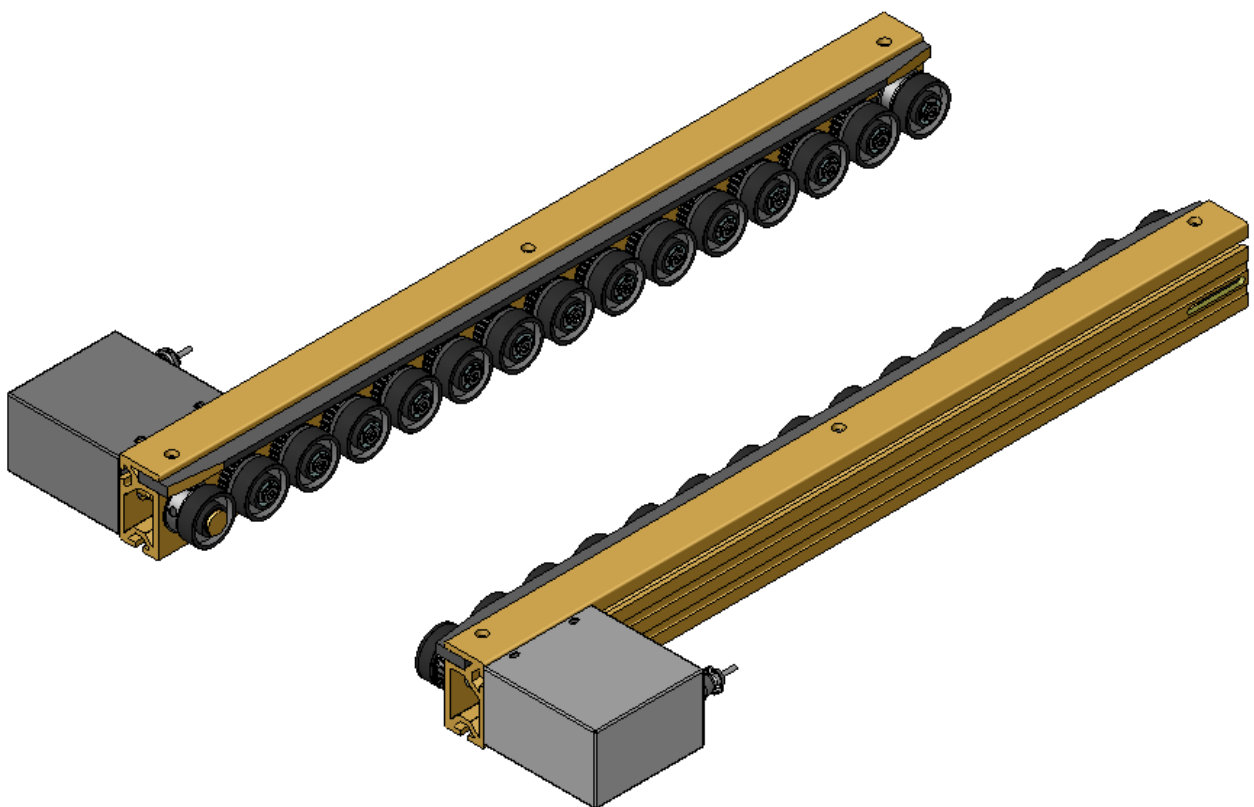


# Quickdraw<sup>®</sup>

SYSTEMS

## HD Conveyor Maintenance Guide



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## Overview

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*Quickdraw Conveyors are designed to be the most reliable and easiest to maintain automated process conveyors available. This Guide consists of easy to understand maintenance procedures for your HD Series Conveyor. This Guide also contains a Troubleshooting Section to help technicians identify the potential causes of any problems that may occur.*

*If you require any assistance, technical support or have any questions, please contact Quickdraw's Customer Service Department at:*

### Quickdraw Systems

*Phone:* 1-800-473-8837  
(952) 935-6921

*Fax:* (952) 933-5803

*Internet:* [www.qdraw.com](http://www.qdraw.com)  
*E-mail:* [info@qdraw.com](mailto:info@qdraw.com)

