#### **PRODUCT PRESENTATION**





Leading the World in Frictionless Braking Technology

#### **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

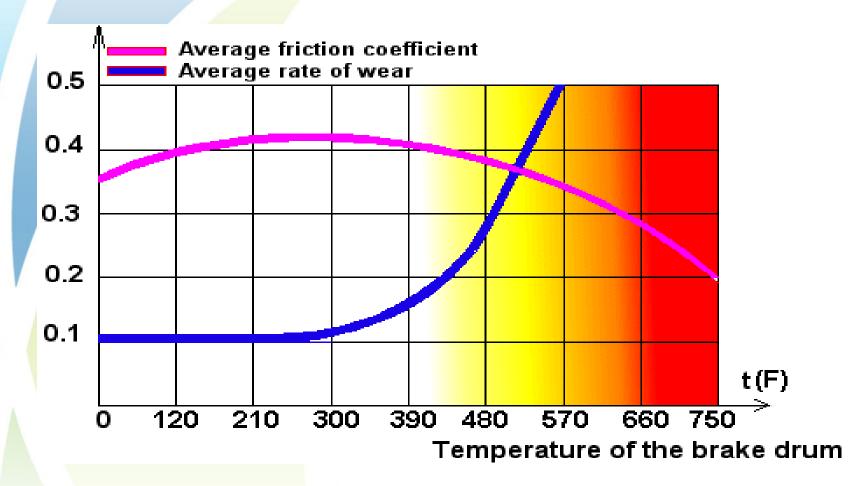
## BENEFITS OF A FRICTIONLESS BRAKING SYSTEM



- > ADDITONAL BRAKING
- BRAKING WITHOUT WEAR
- BRAKING WITHOUT FADE
- **EXTENDED FOUNDATION BRAKE LIFE**
- > THE ADVANTAGE OF A SECOND BRAKING SYSTEM

