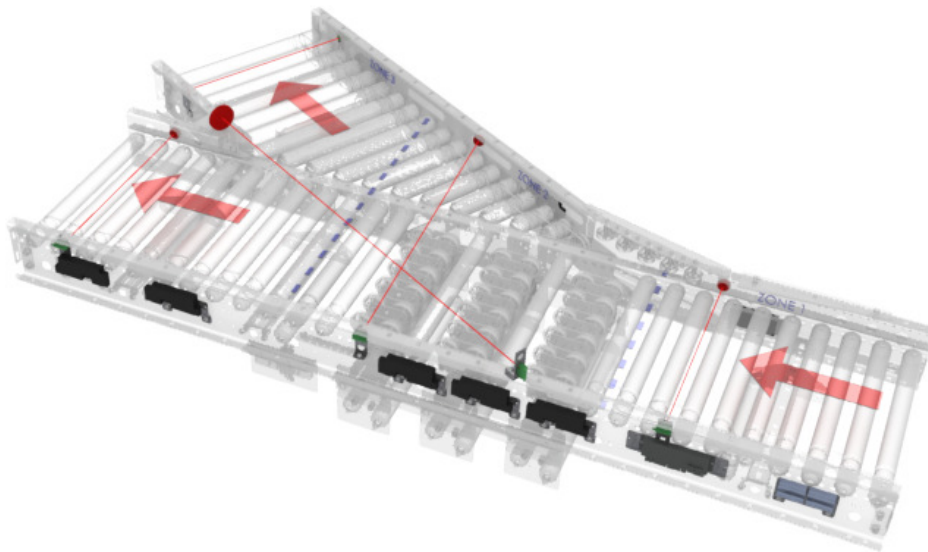
Figure 2: Zone Description

The MDR accumulation is a true zero-pressure accumulation (ZPA). This means that the product being conveyed never comes in contact with any other product; provided it is dimensionally compatible with the zone (product length is less than the zone length). Hilmot has several divert configurations, with between frame(BF) dimensions ranging from 15" to 36". The standard zone length of merges 15" BF through 24" BF is 30", meaning that the mainline frame is 90" (3- 30" zones) and the spur is 60" in length. For BF's 27" through 30", the zone length is 36" and the mainframe is then 108", with a 72" spur. Divert modules over 30"BF have a 144" mainframe. The merge modules are available in a 30 degree or 45 degree angle configuration for most BF's. There is no accumulation zone in the spur on the larger modules due to the natural geometry of the unit.

Standard Zones

Figure 2a shows a typical zone layout for a standard 3 zone divert module. The blue dotted lines represent the zone breaks for each zone. Each zone has one or more motorized drive rollers (MDR), a photo eye sensor, reflector, motor control cards for each motor, and carrier rollers. Notice that Zones 1 and 2 are shared zones across both the mainline and the spur line. A box can accumulate on either the mainline or the spurline, but not both. The photoeye is mounted to shoot across both the mainline and spur lines to detect if a box either is on the mainline or the spurline for these zones. In the case of the smaller BF's, you may have room for another zone on the spur, in which case a package could accumulate there.

Figure 2a: Standard Zones



COMPONENTS

MOTOR CONTROL CARD - INTERROLL - 9006

Zone Technology

The motor control card on a divert module still manages the functionality of a motorized drive roller which in turn drives idler rollers using O rings or other belts. However, on a divert module, the ZPA features are not used, and there are no phone cables on any of the internal cards (the downstream zone may use a cable out of the downstream port for PLC to ZPA handoff). The

motor cards simply run the MDRs through a straight +24VDC signal to the “Smart 1 Input” terminal on the card, from the PLC outputs. All logic is handled by the PLC controller. Program can be locally programmed or can be via Remote I/O with a master controller. **Figure 3** provides a schematic with corresponding component table to clarify location and functionality.

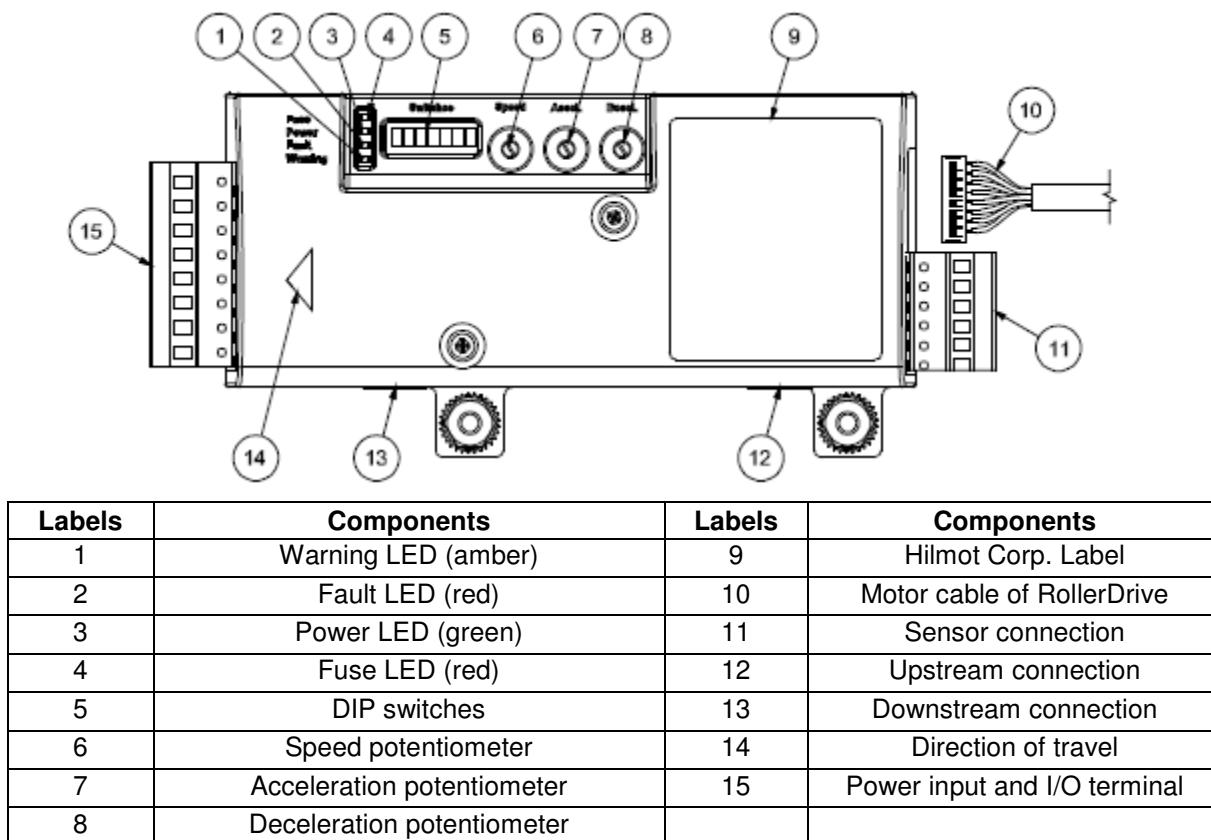


Figure 3: Motor Control Card

Motor Control Card Modes of Operation

The operational modes of a divert module MDR conveyor with motor control card drive controls include:

