How to Use This Manual

This manual provides detailed instructions on the removal, installation and disengaging of sprag type backstops (overrunning clutches) furnished as an accessory on Type VP parallel shaft and Type VR right angle shaft gear drives. Use the table of contents below to locate required information.

CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

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Introduction

The following instructions apply to the installation of internal backstops for V-Class Sizes M133 thru M227.

CAUTION: *Consult applicable local and national safety codes for proper guarding of rotating members. Lock out power source and remove all external loads from drive before servicing drive or accessories.*

> ***WARNING:*** *STARTING GEAR DRIVES WITH INTERNAL BACKSTOPS — Gear drives with internal backstops must never be started with the backstop operating in the locking direction as this could lead to the destruction of the backstop.*

PETROLEUM BASED LUBRICANTS — Refer to Owners Manual 178-052 for proper selection of petroleum based lubricants.

NOTE: Extreme Pressure (EP) gear lubricants are required for V-Class gear drives.

The design of the standard internal backstop incorporated into the V-Class product line is compatible with industrial type sulfur-phosphorus EP lubricants. Therefore, EP lubricants are acceptable for use with V-Class gear drives equipped with our standard internal backstop.

SYNTHETIC LUBRICANTS — Refer to Owners Manual 178-052 for proper selection of synthetic lubricants.

BACKSTOP APPLICATION — Backstops are designed to prevent reverse rotation or backrun without backlash for conveyors, bucket elevators, and similar applications. Backstops are not approved for use on systems that are designed for handling of people such as elevators, manlifts, ski tows and ski lifts. DO NOT use a backstop as a substitute for a brake.

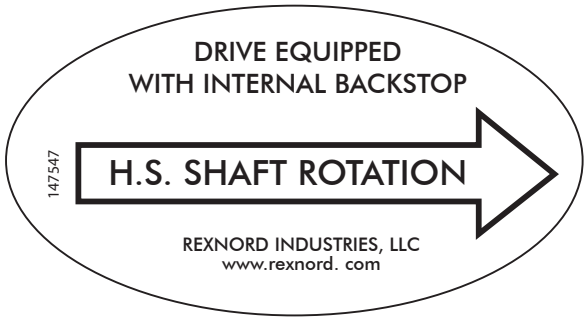
INDEXING — DO NOT use the backstop for indexing applications. The backstop is designed to prevent reverse rotation five times or less in eight hours, with one minute or more in overrunning direction between backstopping load applications. If backstopping operations are more frequent, or the time between operations is less than one minute, the backstop is classified as an indexing device and must be referred to the Factory.

DRIVE WITH BACKSTOP: To prevent damage to the backstop due to incorrect motor shaft rotation at start up couplings are NOT assembled when drives are furnished with backstops. After completing the electrical connection, check motor and drive shaft rotations. Then complete alignment and assembly of coupling.

IMPORTANT*: If backstop slippage occurs, return the backstop to the Factory for inspection and replacement. Attach a "Returned Material Authorization" tag which is available from Rexnord Representatives and the Factory.*

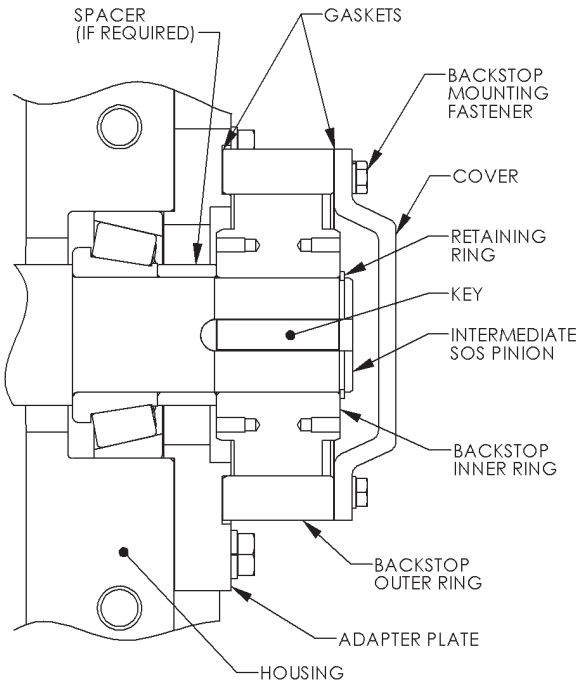
Backstop Installation

1. Ensure that the key and keyway is free of burrs or nicks.
2. Carefully clean all mounting surfaces including housing oil feed/return holes and gear drive shaft.
3. Remove the backstop assembly from the protective packaging and wipe off any excess lubricant from all components.
4. Before installing backstop, locate high speed shaft rotation label at high speed end of housing and check direction of gear drive high speed shaft in normal operation.



