

# **The Latest on Transmissions**

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Eaton**

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**WELLINGTON**

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WORLD

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**FTM**

# **Eaton<sup>®</sup> Fuller<sup>®</sup> Transmissions**

# **Automated Transmissions**

*Vision*

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**FTM**

**Our Vision is to be the leading producer of  
electronically automated truck transmission  
systems in the world**

## *Automated Mechanical Transmissions*

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PTM

### *Why Automation?*

- ✓ Safety
- ✓ Productivity
- ✓ Fuel economy
- ✓ Driver control
- ✓ Driver convenience
- ✓ Ease of operation
- ✓ Simplicity
- ✓ Reliability

# **Automation and the Real World**

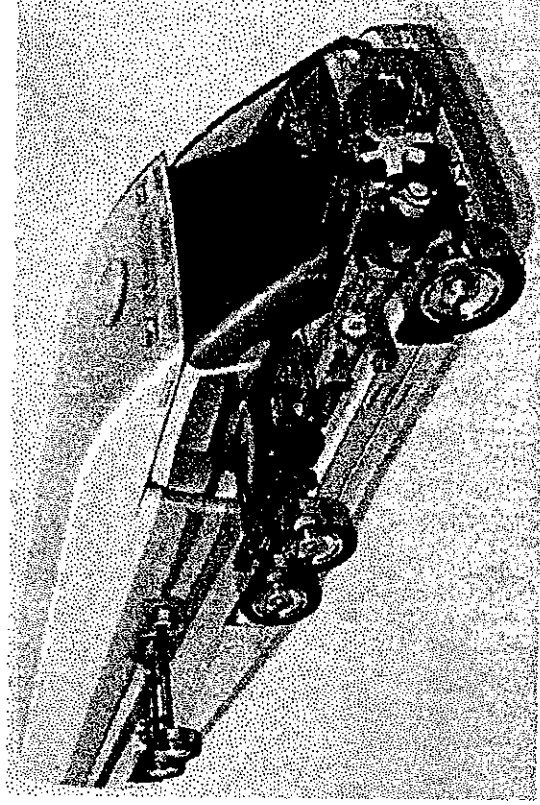


- **What has changed?**
  - **Automation has become affordable**
  - **Partial and full automation of manual-base transmissions**
  - **Increasing volume drives manufacturing efficiencies**
  - **Fuel efficiency claims are being proven out**
  - **We're becoming more comfortable with it**
  - **Fleets are becoming convinced of its cost-effectiveness**
  - **Drivers are coming to accept and embrace automation**

## Changing Application Environment

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- **Increased HP, higher torque, lower RPM, and lower friction engines**
- **Higher GCW**
- **More aerodynamic cabs and trailers**
- **Improved radial tires**
- **Improved maneuverability**
- **Improved safety**

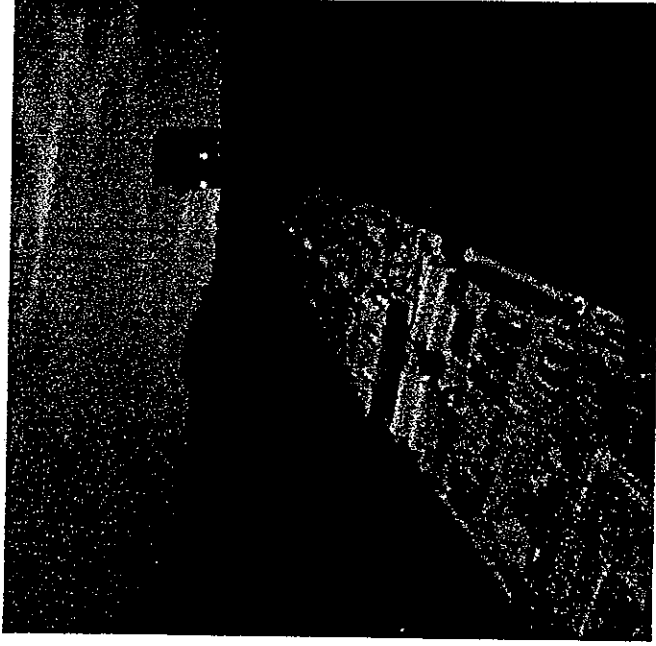


**Eaton® Fuller®  
Automated Mechanical Transmissions**

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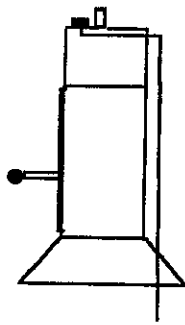
**J1939 Data Link — The Enabling  
Technology**

