

### **Industrial Conveyor Specialists**

Installation, Maintenance & Parts Manual For

### **MODEL 104 - Drum Motor**

For Additional copies of this manual, please visit our website at www.titanconveyors.com
Go to Info Center, Select the Maintenance Manual Tab and select the manual for your model conveyor or click on the link below.

https://www.titanconveyors.com/info-center#823236-maintenance-manuals



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Serial No.

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### **Return Goods Authorization Policy**

Titan Industries has a **RETURN GOODS AUTHORIZATION** Procedure for **all** returned items. With this procedure, we are able to streamline our process and expedite your return.

This will require you to call a Titan salesperson prior to your sending back the item to get a RGA number and receive instructions on how to return the item. Other information needed at this time would be your original purchase order number, Titan serial number, job number or invoice number. This will give our salesperson the pertinent information needed for tracking your part or component. After receiving you RGA number, you will have ten working days to return the item to us for processing. All returned goods must have this RGA number clearly marked on the outside of the box or crate and all paperwork pertaining to the return. Any return without a RGA number, will be refused and returned to you at your cost. Anytime you want to inquire about your return, please reference the Titan RGA number.

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- (A) Seller warrants that the material in and the workmanship on the equipment manufactured by TITAN will be free from defects at time of shipment. If during the first year from the date of shipment, the Buyer establishes to the seller's satisfaction that any part or parts manufactured by TITAN were defective at the time of shipment, TITAN will, at its own expense, repair or replace (but not install) replacement parts. For a time purpose of this warranty, one year will constitute 2080 hours of operation based on an 8 hour day. Sellers liability under this warranty is limited to replacement parts only and the seller will make no allowance for corrective work done unless agreed to by the seller in writing. Charges for correction of defects by others will not be acceptable, unless so authorized in writing, prior to the work being performed, by an officer of the company. Damage caused by deterioration due to extraordinary wear and tear (including, but not in limitation, use said equipment to handle products of a size, weight and shape or at speeds or methods which differ from information originally provided), chemical action, wear caused by the presence of abrasive materials or by improper maintenance or lubrication or improper storage prior to installation, shall not constitute defects. Failure to install equipment properly shall not constitute defects. Warranty does not cover consumable items. Warranty does not cover belt tracking or adjustment at installation or periodic adjustment that may be required during normal operation. Refer to the maintenance manual for belt tracking instructions.
- (B) Seller has made no representation, warranties, or guarantees, expressed or implied, not expressly set forth on above paragraph. Seller shall not be liable hereunder for any consequential damages included but not in limitation, damages which may arise from loss of anticipated profits or production or from increased cost of operation or spoilage of material.
- (C) The components used in manufacture of said equipment which were manufactured by others will carry such manufacturers' customary warranty, which seller will obtain for buyer upon request.
- (D) No representative of TITAN has been conferred with any authority to waive, alter, vary or add to the terms of warranty state herein, without prior authorization in writing executed by an officer of the company.
- (E) The foregoing is in lieu of any and all other warranties, expressed or implied, or those extending beyond the description of the product.

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### Safety

The Safety alert symbol is used with the signal words





A DANGER, A WARNING and A CAUTION to alert you to safety messages.

They are used in safety decals on the unit and with proper operation and procedures in this manual. They alert you to the existence and relative degree of hazards.

Understand the safety message. It contains important information about personal safety on or near the conveyor.



POTENTIALLY HAZARDOUS SITUATION which if not avoided, could result in death or serious injury.



POTENTIALLY HAZARDOUS SITUATION which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



POTENTIALLY DESTRUCTIVE SITUATION which if not avoided, may result in damage or reduce the longevity of the equipment.

### Safety Decals

**ALWAYS** replace missing or damaged Safety Decals.

#### **Operational Safety**



Keep Hands, feet, hair and loose clothing away when conveyor is running



**ALWAYS** keep hands away from conveyor while moving.



**NEVER** climb, sit, walk or ride on conveyor



**ALWAYS** lock out power before servicing.



**ALWAYS** lock out power before servicing to avoid electrical shock.



AND LOOSE CLOTHING AWAY WHEN CONVEYOR IS RUNNING

**ALWAYS** keep hands, feet, hair & loose clothing away.



ALWAYS keep hair and loose clothing away.