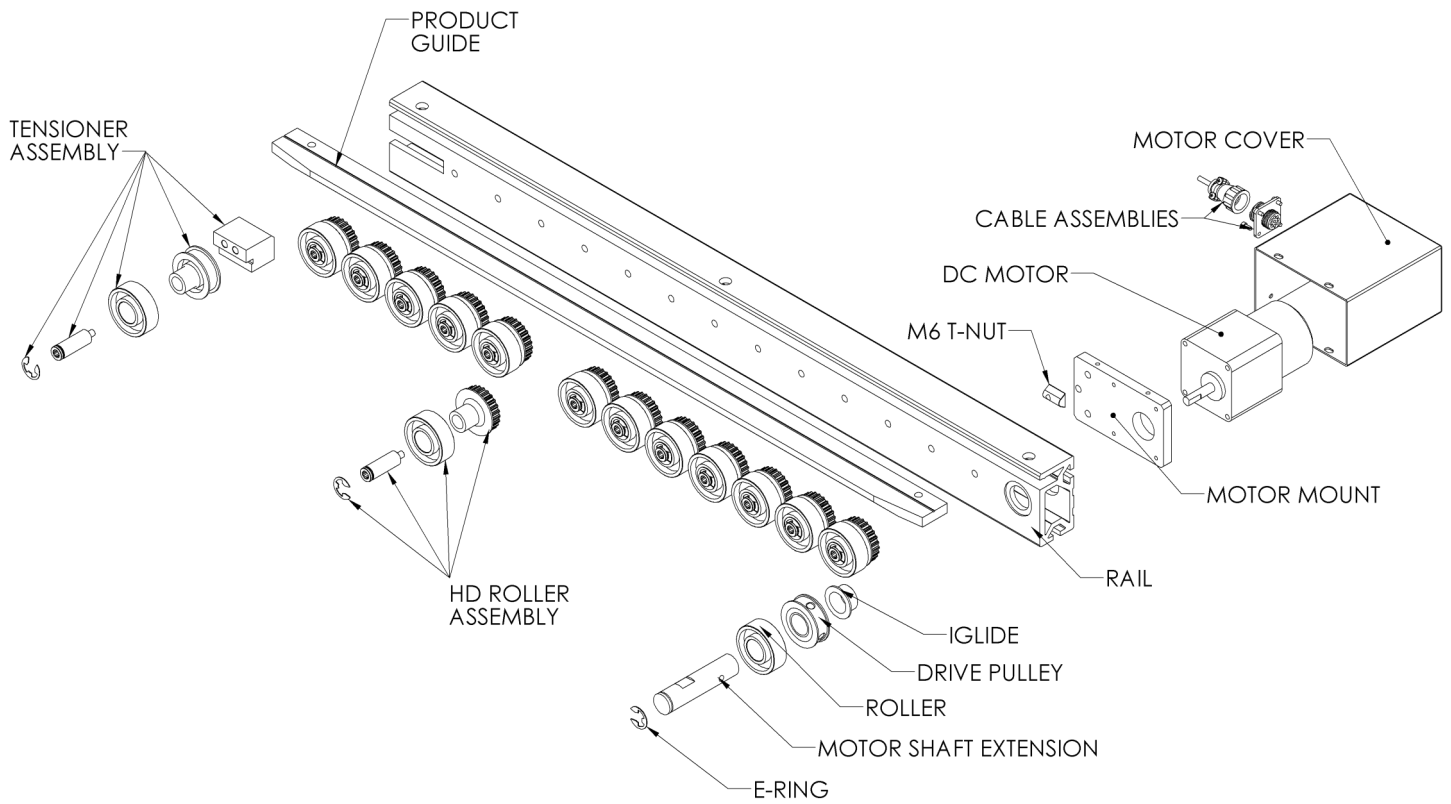
*Or, write to us at:*

**Quickdraw Systems  
700 Industrial Circle S.  
Shakopee, MN 55379-1897**

*Note: Some illustrations in this manual include features that may not match or be included on your conveyor system.*

