

Bibbigard® Backstop Units



Fitting a Bibbigard Backstop cuts out the danger of fully loaded conveyors running back for any reason. These non-lubricated, fail-safe products operate without reliance on a power source or manual operation: rapidly and effectively, every time.

Bibby Transmissions Torque Control Division also offers a wide range of Torque Limiters to protect plant and machinery from damage due to overload, and to protect production by minimising

machine downtime in the event of a stoppage. Bibby Transmissions offer complete answers to the problems created by torque and the mechanical transmission of power with a wide range of quality products all backed by comprehensive design and manufacturing expertise, in-house test facilities and technical support.

Specify Bibby Transmissions products to protect your investment in people, plant and production.

Bibby Transmissions Backstop Units

Applications

- *Fail safe*
- *Bi-directional*
- *Automatic operation*
- *Lubrication free*
- *Externally mounted*

These important safety devices have been developed to provide a facility whereby gravitational run-back of loaded conveyors with the consequent load spillage, equipment damage and potential personnel injury, is prevented automatically during conveyor stoppages.

The units, which are fail-safe, operate when the conveyor stops for any reason, without reliance on any power or manual operation. They have replaced conventional brake systems where these were used to prevent run-back, and which were dependent on an external power source for operation.

They occupy comparatively little space, are easy to install, lubrication free and require virtually no maintenance.

A major advance in backstop design

The Series 300 range of Backstop Units from Bibby Transmissions incorporates the knowledge and operational experience gained over many years of supplying Backstops to major gearbox manufacturers and users.

A prime feature of the design is the centralised auxiliary plate on which the load pins are located. This has the advantage of enabling the units to be used for either clockwise or anti-clockwise free rotation with only minor changes of re-configuration required, giving operators greater flexibility in use.

A further advantage is a major reduction in the spare parts stockholding required, keeping operational costs to a minimum. Series 300 Backstops offer all of the reliability and proven design excellence for which Bibby Transmissions have gained a high reputation over many years of successful operation. They are used throughout the world in mining, quarrying, water pumping stations - indeed any application where shaft reversal, brought about by a stoppage, presents a costly or hazardous situation.



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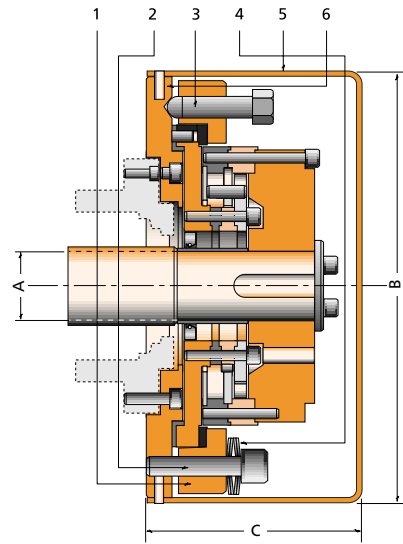
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The Series 300 range has been extensively proven in operation both at our own test facility and in operational use, and upholds Bibby Transmissions' tradition of leadership in the design and manufacture of reliable Backstop Units.

Torque Limiting Plate Controlled Release Type (TLPCR)



The Bibbigard Series 300 Torque Limiting Controlled Release Backstop is of a similar construction to the Series 300 PCR, but incorporates a torque limiting facility. Designed for use on single motor drive or multi-motor drive conveyors where two or more Backstops would be employed, it prevents the torque resulting from a staked (hold-fast) condition being transmitted to, and thus overloading, the gearbox.

A series of M24 socket head cap screws (2), each with a stack of Belleville washers (4) under the head, pass through the clamp ring (1) and are threaded into the adaptor plate (6). These are tightened to provide the braking torque. On the same PCD a series of M24 hexagonal head 'tension release' screws (3) are threaded through the clamp ring (1) so that their domed ends can bear against the adaptor plate (6).

Tightening the tension release screws (3) results in the clamp ring (1) being drawn back to further compress the Belleville washers (4) against the underside of the heads of the socket head cap screws (2), and so releases the pressure on the brake lining. The speed at which the controlled release operates is dependent on the degree to which the tension release screws are tightened. Under normal circumstances the braking torque is preset and the torque adjustment screws (2) locked with security seals.