ALWAYS read and follow warning labels.



**Never** run conveyor without guards in place.



DO NOT run conveyor with guard off.

### INTRODUCTION

The management and employees of Titan Industries thank you for specifying Titan equipment. This manual will give you the basic information to install and maintain your equipment. If special circumstances or questions come up call Titan at 920-982-6600.

### I. RECEIVING

Upon delivery of your Titan conveyor, check the packing slip or bill of lading accompanying the unit. If any components are missing, contact Titan IMMEDIATELY with a description of the missing components along with the conveyor serial number(s). The serial number is found on the serial plate normally positioned by the drive.

Check the unit(s) over carefully upon arrival for damage. If you find any damage note it on the bill of lading. **YOU MUST** also file a claim **IMMEDIATELY** with the carrier.

### II. INSTALLATION



WEAR SAFETY GLASSES, SAFETY SHOES, AND GLOVES.



HAVE AREA AROUND INSTALLATION SITE CLEARED OF DEBRIS.



LOCKOUT POWER TO CONVEYOR(S) UNTIL START-UP.



LOOK OUT FOR SHARP EDGES WHILE HANDLING CONVEYOR COMPONENTS.



BE CAREFUL IN AND AROUND THE CONVEYOR(S) DURING INSTALLATION. ALSO, BE AWARE OF OTHERS IN THE AREA.



ONLY ALLOW QUALIFIED PERSONNEL TO ASSEMBLE AND INSTALL CONVEYORS.

### **COMPONENT CHECKLIST**

Prior to start up use the following list to double check the conveyor components.



**MOTOR** 

Have a qualified electrician ensure the motor is wired correctly for your power source. Check that motor is securely fastened to the reducer or motorbase.



BEARINGS

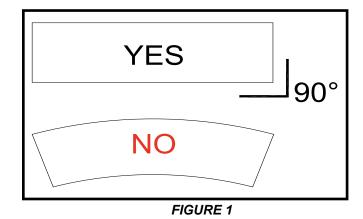
Double check that bearings are fastened securely. Be sure that locking collars are

tightened and set screws are secured firmly to the shaft.

\*Additional information available in section III Maintenance.

#### **BELT INSTALLATION**

- 1. Locate all take-up pulleys to their minimum take-up positions to allow for easy belt installation.
- As a double check, lay out belt on a level surface and pull tight. The belt should lay flat and be in a straight line.
   See FIGURE 1. At this time recheck belt ends to ensure that they were cut squarely and that the lacing was installed properly.



3. With typical belt threading arrangement shown on page 7 **FIGURE 3** of this manual, install the belt on the conveyor. Interlock the laced ends squarely, and push the connector pin thru the lacing. If a metal connector pin is used, center the pin and bend the ends over slightly to keep the pin from working out. See **FIGURE 2** 

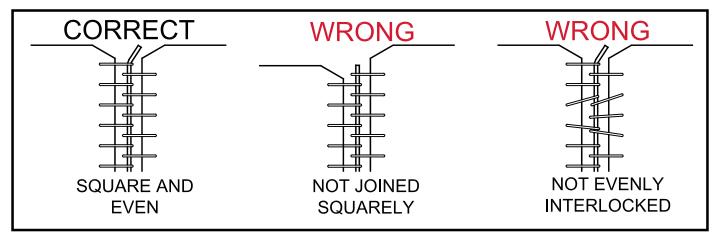


FIGURE 2

4. After making sure the conveyor is cleared off and the drive pulley is moving the belt in the correct direction, run the conveyor. Take up slack belt with the take-up provided until there is no slippage between the drive pulley and the belt.



