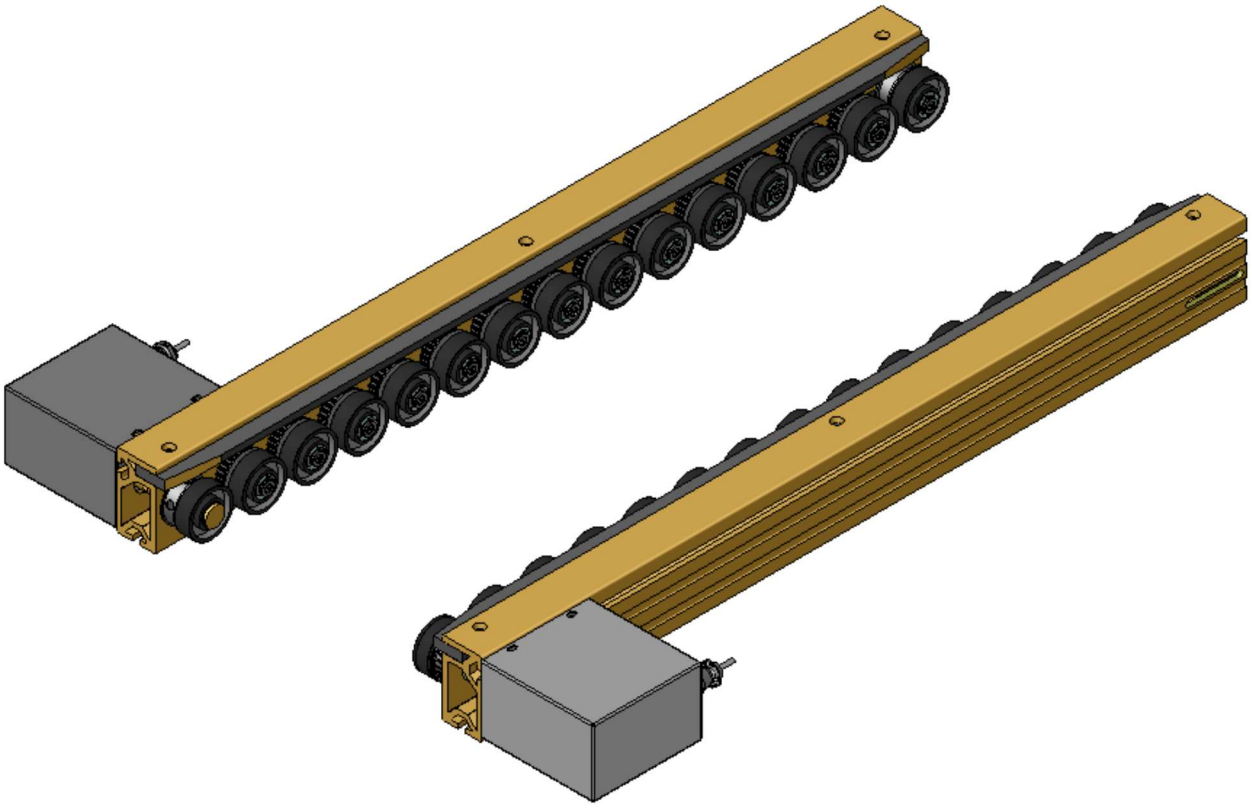
Quickdraw®

SYSTEMS

HD Conveyor Maintenance Guide



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Overview

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

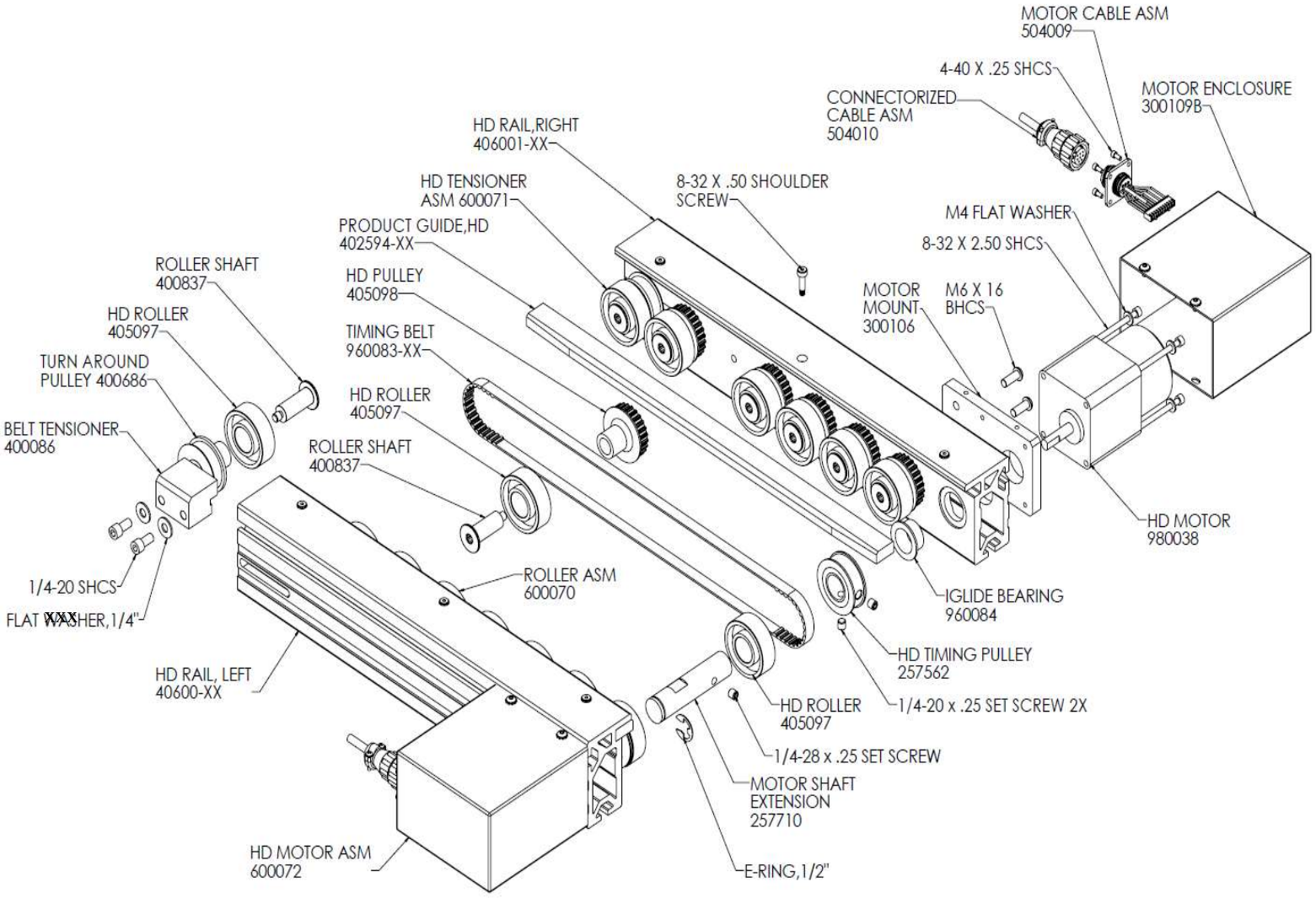
