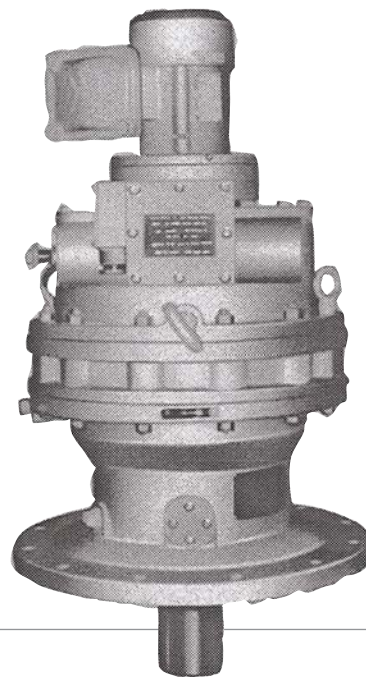


Torque Limiter Equipped Cyclo[®] Speed Reducers and Gearmotors



Introduction

Torque limiters are offered as optional equipment for specific models of Cyclo[®] speed reducers and gearmotors. These torque limiting devices prevent damage to machinery from overloads and jams and reduce costly downtime.

On a unit equipped with a torque limiter, when the Cyclo[®] reducer or gearmotor output torque exceeds a predetermined limit, a micro switch instantly breaks the motor circuit to protect the process equipment. These controls are available for either one or bi-directional rotation.

Features

Safe Unattended Operation

Reliable torque limiter response to overload cuts motor power automatically, stopping the driven machine.

Cost Effective Machine Design

The limit set on a Cyclo[®] unit equipped with a torque limiter is more accurate and reliable when compared to conventional torque limiters. Consequently, use of a lower safety factor on auxiliary equipment may be considered, which will decrease the cost of the entire system.

Bi-directional Torque Setting

Usually the torque limiter is set for only one direction of slow speed shaft rotation; however, if requested, it can be set for bi-direction.

Easy Set Point Adjustment

The factory sets all calibration levels. No further adjustments are required. However, you can make an adjustment within +25% of set torque by rotating the adjusting bolt that changes restraint spring load and set point.

Enclosed Structure

The torque limiter is enclosed to keep out gas, dust and other environmental contaminants.

Combines with Other Protective Devices

The torque limiter may be connected to another alarm system (i.e., buzzer and/or lamp) as an option to warn of power failure.

High Precision

The basic component of the torque limiter is a high-precision coil spring. Under load, the spring deflects in proportion to torque. Repeatability of the torque set point is +5% to +10%.

Instantaneous Overload Response

Overload response time is much faster than comparable electrical systems.

Option to Withstand Start-up Torque

The torque set point may optionally withstand start-up torque by bypassing the limit switch current.

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Operating Principle

Operation (Figure 1)