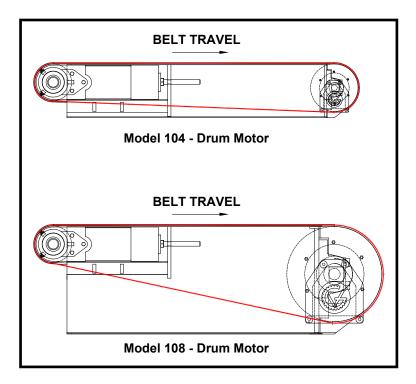
A GENERAL RULE FOR CORRECT BELT TENSION IS THAT THE BELT MUST BE TIGHT ENOUGH TO MOVE YOUR PRODUCT AT FULL LOAD. OVERTIGHTENING OF THE BELT WILL CAUSE THE BELT, PULLEYS, BEARINGS, AND DRIVE COMPONENTS TO WEAR OUT PREMATURELY.

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### III. MAINTENANCE

#### **BELT TRACKING**

Figure 3 shows the belt travel around pulleys.



1. The first step in belt tracking is to make sure all pulleys are parallel with each other and perpendicular to the frame. Once this has been done refer to *FIGURE 4* for proper tracking adjustments on end drive conveyors.



IN REF. TO LEFT HAND AND RIGHT HAND SIDES, WE AT TITAN INDUSTRIES ALWAYS POSITION OURSELF STANDING AT THE INFEED, LOOKING AT THE DRIVE END TO DETERMINE RIGHT HAND VS LEFT HAND

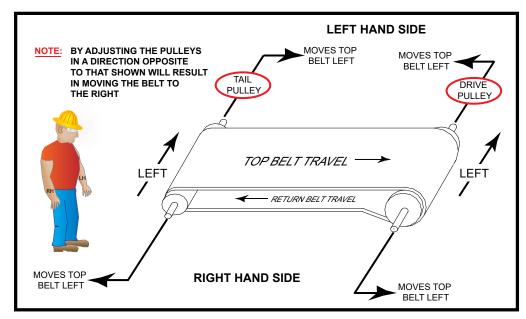


FIGURE 4

- 2. With the conveyor running, make pulley adjustments of 1/16 of an inch, allowing the belt several revolutions to react between each adjustment.
- 3. After the belt has been tracked **WATCH IT CLOSELY** for a few days making any additional adjustments required during this initial stretch-in period.

- 4. On longer units a short section of laced belt called a "Dutchman" is added to the overall length of the belt. As the belt is taken up the "Dutchman" can be removed to allow the conveyor take-up additional adjustment.
- 5. Make sure maintenance personnel look over the conveyor belt at least weekly and check on the following:



Belt is tracking properly and is not slipping on drive pulley.



Pulleys, rollers, deck, etc. are free from foreign material that could fall in or stick to the belt and cause damage.



Belt is not being frayed or cut by siderails, chutes, hoppers, etc.



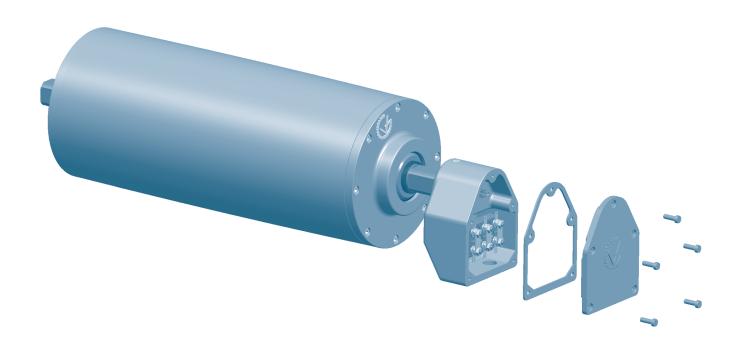
That belt lacing is not being damaged and belt connector pin is staying in the lacing.

#### **BEARINGS**

1. **LUBRICATION** - Bearings used on Titan Conveyors are normally re-lube bearings. The use of a #2 consistency lithium based grease is advised.

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# **Drum Motor Installation Manual**

www.vandergraaf.com

2 Van der Graaf Court, Brampton, ON L6T 5R6 Canada Tel: (905) 793-8100 Fax: (905) 793-8129 Technical Support: 1 (866) 595-3292

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### **INSTALLING THE DRUM MOTOR:**

The Drum Motor MUST be mounted horizontally, square to the conveyor frame and parallel to the idler pulley. The arrow on the shaft opposite the junction box MUST be pointing up, with no more than 30 degrees off of vertical. This will ensure that the gear reducer is properly lubricated. For special mounting arrangments, consult your Van der Graaf representative.