E-mail: info@qdraw.com

Quickdraw Systems
9650 Newton S.
Bloomington, MN 55431

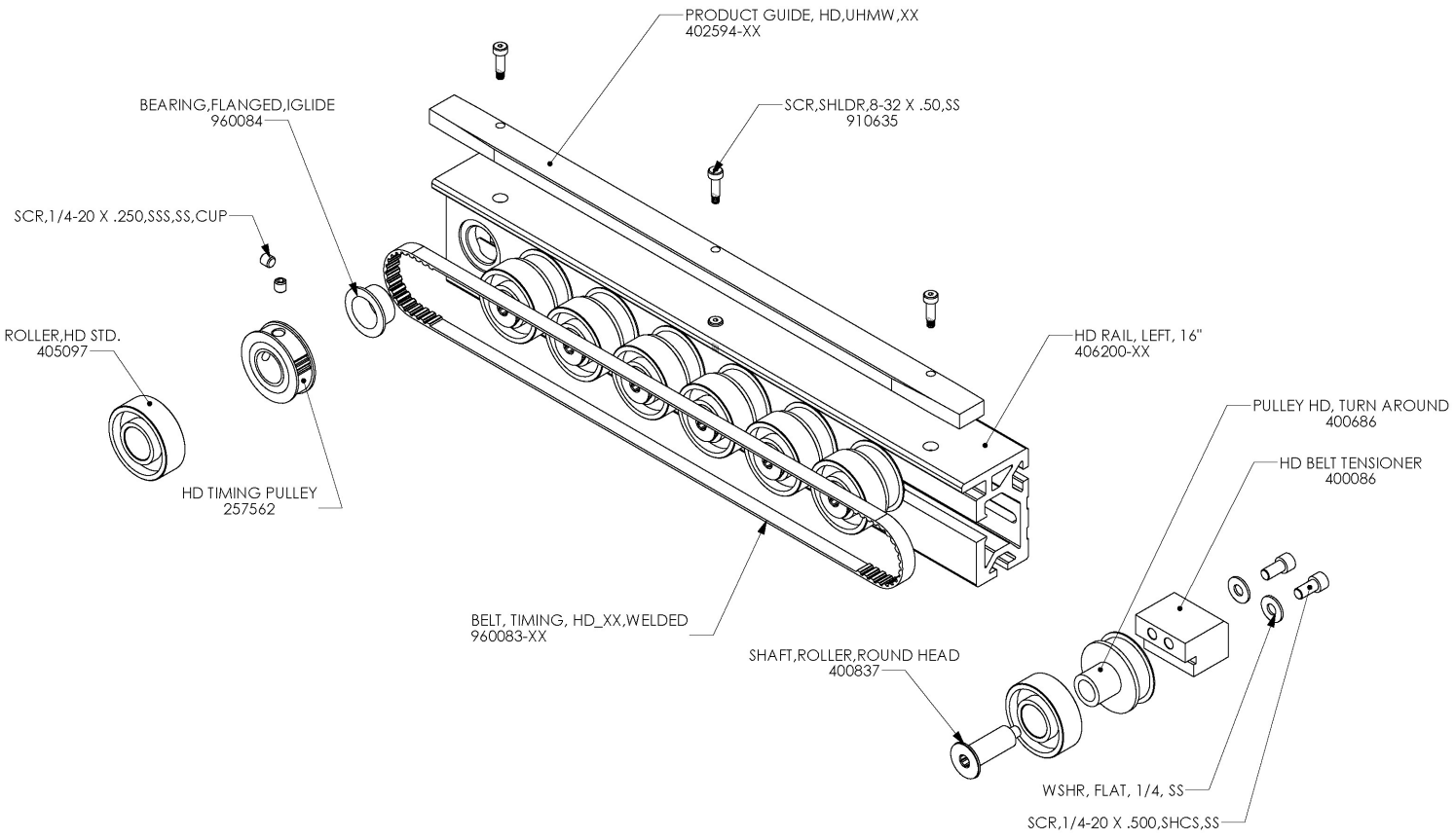
Note: Some illustrations in this manual include features that may not match or be included on your conveyor system.