Operation

1. The brake is applied at the preset torque while the conveyor is operating normally.
2. In the event of a staked (hold-fast) condition arising in the conveyor belt, switch off the conveyor drive and establish the reason in accordance with the appropriate Code of Practice. Do not attempt to clear the obstruction at this time.
3. Remove cover (5) from the Backstop Unit to gain access to the tension release screws (3).
4. Gradually tighten the tension release screws (3) a maximum of a quarter turn at a time in diametrically opposite order to release the brake. This permits the locked Backstop and drive shaft to rotate slowly, dissipating the stored energy in the belt, and allowing the conveyor to be let down under control.

5. The obstruction may now be safely cleared.
6. Before re-starting the conveyor, loosen the tension release screws (3) completely to allow the brake torque to be re-established.
7. Re-fit the cover (5) and re-start the drive.

Important

On conveyors fitted with more than one Backstop, operations 3 and 4 must be repeated on each Backstop before operations 6 and 7 are carried out on any of them. Failure to do this will result in the belt retaining some stored energy.

Dimensional Detail

Torque Limiting Controlled Release Units

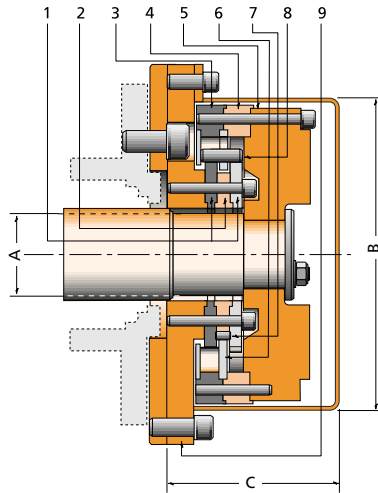
For details and dimensions of Standard Types and Plate Controlled Release Units, see Table on pages 66 and 67

Unit Size	Max. Torque		Max. Shaft Size Diameter A		Overall Dimensions			
	lbf ft	Nm	ins	mm	Diameter B ins	mm	C	
					ins	mm	ins	mm
302 TL PCR	4,280	5,800	2.36	60	12.79	325	4.92	125
304 TL PCR	10,600	14,350	3.70	94	16.14	410	7.28	185
306 TL PCR	41,000	55,600	5.12	130	19.68	500	8.27	210
308 TL PCR	71,500	96,950	8.98	228	28.35	720	11.81	300

TL PCR units have a safety factor of 1.5 included in the maximum torque ratings.

TL PCR size 308 can be supplied with a higher maximum torque rating as a special unit.

Series 300 Basic Unit



Construction

The 300 SERIES BASIC UNIT comprises a backplate (9) to which is bolted the catcher assembly, consisting of load rings (1) and an index ring (2), each with a series of ramps.

The auxiliary plate (6) encircles the index ring and is located in a recess in the wheel assembly (3, 4, 5) which in turn is attached to the rotating shaft.

Indexing pins (7) are located between the index ring of the catcher and recesses on the inner diameter of the auxiliary plates. Load pins (8) are held between the angled slots in the auxiliary plate and teeth in the wheel rings.

Service Factors

Conveyors

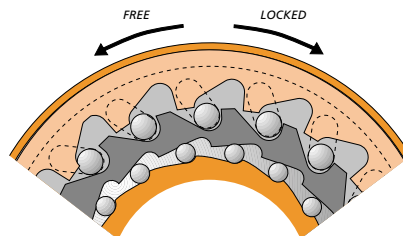
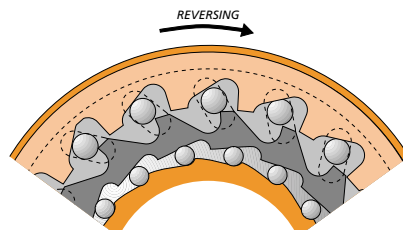
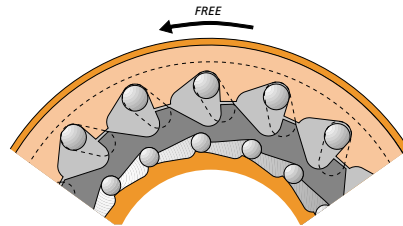
Underground, with incline of 1 in 4 or above	3.0
Underground, with incline of less than 1 in 4	2.5
Above ground, with incline of 1 in 4 or above	2.0
Above ground, with incline of less than 1 in 4	1.7
Screw pumps	1.0
Fans & Turbines	0.5

Note:

Where the Backstop is to be installed on the final output shaft, please consult [BIBBY Transmissions](#) in order to ensure correct product selection.