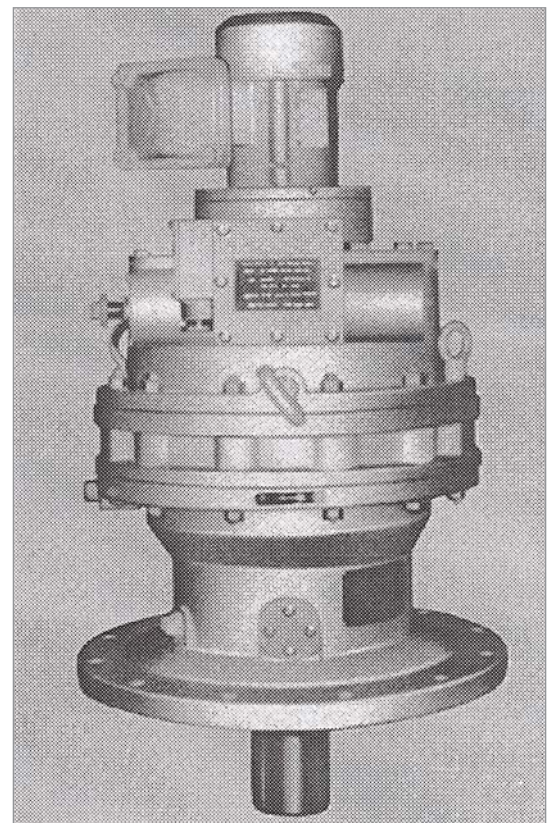
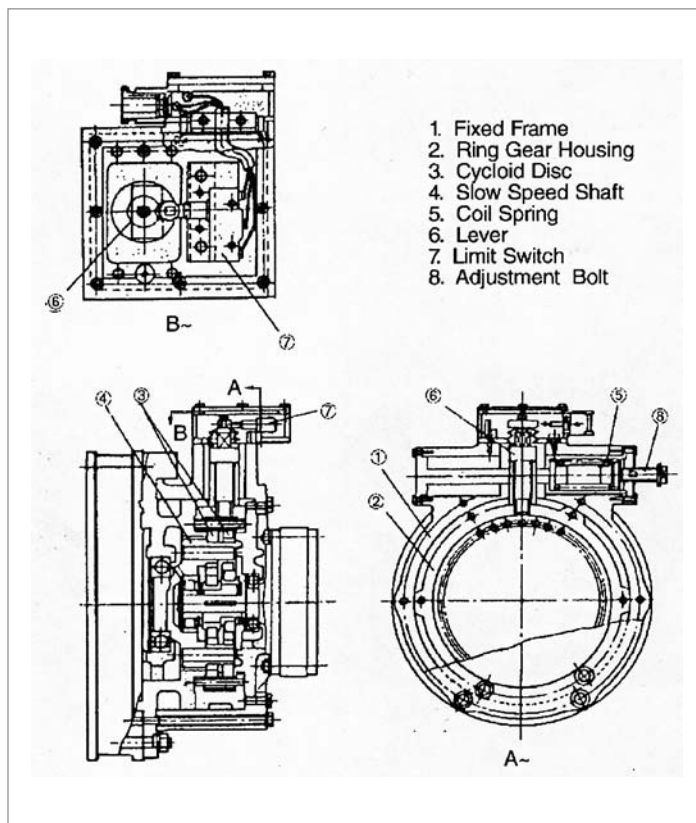
Output torque on the slow speed shaft (4) of the Cyclo drive is transmitted by means of a Cycloid disc (3) to the ring gear housing (2), which is free to rotate in the fixed frame (1).

Under constant load, the lever (6) fitted in the ring gear housing (2) is held in a fixed position by the preset force of the coil spring (5). When load on the slow speed shaft (4) is increased, the ring gear housing (2) rotates in the opposite direction to the slow speed shaft (4) causing the lever (6) to press against the coil spring (5).

When the output load exceeds the preset value, the lever (6) actuates the limit switch (7), instantaneously cutting motor power. After the motor stops, and the cause of overload eliminated, the force of the coil spring (5) returns the lever (6) to its original neutral position.

The torque limiter mounts on the first stage housing of double reduction units (example: on frame of 6130 for double reduction size 6195DB) and on the second stage housing of triple reduction units (example: on frame 6130 of triple reduction size 6195TD).

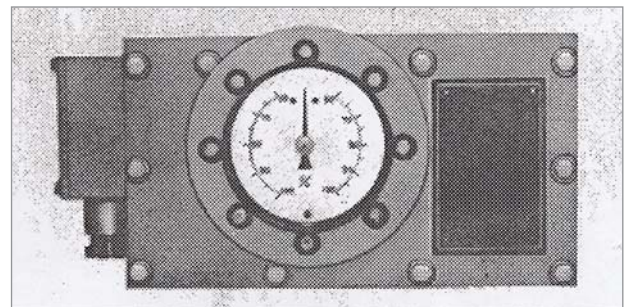
Figure 1. Torque Limiter Components



Additional Features

Torque can be Calibrated

A torque limiter with an indicator that shows the load percentage is also available. The indicator on this type shows load percentage against the set torque. The indicator gauge covers a range of 60 to 100% of torque. Other gauge indicators are available upon request, please consult factory.



Speed Reducers and Gearmotors

Additional Features (cont.)

Torque can be Read at Locations Remote from the Reducer

Load cell type torque limiters use a transducer as an overload protection device. The transducer services reactive load at the Cyclo® ring gear housing. Reactive load is converted into an electrical signal (i.e., 4 - 20 ma d.c.) for feedback, control and torque indication.