5. Note the direction of the backstop shaft rotation and mark this direction on the end of the shaft with an arrow.
6. Locate the arrow etched on each side of the backstop's inner ring indicating the direction of rotation when the backstop is operating in the freewheeling (overrunning) direction. After assembly, the arrow direction on the backstop assembly must correspond with the direction of the arrow marked on the shaft.
7. Apply a coat of light machine oil to the outside diameter of the shaft and backstop bore to protect against corrosion and assist during assembly. DO NOT REMOVE THE RETAINING STRAP AROUND THE INNER RING. The strap compresses the sprags and provides clearance during outer ring installation.
8. If shaft does not have a shoulder to locate the backstop, a spacer is required. Slide the backstop spacer onto the gear drive shaft.
9. Install the key into the shaft keyway.
10. Align the key with the keyway in the inner ring and carefully push the assembly onto the shaft until it is located against the shaft shoulder or spacer. Ensure that the backstop is mounted onto the shaft so that the arrow of rotation found on the face of the backstop assembly corresponds with the arrow marked earlier on the shaft indicating the freewheeling direction.

WARNING: *EXCESSIVE FORCE — When mounting the inner ring onto the shaft, pressure should only be exerted on the face of the inner ring. Pressure applied to the sprag cage could damage the backstop, resulting in a premature failure. DO NOT FORCE OR HAMMER backstop onto shaft.*



11. Install retaining ring into groove on shaft extension to hold backstop assembly on shaft. NOTE: Clearance between backstop and retaining ring allows for backstop to float axially on shaft.
12. Clean mounting surfaces on both sides of backstop outer ring, cover, and housing with solvent. Place gasket over inner ring of backstop for use between outer ring and housing.
13. With the retaining strap around the inner ring assembly, gently slide the outer ring over the inner ring assembly while rotating the outer ring in the direction opposite of the arrow marked on inner ring face. Remove the retaining strap when all the sprags are engaged.
14. Align the outer ring fastener holes with the fastener holes in the drive housing and gasket.
15. Install four (4) mounting screws into the outer ring and hand tighten to secure the backstop assembly. Confirm operation of backstop by turning the input shaft in the required direction of rotation by hand.
16. Remove the four (4) fasteners from the outer ring. Place gasket between outer ring and cover.
17. Assemble the cover to the outer ring with fastener and lock washer and secure the outer ring to the drive housing. Cross tighten fasteners according to Table 1A thru Table 1D based on configuration.
18. Fill drive to oil level marked on dipstick with lubricant specified in Owners Manual 178-052.
19. Check motor for correct rotation before completing connection to drive.

Table 1A — VP2 Backstop Fastener Tightening Torque: ±5%
(DO NOT Lubricate Fasteners)

Drive Size	Nominal Ratios	Fastener Size	ISO Property Class	Tightening Torque	
				Nm	lb-ft
M107	5.60-20.0	M8 x 1.25	12.9	41	30
	22.4-28.0	M6 x 1.00	8.8	10	7
M117	5.60-20.0	M8 x 1.25	8.8	24	18
	22.5-28.0	M6 x 1.00	10.9	15	11
M127	5.60-20.0	M10 x 1.50	10.9	69	51
	22.4-28.0	M8 x 1.25	8.8	24	18
M133-M157	All	M10 x 1.50	8.8	49	36
M163 M165 M167	5.60 - 20.0	M12 x 1.75	10.9	120	89
	22.4 - 28.0	M10 x 1.50	10.9	69	51
M173 M175 M177	5.00 - 18.0	M16 x 2.00	10.9	305	224
	20.0 - 25.0	M12 x 1.75	10.9	120	89
M187	5.60 - 20.0	M16 x 2.00	10.9	305	224
	22.4 - 28.0	M12 x 1.75	10.9	120	89
M193 M195 M197	5.00 - 18.0	M20 x 2.50	8.8	420	310
	20.0 - 25.0	M16 x 2.00	10.9	305	224
M203 M207	5.60 - 20.0	M20 x 2.50	8.8	420	310
	22.4 - 28.0	M16 x 2.00	10.9	305	224
M213 M215 M217	5.00 - 18.0	M20 x 2.50	8.8	420	310
	20.0 - 25.0	M16 x 2.00	10.9	305	224
M223 M225 M227	5.60 - 20.0	M20 x 2.50	8.8	420	310
	22.4 - 28.0	M16 x 2.00	10.9	305	224

Table 1B — VP3 Backstop Fastener Tightening Torque: ±5%
(DO NOT Lubricate Fasteners)