- **New control capabilities**
- **Precision and efficiency  
not possible before**
- **Up to one million bits per  
second**
- **Transmission controller  
directing engine speed  
and torque**
- **Just the breakthrough needed**

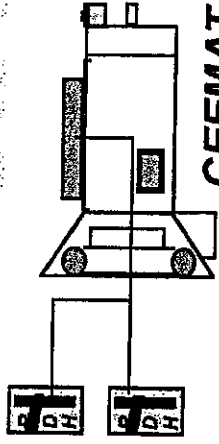




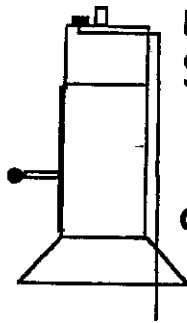
# Automation



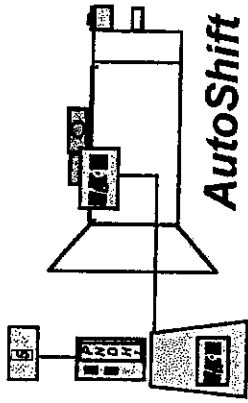
Super 13 / 18 Top 2



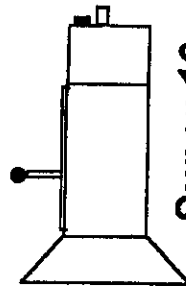
CEEMAT



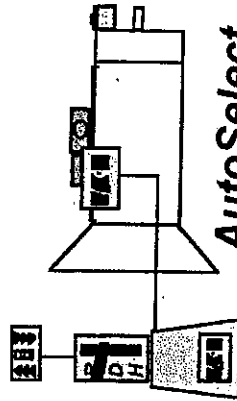
Super 10 Top 2



AutoShift



Super 10



AutoSelect

# **Eaton® Fuller® Automated Mechanical Transmissions**

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## **OEM Benefits of a Data Link Transmission**

- **Ease of assembly**
  - **Engine/transmission package assembled into chassis**
  - **Shift console and display assembled into cab**
  - **Umbilical connects the two**
- **Data link benefits**
  - **Reduced adjustments**
  - **Shared sensors**
  - **Distributed control and redundancy**

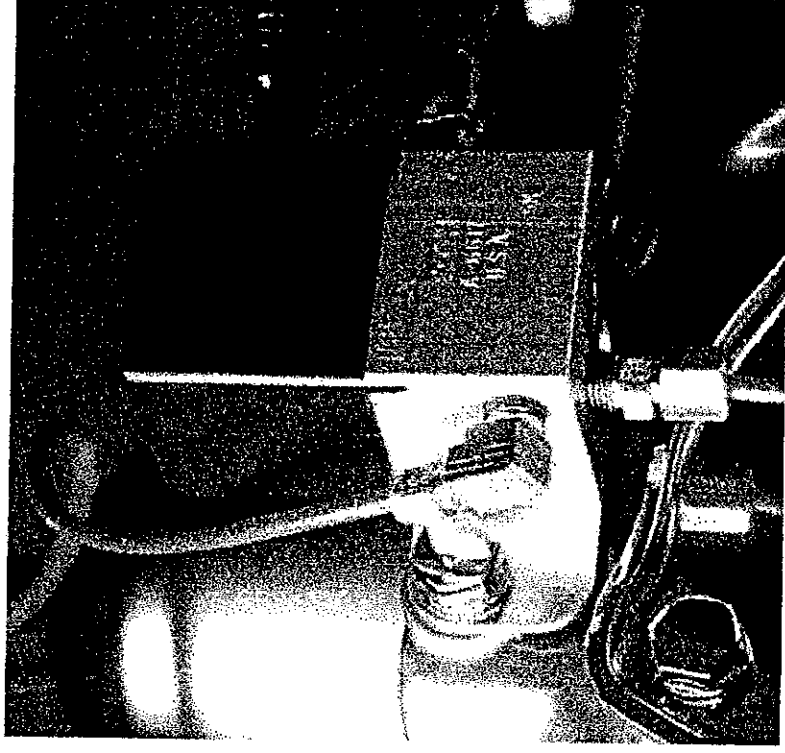
**J1939 paves the way for a truly integrated system**