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

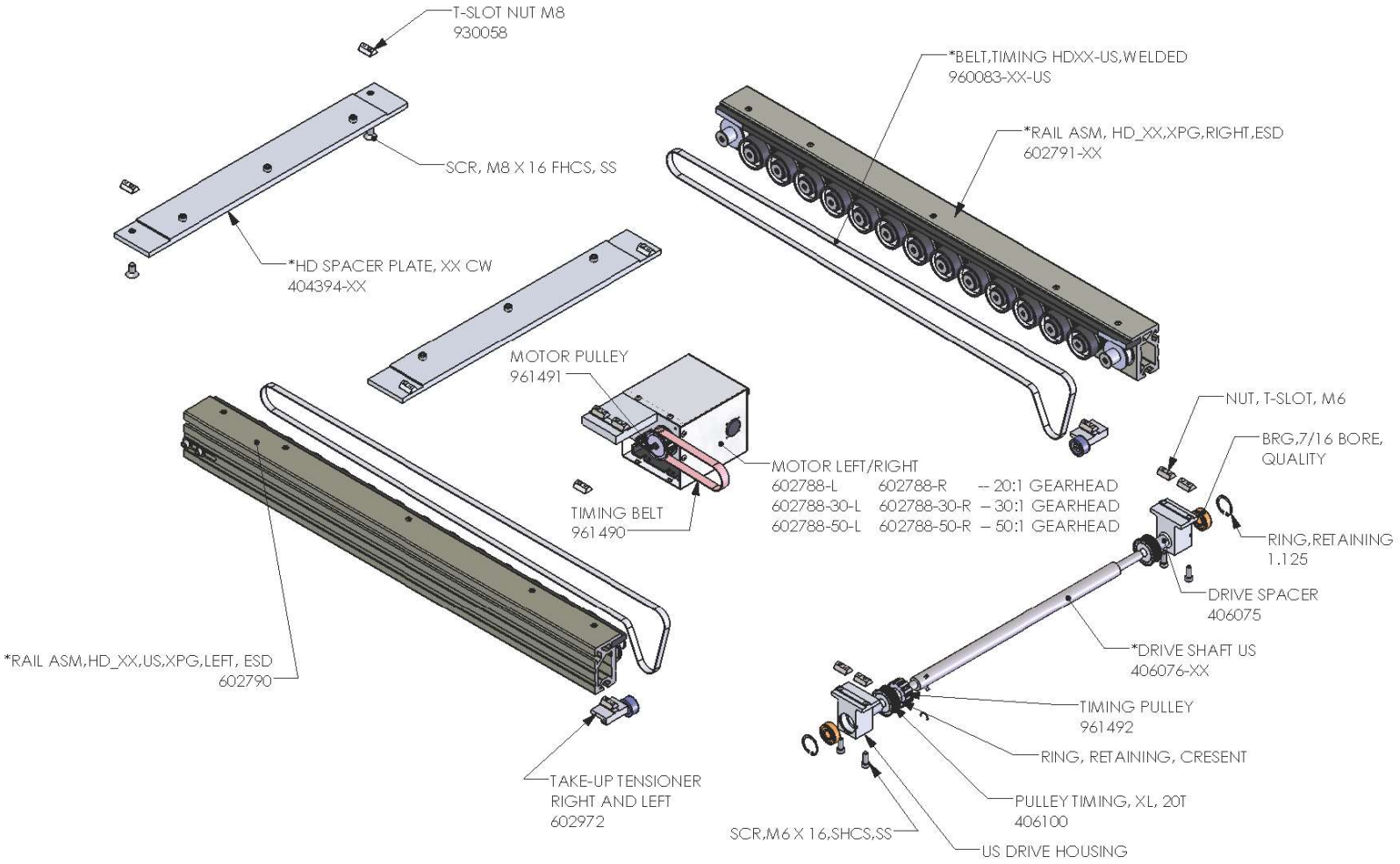
HD Conveyor Direct Drive Assembly



HD Rail Exploded Assembly

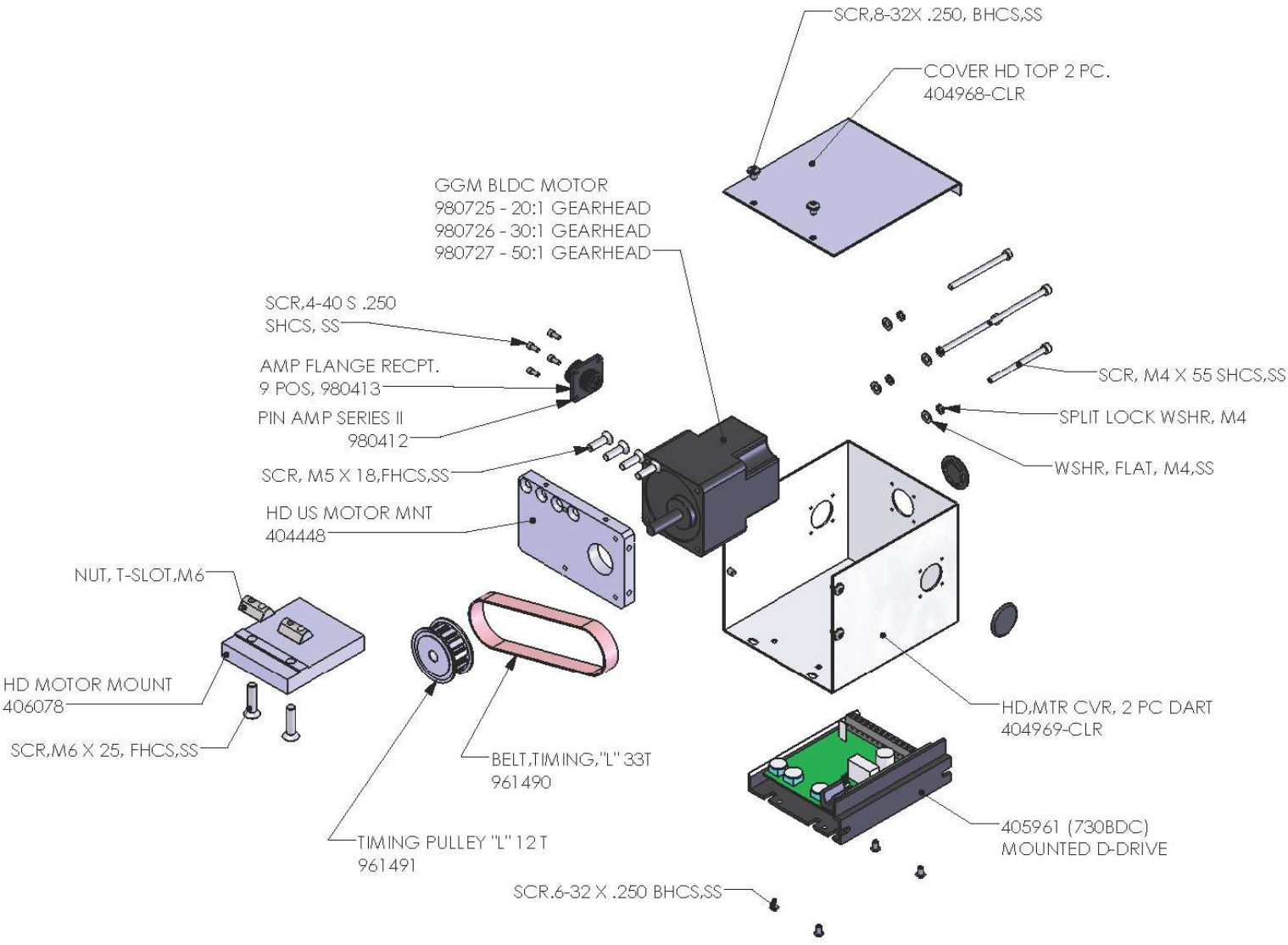


HD Underslung-Shaft Conveyor Exploded Assembly



*** INDICATES LENGTH OR WIDTH DEPENDANT PART NUMBERS, CALL QUICKDRAW FOR DETAILED PART NUMBERS. 800-473-8837 OR 952-935-6921**

HD Underslung-Shaft Motor Exploded Assembly



Powering Conveyors By Hand