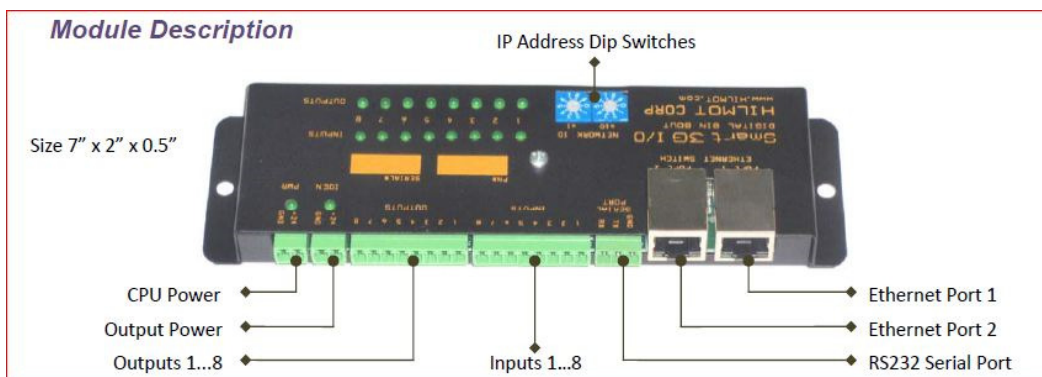
Motor Control Card Special Features

- **Diagnostics:** LED's provide motor, sensor, and jam diagnostics as well as power, fuse, and temperature status.
- **Smart braking:** In a PLC controlled merge, the drive cards are all in zero motion hold when the cards are powered. Putting a +24VDC signal on the forward and reverse terminals (PIN 5 and PIN 6 on power terminal block) will put the motorized roller into coast mode.
- **NPN or PNP:** All inputs and outputs can be switched, collectively, for NPN or PNP with one switch.

HILMOT SMART 3G ETHERNET PLC

Operation of the PLC

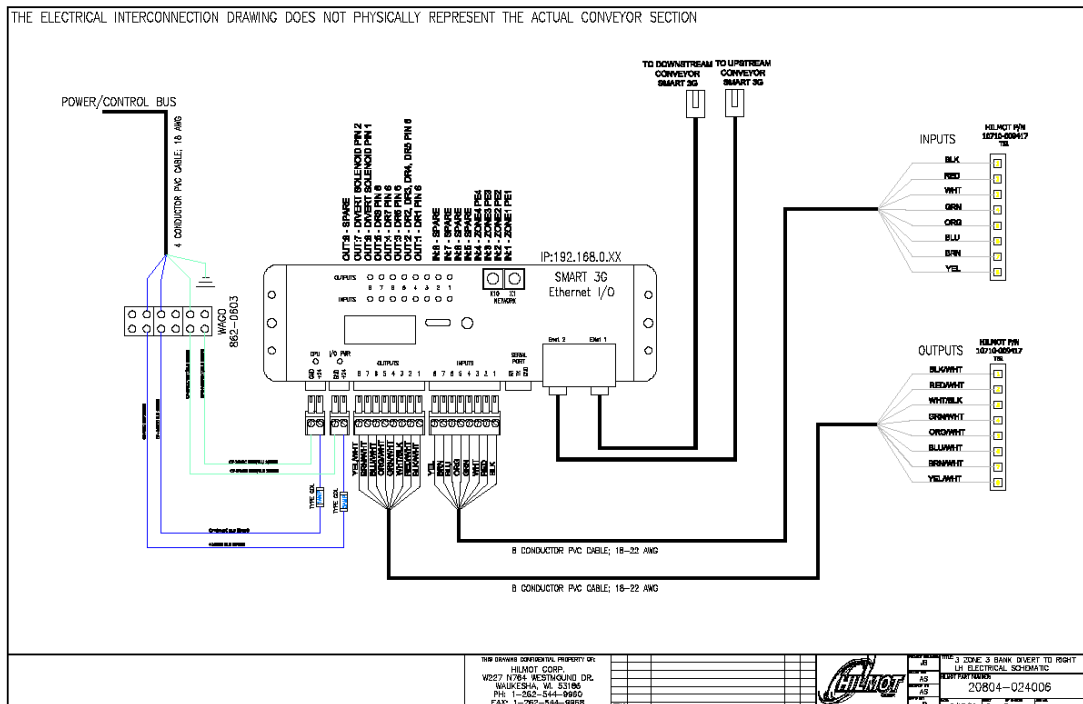
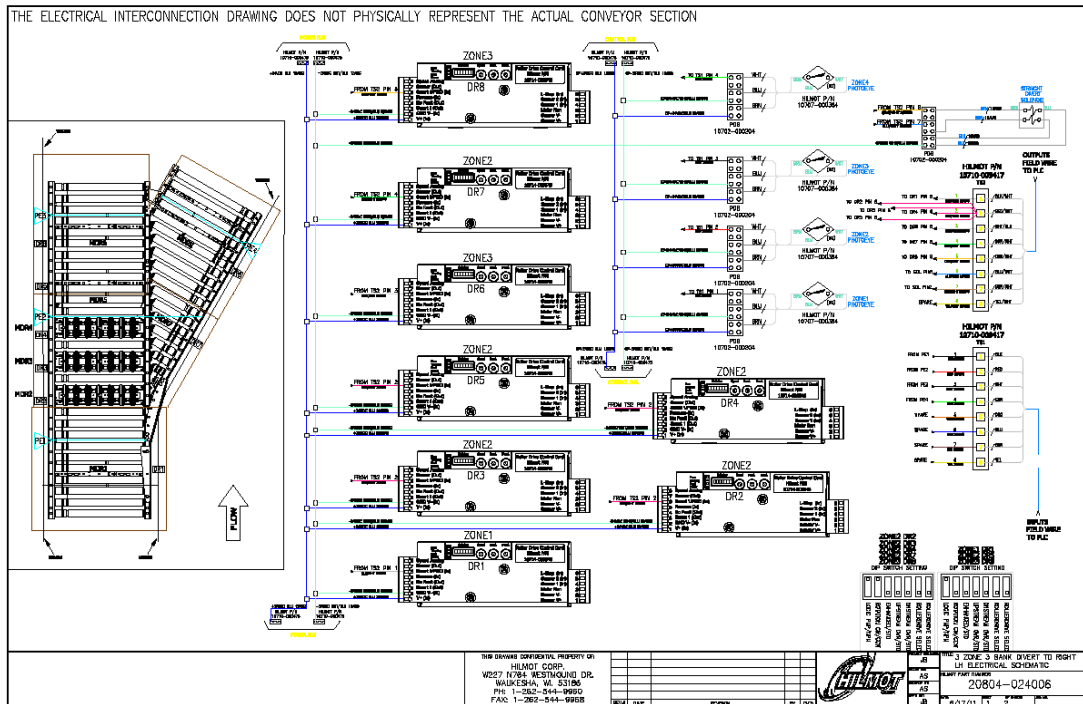
The standard Hilmot PLC card is the Smart 3g Ethernet I/O controller. It is an 8in/ 8out plc, which is locally programmable or works with Ethernet IP protocol. The program is written in ladder logic using the free software Superlogix found on www.hilmot.com. The standard 3 or 4 zone divert module is wired with 4 photo eyes and 8 motors for a 3 bank divert. BF's above 27" may have 4 divert banks depending on package size. This determination of whether 3 banks or 4 are needed is usually made at design time based on application. All divert bank MDRs are jumpered together to a single output on the PLC card or wired to a singular connection point on the terminal strip so that all rollers in the mechanism start and stop together. See **Figure 4** for an example of a standard wiring schematic for a standard 3 zone, 3 bank divert using a Smart 3g card.