**NOTE:** The Drum Motor has been factory filled with the correct amount and type of oil, and does not require any additional oil. Oil change recommended at 50,000 hour intervals (see page 9).

### **ELECTRICAL CONNECTION:**

To ensure proper electrical connection, always reference the connection diagrams provided (see pages 4-6). Be sure to use qualified personnel and observe compliance with local electrical codes. If in doubt, consult your Van der Graaf representative. Ensure that the motor is being installed with the appropriate overload protection device(s), (fuse, breakers, thermal overload protection {GV-THERM}) if equipped. Reference the Drum Motor nameplate to determine allowable full load amperage.

When the motor is equipped with a backstop (TB) device, the motor must be connected electrically according to the correct rotational direction (see page 7 for complete instructions).

#### PRIOR TO STARTING:

- 1. Be sure that the Drum Motor is correctly connected and supplied with the rated voltage.
- 2. Check that the Drum Motor and conveyor belt are unobstructed and free to rotate.

**CAUTION:** Never over tension the conveyor belt as internal damage may occur.

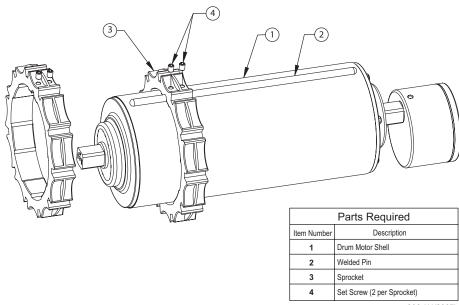


### **Drum Motor with Sprockets (STM) Assembly Procedure**

- 1. Align pin slot in Sprocket (3) to the welded pin (2) on the shell (1).
- 2. Slide sprocket (3) over the Drum Motor shell (1).
- 3. Insert Set Screw (4) in their respected holes.
- 4. Repeat the sequence for the balance of the Sprockets.
- 5. Space Sprockets on the face of the shell to match belt pockets.
- 6. Lock center Sprocket/s by lightly tightening set screws.

### **IMPORTANT NOTE:**

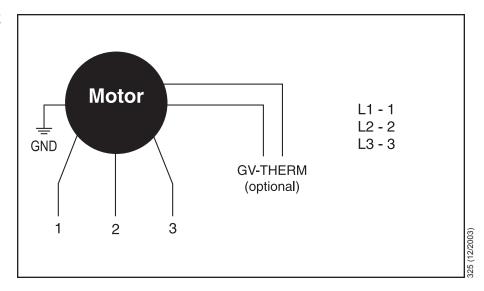
- ▶ Observe not to deform the sprocket by excessively tightening set screws.
- ► Ensure that locked Sprockets in head and tail pulleys are corresponding to the same pockets in the belt.



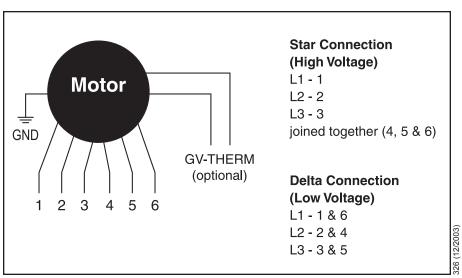
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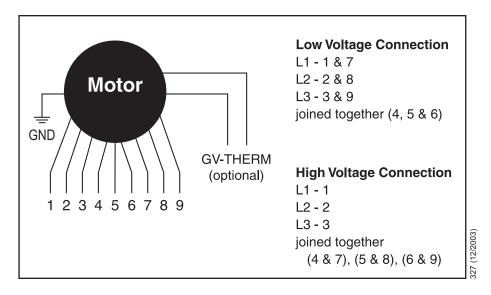
#### **SINGLE VOLTAGE - THREE PHASE**



### DUAL VOLTAGE - THREE PHASE (STAR/DELTA)



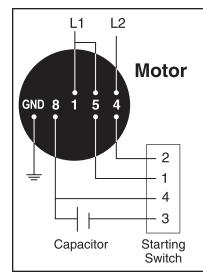
### DUAL VOLTAGE - THREE PHASE (240/480 VOLTS)



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### **SINGLE PHASE (110 VOLTS)**

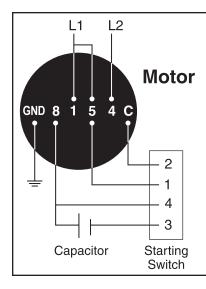


To reverse direction, interchange motor leads 5 and 8.