Multiple Contacts

Dual safety devices using two limit switches are available. One limit switch can be set to alarm at a torque less than set torque. The second switch can be set to cut the motor power source at set torque.

Available Models

Explosion proof and underwater models available upon request. Consult the factory.

Applications

Mixer, stoker, conveyor, roll and various other machines.

Required Application Data

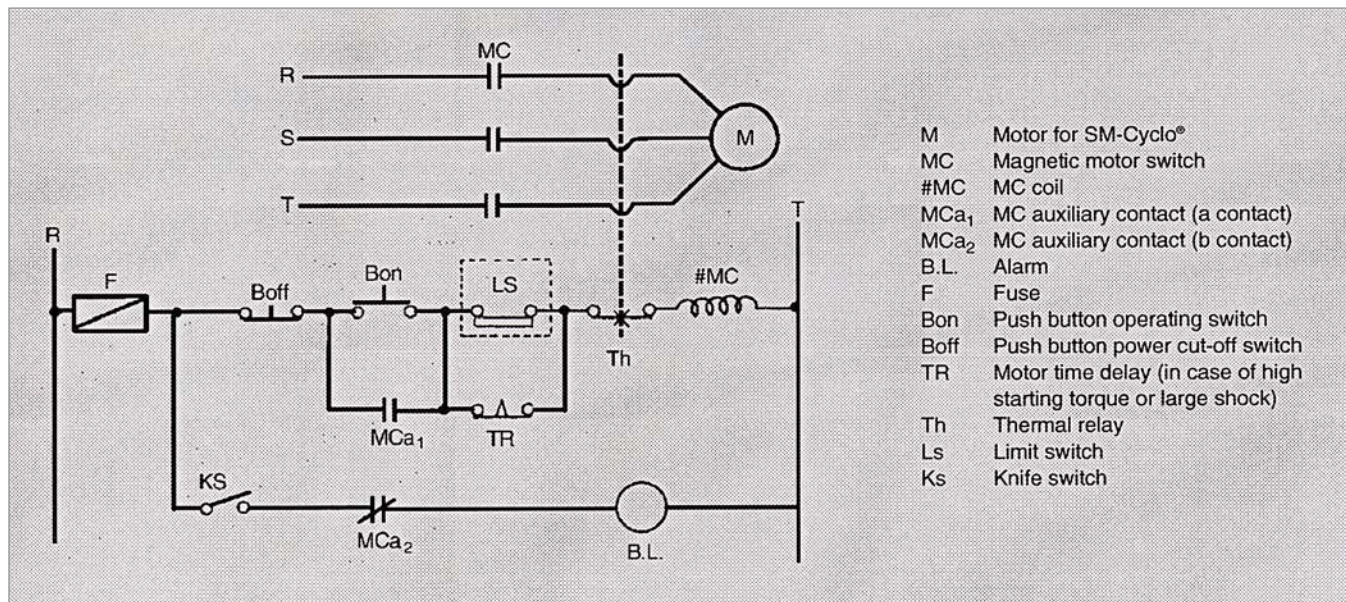
- Slow speed shaft normal torque
- Slow speed shaft pre-set torque
- Direction of the slow speed shaft rotation viewed from the shaft side
- Motor input speed and power
- Driven machine
- Load conditions - degree of shock and operating cycles
- Cyclo® frame size and reduction ratio
- Whether or not bi-direction is required
- Installation location - indoor or outdoor
- Ambient condition - dust, corrosion, explosion

Wiring

Wiring Connection Example (Figure 2)

1. Energize the motor (M) by pressing the operation push button (Bon). MCa_2 for the alarm is in the open position.
2. The limit switch (LS) activates when torque exceeds the preset limit.
3. MCa_1 opens to turn off the motor and the alarm (B.L.) sounds.
4. Anticipated starting time may be extended if starting torque is higher than set torque by installing a time delay (TR).