#### **HEAT EFFECTS ON BRAKE LININGS**

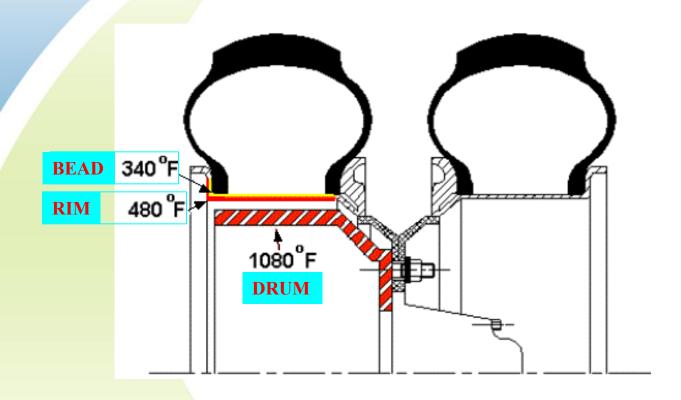




#### TELMA KEEPS BRAKE TEMPERATURES TO A SAFE LEVEL

#### **HEAT EFFECTS ON TIRES**



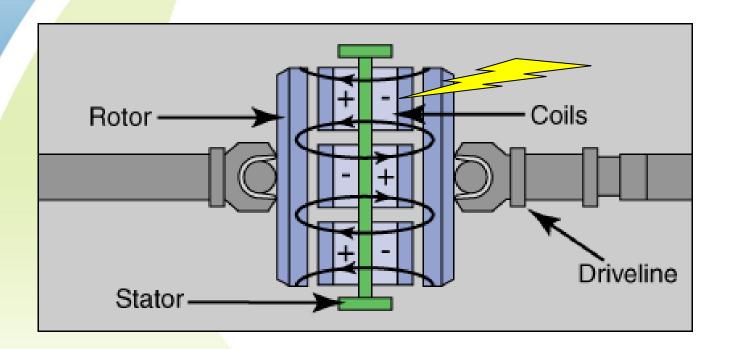


#### TELMA KEEPS BRAKE DRUMS COOLER

#### **TELMA OPERATION**



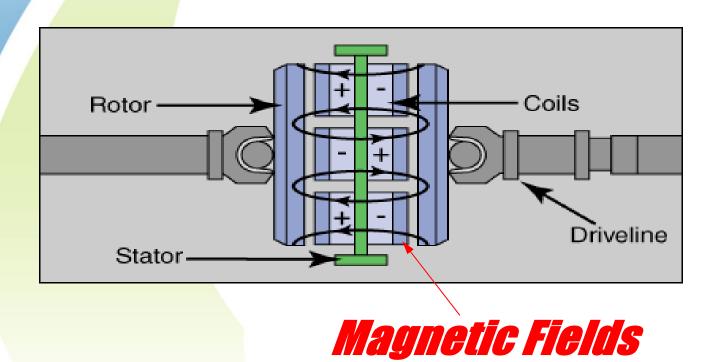
Electric current is sent to coils with alternate polarity, creating a magnetic field



#### **OPERATING PRINCIPLE**



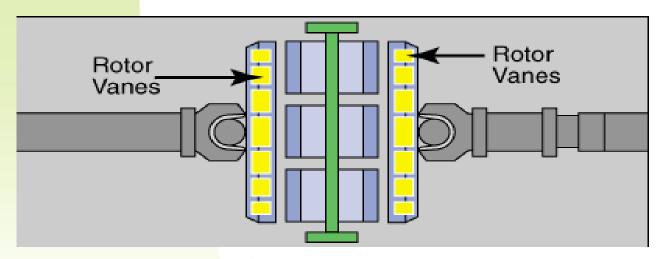
Eddy currents - generated as the rotors pass through the magnetic field, slow the rotation of the driveline



#### **DESIGN**

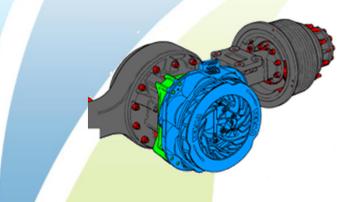


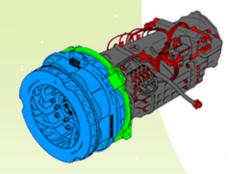
- Air cooled heat generated by the rotors is dissipated directly to the air
- Frictionless design no contact between moving parts
- > Self Regulating heat absorbed equals heat dissipated