#### NOTE -

This motor is designed to be operated with a conveyor belt. Bench testing may result in excessive noise. The noise in no way effects the performance of this motor.

SINGLE PHASE (220 VOLTS)

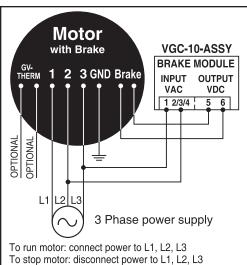


To reverse direction, interchange motor leads 5 and 8.

### - NOTE -

This motor is designed to be operated with a conveyor belt. Bench testing may result in excessive noise. The noise in no way effects the performance of this motor.

THREE PHASE WITH BRAKE (RTM)



#### **INSTALLATION NOTES:**

To reverse direction interchange motor leads 2 & 3.

When wired with a soft starter or variable frequency drive (VFD), consult your local Van der Graaf representative for wiring instructions.

Please Note: Improper operation with a soft starter or variable frequency drive could result in motor failure.

For maximum cycling rates & timing requirements, contact your local Van der Graaf Representative.

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### THREE PHASE (240 VOLTS) WITH BRAKE (RTM)

#### VGC-11-240 Motor BRAKE MODULE with Brake OUT 200 VDC IN 240 VDC IN 240 VDC OUT 200 V RUN RUN 3 GND Brake 2 2 3 4 5 6 Factory Installed **JPTIONAL** L1 L2 240 VAC 3 Phase power supply

To run motor: connect power to L1, L2, L3 To stop motor: disconnect power to L1, L2, L3 \*Factory Jumper must be installed.

### **INSTALLATION NOTES:**

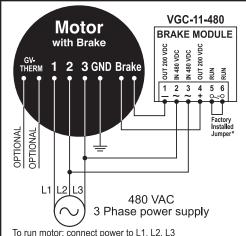
To reverse direction interchange motor leads 2 & 3.

When wired with a soft starter or variable frequency drive (VFD), consult your local Van der Graaf representative for wiring instructions.

Please Note: Improper operation with a soft starter or variable frequency drive could result in motor failure.

For maximum cycling rates & timing requirements, contact your local Van der Graaf Representative.

THREE PHASE (480 VOLTS) WITH BRAKE (RTM)



To run motor: connect power to L1, L2, L3
To stop motor: disconnect power to L1, L2, L3
\*Factory Jumper must be installed.

### INSTALLATION NOTES:

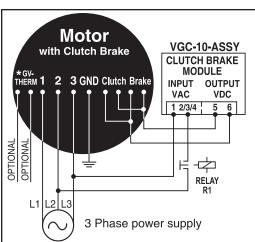
To reverse direction interchange motor leads 2 & 3.

When wired with a soft starter or variable frequency drive (VFD), consult your local Van der Graaf representative for wiring instructions.

Please Note: Improper operation with a soft starter or variable frequency drive could result in motor failure.

For maximum cycling rates & timing requirements, contact your local Van der Graaf Representative.

THREE PHASE WITH CLUTCH BRAKE (CBTM)



INSTALLATION NOTES:

To reverse direction interchange motor leads 2 & 3.

When wired with a soft starter or variable frequency drive (VFD), consult your local Van der Graaf representative for wiring instructions.

Please Note: Improper operation with a soft starter or variable frequency drive could result in motor failure.

For maximum cycling rates and timing requirements, contact your local Van der Graaf Representative.