# **Automation - Super 10, 13, 18 Top 2™**

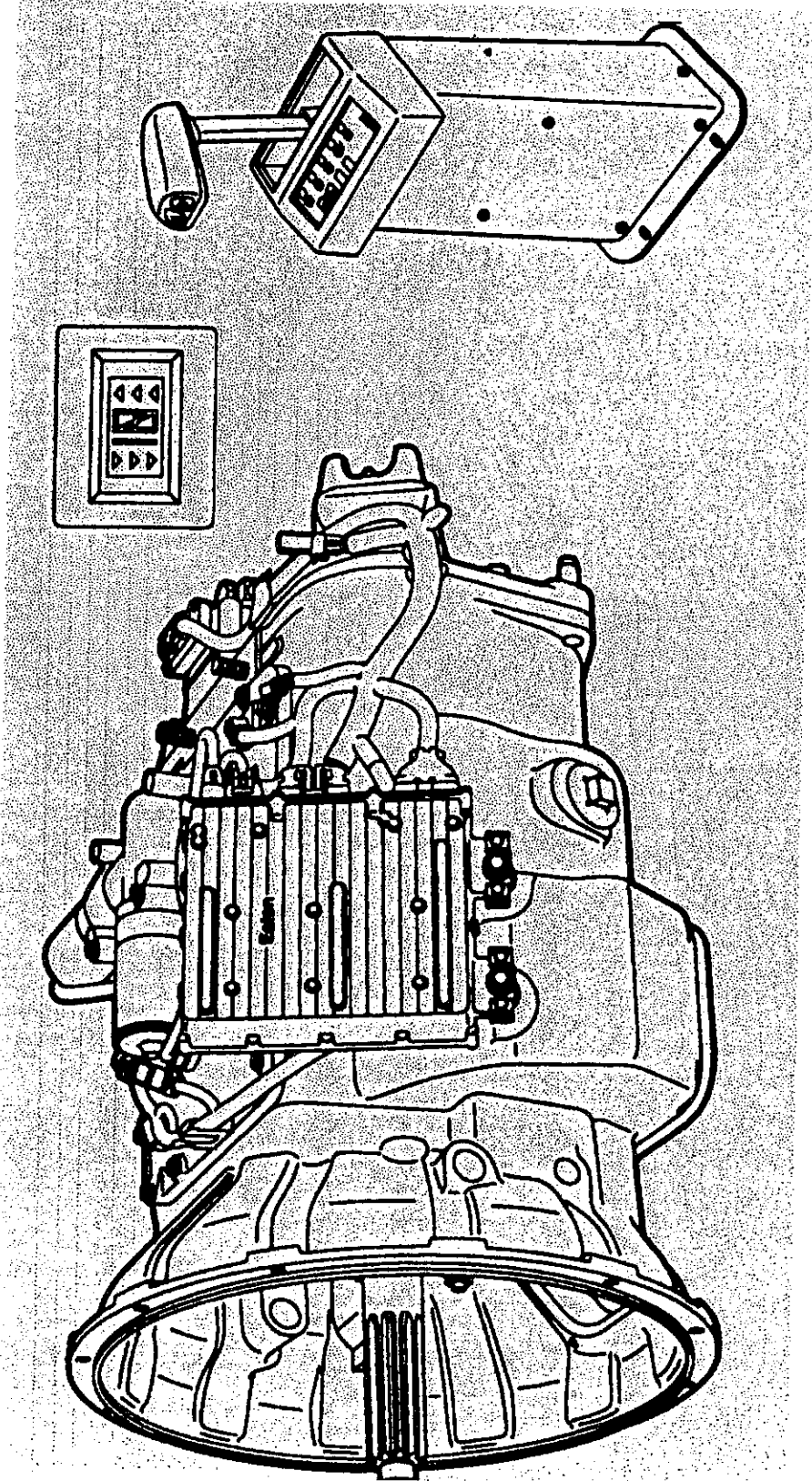


## **Basic Operation**

- Automatic shifts controlled by engine
- Shift logic resides in engine ECU
- Signal from ECU activates Top 2 solenoid to effect final shifts



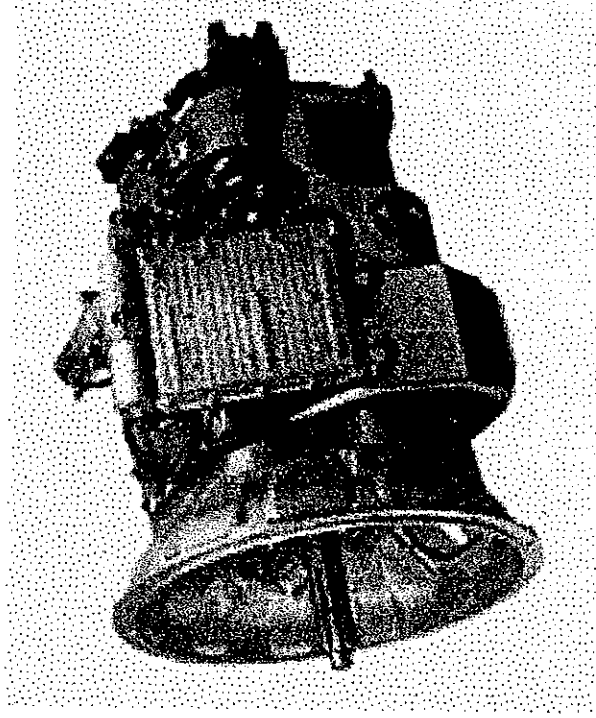
*Auto Select*  
**Automated Mechanical Transmissions**



## Automation - AutoSelect

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- **Shift-by-Wire**
- **Clutch for starts & stops only**
- **Reduced driver fatigue**