*Note: This maintenance manual is offered in the English language. If other languages are required, Quickdraw is not responsible for translation.*

# HD Conveyor Drive Assembly



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## Powering Conveyors By Hand

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*Powering the Conveyor by hand must be done during Product Guide replacement and after every maintenance procedure prior to connecting the power source. This is done to ensure that the Timing Belts are seated properly onto the teeth of the pulleys.*

*Important: Failure to hand-power a conveyor before turning on its motor may result in the following:*

- 1) Blown Fuse*
- 2) Timing Belt Damage*
- 3) Drive Assembly Damage*

**Procedure:**

- 1) Turn the Drive Pulley with your fingers. Turn in both directions until the Timing Belts are properly seated. *\*The last direction turned should be the same as the conveyor's direction of flow.*
- 2) To avoid problems, hand-power the conveyor as it is being assembled. *For example: After assembling the Drive system, hand-power the conveyor. After replacing the Product Guide, hand-power the conveyor.*

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## Preventative Maintenance

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*The following is a list of procedures that should be followed as a part of a regular maintenance routine.*

### **Procedure For HD Conveyors:**

- 1) Check the Conveyor to make sure that all rollers are turning freely.
- 2) Check for wear on the Timing Belts.
- 3) Check to make sure that the Conveyor is securely fastened to its frame.
- 4) Always hand-power the Conveyors after maintenance and before start-up.

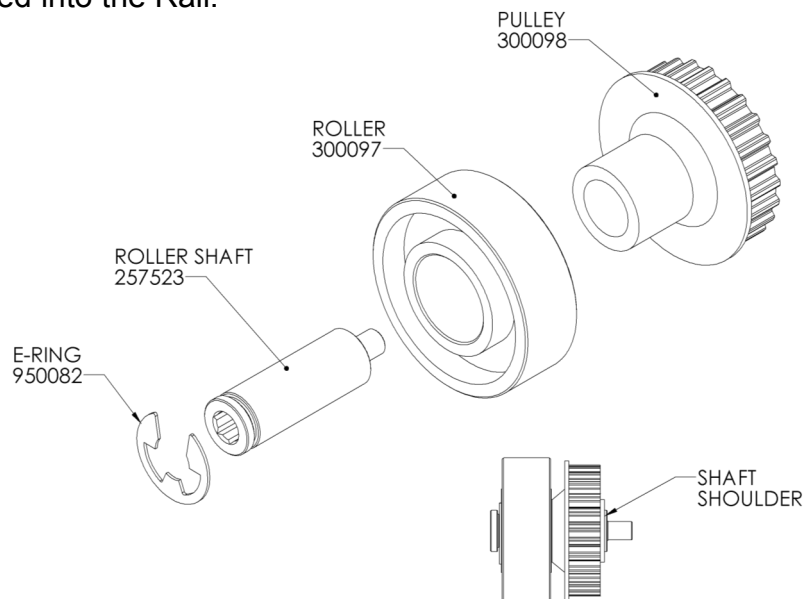
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## Pulley / Roller Replacement

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### **Procedure:**

- 1) Loosen the Shaft from the Rail with a 1/4 " internal hex wrench.
- 2) Turn the Shaft out with your fingers.
- 3) Place a new Roller and/or Pulley on the Shaft.
- 4) Make sure that the shoulder of the Shaft extends past the Pulley to prevent the Roller from being pinched against the Rail (See below).
- 5) Turn the Roller Assembly into the rail with your fingers until snug.
- 6) Using a Torque Wrench set to 65 inch/pounds, tighten the Roller Assembly.
- 7) Hand-spin the Pulley and Roller to make sure they spin freely and are not being pinched into the Rail.