Powering the Conveyor by hand must be done during Product Guide replacement and after <u>EVERY</u> 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.

<u>Important:</u> 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***

<u>Procedure:</u>

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.

Preventative Maintenance

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

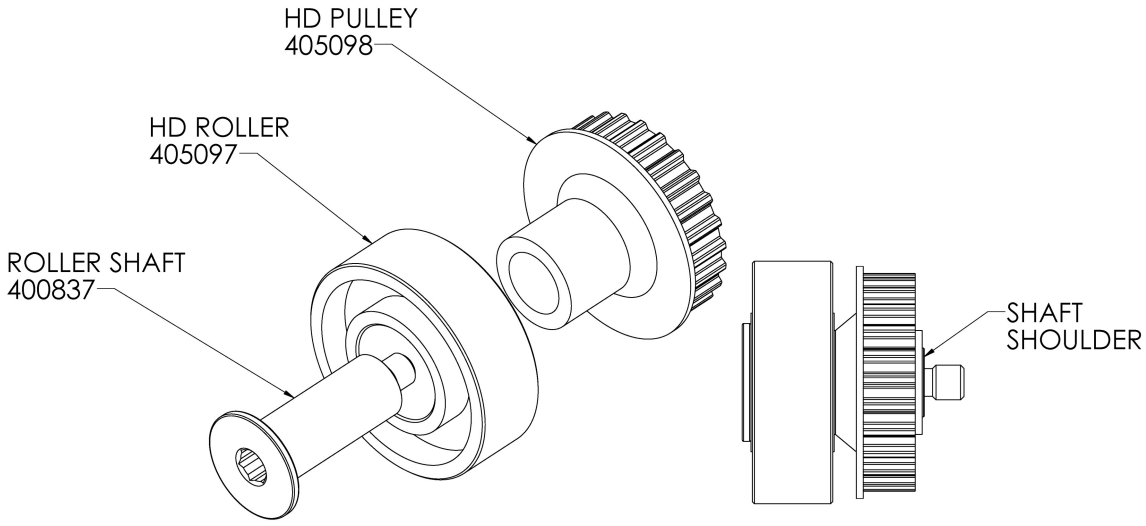
Procedure For HD Conveyors:

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.

Pulley / Roller Replacement

Procedure:

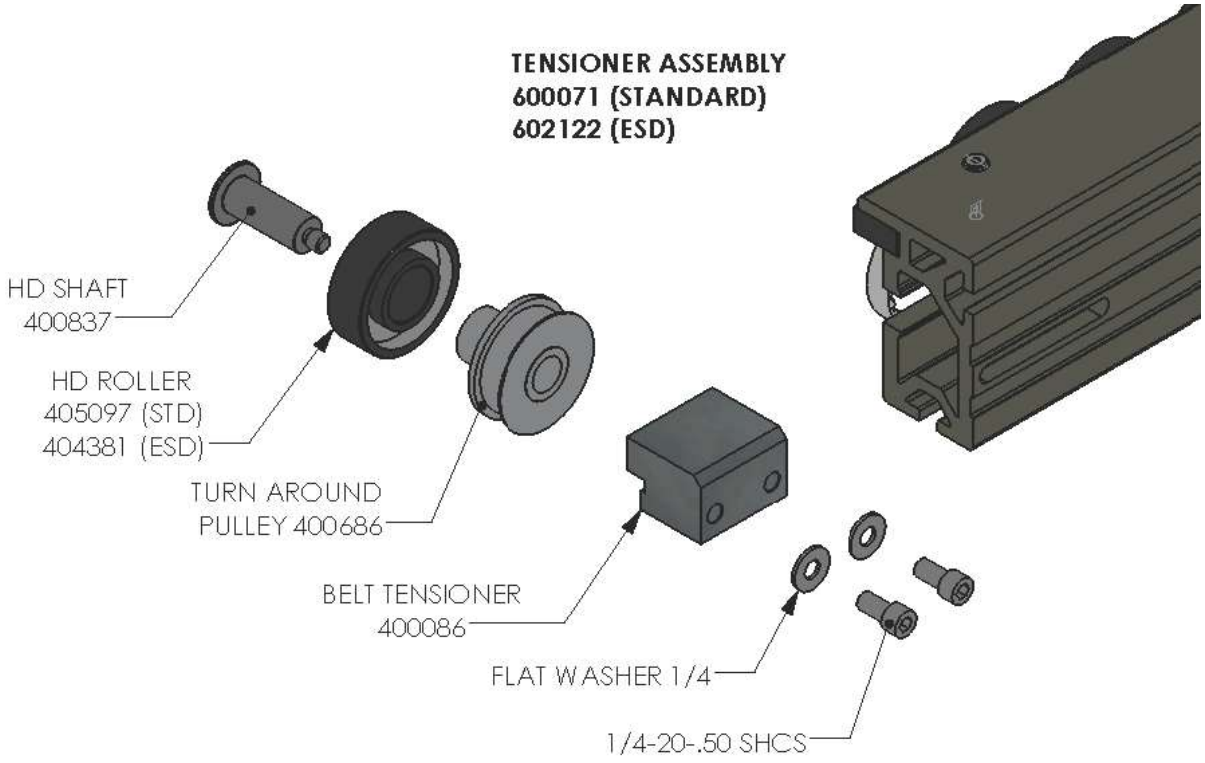
1) Loosen the Shaft from the Rail with a 1/4 " internal hex wrench.
2) Turn the Shaft out with your fingers.
3) Place a new Roller and/or Pulley on the Shaft.
4) Make sure that the shoulder of the Shaft extends past the Pulley to prevent the Roller from being pinched against the Rail (See below).
5) Turn the Roller Assembly into the rail with your fingers until snug.
6) Use a Torque Wrench set to 100 inch/pounds to 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.

Belt Tension

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.

Motor Replacement

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 align 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 8).
9) Turn on the Conveyor.

Timing Belt Replacement

Procedure:

1) Remove Product Guide by removing the shoulder screws located along the top of the conveyor and sliding the product guide from the rail.
2) Loosen the Belt Tensioner at the end of the Rail opposite the Motor.
3) Remove the old Timing Belt.
4) Place the new Timing Belt over the far end pulley. * *Make sure that the Belt is engaged 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 8).
11) Turn on the Conveyor.

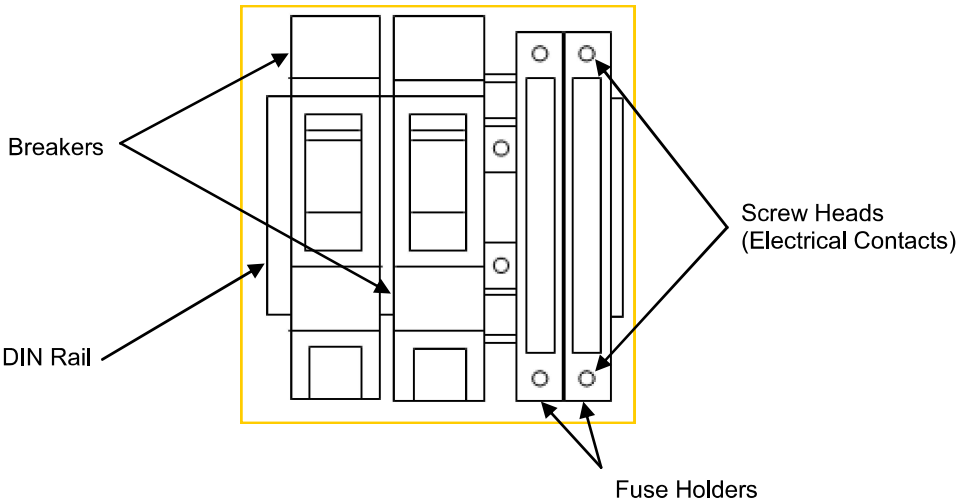
Electrical Controls Maintenance

Measuring Current Draw

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 #19.
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 than1.0 amps unloaded.

GGM Motor Standard wiring (Dart Card in Motor Enclosure)