SERIES 1000, PIVOT HEAD DIVERT MODULE



Figure 4 Standard Divert Schematic for 3 Zone, 3 Bank Divert



Hilmot has several standard ladder programs available to perform a variety of functions including but not limited to:

- 1 to 1 priority alternating (mainline : spur line)
- Input dependent priority(priority shifts based on upstream photoeyes)
- Selector switch 3 mode operation (mainline: alternating: spurline)
- Divert based on information from Scanner or WMS

Motor Control Card Circuit Protection

The motor outputs are protected by surge protection circuitry. They prevent damage to the motor control chips from back EMF that might be generated by the MDR when it is rotated by an outside force such as heavy packages arriving at high speed from powered or gravity-fed conveyors. This is referred to as “over-driving” the MDR. Care should be taken to minimize over-driving.

Motor Control Card Installation Dimensions

The diagram of the ZPA motor control card in **Figure 4** depicts the installation dimensions. Mounting hardware is supplied for mounting to the conveyor frame. Ensure that there is metal to metal contact with the ZPA heat sink for optimal thermal transfer.

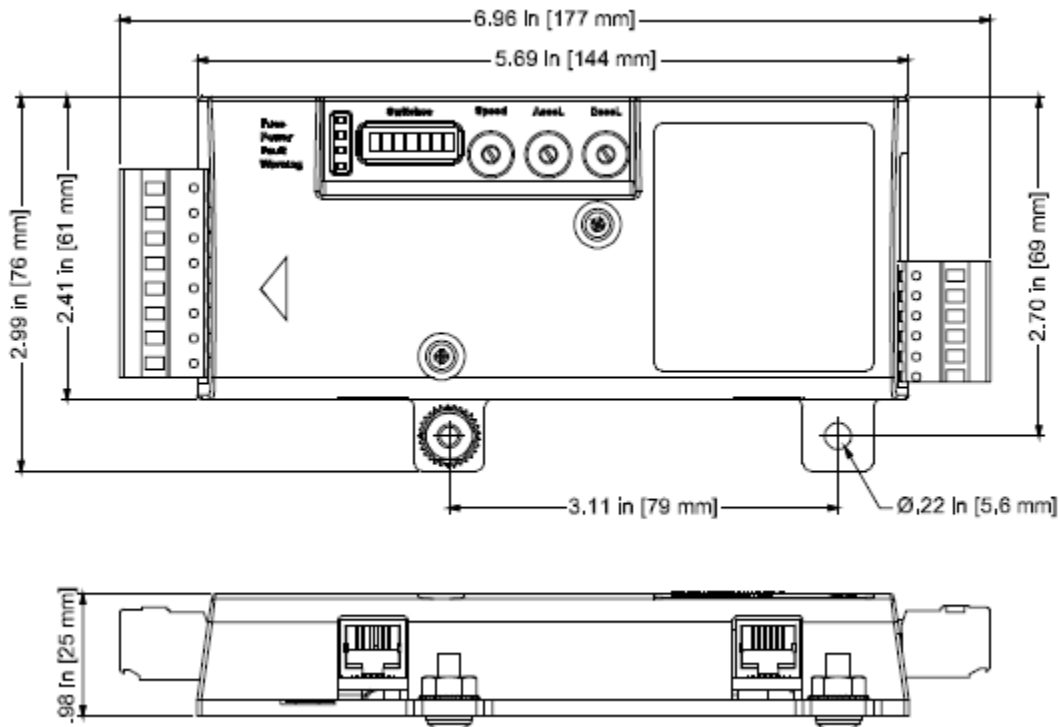


Figure 4: Motor Control Card Dimensions

Motor Control Card Replacement

⚠ WARNING

Before attempting to repair or replace a drive roller, drive card, controller device, or any other device connected to these components, be sure that power to the controls is locked out to prevent premature or accidental start-up. Failure to follow this instruction may result in serious personal injury, and/or equipment damage.

1. Turn off and lock out the power supply to the conveyor.
2. Remove the power plug from the card.
3. Remove the drive roller cable connector and the control cable or com-link from the drive card.
4. Inspect the card and observe the jumper and switch settings.
5. Remove drive card and mounting bracket from the conveyor.
6. Set the switches and jumpers on the new card to match the old one.
7. Remove drive card from mounting bracket and replace with spare.
8. Carefully connect the control cable or com-link and drive roller cable to the card.
9. Reconnect the power plug.
10. Unlock the power supply and turn it on.

MOTORIZED DRIVE ROLLER (MDR)

The standard divert module uses a 14" MDR mounted below the surface rollers and is slaved up to carrier rollers on the surface for all zones other than the divert zone. The divert banks require a non-grooved MDR equal to the BF of the divert module. The motorized drive roller (MDR) is the muscle of the conveyor zone. It provides the torque and speed required to move the product to the next zone. The MDR has the motor and gearing encapsulated inside the roller tube. A more detailed description can be found in **Figure 5** below.