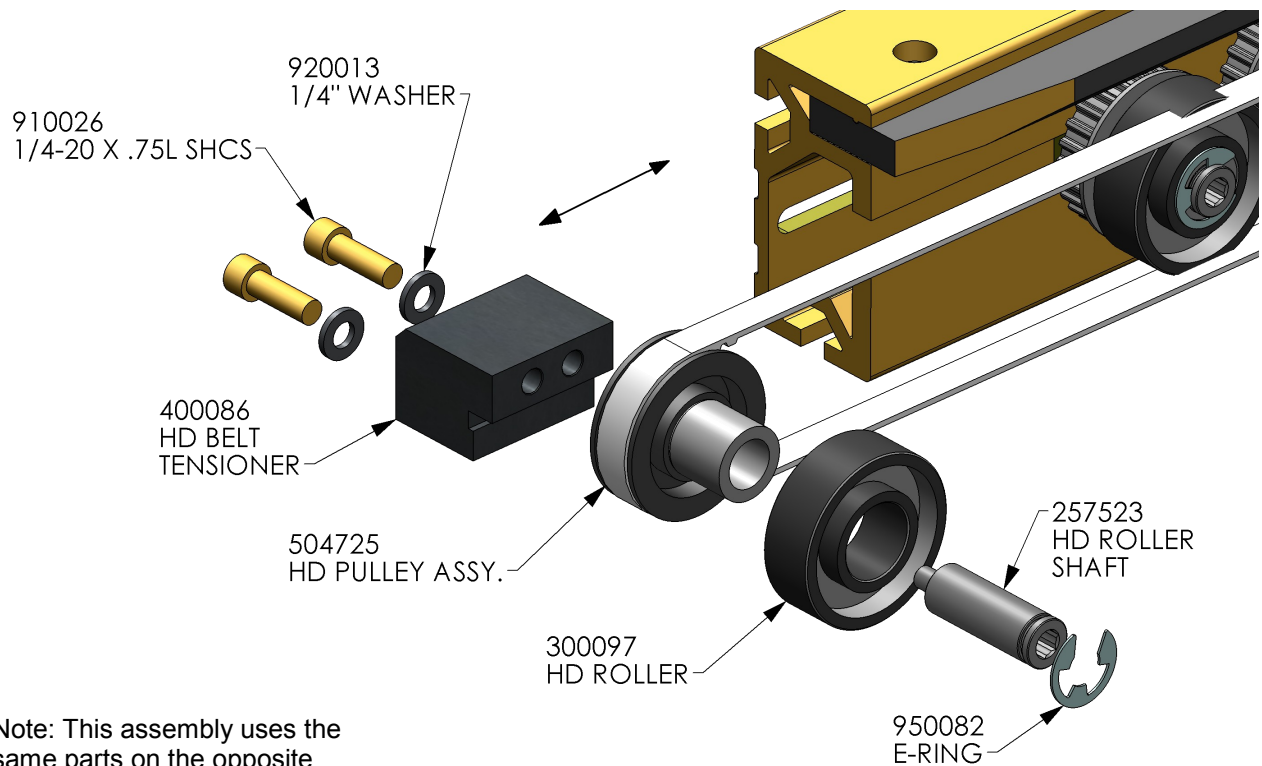
*Make certain that the Roller Shaft's shoulder extends past the Pulley.*

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## Belt Tension

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***Important:*** Over-tension of the belts on the HD system may cause increased wear on the drive components of the system. The tensioners on this conveyor are only supplied to take up slack and are not intended to increase belt pulley engagement.



Note: This assembly uses the same parts on the opposite side. Assemble the pulley/roller in the other hole.

### **Procedure:**

- 1) Loosen the two fasteners securing the belt tensioner at the end of the rail opposite the drive side.
- 2) Pull the Tensioner by hand to take the slack out of the belt. **Do not use anything to pry the tensioner, it should be only hand tight.**
- 3) Tighten the two fasteners to lock the tensioning block into place.