For other applications, please contact Bibby Transmissions for further discussion.

Standard units have a safety factor of 2.0 included in the maximum torque settings.



Operation

When the conveyor starts, the indexing pins and load pins ride up the ramps on the stationary catcher into the wheel recesses and to the top of the slots in the auxiliary plate. As speed increases they are held clear of the catcher jointly by centrifugal force and the auxiliary plate.

When the drive shaft stops rotating the indexing pins locate on the ramps around the index ring of the catcher and hold the auxiliary plate stationary.

Reverse movement of the rotating shaft, resulting from gravitational movement of the conveyor, drives the load pins down their angled slots to locate with the ramps on the load rings of the catcher assembly and the opposing ramps on the wheel. This creates a mechanical lock with the load pins carrying the reverse torque between these ramps, eliminating any frictional wedging action.

Dimensional Detail

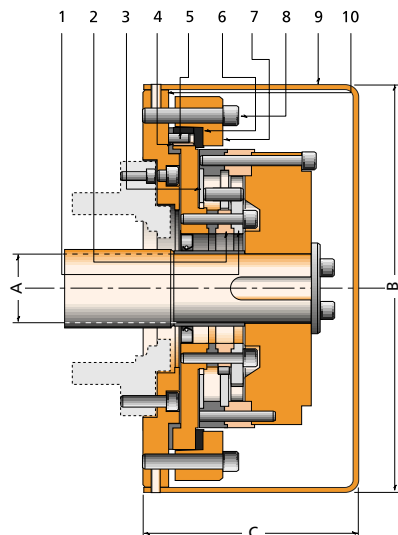
Standard Non-Controlled Release Units

For details and dimensions of Plate Controlled Release and Torque Limiting Units, see Tables on pages 67 and 68

Unit Size	Max. Torque		Max. Shaft Size Diameter A		Overall Dimensions			
	lbf ft	Nm	ins	mm	Diameter B		C	
					ins	mm	ins	mm
302	3,210	4,350	2.36	60	6.89	175	3.94	100
304	8,000	10,850	3.70	94	10.04	255	6.30	160
306	30,800	41,750	5.12	130	12.60	320	17.28	185
308	130,000	176,200	8.98	228	19.69	500	10.63	270

Plate Controlled Release Type (PCR)

Designed primarily for mining, steel and other heavy industries, the Bibbigard Series 300 Plate Controlled Release Backstop provides the same high safety attributes as the basic Series 300 unit, but additionally incorporates a 'Plate' brake to provide SAFE, CONTROLLED RELEASE of excessive conveyor belt tension resulting from trapped tail ends or similar staked (hold-fast) conditions.



In these units the catcher rings (1, 2) are bolted to a pressure plate assembly (3,4,5) which forms part of the controlled release mechanism. The brake lining (6) is a continuous ring of friction material located between a clamp ring (7) and the pressure plate assembly. A series of M24 socket head cap screws (8) pass through the clamp ring (7) and are threaded into the adaptor plate (10) to provide the brake tightening and release operation. The bearing (4) of the pressure plate assembly is located between the adaptor plate (10) and the pressure plate (3).

Operation

1. The brake is fully applied at all times while the conveyor is operating normally.
2. In the event of a staked, or hold-fast, condition arising in the conveyor belt, switch off the conveyor drive and establish the reason in accordance with the appropriate Code of Practice. Do not attempt to clear the obstruction at this time.
3. Remove cover (9) from Backstop Unit to gain access to the M24 brake adjustment screws (8).
4. Gradually slacken off the screws (8) a maximum of a quarter turn at a time, in diametrically opposite order, to release the brake. This permits the

'locked' Backstop and drive shaft to rotate slowly, allowing the stored energy in the belt to be dissipated safely under control. At the same time, the conveyor can be let down, still under control, as far as is required.