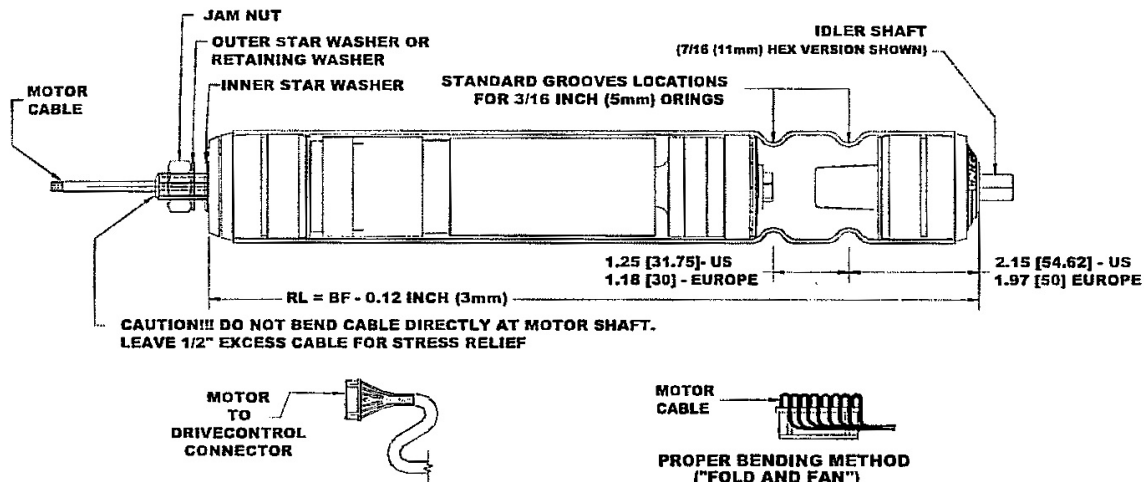


Figure 5: Motorized Drive Roller

Replacement of MDR

1. Turn off and Lockout / Tag-out all power to the conveyor section.
2. Make sure that the Gear Ratio matches that of the roller that is being replaced. Standard Gear Ratios would include: 12:1, 16:1, 24:1, 36:1, 64:1, and 96:1. This is important if the conveyor system is comprised of more than one speed.
3. The replacement roller should include :
 - a. 14" Motorized Drive Roller
 - b. Hardware kit
 - i. star washers – qty. 2
 - ii. motor nut
 - iii. motor instructions
4. Install a star washer on the threaded motor shaft. Fold the wires perpendicular to the connector and fan the wires down the backside of the connector. When folding the wires over the top of the connector use care not to put too much stress on the connector pins and try not to overlap and wires on top of other wires. This will allow the connector to easily pass through the washer. Just simply bending the wires at the connector and forcing the star washer over the wire can cause damage to the insulation on the wires leading to failure of the MDR.
5. Utilizing the fold and fan method described above insert the MDR connector into the hex hole and gently pull the cable extending from the motor through.
6. Insert the threaded hex shaft into the hex hole. Push the spring loaded idler shaft inwards and line the roller up with the hole. Release the idler shaft and allow it to pop into the hole in the frame. **Figure 6** shows an exploded view of the process.
7. Install the outer star washer using the fold and fan method

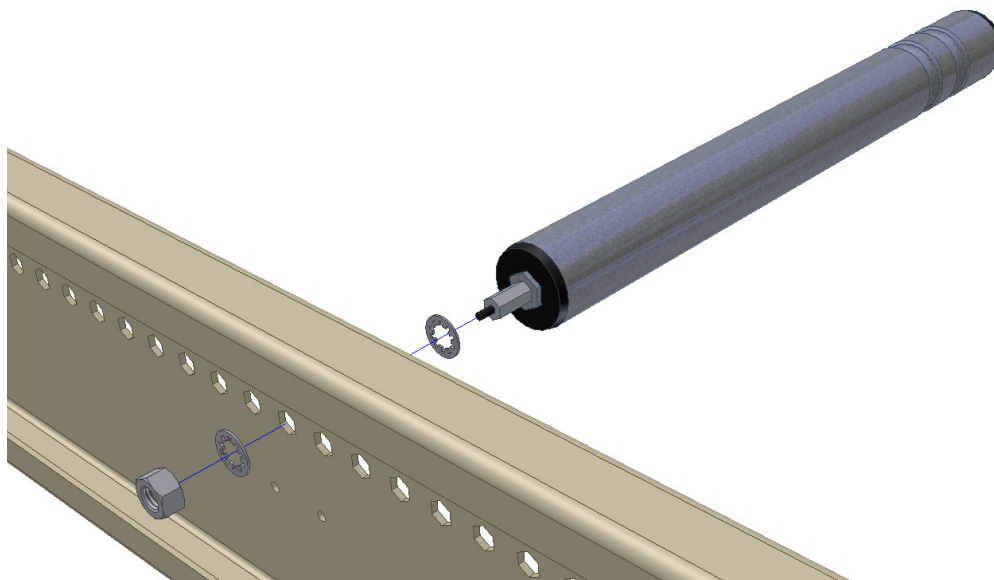


Figure 6: Motorized Drive Roller (Exploded View)

8. The motor nut threads on to the motorized drive roller shaft, and should be to the proper torque of: **30 ft-lbs +/- 5 ft-lbs (40.7 N-M +/- 6 N-M)**.

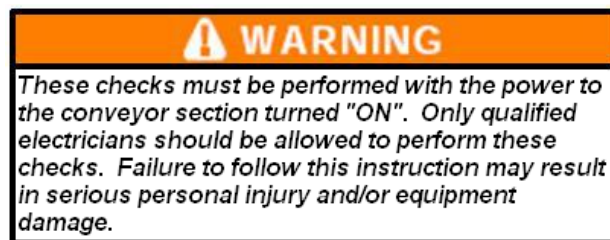
Note: Torque is critical. Failure to properly torque the MDR will result in the shaft spinning in the frame, twisting of the wires and failure of the MDR. Exceeding this torque specification will also result in the conditions above.

9. Tools required to achieve proper torque can be seen in **Figure 7**.



Figure 7: Proper Torque Tools

10. Plug the motor cable into the motor control card.
11. Turn on power to the conveyor section.



12. Check to see if roller operates by passing your hand in front of the photo eye sensor of the zone that is being serviced or the photo eye sensor located upstream with respect to flow.
13. If the MDR does not operate review the [Troubleshooting Section](#).

Carrier Roller

The carrier roller is used to take the weight of the product and also distributes the torque generated by the motorized drive rollers via o-belts, chain, timing belts, strip belts, or full-width belts. Generally no more than nine carrier rollers per motorized drive roller are used in each zone.

Replacement of Carrier Roller

1. Turn off and Lockout / Tag-out all power to the conveyor section.

2. Use an appropriate tool to push in the spring loaded axle on the roller and free that side of the axle from the frame of the conveyor.
3. Carefully disengage the opposite end of the roller from the frame. Make sure the axle is not pinched on the frame causing damage during removal.
4. Remove the disengaged roller entirely from the frame section.
5. Insert the axle of the replacement roller through the conveyor frame.
6. Use an appropriate tool to push in the spring loaded axle and lower the roller into position, aligning the axle with the hex hole in the conveyor frame.
7. Unlock and turn on the power to the conveyor section.

Photo Eye Sensor

A photo eye sensor is used to sense the presence of the product. Two styles of photo eye sensors are used on standard Hilmot Conveyor: Retro-Reflective Photoelectric Sensor & Background Suppression Diffused Photoelectric Sensor.

Standard Retro- Reflective Photoelectric Sensor (P+F)

Figure 8 displays the cable connection types for the Tru-View ML17 series photoelectric sensors - 3.5m sensing range - Polarized retro-reflective mode - 4-in-1 output N.O./N.C. - 2m cable.

Wiring Diagrams

4-in-1 Output

The 4-in-1 output offers one normally open and one normally closed output, both of which automatically detect the connected load, so the outputs either source or sink current depending on the load. A single sensor can operate as NPN normally open, NPN normally closed, PNP normally open, or PNP normally closed.

