PRODUCT PRESENTATION

Telma

Friction Free Efficiency

Telma

Emission-Free Braking

Leading the World in Frictionless Braking Technology

TL101018 Telma Retarder Inc. 2020
OVERVIEW

- How the Telma Works
- System Components
- Types of Control
- Wiring Diagrams
- Periodic Inspections
- Troubleshooting
- Repairs
- Retarder Serial and Part Number Identification
- Telma Technical Support Website
WHAT ARE FOUNDATION BRAKES DESIGNED TO DO?

➤ STOP THE VEHICLE WITHIN A CERTAIN DISTANCE

➤ HOLD THE VEHICLE WHEN STOPPED

FOUNDATION BRAKES ARE NOT DESIGNED TO MAKE REPEATED STOPS WITHOUT A REDUCTION IN PERFORMANCE
BENEFITS OF A FRICTIONLESS BRAKING SYSTEM

- ADDITIONAL BRAKING
- BRAKING WITHOUT WEAR
- BRAKING WITHOUT FADE
- EXTENDED FOUNDATION BRAKE LIFE
- THE ADVANTAGE OF A SECOND BRAKING SYSTEM
HEAT EFFECTS ON BRAKE LININGS

TELMA KEEPS BRAKE TEMPERATURES TO A SAFE LEVEL
HEAT EFFECTS ON TIRES

TELMA KEEPS BRAKE DRUMS COOLER
Electric current is sent to coils with alternate polarity, creating a magnetic field.
OPERATING PRINCIPLE

- **Eddy currents** - generated as the rotors pass through the magnetic field, slow the rotation of the driveline

![Diagram of Eddy Currents](image)
DESIGN

- **Air cooled** - heat generated by the rotors is dissipated directly to the air

- **Frictionless design** - no contact between moving parts

- **Self Regulating** – heat absorbed equals heat dissipated
TYPES OF TELMA

FOCAL SERIES
MOUNTS ON AXLE OR TRANSMISSION

AXIAL SERIES
MOUNTS TO FRAMERAIL
Axial AC SERIES

OLDER GENERATION
AC50-55 LIGHT DUTY
AC82-45 HEAVY DUTY

AC82-45 is still available for some industrial applications
Axial AD SERIES

Coils

Rotor

Stator

MEDIUM TO HEAVY DUTY
AD61-30
AD61-55
AD72-00
AD72-45
Axial AF30-35

Typical applications are Ford Transit and Mercedes Sprinter
Axial AF5 SERIES

**AF50-55**
Typical applications include
Ford E Series
Chevrolet G4500

**AF50-90**
Typical applications are vehicles with hydraulic brakes from the following manufacturers
Ford F Series
Navistar
Freightliner
Axial AF8 SERIES

EXTREME DUTY
AF83-20
AF83-40

Coils
Stator
Rotor
FOCAL SERIES

- Typical applications include fire trucks, rear engine vehicles, short wheelbase vehicles.
- Mounts directly to the differential.
- No shaft or bearings.
- Less weight and less drive shaft shortening than axial type.
- Designs are specific to each axle.

Meritor single axles
Dana single and tandem axles.
TYPES OF CONTROL
Hydraulic brakes without brake pedal position message

Air brakes without brake pedal position message

Vehicle CAN

Optional Hand Control

TL101018 Telma Retarder Inc. 2020
TELMA CONTROL SYSTEM WITH iRCS

For Hydraulic brakes without brake pedal position message

Air brakes without brake pedal position message

Vehicle CAN

Optional Hand Control

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BRAKE PEDAL "FOOT CONTROL"

- ACTIVATES AUTOMATICALLY WHEN FOOT BRAKE IS APPLIED
- USED IN URBAN STOP AND GO APPLICATIONS

TIG31066 rotary switch for hydraulic brakes (when brake pedal position message is not broadcast by the CANBus) – must be used with TRCM control module – previously plunger type switch which is no longer available was used with ABS interface or speed switch

TIG31065 pressure transducer for air brakes (when brake pedal position message is not broadcast by the CANBus) – must be used with TRCM control module – previously air pressure switches were used with ABS interface or speed switch

If brake pedal position message is broadcast by the CANBus foot control is managed by the TRCM control module and no switch is needed
OFF THROTTLE CONTROL

• TELMA ACTIVATES WHEN THE ACCELERATOR IS RELEASED

• USED FOR AUTOMATIC ACTIVATION BEFORE THE BRAKES ARE APPLIED

• LIMITED TO ONE OR TWO STAGES BECAUSE TELMA ACTIVATION IS NOT PROGRESSIVE
MANUAL “HAND CONTROL”

- USED FOR APPLICATIONS WHERE THERE ARE LONG DESCENTS
- MUST BE TURNED OFF MANUALLY
- CONTROLLED WITH A LEVER ON THE DASH OR STEERING COLUMN
- NOT RECOMMENDED FOR URBAN STOP AND GO APPLICATIONS
- MAY BE USED TO PRESELECT THE NUMBER OF TELMA STAGES TO COME ON WHEN ACCELERATOR IS RELEASED
SYSTEM COMPONENTS
ABS interface and speed switch

These two components were used for low speed cutoff and connection to ABS before CANBus communication was available. They are no longer available.

The Telma ABS interface was used to connect to the vehicle ABS and speed signal using a hard wired connection to turn off the Telma system during an ABS event and to provide low speed cutoff.