5. The obstruction may now be safely cleared.
6. Before re-starting the conveyor, re-tighten the brake adjustment screws (8) in diametrically opposite order, to the tightening torque recommended by BIBBY Transmissions, thereby re-activating the plate brake mechanism.
7. Re-fit cover (9) and re-start the drive.

Dimensional Detail

Plate Controlled Release Units

For details and dimensions of Standard Types and Torque Limiting Units, see Table on pages 66 and 68

Unit Size	Max. Torque		Max. Shaft Size Dia A		Overall Dimensions Dia B				
	lbf ft	Nm	ins	mm	ins	mm	ins	C	mm
302PCR	3,210	4,350	2.36	60	12.79	325	4.92	125	
304PCR	8,000	10,850	3.70	94	16.14	410	7.28	185	
306PCR	30,800	41,750	5.12	130	19.68	500	8.27	210	
308PCR	71,500	96,950	8.98	228	28.35	720	11.81	300	

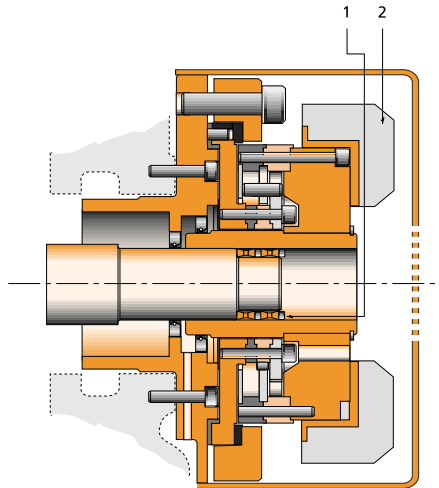
PCR units have a safety factor of 2.0 included in the maximum torque ratings.

PCR size can be supplied with a higher maximum torque rating as a special unit.

Fan End Mounted Type

This type is designed specifically to fit on the Fan End of a worm reduction gearbox as a standard unit, or it can incorporate the controlled release or the torque limiting facility.

In all cases the maximum torque capacities and shaft capacities are identical to those shown in the respective tables in this section. Where it is required to be fitted to an existing gearbox without a keyway in the worm shaft, the unit can be supplied with a proprietary locking ring to provide the necessary drive medium, with an appropriate reduction in shaft diameter capacity (details available on request).



Selection procedure for Bibbigard Backstops

Selection

1. Select appropriate Service Factor from page 66.
2. Establish position at which Backstop is to be fitted.
3. Calculate the peak torque relating to the shaft onto which the unit will be fitted.
4. Select the nearest higher torque rating from Maximum Torque column, in the appropriate 'Dimensional Detail' table.
5. Check across from Torque figure to max. shaft Dia. A to ascertain that the unit will accommodate the mounting shaft.
6. Check overall dimensions to ensure space available will permit correct mounting.

Note: If in doubt, please consult Bibby Transmissions.

Example

A Bibby Plate Controlled Release Backstop is required to be fitted to the second motion shaft of the gearbox in the drive of an underground conveyor operating on a 1 in 4 gradient. Gearbox transmits 150 kW at 120 r.p.m. Mounting shaft diameter 90mm.

1. Select appropriate Service Factor (SF) from page 66, in this case 3.
2. Calculate shaft torque:

$$\begin{aligned} & \frac{\text{kW} \times 9,553 \times \text{SF}}{\text{r.p.m.}} \\ & = \frac{150 \times 9,553 \times 3}{120} = 35,823 \text{ Nm} \end{aligned}$$

3. From the table on page 67, select unit which has the next higher torque rating to 35,823 Nm, which in this case is the 306 PCR (41,750 Nm).
4. Check Maximum Shaft Diameter of Size 306 PCR unit, which shows that up to a 130mm shaft can be accommodated.
5. Check overall dimensions of Size 306 PCR to ensure that the unit can be mounted correctly in the space available.

Note:
Maximum torque ratings above have a Safety Factor of 2.

Note:

Friction materials used in Bibbigard® Backstops incorporating Controlled Release features do not contain asbestos.