4⁺IN¹
FOUR OUTPUTS
ONE SENSOR



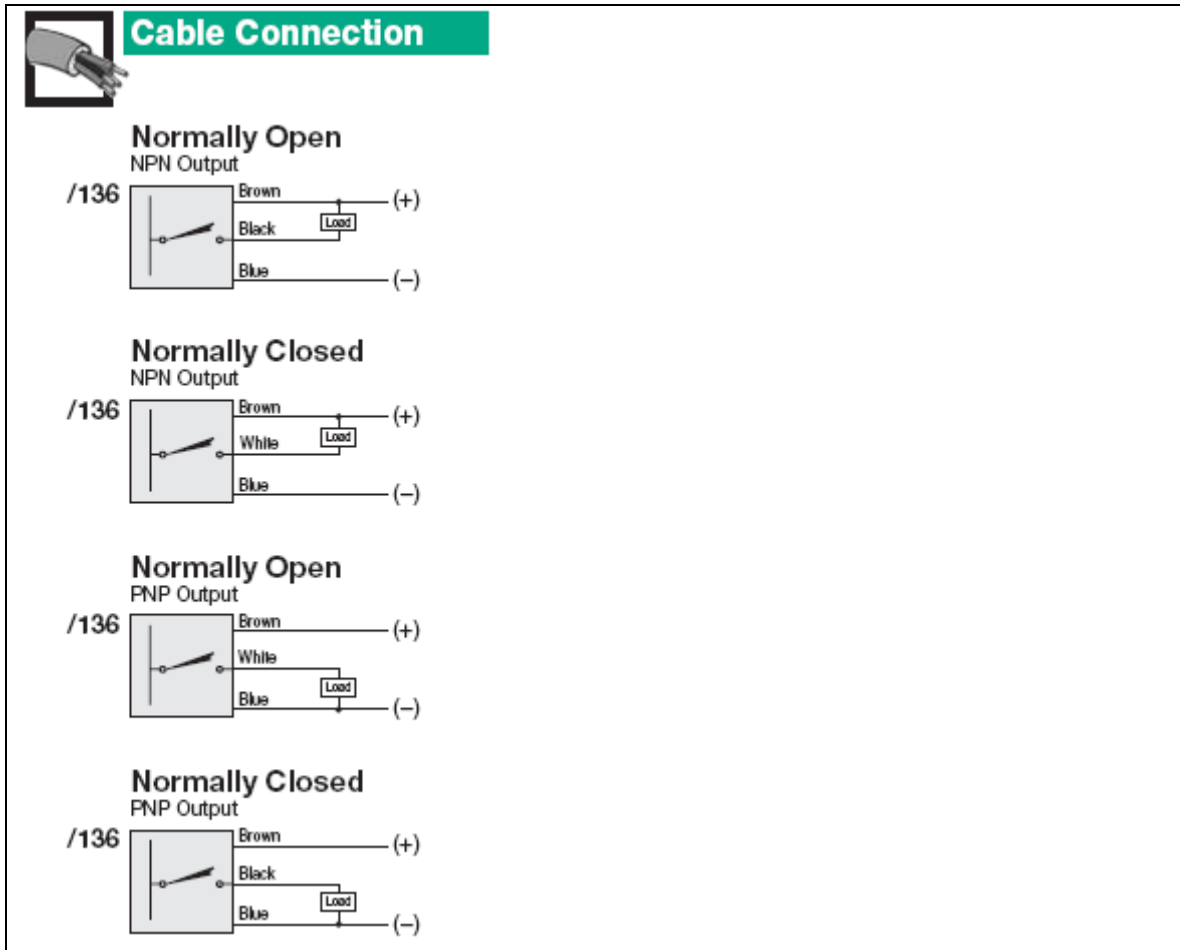


Figure 8: Retro – Reflective Sensor

Standard Background Suppression Diffused Photoelectric Sensor (SICK)

Figure 9 displays the connection diagram for the WTR series photoelectric sensors – 90mm sensing range – Background Suppression Diffused- 4-in-1 output N.O./N.C. - 2m cable.

Features

- Under-the-Conveyor Mount
- Stand alone sensor easily integrated with ZPA systems
- PNP and NPN complimentary outputs
- Adjustable Background Suppression (ABS) sensing technology, ignores background targets and no reflector is required



Connection Diagram

WTR2-P511S20

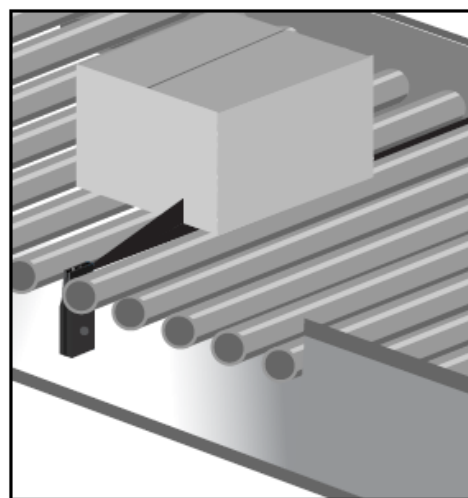
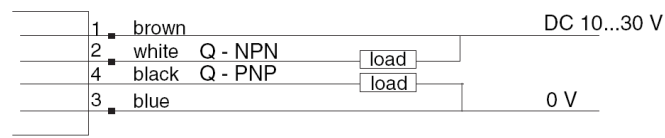


Figure 9: Background Suppression Diffused Sensor

PNEUMATICS

The pneumatic system on the divert module consists of the small cylinder mounted underneath the main weldment, the solenoid valve and a regulator. The cylinder had flow control valve on each side to control the speed of the actuator. The 24V DC solenoid valve is mounted on a bracket under the main frame of the module and the regulator is usually mounted on a regulator mounting bracket which bolts anywhere on the main frame. Normal operating pressure of a divert module is usually between 40-50 psi, but varies by BF. At the time of equipment commissioning or start up, a divert may need to run at a higher psi until the new mechanical parts break in. After two weeks, the pressure should be adjusted down to avoid unnecessary wear on the roll pins that attach the master pivot wheel to the cylinder. Flow controls should also be tuned in to prevent

pivot wheels from “snapping” from impact. The technical information for the pneumatic components is located below.