Connect power to L1, L2, L3; To run drum motor close contact R1; To stop drum motor open contact R1

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330\_VGC11-480 (12/2012)

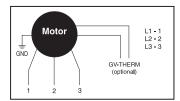
### Connecting a Drum Motor Equipped with a Backstop (TB) Device

- 1. Look for the brass arrow on the end flange. It will indicate which direction the drum motor will rotate.
- **2.** Mark the three incoming power supply leads with numbers L1, L2, L3. Ensure that the ground lead is properly connected to the ground.
- 3. Connect the incoming power supply leads:

L1 to motor lead #1

L2 to motor lead #2

L3 to motor lead #3



**4.** Turn the power to the motor ON and OFF, (no more than 0.5 second on the ON position). If the motor rotates then the connection is correct and you can proceed to step 5. If the motor does not rotate, interchange any of the two power supply leads.

Example: L1 to motor lead #2

L2 to motor lead #1

Turn the power ON and the motor should rotate in the correct direction. Change the markings on the incoming power supply leads to correspond with the motor leads.

Example: L2 to be changed to L1 and

L1 to be changed to L2.

Before Step 4 is complete, the motor should be running in the correct rotation and the connection should be as follows:

Power supply Motor Leads

L1 to 1

L2 to 2

L3 to 3

When that is completed, proceed to step 5.

**5.** Finalize the motor connection:

Power supply Motor Leads

L1 to 1

L2 to 2

L3 to 3

6. Turn ON the motor.

## Releasing & Engaging a Drum Motor Equipped with a Manual Release Backstop (MRB) Device

### To Release the Backstop Feature:

- 1. Bring the drum motor to full stop and disconnect power.
- 2. Remove the shaft cap located on the shaft end, opposite the junction box or cable entry.
- **3.** Using a 10mm deep socket 1/4" drive and a ratchet; insert socket into the shaft and turn clockwise until the end, approximately 15 turns and allow motor to rotate freely in opposite direction.
- **4.** Remove socket and re-install the shaft cap. The motor will operate in both directions.

### To Engage the Backstop Feature - Repeat Steps 1 & 2:

**3.** Using a 10mm deep socket 1/4" drive and a ratchet; insert socket into the shaft and turn counter clockwise, approximately 15 turns.

**NOTE**: Do not exert force to turn the socket as some movement for the drum may be necessary to align the shaft to engage to its mating part. Forcing the rotation of the socket may result in damage to internal components.

**4.** Once re-engaged, remove the socket and re-install the shaft cap. The motor will operate in only the direction indicated by the brass arrow mounted on the side of the unit.

NOTE: The drum motor is shipped with the Backstop already engaged.

If you require assistance, please contact Van der Graaf Technical Support:

1 (866) 595-3292 or email: techsupport@vandergraaf.com



### **Oil Change Instructions**

All Drum Motors are factory filled with oil that is free of detergent additives. It is recommended that oil changes be performed at 50,000 hour intervals.

**NOTE:** Do not use oil additives which can cause damage to the motor insulation or seals. Electrically conductive-bases oils, such as graphite and molybdenum disulfide, should not be used, as they will result in electric motor insulation damage.

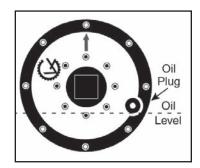
#### **OIL CHANGE**

- 1. Allow the drum motor to cool to normal temperature.
- 2. Rotate the drum motor until the oil plug is located in the 6 o'clock position.
- Unscrew the oil plug and allow the oil to drain completely.
   Note: There may be internal pressure released when removing the oil plug, this is normal.



4. Refill the drum motor with the suggested oil type (page 11) and amount of oil (page 10).

To verify the oil level, rotate the drum motor until the embossed arrow on the end flange (Models: TM160 - TM500), or the nameplate on the end flange (Models: TM127 mild steel only) is pointed in the 12 o'clock position. The oil plug will be approximately in the 4 o'clock position. The oil level should be up to the level of the oil plug.\*



5. Re-install the oil plug and if available, install a new copper seal.

\*For Airline Specified Drum Motors, please contact Van der Graaf Technical Support: 1 (866) 595-3292 or email: techsupport@vandergraaf.com for appropriate oil levels.