Drive Size	Nominal Ratios	Fastener Size	ISO Property Class	Tightening Torque	
				Nm	lb-ft
M107	31.5-112	M6 x 1.0	8.8	10	7
	125-160	M6 x 1.0	8.8	10	7
M117	31.5-112	M6 x 1.0	8.8	10	7
	125-160	M6 x 1.0	8.8	10	7
M127	31.5-112	M6 x 1.0	10.9	14	10.5
	125-160	M6 x 1.0	8.8	10	7.5
M133 M137	31.5 - 112	M8 x 1.25	8.8	24	18
	125 - 160	M6 x 1.00	8.8	10	7.5
M143 M145 M147	31.5 - 112	M10 x 1.50	8.8	49	36
	125 - 160	M6 x 1.00	8.8	10	7.5
M153 M155 M157	31.5 - 112	M10 x 1.50	8.8	49	36
	125 - 160	M8 x 1.25	10.9	35	26
M163 M165 M167	31.5 - 112	M10 x 1.50	10.9	69	51
	125 - 160	M8 x 1.25	10.9	35	26
M173 M175 M177	28.0 - 100	M10 x 1.50	10.9	69	51
	112 - 140	M8 x 1.25	10.9	35	26
M187	31.5 - 112	M10 x 1.50	10.9	69	51
	125 - 160	M8 x 1.25	10.9	35	26
M193 M195 M197	28.0 - 100	M10 x 1.50	10.9	69	51
	112 - 140	M10 x 1.50	8.8	49	36
M203 M207	31.5 - 112	M10 x 1.50	10.9	69	51
	125 - 160	M10 x 1.50	8.8	49	36
M213 M215 M217	28.0 - 100	M16 x 2.00	10.9	305	224
	112 - 140	M10 x 1.50	8.8	49	36
M223 M225 M227	31.5 - 112	M16 x 2.00	10.9	305	224
	125 - 160	M10 x 1.50	8.8	49	36

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Table 1C — VR2 Backstop Fastener Tightening Torque: ± 5%
(DO NOT Lubricate Fasteners)

Drive Size	Nominal Ratios	Fastener Size	ISO Property Class	Tightening Torque	
				Nm	lb-ft
M107	All	M8 x 1.25	12.9	41	30
M117	All	M10 x 1.50	8.8	49	36
M127	All	M10 x 1.50	8.8	49	36
M133 M137	All	M12 x 1.75	10.9	120	89
M143 M145 M147	All	M10 x 1.50	8.8	49	36
M153 M155 M157	All	M16 x 2.00	8.8	214	158
M163 - M187	All	M16 x 2.00	10.9	305	224

Table 1D — VR3 Backstop Fastener Tightening Torque: ±5%
(DO NOT Lubricate Fasteners)

Drive Size	Nominal Ratios	Fastener Size	ISO Property Class	Tightening Torque	
				Nm	lb-ft
M107	14.0-50.0 & 80.0-90.0	M8 x 1.25	12.9	41	30
	56.0-71.0 & 100-125	M6 x 1.00	8.8	10	7
M117	14.0-50.0 & 80.0-90.0	M8 x 1.25	8.8	24	18
	56.0-71.0 & 100-125	M6 x 1.00	10.9	15	11
M127	14.0-50.0 & 80.0-90.0	M10 x 1.50	10.9	69	51
	56.0-71.0 & 100-125	M8 x 1.25	8.8	24	18
M133 - M157	All	M10 x 1.50	8.8	49	36
M163	14.0-50.0 & 80.0-90.0	M12 x 1.75	10.9	120	89
M165 M167	56.0-71.0 & 100-125	M10 x 1.50	10.9	69	51
M173	12.5-45.0 & 71.0-80.0	M16 x 2.00	10.9	305	224
M175 M177	50.0-63.0 & 90.0-112	M12 x 1.75	10.9	120	89
M187	14.0-50.0 & 80.0-90.0	M16 x 2.00	10.9	305	224
	56.0-71.0 & 100-125	M12 x 1.75	10.9	120	89
M193	8.0-45.0 & 71.0-80.0	M20 x 2.50	8.8	420	310
M195 M197	50.0-63.0 & 90.0-112	M16 x 2.00	10.9	305	224
M203	9.0-50.0 & 80.0-90.0	M20 x 2.50	8.8	420	310
M207	56.0-71.0 & 100-125	M16 x 2.00	10.9	305	224
M213	8.0-45.0 & 71.0-80.0	M20 x 2.50	8.8	420	310
M215 M217	50.0-63.0 & 90.0-112	M16 x 2.00	10.9	305	224
M223	9.0-50.0 & 80.0-90.0	M20 x 2.50	8.8	420	310
M225 M227	56.0-71.0 & 100-125	M16 x 2.00	10.9	305	224