The Telma speed switch was used to connect to the vehicle speed signal using a hard wired connection to provide low speed cutoff for vehicles that were not equipped with ABS.
TELMA FOOT SWITCH FOR HYDRAULIC BRAKE SYSTEMS

A mechanical switch is only needed for hydraulic brake systems where the brake pedal position message is not broadcast on the CANBus

A plunger type switch was used previously but is no longer available

The Telma rotary type switch replaced the plunger type switch and is the current switch if needed. It sends a variable increasing voltage to the TRCM as the brake pedal is applied.

Note: no foot switch is needed on any light truck chassis from MY2012
TELMA FOOT SWITCH FOR AIR BRAKE SYSTEMS

A pressure transducer is used for air brake systems and connected to the primary delivery port of the treadle valve.

Pressure switches were used prior to the introduction of the Telma TRCM controller in 2010.

A pressure transducer has been used since introduction of the Telma TRCM controller and is needed if the brake pedal message is not broadcast on the CANBus.
Telma Retarder Control Module (TRCM1)

- **Telma Retarder Control Module (TRCM1)**
  - Released in 2010
  - Obtains information from the vehicle CANbus system (J1939, J2284)
    - No longer requires hardwired ABS signal, speed signal, etc.
  - Activates retarder using pressure transducer for air brake systems or rotary switch for hydraulic brake systems

- **Telma Desktop Client Software:**
  - PC interface software for configuration and diagnosis
  - Free download from telmausa.com
  - Configuration menu allows users to change settings such as the low speed cutoff, off throttle control, and adjust when each stage turns on.
  - Low speed cutoff can be set to 0 MPH to allow for testing of the Telma system at a stand still.
  - Diagnostics menu simplifies troubleshooting.
Telma Retarder Control Module (TRCM2)

- Latest control module design released in 2019
- Same features as TRCM1 – PC configuration and diagnostics
- New Features
  - Direct usb connection using usb-c connector on the board – usb to serial adapter no longer needed
  - Automatic virtual COM port connection
  - Can now control electronic PWM power module in addition to relay box
  - Apple and Android Phone apps for configuration and diagnostics
RELAY BOX

- Distributes battery power to the TELMA in 4 stages
- Installed on the frame rail between the batteries and the TELMA
- Should always be mounted in a vertical position with the wiring coming out of the bottom
iRCS – PWM power

- Can be used in place of relay box
- Premium product optional upgrade
- All electronic – no parts to wear
- Stepless Pulse Width Modulation (PWM) activation
- Activation from 0 to 100% instead of 4 stages
- Manufactured to aircraft industry quality standard ISO26262
Indicator Lights

• Dashboard Indicator
  – Drivers main indication of the Telma’s operation
  – 4 individual LED’s, one for each stage
  – Located in direct view of driver, on dashboard

- TELMA POWER = OFF
- TELMA POWER = 25%
- TELMA POWER = 50%
- TELMA POWER = 75%
- TELMA POWER = 100%
TELMA WIRING TRCM and iRCS
PERIODIC INSPECTIONS
## General Periodic Inspections

*The TELMA is a very low maintenance device. The following quick, visual, inspections can improve the life expectancy and performance of your retarder.*

<table>
<thead>
<tr>
<th>Item</th>
<th>Initial Check at</th>
<th>Check every 3000</th>
<th>Check every 12000</th>
<th>Check every 40000</th>
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<tr>
<td>NO ABNORMAL END PLAY BETWEEN THE ROTOR AND STATOR</td>
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<tr>
<td>AIR GAP WITHIN SPECIFICATIONS</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td>COILS, STATOR, AND ROTORS FOR DAMAGE</td>
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<tr>
<td>TELMA GREASE SEALS (AD/AC/AF SERIES) / GREASE INTERVAL (CC SERIES)</td>
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<td>FASTENER TIGHTNESS – DRIVE SHAFTS AND TELMA BRACKETS</td>
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<td>CONDITION OF RUBBER MOUNTS (AD/AC/CC SERIES ONLY)</td>
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<tr>
<td>GROUNDS, WIRING and RELAY BOX CONTACT CONDITION</td>
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<tr>
<td>TELMA AMPS WITHIN SPECIFICATIONS</td>
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<td>HYDRAULIC BRAKE FOOT SWITCH ADJUSTMENT</td>
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<td>DASH LIGHT BAR FUNCTIONS WHEN TELMA IS APPLIED – ROAD TEST</td>
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<td>TELMA TURNS OFF WHEN VEHICLE STOPS – ROAD TEST</td>
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<td>X</td>
<td>X</td>
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</tbody>
</table>
WASHING

- Wash to keep rotors clean for maximum cooling
- Wash only when cold
- Wash as often as needed – more often under harsh conditions
- If pressure washed – do not use detergent or spray directly at coils
PART NUMBER AND SERIAL NUMBER IDENTIFICATION
AC SERIES IDENTIFICATION

BOTTOM OF FRAME
AD/AF SERIES IDENTIFICATION

AD/AF Series part number and serial number
FOCAL IDENTIFICATION

BARCODE STICKER AND ENGRAVED ON FRAME 90° CLOCKWISE FROM CONNECTING BLOCK
TECHNICAL SUPPORT

Website www.telmausa.com
Phone: 1-847 593-1098 option 4
Email: engineering@telmacse.com