#### **TYPES OF TELMA**

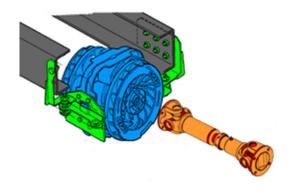


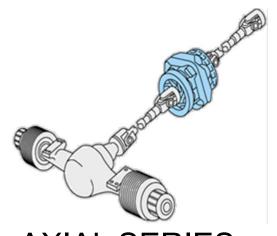




FOCAL SERIES

MOUNTS ON AXLE OR TRANSMISSION





AXIAL SERIES
MOUNTS TO FRAMERAIL

#### **Axial AC SERIES**

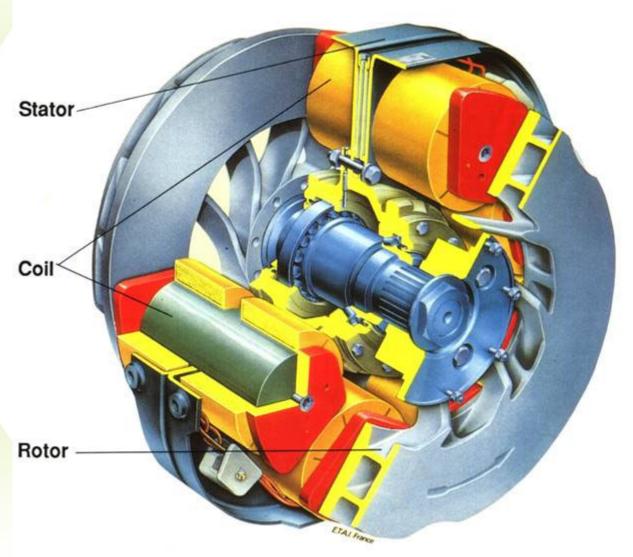


#### **OLDER GENERATION**

AC50-55 LIGHT DUTY

AC82-45 HEAVY DUTY

AC82-45 is still available for some industrial applications