CAT.IBD20-2A

Air Cylinder Series NCM

Stainless Steel Body Cylinders

7/16", 9/16", 3/4", 7/8", 1-1/16", 1-1/4", 1-1/2", 2" Bore



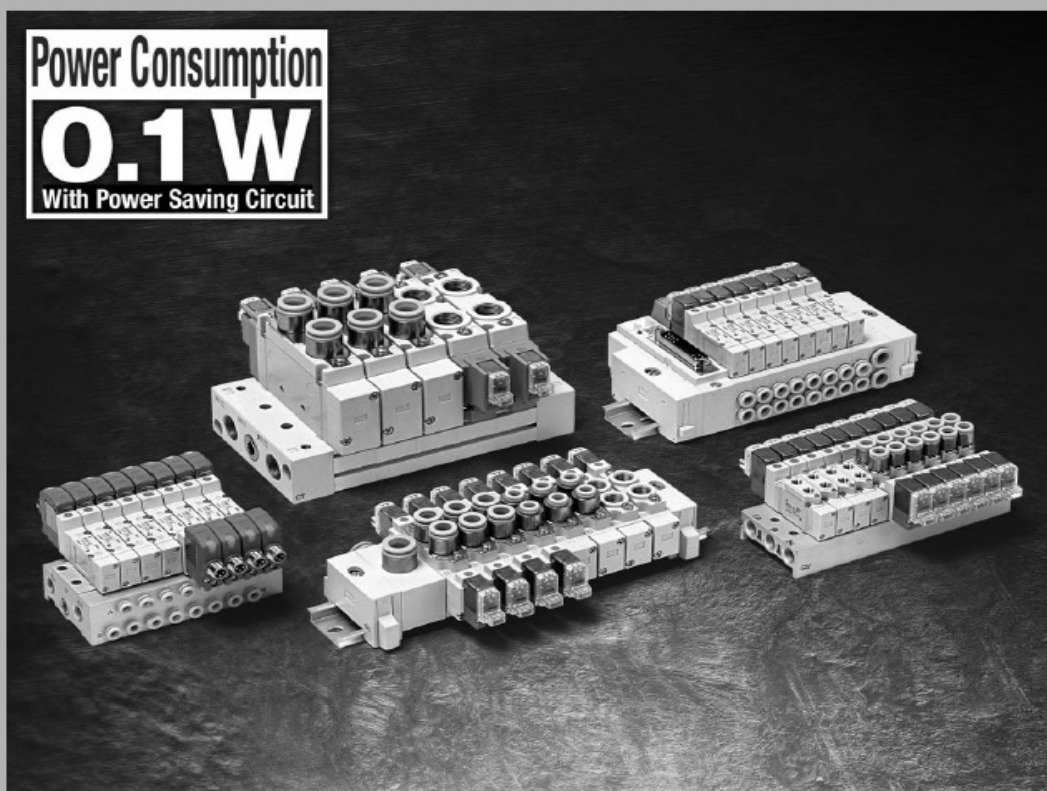
Standard type	Actuation	Style	Auto switch capable	Non-rotating rod	With bumper	Bore size	Standard stroke (inch)
	Double acting	Single rod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	044 (7/16") 056 (9/16") 075 (3/4") 088 (7/8") 106 (1-1/16") 125 (1-1/4") 150 (1-1/2") 200 (2")	[Bore size 044/056] 0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4") [Bore size 075 and above] 0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4"), 0600 (6")
	Double acting	Double rod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	075 (3/4") 088 (7/8") 106 (1-1/16") 125 (1-1/4") 150 (1-1/2") 200 (2")	0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4"), 0600 (6")
	Single acting	Single rod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	075 (3/4") 088 (7/8") 106 (1-1/16") 125 (1-1/4") 150 (1-1/2")	0050 (1/2"), 0100 (1"), 0200 (2"), 0300 (3"), 0400 (4"), 0500 (5"), 0600 (6")

5 Port Solenoid Valve

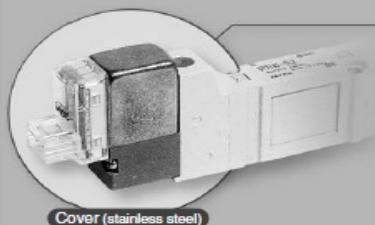
Series SY3000/5000/7000/9000

Rubber Seal

Power Consumption
0.1 W
With Power Saving Circuit



SJ
SY
SV
SYJ
SZ
VP4
S0700
VQ
VQ4
VQ5
VQC
VQZ
SQ
VFS
VFR
VQ7



Cover (stainless steel)

- Improved pilot valve
Pilot valve cover is stronger using stainless steel.
Mounting thread is also reinforced from size M1.7 to M2.

Flow Characteristics

Series	Flow characteristics		
	C [dm ³ /(s·bar)]	b	Cv
SY3000	1.1	0.28	0.29
SY5000	2.8	0.37	0.90
SY7000	4.5	0.28	1.4
SY9000	10	0.29	2.5



101

Filter - Regulator

Series AW20~40

How To Order

AW 30 - N 03 D - 8 Z - X48

Filter - Regulator • *Part number*

Body Size •

Symbol	Size
20	1/8
30	3/8
40	1/2

NPT Threads •

Port Size •

Symbol	Port Size	Applicable Body Size
02	1/4	20
03	3/8	30
04	1/2	40

• With External Epoxy Coating, Stainless Fasteners

• Name Plate, Caution Plate On Bowl in psi, °F

• Bowl

Symbol	Description	Applicable Body Size
2	Metal Bowl	20
8	Metal Bowl With Sight Glass	30, 40

• Accessories

Symbol	Description	Applicable Body Size
Nil	None	All
B*	Mounting Bracket	All
C	Float Auto Drain (N.C.)	30, 40
D	Float Auto Drain (N.O.)	30, 40
H*	Panel Mount Nut	All

Note: Other sizes, thread forms, options, etc. may be possible, please contact SMC for availability.

*Note: Bracket and/or panel mount nut are not assembled and are supplied loose at time of shipment.



Specifications

Body size	20	30	40
Operating specifications	Same as standard - see catalog ES40-42D or NC160A		
Port size	1/4" NPT	3/8" NPT	1/2" NPT
Auto drain port	N/A	1/4" NPT	
Bowl type	Metal	Metal with sight gauge	
Body material	Die cast aluminum		
Bowl material	Die cast aluminum		
Body, Bowl surface treatment	Epoxy resin coating		
Bonnet	Polyacetal		
Manual drain (AF, AW)	POM		
External screws	Stainless steel 410		
Individual mounting brackets	Epoxy coated steel		
Panel mount nut	POM		
Sight glass hardware	Stainless steel 304		

Accessories

Model	Mounting Bracket Kit (Optional)	Panel Mounting Nut (Optional)
AW20	AW20P-270AS-X480	AR20P-260S
AW30	AR30P-270AS-X480	AR30P-260S
AW40	AR40P-270AS-X480	AR40P-260S

Dimensions - Refer to drawings on page 7

Standard

Model	Port Size		Gauge Port		Dimensions																	
	A	C	D	DD	E	F	H	J	K	L	Q	S	T	U	V	W	X	Y	Z	AA	CC	
AW20	NPT 1/4	NPT 1/8	40	—	—	70(max.73)	5	157(max.160)	52	30	44	5.4	15.4	34	55	2.3	M28 X 1	30	6	14	28.5	
AW30	NPT 3/8	NPT 1/8	53	34.5	30	83(max.86)	3.5	218(max.221)	59	41	46	6.5	8	40	53	2.3	M38 X 1.5	31	7	19	38.5	
AW40	NPT 1/2	NPT 1/4	70	41	38	88(max.92)	1.5	255(max.259)	75	50	54	8.5	10.5	54	70	2.3	M42 X 1.5	35.5	7	21	42.5	