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## Motor Replacement

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### Procedure For HD Models:

- 1) Unplug the Motor Cable from the Motor.
- 2) Loosen the set-screw that connects the motor to the Shaft Extension.
- 3) Remove the four screws that secure the Motor to the Motor Bracket.
- 4) Remove the Motor.
- 5) Attach the new Motor to the Motor Bracket with the four screws. Make sure that the Motor Shaft has been inserted into the Motor Shaft Extension correctly before tightening the four screws.
- 6) Secure the Extension on to the Motor Shaft. Be sure to line up the set-screw on the Extension with the flat on the motor shaft.
- 7) Plug the Motor Cable into the Motor.
- 8) Hand Power the Conveyor (See Page 5).
- 9) Turn on the Conveyor.

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## Timing Belt Replacement

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### Procedure:

- 1) Remove Product Guide by removing the shoulder screws located along the top of the conveyor and sliding the product from the rail.
- 2) Loosen the Belt Tensioner at the end of the Rail opposite the Motor.
- 3) Remove old Timing Belt.
- 4) Place the new Timing Belt over the far end pulley. *\* Make sure that the Belt is on the teeth of the Pulley.*
- 5) Pull the Belt toward the Motor end until it is around all of the pulleys on the conveyor.
- 6) Check the Timing Belt to ensure that it is not twisted or caught on the Rail.
- 7) Place the Belt around Drive Pulley.
- 8) Re-tension the Belt using the Tensioner opposite the Motor
- 9) Replace the Product Guide.
- 10) Hand-Power the Conveyor (See Page 5).
- 11) Turn on the Conveyor.

# Electrical Controls Maintenance

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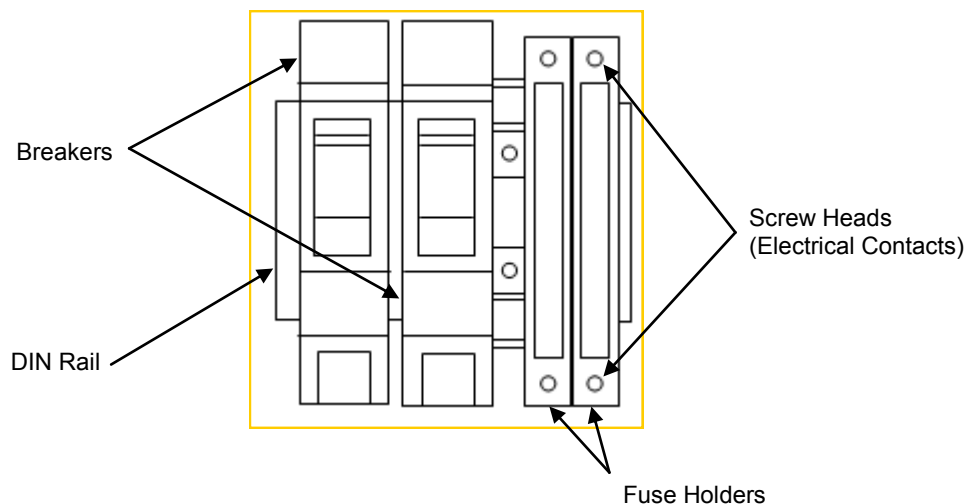
## Measuring Current Draw

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### Procedure:

**Warning:** This procedure describes testing in an open, powered Control Panel. Use caution.

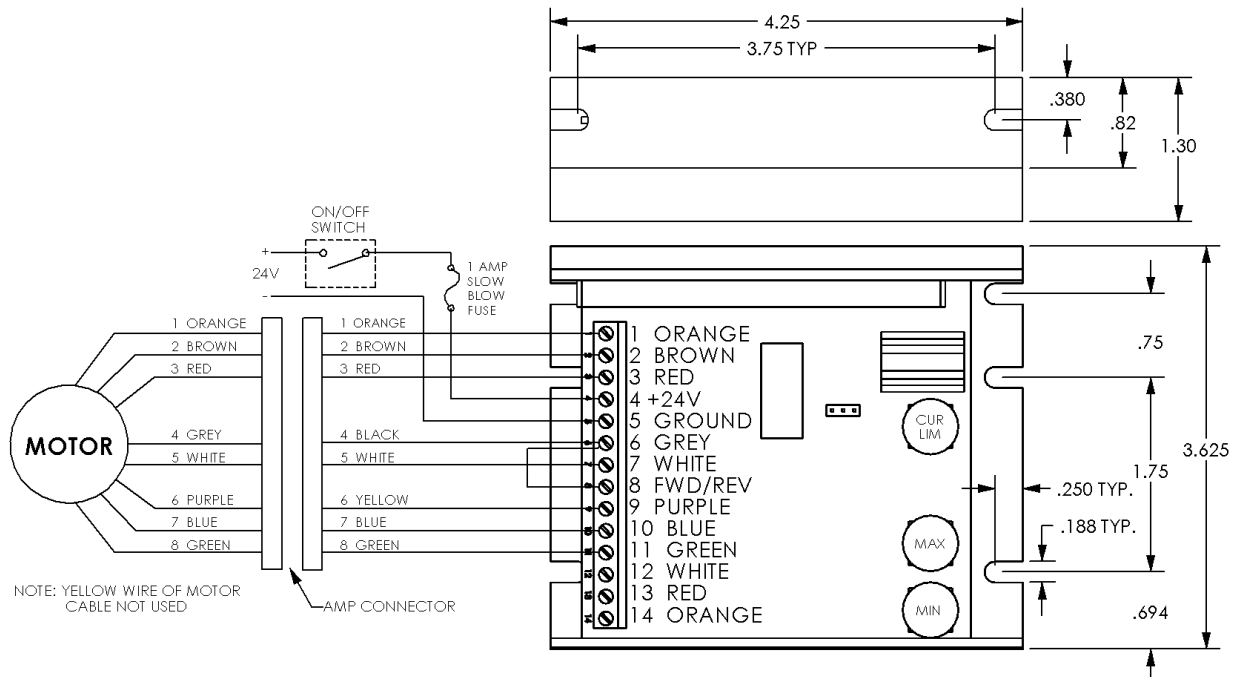
- 1) In the Control Panel, open the Fuse Cover on the Fuse segment for that specific Conveyor. Opening the cover removes the fuse from the circuit.
- 2) With power on, carefully place the Ammeter's Probes on the screw heads as indicated in the diagram. The conveyor will "turn on". Take a reading on the meter.
- 3) If the reading is negative, reverse the probes.
- 4) The reading on a standard MR conveyor (unloaded - no product or pallet resistance) should be less than or equal to 1.0 amps.
- 5) If the reading exceeds this, see the Trouble Shooting -High Current section of this Manual on page #14.
- 6) Remove the Ammeter and close the Fuse segment cover. Close the Control Panel cover.



Example of Breakers and Fuse Holders mounted on DIN Rail inside a control Panel.

**Note:** *Quickdraw Conveyors with a standard 20W Motor should draw no more than 1.0 amps unloaded.*

# Motor Control Card Wiring Diagram



## Wiring Diagram For The Dart 700BDC

**Please Note:** The enclosed Speed Pot is connected as follows:  
White to 12; Red to 13; and Orange to 14. To eliminate the Speed Pot, jumper Terminals 12 & 13 and set speed using on-board controls.

### Motor Cable Wiring Guide

Pin	Ribbon Cable	Pin	8 Conductor Cable
1	Orange	1	Orange
2	Brown	2	Brown
3	Red	3	Red
4	Grey	4	Black
5	White	5	White
6	Purple	6	Yellow
7	Blue	7	Blue
8	Green	8	Green

Note: the Yellow Wire is Not Used on the Ribbon Cable.

### Procedure to Change direction— Dart DC Brushless 700BDC Card:

- 1) Unplug power to Conveyor.
- 2) Locate the Motor Control Card that is operating in the wrong direction.
- 3) Turn off power.
- 4) Unplug the Conveyor Control Box from electrical power.
- 5) Check the Control Card for a wire jumper (usually orange in color) connecting Terminals #6 and #8.
- 6) If there is a jumper wire, remove the wire to change the direction of flow.
- 7) If there is no jumper, insert a wire jumper to change the direction of flow.
- 8) Plug in the Conveyor Control Box.
- 9) Turn on the power.