#### **Axial AD SERIES**



Coils

#### MEDIUM TO HEAVY DUTY

AD61-30

AD61-55

AD72-00

AD72-45

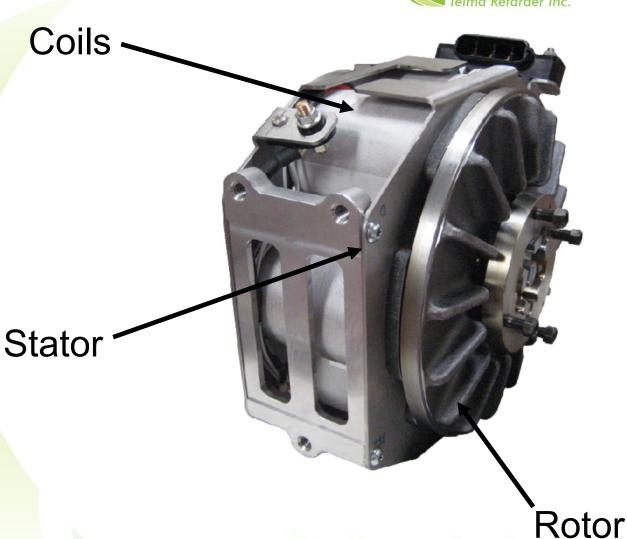
Rotor



#### Axial AF30-35



Typical applications are Ford Transit and Mercedes Sprinter



#### **Axial AF5 SERIES**

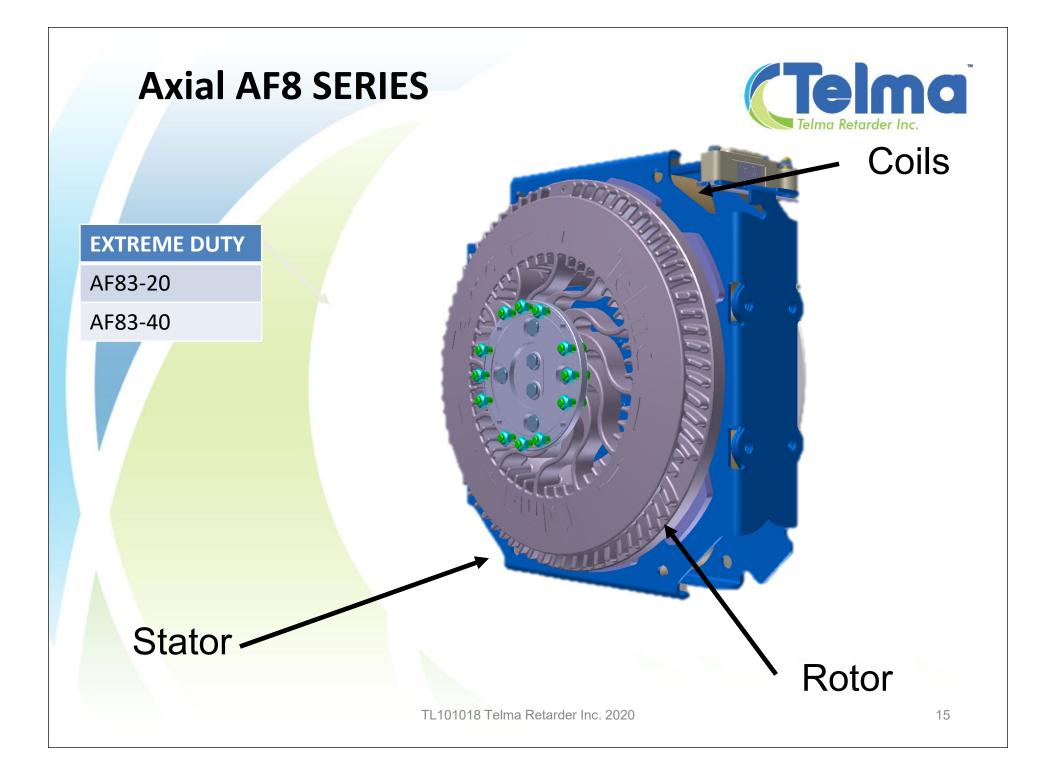
**AF50-55 Typical applications include Ford F Series Chevrolet G4500** 