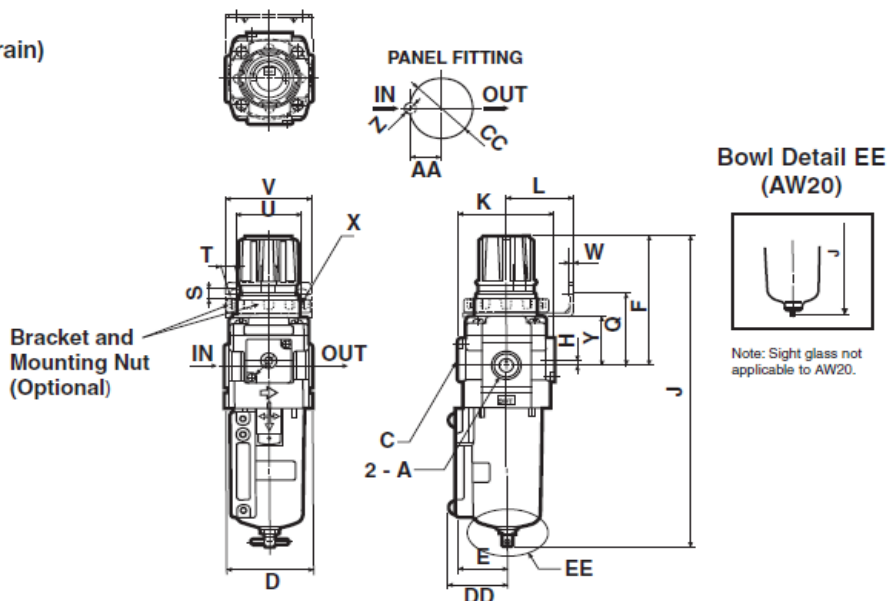
Auto Drain

Model	Port Size		Gauge Port		Dimensions																
	A	C	D	DD	E	F	H	J	K	L	Q	S	T	U	V	W	X	Y	Z	AA	CC
AW30	NPT 3/8	NPT 1/8	53	34.5	30	83(max.86)	3.5	239(max.242)	59	41	46	6.5	8	40	53	2.3	M38 X 1.5	31	7	19	38.5
AW40	NPT 1/2	NPT 1/4	70	41	38	88(max.92)	1.5	276(max.280)	75	50	54	8.5	10.5	54	70	2.3	M42 X 1.5	35.5	7	21	42.5

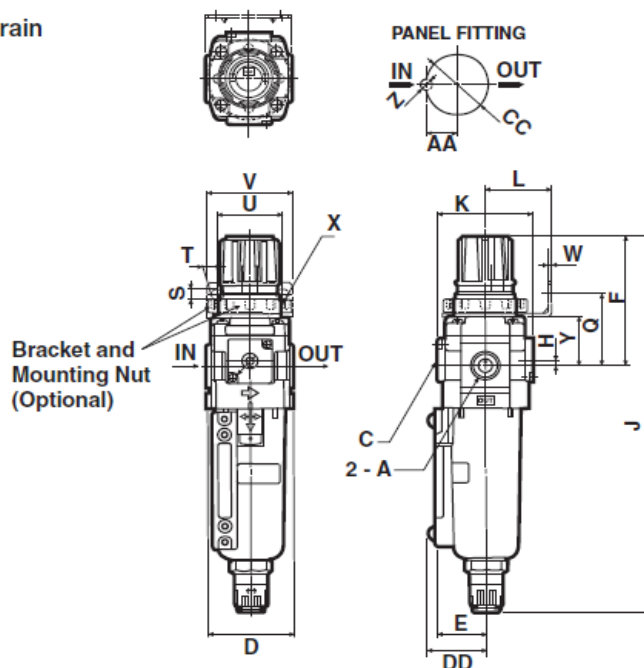
Series AW20~40

Filter - Regulator

Standard (Manual Drain)



With Auto Drain





TROUBLE SHOOTING

When troubleshooting equipment problems, it is essential to completely understand how the system functions during normal operation. Thoroughly review the operational description, the circuit drawings, and the electrical diagrams sent with your equipment. Once the system operation is understood, it is usually best to start at the problem, and then work back to the source.

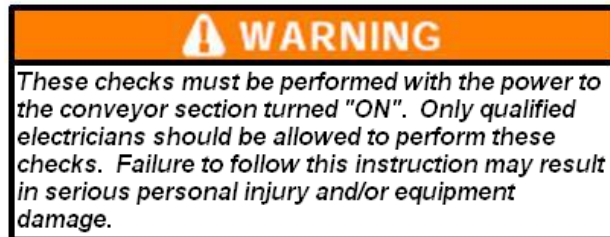
Procedures are discussed at length in the following pages; however, there are certain guidelines that should be followed for all troubleshooting problems.

- Locate the problem.
- Listen and observe.
- Identify the problem as an electrical, mechanical, or pneumatic problem.
- Determine symptoms through observations.
- Think and act with caution and clear thinking.
- List short and long term solutions.
- Select a solution or possible solutions.
- Implement and document one solution at a time.

Troubleshooting a Dead Zone on the Conveyor

Perform the following visual checks prior to any troubleshooting:

1. Visually check and confirm that all wires are intact and all connectors are secure.
2. Visually check and confirm that there are no obstructions to the rollers.
3. Inspect the photo eye sensor and check for proper operation as described in the Preventative Maintenance section of this manual.



Controller Check

The controller typically controls 4 to 8 zones. If less than 4 zones are not functional, check individual communication cables.

Check the input voltage into the controller. If no voltage is detected, check the in-line fuse. If the in-line fuse is functional, check the power supply.

Power Supply Check

The power supply typically supplies voltage to multiple zones. If the power supply is defective, all zones supplied will be inoperative. If only one or two zones are inoperative, check the individual connection cables and connectors going to each card.

Check the input voltage into the power supply. Check the power supply fuse or the circuit breaker. Replace if defective.

Motor Control Card / Motorized Drive Roller Checks

This check determines if the motor control card and the motorized drive roller are functional and must be done with power to the conveyor turned on.

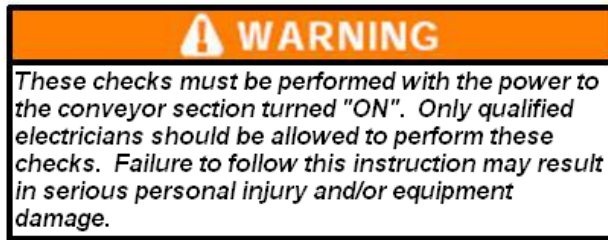


1. Determine which motor control card is being used at the zone location.
2. Refer to corresponding vendor information to determine which input pins are designated '24VDC' input, '0VDC' input, and 'Run' input.
3. Jumper across the '0VDC' and 'Run' pins (NPN) using a suitable jumper wire. The motorized drive roller may rotate.
4. Jumper across the '24VDC' and 'Run' pins (PNP) using a suitable jumper wire. The motorized drive roller may rotate. If the motorized drive roller rotates in either "Step 3" or "Step 4", check the photo eye sensor, the com-link cable/connection (if applicable) or the controller cable/connection (if applicable). If the motorized drive roller does not rotate, proceed to Step 5.
5. This procedure requires use of an exact spare motor control card (be attentive of NPN and PNP signal differences in the card). It is not necessary to remove the drive card from the mounting fixture for this check.
 - a. Turn off and lock out the power to the conveyor section.
 - b. Remove connectors from existing motor control card one at a time and install in the exact corresponding connector on the spare motor control card.
 - c. When all connectors have been installed on test motor control card, and connections have been checked and secured, place the spare motor control card in a safe position so it cannot be damaged by the rotating motorized drive roller.
 - d. Unlock and turn on power to the zone, and cover the adjacent upstream sensor.

If the motorized drive roller rotates, the motor control card is defective. Replace the motor control card using the procedure [Motor Control Card](#) section of this manual. If the motorized drive roller still does not rotate, the motorized drive roller is defective. Replace the motorized drive roller using the procedure in the [Motorized Drive Roller \(MDR\)](#) section of this manual.