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## Setting Conveyor Speeds

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*Unless otherwise requested, Quickdraw sets all Conveyor Speeds at 60 ft./min. for all Conveyor Systems that include Conveyor Control Boxes. Quickdraw does this to standardize its conveyor performance data. The Motor Cards used on most applications come with Speed Potentiometers (Speed Pots) that can either be used or discarded.*

*Most customers choose not to use the Speed Potentiometers, but rather set speed with Min/Max Speed Pots directly attached to the board.*

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### How to Determine Conveyor Speed

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#### **Procedure:**

- 1) Place a small piece of reflective tape onto the roller.
- 2) Turn on the conveyor.
- 3) Measure the rpm with a Handheld Optical Digital Tachometer, such as the "AMETEK Model 1726 Optical Digital Tachometer".

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### How to Convert Linear Distance/Minute to Target RPM

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#### **Procedure:**

- 1) Establish the needed conveyor flow rate. \* *For example: 60 ft/min.*
- 2) Determine the diameter of a Roller. \* *The diameter of a HD Roller is 1.75".*
- 3) Use the following formula to determine the target rpm:
 
$$\text{Target RPM} = \text{Linear Speed (ft/min)} / \{\pi * \text{roller diameter (in feet)}\}$$
  - Target RPM = 60 ft/min. /  $\pi * (1.75"/12"/ft)$
  - Target RPM = 60 ft/min. /  $\pi * 0.146 \text{ ft.}$
  - Target RPM = 60 ft/min. / 0.458 ft.
  - Target RPM = 131

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### Setting Conveyor Speed on Dart 700 BDC Control Cards

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#### **Procedure:**

##### **With Speed Pot:**

- 1) Turn the dial on Speed Pot until the tachometer reads target rpm.
- 2) If unable to achieve target rpm, adjust the white Min and Max dials found on the Motor Control Card until the target rpm can be achieved within the range of the Speed Pot.

##### **Without Speed Pot:**

- 1) Adjust the white Min and Max dials found on the Motor Control Card until the target rpm can be achieved.

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## Phase Considerations

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For most applications, Quickdraw Systems uses low voltage, Brushless DC 3-Phase Motors and Control Cards. Occasionally, a faulty phase may be the problem. Signs of a bad phase include but are not limited to:

- a) Intermittent Motor Failure.
- b) The ability to start the Motor by turning the Drive Pulley after initial powering-up of the Conveyor. After the Motor has been finger started, the Motor turns on its own, but again may intermittently have a start-up problem.

To remedy this situation, follow the Electrical Troubleshooting guide on the following page. Make certain to turn the Conveyor on and off multiple times to make sure that the real cause of the problem is found.

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## Electrical Troubleshooting

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### **Procedure:**

- 1) Check all electrical connections. Make sure that all plugs are connected properly.
- 2) Make sure that it is an electrical problem by eliminating the Conveyor as a possible cause of failure:
  - a) Measure the current draw (See Page 9).
  - b) Hand power the Conveyor.
  - c) Attach the Conveyor to a Motor Cable that is connected to a different, functioning Motor Control Card. \* *Use a different Conveyor Control Box if possible.*
  - d) Measure the current draw.
- 3) If the Conveyor turns by hand, and operates within an acceptable current draw range when connected to a different Motor Control Card, the problem lies somewhere in the original electrical system.

Possible causes include:

  - a) Electrical connections.
  - b) The Motor.
  - c) The Motor Cable.
  - d) The Power Supply.
- 4) To check the Motor, plug the electrical system in question into a different Conveyor. If the new Conveyor operates properly, the Motor on the original Conveyor is probably the cause and should be replaced.
- 5) To check the Motor Cable, switch Cables with a Conveyor that is operating properly. If the problem disappears, check the original Cable for bad electrical connections or cuts. If the original Cable cannot be repaired, then it must be replaced.
- 6) Unplug the Conveyor Control Box and check for loose connections or cut wires within the Control Box. Be careful not to create additional problems by pulling too forcefully on the wires. If you believe that you have found loose wiring and have taken steps to reconnect them properly, plug in the Control Box and measure the current draw of the original system. If the current draw is within the acceptable range, you have fixed the problem. If not, proceed to step #7.
- 7) If you still have not found the problem, replace the Motor Card using the Wiring Diagram on Page 10 as a guide.
- 8) If this does not eliminate the problem, please call a Quickdraw Systems representative for support at 1-800-473-8837 or 952-935-6921.