### **Drum Motor Oil Content (in Litres) -**

Face	Drum Motor Oil Content (in Litres) per Face Width													
Width														
(inches)	TM 100B25	TM 113B25	TM 127.25	TM 160A25	TM 160.30	TM 215A30	TM 215.40	TM 273.40	TM 315A40	TM 315.50	TM 400A50	TM 400.60	TM 500A60	TM 500A75
9.84			0.4	1.45										
10.24	0.38	0.5												
10.83	0.4	0.5	0.5	1.6										
11.81			0.6	1.7										
12.20	0.45	0.6												
12.80			0.7	1.9										
13.78			8.0	2.0	1.45	4.6								
14.17	0.6	0.9												
15.75			1.0	2.35	1.7	5.7								
16.14	0.8	1.1												
16.73			1.1	2.5	1.75	6.3	2.7	6.5	15.0					
17.72			1.1	2.8	1.9	6.5	3.1	7.0	15.8					
18.11	0.9	1.3												
19.69	4.4	4.5	1.4	3.2	2.2	8.1	3.9	7.9	17.5	9.1	21.4			
20.08	1.1	1.5	4.5	2.0	0.5	0.0	4.0	0.0	40.0	40.0	04.0			
21.65	4.0	1.0	1.5	3.6	2.5	9.3	4.3	8.8	19.0	10.8	24.0			
22.05	1.3	1.8	1.7	4.0	2.8	10.4	4.7	9.7	20.5	12.5	26.6	26.1	43.7	
23.62 24.02	1.5	2.1	1.7	4.0	2.0	10.4	4.7	9.1	20.5	12.5	20.0	20.1	43.7	
25.59	1.5	2.1	1.8	4.45	3.1	11.7	5.1	10.7	22.5	13.5	29.2	27.8	46.9	
25.98	1.6	2.3	1.0	7.70	0.1	11.7	0.1	10.7	22.0	10.0	20.2	27.0	40.0	
27.56			2.1	4.8	3.2	12.8	5.5	11.5	24.0	15.4	31.8	29.5	50.1	
27.95	1.8	2.5												
29.53			2.3	5.1	3.4	14.0	6.3	12.5	25.5	17.0	34.4	31.3	53.4	
29.92	1.8	2.6												
31.50			2.4	5.5	3.7	15.2	7.1	13.3	27.5	18.3	37.0	33.0	56.6	
31.89	2.1	2.9												
33.46			2.6	5.9	3.9	16.5	7.9	14.5	29.0	19.2	39.6	34.8	59.8	48.0
33.86	2.2	3.1												
35.43			2.9	6.3	4.1	17.6	8.7	15.2	30.5	20.8	42.2	36.5	63.0	51.0
35.83	2.5	3.5												
37.40			3.0	6.7	4.4	18.9	9.1	15.9	31.0	22.5	44.8	38.2	66.0	51.0
37.80	2.7	3.7												
39.37			3.2	7.1	4.6	20.0	9.5	16.6	32.5	23.4	47.5	40.0	69.5	53.0
39.76	2.9	4.1										.,		
41.34			3.4	7.5	4.7	21.3	9.9	18.0	34.0	24.2	50.0	41.7	72.8	53.0
31.73	3.0	4.2	0.0	7.0	4.0	00.0	40.0	40.7	05.5	05.0	50.7	40.0	70.0	55.0
43.31	0.4	4.4	3.6	7.9	4.8	22.0	10.3	18.7	35.5	25.0	52.7	42.6	76.0	55.0
43.70	3.1	4.4												
45.67	3.3	4.7									1			
Above 45.67" add	0.03 L per inch	0.05 L per inch	0.075 L per inch	0.175 L per inch	0.15 L per inch	0.5 L per inch	0.3 L per inch	0.375 L per inch	0.8 L per inch	0.675 L per inch	1.3 L per inch	0.875 L per inch	1.6 L per inch	1.25 per inch

**Example:** TM160.30 Drum Motor with face width of 33.46 inches requires 3.9 litres of oil.

(1 Litres = 0.265 gallons; 100 mm = 3.94 inches)