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



Stator





#### **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

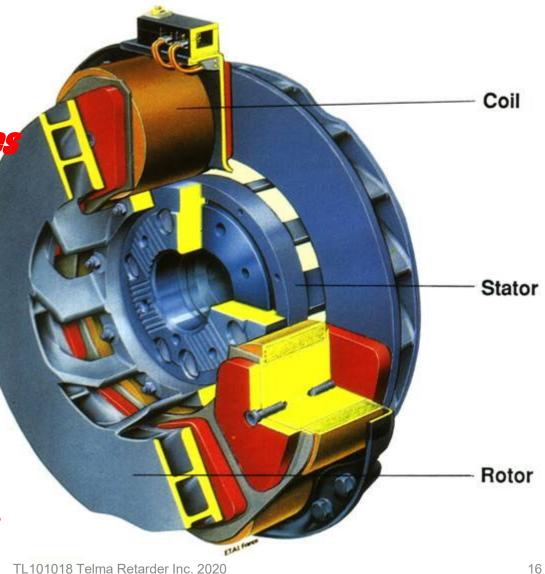
each axle.

Meritor single axles

Dana single and tandem

axles.

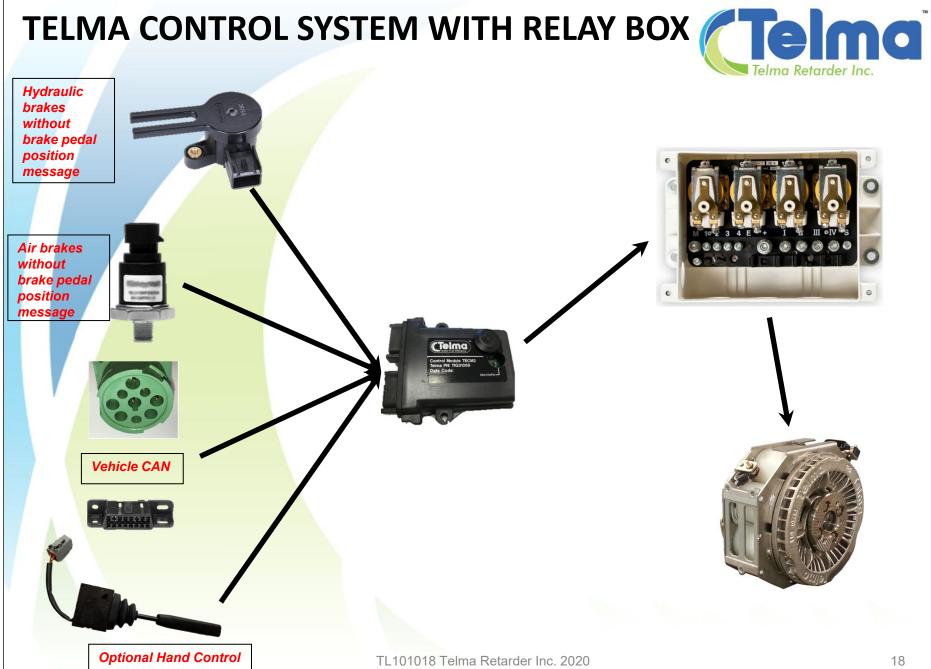






### **TYPES OF CONTROL**





#### **TELMA CONTROL SYSTEM WITH IRCS**





**Optional Hand Control** 

TL101018 Telma Retarder Inc. 2020

#### **BRAKE PEDAL "FOOT CONTROL"**

- Telma Retarder Inc.
- 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

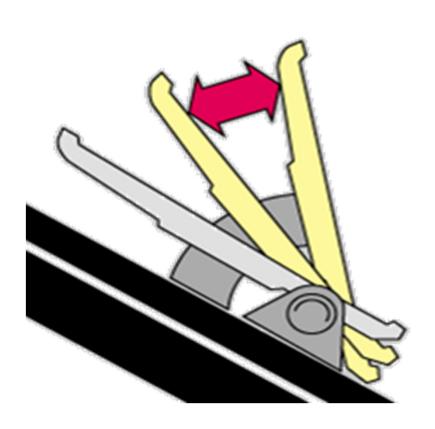


If brake pedal position
message is broadcast by the
CANBus foot control is
managed by the TRCM
control module and no switch
is needed

#### **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

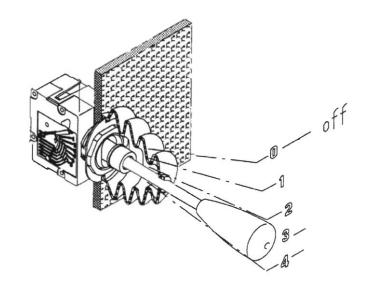


#### MANUAL "HAND CONTROL"

➤ 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
- 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

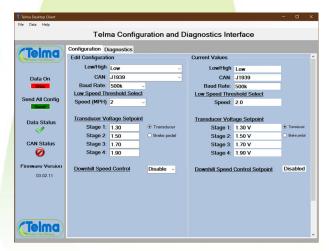


A pressure transducer has been used since introduction of the Telma TRCM controller and is needed if the brake pedal message is not broadcast on the CANBus

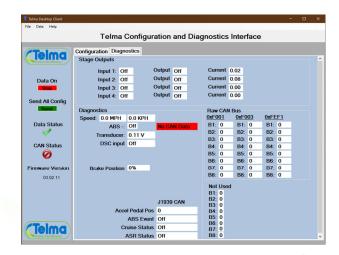


Telma Retarder Control Module (TRCM1) (Telma

- > 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.







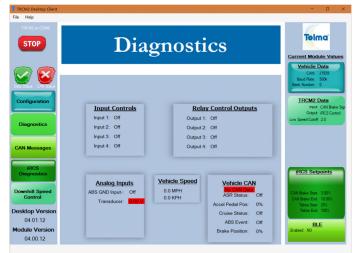
### Telma Retarder Control Module (TRCM2) (Telma)

- 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 boa<mark>rd – usb to se</mark>rial 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