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## Troubleshooting

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*Important: When performing any maintenance, make certain that the Drive Assembly is free to turn before applying power to the Motor.*

Problem	Possible Cause(s)	Solution
<b>Conveyor Rollers are not turning.</b>	<ul style="list-style-type: none"> <li>a) Is the Motor turning?</li> <li>b) Is the Drive Shaft Extension turning?</li> <li>c) Is the Belt pinched between the Teeth of the Pulley and the Product Guide?</li> </ul>	<ul style="list-style-type: none"> <li>a) If not, refer to Motor problems.</li> <li>b) Check the Set screw connecting the Motor Shaft to the Extension..</li> <li>c) Remove the Product Guide and Power by Hand. Replace the Product Guide and Power by Hand.</li> </ul>
<b>The Motor is not turning.</b>	<ul style="list-style-type: none"> <li>a) Is a fuse blown?</li> <li>b) Is the speed adjustment turned down?</li> <li>c) Is there a faulty connection?</li> <li>d) Is the Motor Control Card receiving 24VDC?</li> </ul>	<ul style="list-style-type: none"> <li>a) Replace blown fuse.</li> <li>b) Adjust the speed on the Motor Control Card.</li> <li>c) Check to see that the Motor is plugged in and no wires are loose on the Motor Control Card.</li> <li>d) Use a volt meter and check the potential across terminal numbers 4 and 5 of the Control Card.</li> </ul>
<b>The Motor will turn, but only when started by hand.</b>	<ul style="list-style-type: none"> <li>a) If the Motor will not start on its own, but will run if manually started, the Motor Control Card is likely at fault.</li> <li>b) Is it a faulty Motor or Motor Control Card?</li> <li>c) Is it a bad wire connection?</li> </ul>	<ul style="list-style-type: none"> <li>a) Replace the Control Card.</li> <li>b) Try another Motor on this Control Card and/or this Motor on another Control Card. Replace the defective component.</li> <li>c) Check the connections between the Motor Control Card and the Motor. Repair any loose connections.</li> </ul>
<b>Motor Fuses continually blow. (High Current)</b>	<ul style="list-style-type: none"> <li>a) Is the Conveyor assembled correctly?</li> <li>b) Is it a bad Motor or Motor Control Card?</li> </ul>	<ul style="list-style-type: none"> <li>a) Check that the Drive Assembly turns easily by hand.</li> <li>b) Try another Motor on this Control Card and/or this Motor on another Control Card. Replace the defective component.</li> </ul>

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## HD Conveyor Components Parts List

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<u>Part Number</u>	<u>Description</u>
254722	DC Motor Control Card
257523	Roller Shaft, HD
300097	Slip Roller, HD
300098	Pulley, HD
257562	Drive Pulley
257710	Drive Shaft Extension
300106	Motor Mount
504009	Cable, 6", Motor to Cover
504010	Cable, 10ft, Cover to Control Panel
504725	HD Pulley, Double Flanged
930055	T-Slot Nut, M5
930056	T-Slot Nut, M6
930058	T-Slot Nut, M8
950082	E-Ring
980038	DC Variable Speed Motor/Gearbox (20W, 15:1)
300109B	HD Motor Cover

### Additional Support:

Contact Quickdraw Systems if you have any questions or need parts that aren't listed on this page.

**Phone: 1-800-473-8837 or (952) 935-6921**

**Fax: (952) 933-5803**

**E-mail: [Info@qdraw.com](mailto:Info@qdraw.com)**