No Voltage to the Motor Control Card

This check determines if there is power being supplied to the motor control card and must be done with power to the conveyor turned on.



1. Determine which motor control card is being used at the zone location.
2. Refer to corresponding vendor information to determine which input pins are supplying the '24VDC' input (pin '0V' and pin '24 V') and check the voltage across these pins using a multi-meter.
3. If the voltage is not between 24-26VDC, check the downstream zone motor control card for voltage. If the same condition exists (voltage is not between 24-26VDC), check the Power Supply.
4. If the voltage is between 24-26VDC, check the power cable wiring and connector.

Troubleshooting Help

If you need further assistance, please visit our website at <http://www.hilmot.com> or call our Customer Service Department at 262.544.9960 or toll free at 800.799.4492, Monday through Friday 8:00 am to 5:00 pm CT.



Appendix A

Symptom	Cause	Corrective Action
ZONE WILL NOT RUN (DEAD ZONE)	MECHANICAL TRANSMISSION	INSURE PROPER MECHANICAL CONNECTION (O-BANDS, DRIVE CHAIN LOOPS, TIMING BELTS, ETC.) BETWEEN MDR & CARRIER ROLLERS.
	NO VOLTAGE TO MOTOR CONTROL CARD	CHECK VOLTAGE ACROSS MOTOR CONTROL CARD.
		CHECK POWER SUPPLY.
		INSPECT INTERCONNECT WIRING FOR LOOSE WIRES.
	MOTOR CONTROL CARD DIP SWITCH SETTINGS ARE INCORRECT	VERIFY DIP SWITCH SETTINGS ACCORDING TO ELECTRICAL INTERCONNECT DRAWING.
	MOTORIZED DRIVE ROLLER IS DEFFECTIVE	REPLACE MOTORIZED DRIVE ROLLER.
	PHOTO-EYE SENSOR INCORRECTLY WIRED	VERIFY WIRING ACCORDING TO CONNECTION DIAGRAM.
	DISCONNECTED PHOTO-EYE SENSOR	RECONNECT PHOTO-EYE SENSOR.
	FAULTY COMMUNICATION CABLE	REPLACE COMMUNICATION CABLE.
		REPLACE MOTOR CONTROL CARD.
	DC COMMON IS NOT CONNECTED BETWEEN POWER SUPPLIES	VERIFY DC COMMON ARE CONNECTED.
ZONE RUNS IN WRONG DIRECTION	MOTOR CONTROL CARD DIP SWITCH SETTINGS ARE INCORRECT	VERIFY DIP SWITCH SETTINGS ACCORDING TO ELECTRICAL INTERCONNECT DRAWING.
	FAULTY POWER SUPPLY	REPLACE POWER SUPPLY
ZONE RUNS CONTINUOUSLY	PHOTO-EYE SENSOR MISALIGNED ON UPSTREAM ZONE	ALIGN PHOTO-EYE SENSOR, CLEAN PHOTO-EYE SENSOR LENS
	DISCONNECTED PHOTO-EYE SENSOR	RECONNECT PHOTO-EYE SENSOR.
	FAULTY COMMUNICATION CABLE	REPLACE COMMUNICATION CABLE.
		REPLACE MOTOR CONTROL CARD.





Symptom	Cause	Corrective Action
MOTORIZED DRIVE ROLLER MAKES EXCESSIVE NOISE	FAULTY MOTORIZED DRIVE ROLLER	REPLACE MOTORIZED DRIVE ROLLER
ZONE RUNS AT A DIFFERENT SPEED THAN REST OF CONVEYOR	GEAR RATION OF MDR IS INCORRECT	VERIFY PROPER MDR, AND REPLACE IF NEEDED
	SPEED POTENTIOMETER ON MOTOR CONTROL CARD IS INCORRECT	USING A TERMINAL SCREWDRIVER ADJUST POTENTIOMETER ON MOTOR CONTROL CARD
	MOTORIZED DRIVE ROLLER IS DEFFECTIVE	REPLACE MOTORIZED DRIVE ROLLER.
LARGE BATCH OF ZONES DO NOT OPERATE	FAULTY POWER SUPPLY	REPLACE POWER SUPPLY
	BREAKER BLOWN AT MAIN PANEL	RESET BREAKER - IF PROBLEM PERSISTS CALL FOR SERVICING
	BREAKER BLOWN AT LOCAL POWER SUPPLY	RESET BREAKER - IF PROBLEM PERSISTS CALL FOR SERVICING
	DISCONNECT SWITCHED AT LOCAL POWER SUPPLY	TURN DISCONNECT TO ON POSITION
	INTERCONNECT WIRES - LOOSE CONNECTION	CHECK WIRING
BOXES RUN INTO EACH OTHER	PHOTO-EYE SENSOR NOT OPERATING	VERIFY PHOTO-EYE SENSOR WIRING
		VERIFY PROPER PHOTO-EYE SENSOR ALIGNMENT
		CLEAN PHOTO-EYE SENSOR LENS
	DEAD ZONE	SEE: ZONE WILL NOT RUN (DEAD ZONE)
	SPEED SET TOO HIGH	SEE: ZONE RUNS AT DIFFERENT SPEED THAN REST OF CONVEYOR.
	PACKAGE LARGER THAN ZONE	VERIFY PACKAGE SIZE TO ORIGINAL CONVEYOR SPECIFICATIONS.
	PHOTO-EYE SENSOR LOCATION IS INCORRECT	MOVE PHOTOEYE SENSOR TO PROPER LOCATION SPECIFIED CONVEYOR PURCHASE.
	MOTOR CONTROL CARD DIP SWITCH SETTINGS ARE INCORRECT	VERIFY DIP SWITCH SETTINGS ACCORDING TO ELECTRICAL INTERCONNECT DRAWING.



Symptom	Cause	Corrective Action
GREEN LIGHTS ON CARD NOT LIT	MOTOR CONTROL CARD IS FAULTING	SEE: MOTOR CONTROL CARD SECTION OF THIS MAINTENANCE MANUAL FOR FAULT INFORMATION.
	NO VOLTAGE TO MOTOR CONTROL CARD	CHECK VOLTAGE ACROSS MOTOR CONTROL CARD.
		CHECK POWER SUPPLY.
		INSPECT INTERCONNECT WIRING FOR LOOSE WIRES.
PRODUCT BOUNCES SPORATICALLY WHILE IN TRANSPORTATION	CONVEYOR SECTIONS DO NOT HAVE SMOOTH TRANSITION AT CONVEYOR CONNECTION	READJUST CONVEYOR HEIGHT.
	DEBRIS ON CONVEYOR	REMOVE DEBRIS FROM CONVEYOR
	DEBRIS ON CONVEYED PRODUCT	REMOVE DEBRIS FROM CONVEYED PRODUCT
IRREGULAR MOVEMENT OF PACKAGE WHILE IN TRANSPORTATION (STUDDERING)	PACKAGE LARGER THAN ZONE	VERIFY PACKAGE SIZE TO ORIGINAL CONVEYOR SPECIFICATIONS.
	DIFFERENT ZONE SPEEDS	SEE: ZONE RUNS AT DIFFERENT SPEED THAN REST OF CONVEYOR.