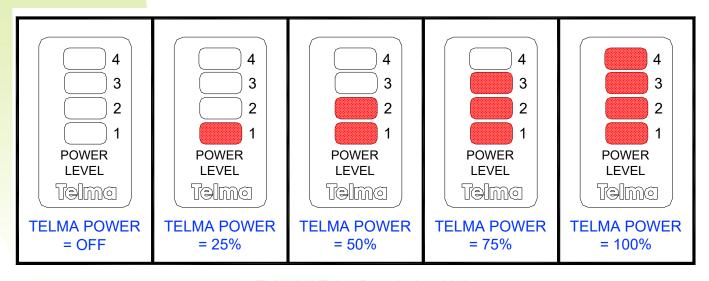




### **Indicator Lights**



- 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

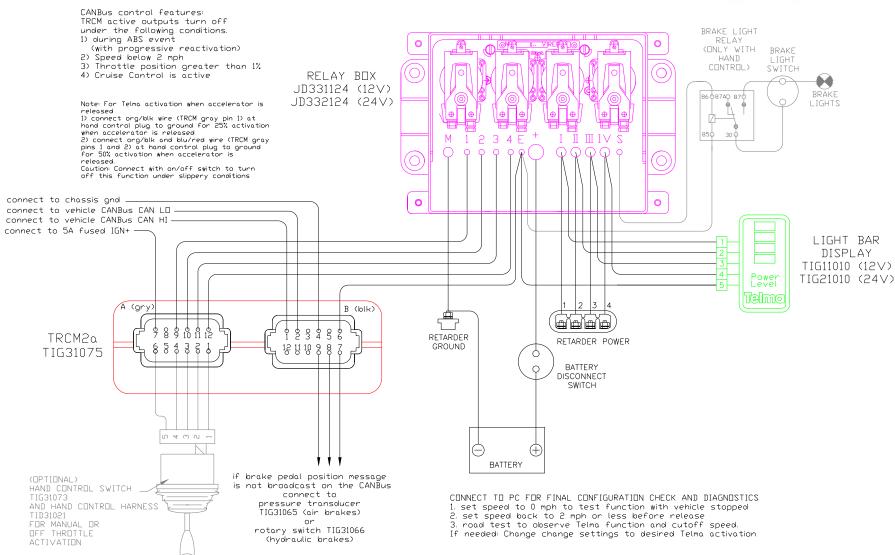




### WIRING DIAGRAMS

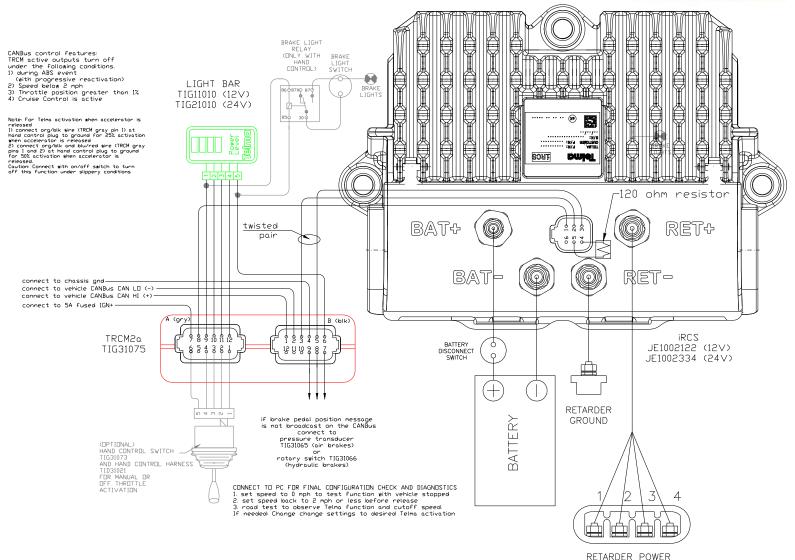
## TELMA WIRING TRCM and RELAY BOX (Telma





#### **TELMA WIRING TRCM and iRCS**







## **PERIODIC INSPECTIONS**

#### **General Periodic Inspections**



40000



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

	Telma Retard	ler Inc.
Initial	Check every	Check every

12000

Check

at

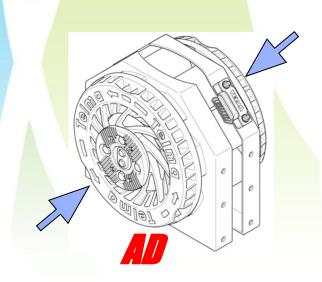
3000

Miles

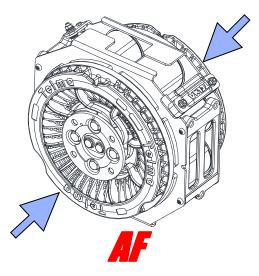
retarde	:	hours	100	650	2550
		months	1	4	12
NO ABNORMAL END PLAY BETWEEN		X			
AIR GAP WITHIN SPECI	X	Х			
COILS, STATOR, AND ROTOR		Х			
TELMA GREASE SEALS (AD/AC/AF SERIES) /			X		
FASTENER TIGHTNESS – DRIVE SHAF	Х	X			
CONDITION OF RUBBER MOUNTS (A			X		
GROUNDS , WIRING and RELAY BOX	Х	Х			
TELMA AMPS WITHIN SPE			Х		
HYDRAULIC BRAKE FOOT SWI	X	X			
DASH LIGHT BAR FUNCTIONS WHEN TEL	Х	X			
TELMA TURNS OFF WHEN VEHICLE	STOPS – ROAD TEST		X	X	