Oil Type	
<u>Manufacturer</u>	Oil Type
Petro Canada Castrol Chevron Esso / Imperial Oil Citgo Gulf Shell Sunoco Mobil	Enduratex EP 150 Gear Oil Molub-Alloy Gear Oil 84 NL Gear Compound 150 Spartan EP 150 EP Compound 150 EP Lubricant 140 Omala S2 G 150 SUNEP 150 Mobil Gear 629, SHC 150

Food Grade Oil Type			
<u>Manufacturer</u>	Oil Type		
Petro Canada Mobil/Exxon	Purity FG EP 100 Nuto FG 100		

Clutch Brake Oil Type				
<u>Manufacturer</u>	Oil Type			
Petro Canada	Duratran Transmission/ Hydraulic Fluid			

### **Troubleshooting**

The unit will not run	<ol> <li>Check for correct connections.</li> <li>Check for correct power supply voltage.</li> <li>In a 3Ø unit check for equal voltage in all 3 phases.</li> </ol>
The unit runs hot	<ol> <li>Make sure the unit is running with a belt. If the application does not require a belt, be sure the motor is No Belt (NB) series.</li> <li>Load not to exceed the capacity of the unit.</li> <li>Check the current draw and make sure it is not higher than the rated current on the name plate.</li> </ol>
The unit will hum, start but very slowly or not start at all	<ol> <li>On 1Ø units, check the capacitor and starting switch.</li> <li>On 3Ø units, check for equal voltage on all 3 legs or open phase in the winding.</li> </ol>
The unit will trip off overload or fuses	<ol> <li>Check the Drum Motor for a short to ground.</li> <li>If no short to ground is present, apply the rated input voltage and with an ammeter, measure the current and ensure that there is a balance of +/-10% variance between all three phases.</li> </ol>
The unit is noisy	<ol> <li>Check the installation of the unit.</li> <li>Make sure that the arrow on the shaft, opposite to the junction box, is pointing up.</li> <li>Check for excess belt tension and relieve.</li> </ol>

**NOTE:** If any of the above mentioned attempts to correct the problem have been performed and the problem persists contact Van der Graaf:

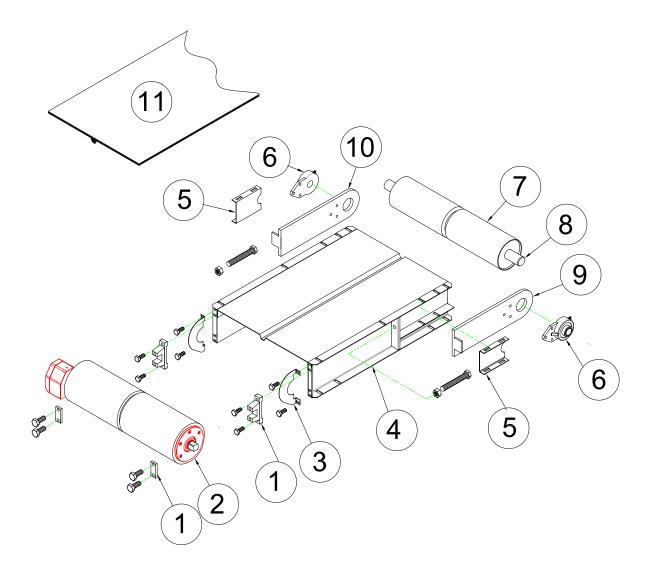
Technical Support: 1 (866) 595-3292 Email: techsupport@vandergraaf.com

Spare Parts Online Order: parts.vandergraaf.com





# MODEL 104 MOTOR DRUM DRIVE SLIDER BED BELT CONVEYOR



- 1. BRACKET (TOP)
- 2. MOTORIZED DRIVE PULLEY
- 1. BRACKET (BOTTOM)
- 3. DRUM GUARD
- 4. FRAME ASSEMBLY
- 5. RETAINER CHANNEL
- 6. BEARING

- 7. TAIL PULLEY
- 8. TAIL PULLEY SHAFT
- 9. TAKE-UP (LH)
- 10. TAKE-UP (RH)
- **11. BELT**