



WARN INDUSTRIES, INC.

# Manual Locking Hub (MLH)

Warn Industries is an ISO 9001, ISO/TS 16949 and ISO 14001 certified supplier to the automotive industry.

## OEM Applications

### Suzuki Motors

Escudo SUV  
Vitara SUV

### Ford Motor Company

F250 Pickup  
F350 Pickup  
F450 Pickup  
F550 Pickup

### General Motors

Kodiak  
Topkick



## Standard Specifications

	Axle Pitch Diameter, mm		
	Ø25	Ø29	Ø32
Weight, g:	570	800	1100
Bolt Circle, mm:	Ø80	Ø83	Ø90
Length, mm:	45	55	65
Overall Size, mm:	Ø95	Ø105	Ø110
Load Capacity, N-m:	3700	4500	6000
Dial Torque, N-cm:	120		
Operating Temp:	-40°C to 120°C		
Max Axle Velocity:	1,600 rpm		
Corrosion Resistance:	200 hrs Salt Spray		
Durability:	160,000 km		
Required Maintenance:	NONE		

## Manual Locking Hub Operation:

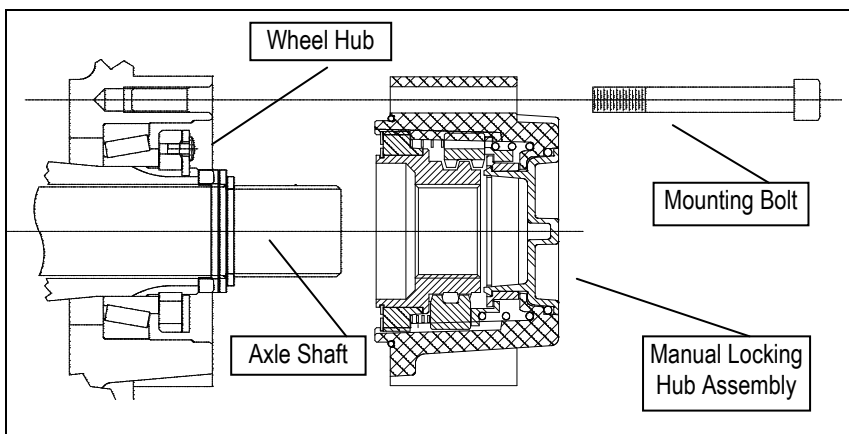
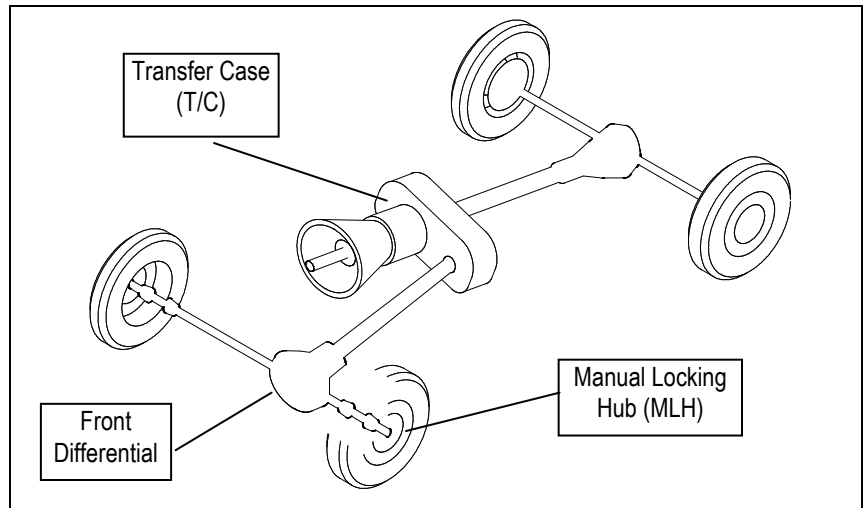
- Driver rotates the control dial to engage (4WD mode) and disengage (2WD mode) the hub.
- The transfer case (T/C) can then be shifted to 4H or 4L modes for 4WD operation.

## Vehicle 4x4 System Requirements:

There are no special system requirements for the MLH or other 4WD components to operate.

### Special Note:

Shift on the fly can be achieved after engaging (4WD mode) the MLH. With the MLH engaged the transfer case can be shifted between 2WD and 4WD with out stopping.