Figure 2. Wiring Diagram



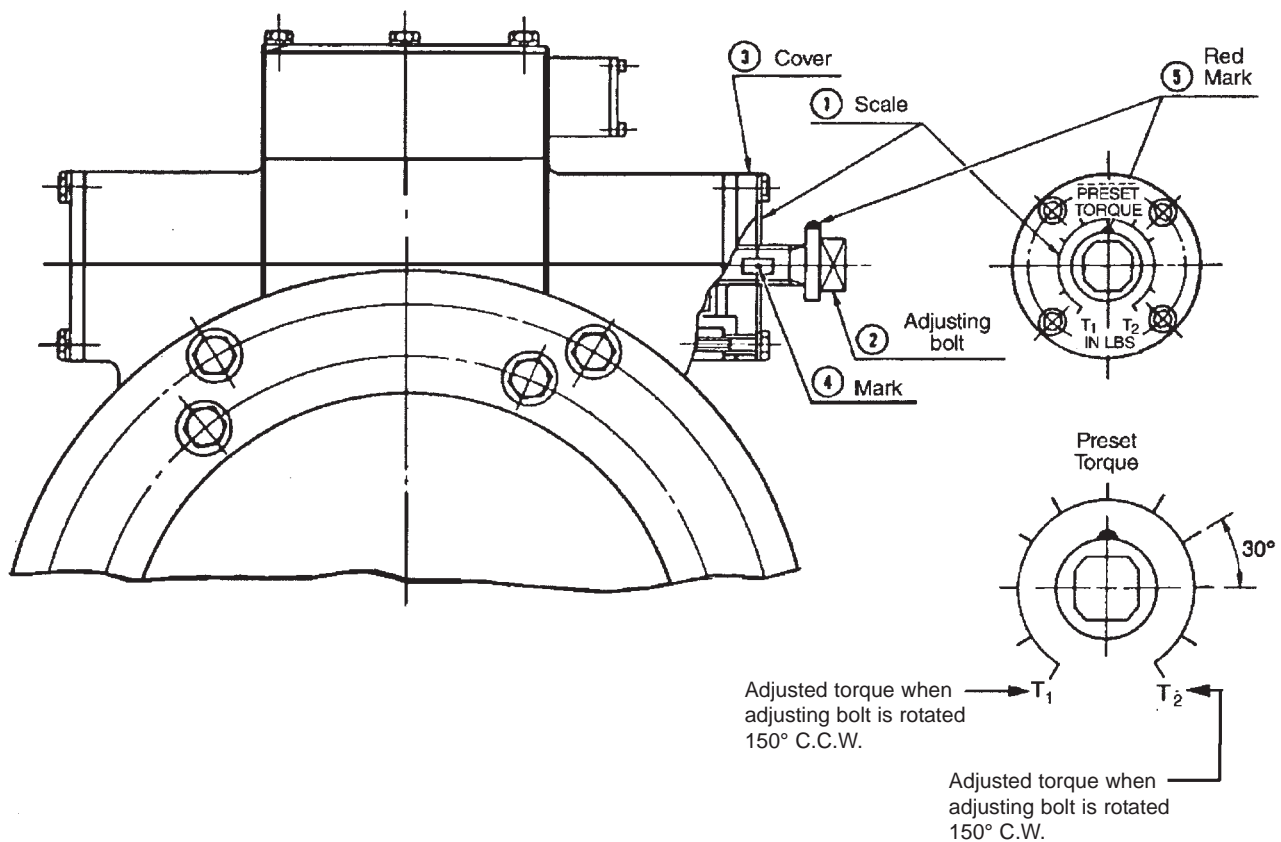
Torque Limiter Equipped Cyclo®

Adjusting Preset Torque

Procedure (Refer to Figure 3)

1. All calibration levels are factory set. No further adjustments are required.
2. If recalibration is required, rotate the adjusting bolt k according to the scale n. Preset torque is shown on the top portion of the scale. T₁ and T₂ show the torque when the adjusting bolt ② is rotated 150° clockwise (C.W.) or counter-clockwise (C.C.W)
3. Adjustment may be made within +25% of the current preset torque. The adjusting bolt ② can be rotated more than +150° over the scale (T₁ and T₂) as long as the torque is within ±25% of current preset torque. However, the readjusted torque should be less than the rated output torque or maximum preset torque in the selection table.

Figure 3. Torque Preset Adjustment



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