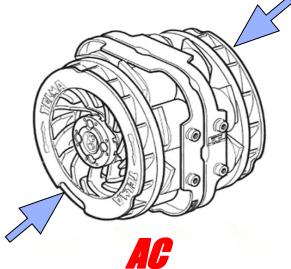
#### **WASHING**

- ➤ 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 INDENTIFICATION

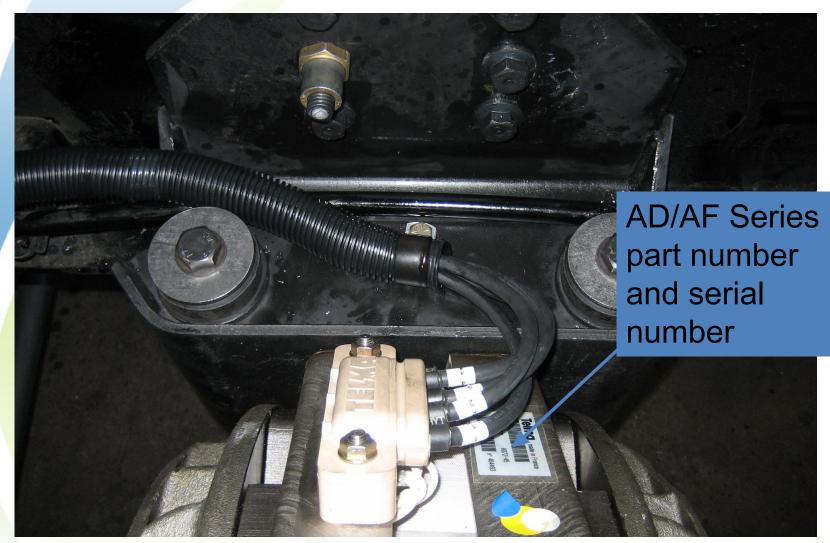
#### **AC SERIES IDENTIFICATION**





#### AD/AF SERIES IDENTIFICATION

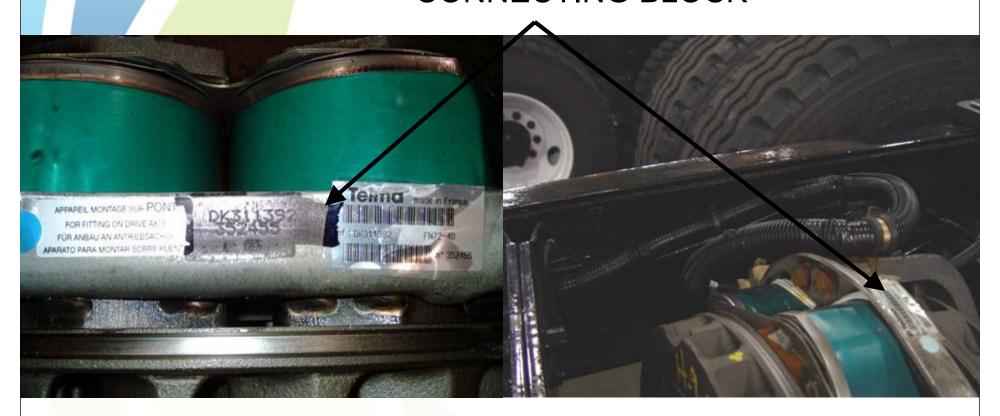




#### **FOCAL IDENTIFICATION**



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