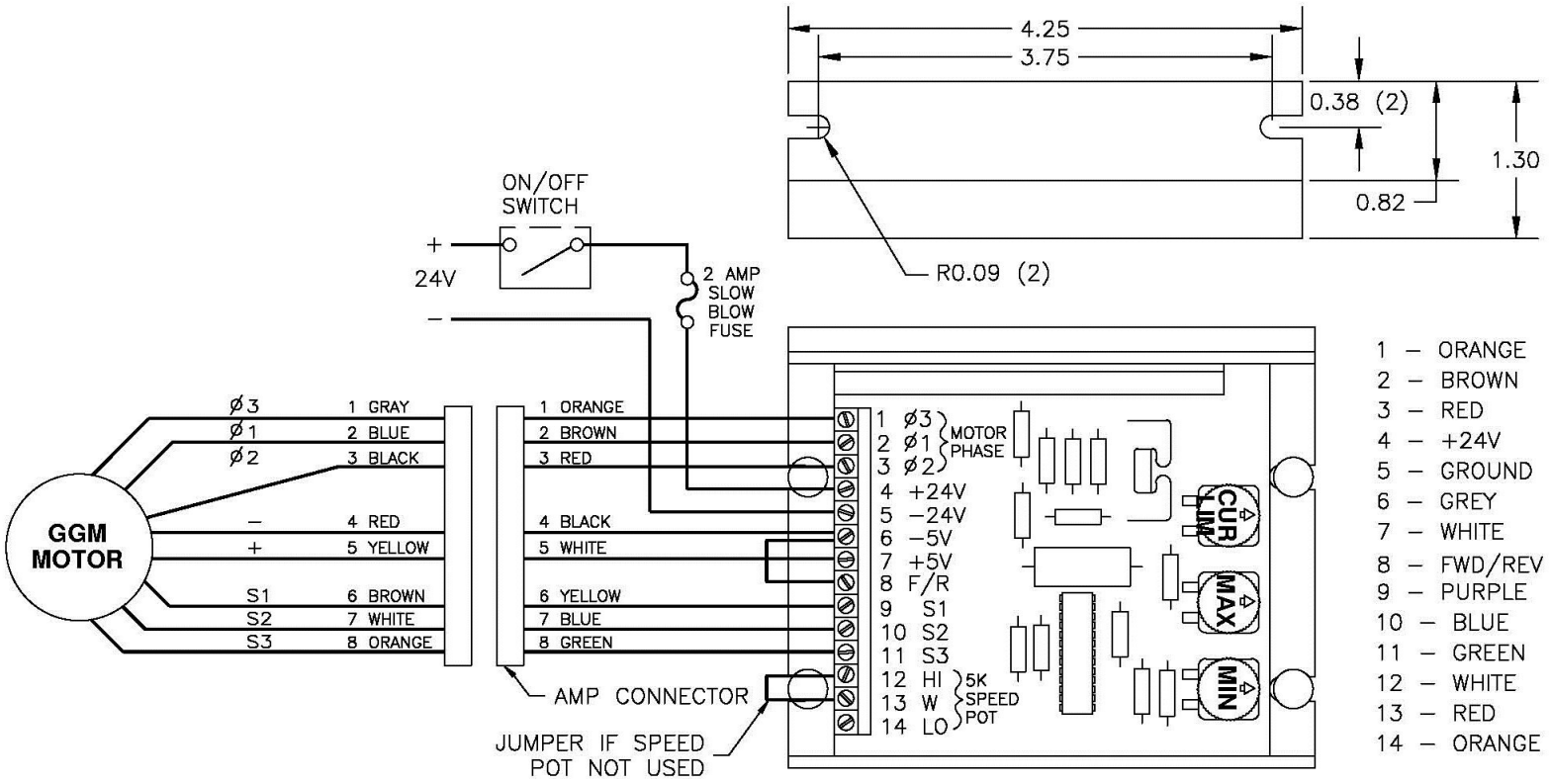
7/12/2016

DART CONNECTORIZATION			INT TO AMP	EXT TO AMP	EXT TO AMP
405961 DART DRIVE	Function	GGM Motor	602098 Cable	603300-XX Cable	603330-XX Cable
			STD 20 GA	HI-FLEX 20 GA	STD 20 GA
1	PHASE 3	GRAY			
2	PHASE 1	BLUE			
3	PHASE 2	BLACK			
4	+VDC		PIN 1, ORANGE	PIN 1, PINK	PIN 1, ORANGE
5	POWER COM		PIN 7, GREEN	PIN 7,GREEN	PIN 7, GREEN
6	MTR COM	RED			
7	+ 5VDC (MTR)	YELLOW			
8	F/R		*PIN 4, BLACK	*PIN 4, GRAY	*PIN 4, BLACK
9	S1	BROWN			
10	S2	WHITE			
11	S3	ORANGE			
12	HI		PIN 2, BROWN	PIN 2, BROWN	PIN 2, BROWN
13	W		PIN 3, RED	PIN 3, YELLOW	PIN 3, RED
14	LO (COM)				
*USE JUMPER BETWEEN DART PINS 8 AND 5 TO FIX DIRECTION					
IN PLACE OF REMOTE SIGNAL					

GGM Motor Standard wiring with NPN enable (Dart Card in Motor Enclosure)

DART CONNECTORIZATION NPN			INT TO AMP	EXT TO AMP	EXT TO AMP
405961 DART DRIVE	Function	GGM Motor	602098 Cable	603300-XX Cable	603330-XX Cable
			STD 20 GA	HI-FLEX 20 GA	STD 20 GA
1	PHASE 3	GRAY			
2	PHASE 1	BLUE			
3	PHASE 2	BLACK			
4	+VDC		PIN 1, ORANGE	PIN 1, PINK	PIN 1, ORANGE
5	POWER COM		PIN 7, GREEN	PIN 7,GREEN	PIN 7, GREEN
6	MTR COM	RED			
7	+ 5VDC (MTR)	YELLOW			
8	F/R		*PIN 4, BLACK	*PIN 4, GRAY	*PIN 4, BLACK
9	S1	BROWN			
10	S2	WHITE			
11	S3	ORANGE			
12	HI		JUMP TO 13	JUMP TO 13	JUMP TO 13
13	W		JUMP TO 12	JUMP TO 12	JUMP TO 12
14	LO (COM)				
P7 - 1/4 SPADE	INHIBIT		PIN 2, BROWN	PIN 2, BROWN	PIN 2, BROWN
*USE JUMPER BETWEEN DART PINS 8 AND 5 TO FIX DIRECTION					
IN PLACE OF REMOTE SIGNAL					

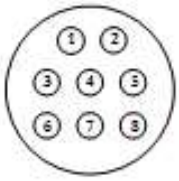
GGM Externally Mounted Motor Control Card Wiring Diagram



Wiring Diagram For The Dart 730 BDC

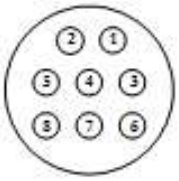
Please Note: The enclosed Speed Pot is connected as follows: White to 12; Red to 13; and Orange to 14. To eliminate the Speed Pot, jumper Terminals 12 & 13 and set speed using on-board controls.