Backstop Removal

1. Clean exterior of drive to prevent contaminants from entering drive.
2. Drain oil from drive.
3. Remove fasteners from the backstop assembly.
4. Remove backstop cover.
5. Gently remove the outer ring from the backstop assembly while rotating the outer ring in the direction opposite of the arrow marked on the inner ring face.
6. Remove the retaining ring from the backstop shaft extension.
7. If backstop is to be reinstalled, place a strap or wire tie wrap around the inner ring sprag assembly to depress the sprags and assist in the installation of the outer ring.
8. Install two fasteners (refer to Table 2A thru Table 2D based on configuration for correct fastener size) into the inner ring of the backstop assembly. Carefully pull inner ring assembly off the shaft.

Backstop Disengagement

Table 2A — VP2 Fastener Size for Removal

Drive Size	Nominal Ratios	Fastener Thread Size
M107	5.60-20.0	M5 x 0.8
M117	22.4-28.0	M4 x 0.7
M127	5.60 - 20.0	M8 x 1.25
M137	22.4 - 28.0	M5 x 0.8
M143 - M167	All	M8 x 1.25
M173	5.00 - 18.0	M12 x 1.75
M175 M177	20.0 - 25.0	M8 x 1.25
M187	5.60 - 20.0	M12 x 1.75
	22.4 - 28.0	M8 x 1.25
M193 - M227	All	M12 x 1.75

Table 2B — VP3 Fastener Size for Removal

Drive Size	Nominal Ratios	Fastener Thread Size
M107	31.5-112	M4 x 0.7
M117	125-160	n/a
M127	31.5-112	M4 x 0.7
	125-160	M6 x 1.0
M133	31.5 - 112	M5 x 0.8
M137	125 - 160	M4 x 0.7
M143	31.5 - 112	M8 x 1.25
M145 M147	125 - 160	M4 x 0.7
M153 M155 M157	All	M5 x 0.8
M163 M165 M167	All	M8 x 1.25
M173 - M187	All	M8 x 1.25
M193	28.0 - 100	M8 x 1.25
M195 M197	112 - 140	M5 x 0.8
M203	31.5 - 112	M8 x 1.25
M207	125 - 160	M5 x 0.8
M213	28.0 - 100	M12 x 1.75
M215 M217	112 - 140	M8 x 1.25
M223	31.5 - 112	M12 x 1.75
M225 M227	125 - 160	M8 x 1.25

Table 2C — VR2 Fastener Size for Removal

Drive Size	Nominal Ratios	Fastener Thread Size
M107	All	M5 x 0.8
M117 - M147	All	M8 x 1.25
M153 - M187	All	M12 x 1.75

Table 2D — VR3 Fastener Size for Removal

Drive Size	Nominal Ratios	Fastener Thread Size
M107	14.0-50.0 & 80.0-90.0	M5 x 0.8
M117	56.0-71.0 & 100-125	M4 x 0.7
M127	14.0-50.0 & 80.0-90.0	M8 x 1.25
M137	56.0-71.0 & 100-125	M5 x 0.8
M143 - M167	All	M8 x 1.25
M173	12.5-45.0 & 71.0-80.0	M12 x 1.75
M175 M177	50.0-63.0 & 90.0-112	M8 x 1.25
M187	14.0-50.0 & 80.0-90.0	M12 x 1.75
	56.0-71.0 & 100-125	M8 x 1.25
M193 - M227	All	M12 x 1.75

When shaft mounting a drive, there are times when disengaging the backstop is desired; for example installing a torque arm. The backstop may be disengaged by the following procedure.

1. Drain oil from drive.
2. Remove mounting fasteners from the backstop assembly.
3. Rotate the backstop outer ring in the direction opposite of the arrow marked on the inner ring face and pull the backstop outer ring away from the drive housing approximately 1mm (.04 inch) or far enough to separate the gasket.
4. The drive now has limited freedom of rotation in both directions.
5. To re-engage backstop, inspect the gasket and replace if damaged, install and cross tighten fasteners according to Table 1A thru Table 1D.

Backstop Reversal

To operate a drive equipped with a backstop in the opposite rotation, the inner ring of the backstop must be removed and flipped front to back such that the arrow indicating direction of freewheel rotation is now in the opposite direction. To remove and reinstall the backstop see “Backstop Removal” and “Backstop Installation” sections of this document. Replace any damaged gaskets prior to installation. Remove high speed shaft rotation arrow if no longer applicable.

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