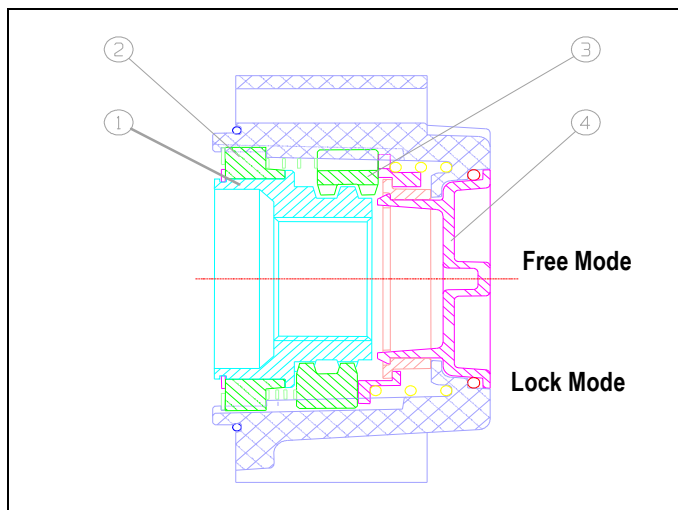
## Manual Locking Hub Assembly Procedure:

1. Clean axle and wheel hub-mounting surface of grease and debris.
2. Slide the Manual Locking Hub assembly over the axle until the hub contacts the wheel hub mounting surface.
3. Install six (6) mounting bolts.
4. Tighten each mounting bolt to the specified torque.



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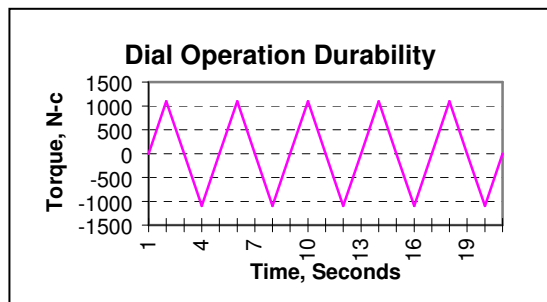
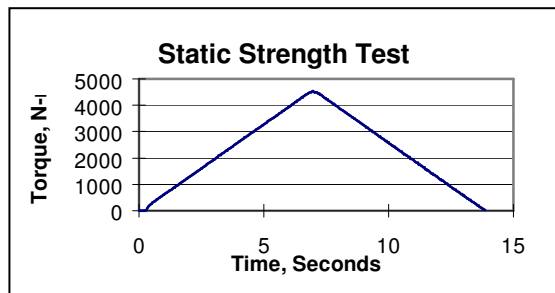
## Manual Locking Hub (MLH) Components

1. Splined Inner Drive Gear (IDG) to match axle.
2. Bearing for 2WD operation.
3. Splined Clutch Ring (CR) engages with the IDG for 4WD operation (locked mode) and moves out of engagement for 2WD operation (free mode).
4. Dial Mechanism for manual changes between lock and free modes.

## Warn's Standard Bench Tests:

MLH test samples must function after each of the following tests:

1. Static Strength: Apply the specified torque load through the IDG with the sample in the locked mode.
2. Fatigue Durability: Apply a forward and reverse torque load through the IDG with the sample in the locked mode.
3. Dial Operation Durability: Apply torque in the lock and free positions.
4. Free Running (2WD Mode) Durability: Rotate the sample in the 2WD mode at a specified speed for a specified amount of time.
5. Sealing Requirements: MLH must not leak after applying a vacuum and submerge the sample under water for specified amount of time.
6. High and Low Temperature Operation: Soak the sample for a specified amount of time at extreme temperatures.



## Typical Vehicle Tests:

MLH test samples must function after each of the following tests:

1. Rapid Start: Locking hub torsional strength under maximum engine power.
2. Water Sealing: No water leaks when manually engaging the locking hub under water.
3. Off Road Durability: Locking hub torsional strength under frame twist conditions.
4. High and Low Temperature Operation: Locking hub operation at extreme temperature conditions.
5. High Speed Durability: Locking hub durability under high speed 2WD driving conditions.

- **Warn's OEM Products:** Center Axle Disconnect Systems (electric and pneumatic) • Continuous Vacuum Locking Hubs • Manual Locking Hubs • Wheel Bearing Retention Systems • Pulse Type Vacuum Locking Hubs • Cam Type Automatic Locking Hubs • Integrated Wheel End Disconnect Systems
- Warn's Products are patent protected in the United States and overseas countries



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