Motor Cable Wiring Guide



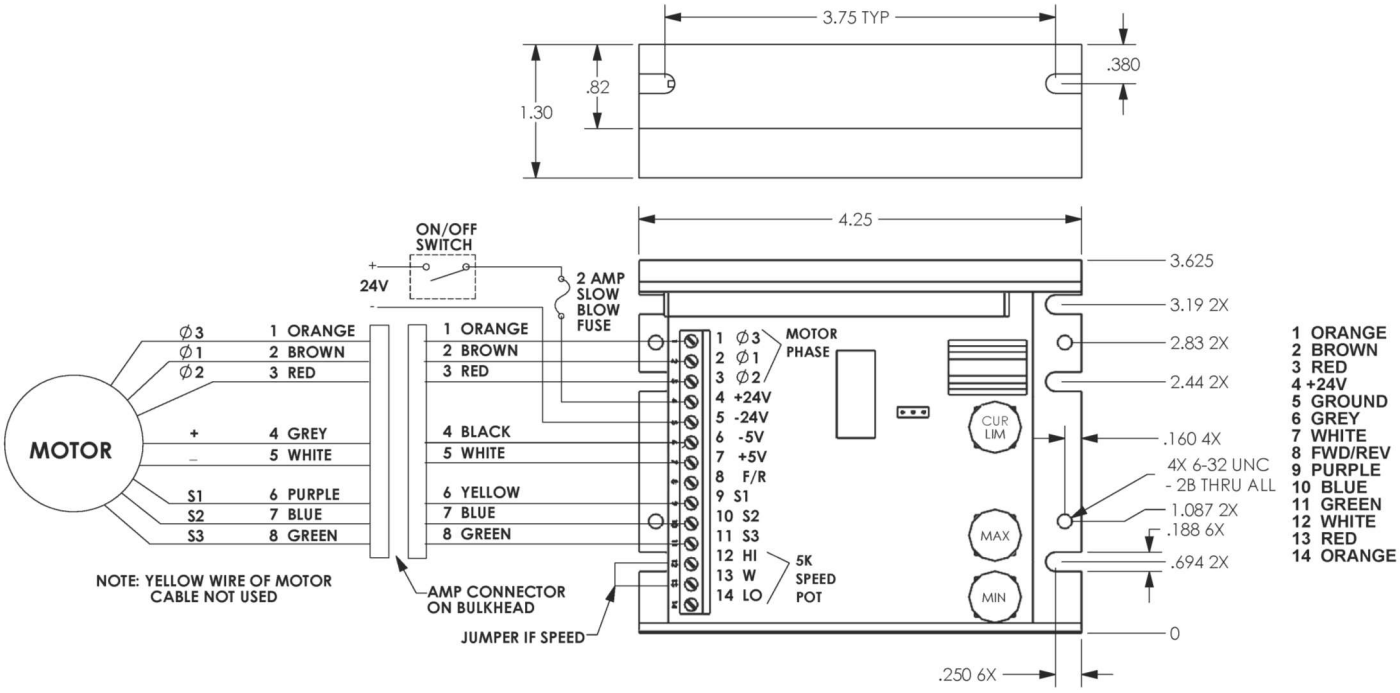
AMP Connector Receptacle Numbering Sequence

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



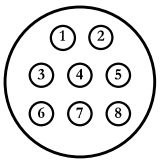
AMP Connector Receptacle Numbering Sequence

Legacy (Japan Servo) Externally Mounted Motor Control Card Wiring



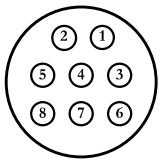
Wiring Diagram For The Dart 730BDC

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.



AMP Connector Receptacle Numbering Sequence

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



AMP Connector Receptacle Numbering Sequence

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

Procedure to Change direction— Dart DC Brushless 730BDC 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 connecting Terminals #5 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.

Setting Conveyor Speeds

Unless otherwise requested, Quickdraw sets all HD Conveyor Speeds at 42ft./min. for all HD 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.

How to Determine Conveyor Speed

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".

How to Convert Linear Distance/Minute to Target RPM

Procedure:

1) Establish the needed conveyor flow rate. * *For example: 42 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:
   Target RPM = Linear Speed (ft/min) / {π*roller diameter (in feet)}
   → Target RPM = 42 ft/min. / π* (1.75"/12"/ft)
   → Target RPM = 42 ft/min. / π* 0.146 ft.
   → Target RPM = 42 ft/min. / 0.458 ft.
   → Target RPM = 92 rpm

Setting Conveyor Speed on Dart 730 BDC Control Cards

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.

Phase Considerations

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 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.

Electrical Troubleshooting

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 12).
    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 Diagrams on Pages 13-15 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.

Troubleshooting

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
Conveyor Rollers are not turning.	a) Is the Motor turning? b) Is the Drive Shaft Extension turning? c) Is the Belt pinched between the Teeth of the Pulley and the Product Guide?	a) If not, refer to Motor problems. b) Check the Set screw connecting the Motor Shaft to the Extension.. c) Remove the Product Guide and Power by Hand. Replace the Product Guide and Power by Hand.
The Motor is not turning.	a) Is a fuse blown? b) Is the speed adjustment turned down? c) Is there a faulty connection? d) Is the Motor Control Card receiving 24VDC?	a) Replace blown fuse. b) Adjust the speed on the Motor Control Card. c) Check to see that the Motor is plugged in and no wires are loose on the Motor Control Card. d) Use a volt meter and check the potential across terminal numbers 4 and 5 of the Control Card.
The Motor will turn, but only when started by hand.	a) If the Motor will not start on its own, but will run if manually started, the Motor Control Card is likely at fault. b) Is it a faulty Motor or Motor Control Card? c) Is it a bad wire connection?	a) Replace the Control Card. b) Try another Motor on this Control Card and/or this Motor on another Control Card. Replace the defective component. c) Check the connections between the Motor Control Card and the Motor. Repair any loose connections.
Motor Fuses continually blow. (High Current)	a) Is the Conveyor assembled correctly? b) Is it a bad Motor or Motor Control Card?	a) Check that the Drive Assembly turns easily by hand. b) Try another Motor on this Control Card and/or this Motor on another Control Card. Replace the defective component.

HD Conveyor Components Parts List

Part Number	Description
257562	Drive Pulley HD
257710	Motor Shaft Extension
300106	HD Motor Mount
300109	Motor Enclosure,DD,HD
400086	HD Belt Tensioner
405097	Roller HD New Material
405098	Pulley HD New Material
400686	Pulley, HD Turnaround
400837	Roller Shaft, Round Head
401962	Shaft,HD,US, DDR/DDL_CW
402489	LABEL, MR, 1800 PAT. NUMBER
402494	STICKER, “QUICKDRAW”
404357	MOUNTED D DRIVE 730 (730BDC)
404381	HD Roller, ESD
404394-XX	HD Spacer Plate_CW
406200-XX	HD, RAIL LEFT, __CL
406201-XX	HD, RAIL RIGHT, __CL
402594-XX	Product Guide, HD, UHMW,__CL, A/S
504009	Cable, 6”, Motor to Cover
504010	Cable, 10ft, Connectorized (For External Card)
504010-15	Cable, 15ft, Connectorized (For External Card)
600070	ASS’Y,HD ROLLER,RND HEAD SHAFT
600071	ASS’Y,HD TENS, RND HEAD SHAFT
600084-XX	Rail Asm, HD_CL, Right, US/DD
600085-XX	Rail Asm, HD_CL, LEFT, US/DD
602096	ASM,HD MTR,RIGHT, W/DART (WHITE,20 WATT/20:1 GEARHEAD)
602097	ASM,HD MTR,LEFT, W/DART (WHITE,20 WATT/20:1 GEARHEAD)
602096-30	ASM,HD MTR,RIGHT, W/DART (WHITE,20 WATT/30:1 GEARHEAD)
602097-30	ASM,HD MTR,LEFT, W/DART (WHITE,20 WATT/30:1 GEARHEAD)
602096-CLR	ASM,HD MTR,RIGHT, W/DART (CLEAR,20 WATT/20:1 GEARHEAD)
602097-CLR	ASM,HD MTR,LEFT, W/DART (CLEAR,20 WATT/20:1 GEARHEAD)
602096-30-CLR	ASM,HD MTR,RIGHT, W/DART (CLEAR,20 WATT/30:1 GEARHEAD)
602097-30-CLR	ASM,HD MTR,LEFT, W/DART (CLEAR,20 WATT/30:1 GEARHEAD)

Part Number	Description
602121	ASM,HD ESD ROLLER, ROUND SHAFT
602131-END-50	ASM,HD PURGE MTR,DDL, (20 WATT, 50:1 GEARHEAD)
602303	HD MOTOR ASM, REMOTE 20:1 (DART)
602303-30	HD MOTOR ASM, REMOTE 30:1 (DART)
602305	HD MOTOR UPGRADE, 20:1 GH
602305-30	HD MOTOR UPGRADE, 30:1 GH
602582-XX	HD Rail Asby, _CL, RIGHT, ESD
602583-XX	HD Rail Asby, _CL, LEFT, ESD
602584-XX	HD Rail Asby, _CL, RIGHT
602585-XX	HD Rail Asby, _CL, LEFT
602716	HD CUSHIONED METERING STOP
602788-30L	ASM,HD,US MTR,LEFT, 30:1
602788-50L	ASM,HD,US MTR,LEFT, 50:1
602788-30R	ASM,HD,US MTR,RIGHT, 30:1
602788-50R	ASM,HD,US MTR,RIGHT, 50:1
603300-XX	ASM, MTR CBL, 20GA, XX-METER
603330-XX	ASM, MTR CBL, 20GA, XX-METER
910032	SCR,M8 X 16,FHCS,SS
910178	SCR, 1/4-20 X .250 SHCS, SS
910186	SCR, 1/4-20 X .500 SHCS, SS
910635	SCR, SHLDR,8-32, .188X.50, SS
920013	WSHR, FLAT, 1/4, SS
930055	T-Slot Nut, M5
930056	T-Slot Nut, M6
930058	T-Slot Nut, M8
950284	Label, CE, .375 x .375
950468	Ring, Retaining, E,3/4
960083-XX	Belt, Timing, HD_CL_Welded
960084	Bearing, Flange, Iglide
961485	20: GEARHEAD (GGM)
961486	30:1 GEARHEAD (GGM)
961406	50:1 GEARHEAD (GGM)
980038	Motor/Gearhead,20W, 15:1 (JAPAN SERVO)

Disclaimer:

The list above contains parts found on “standard” conveyors. If you have questions about parts that are not listed here you may have a specially configured system. Please contact Quickdraw Systems (include your serial number) with those questions or to order specialized replacement parts.

Additional Support:

Phone: **1-800-473-8837 or (952) 935-6921**
Fax: **(952) 933-5803**
E-mail: **Info@qdraw.com**