- **Reduced driveline abuse**
- **Less weight/cost/complexity**
- **Proven Fuller 10-speed**
- **17.5 to 1 Ratio Coverage**
- **Mechanical (electronic) engines**

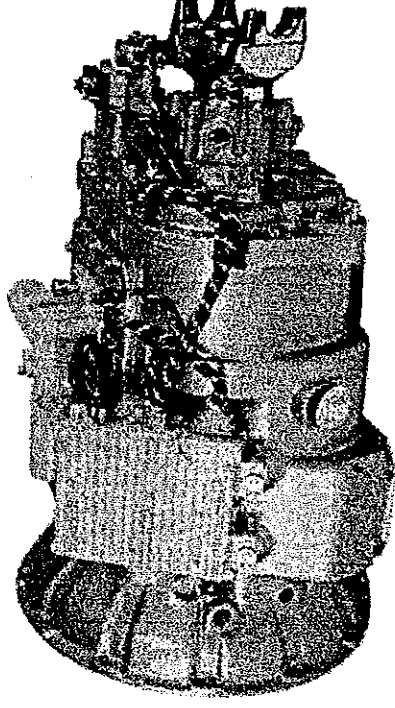


# **Eaton® Fuller® Automated Mechanical Transmissions**

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## **The AutoShift Transmission**

- **Made possible by J1939 protocol**
- **Technology easily applied to any mechanical transmission**
- **Fully automatic shifting**
- **Programmed to mimic “float shifting”**



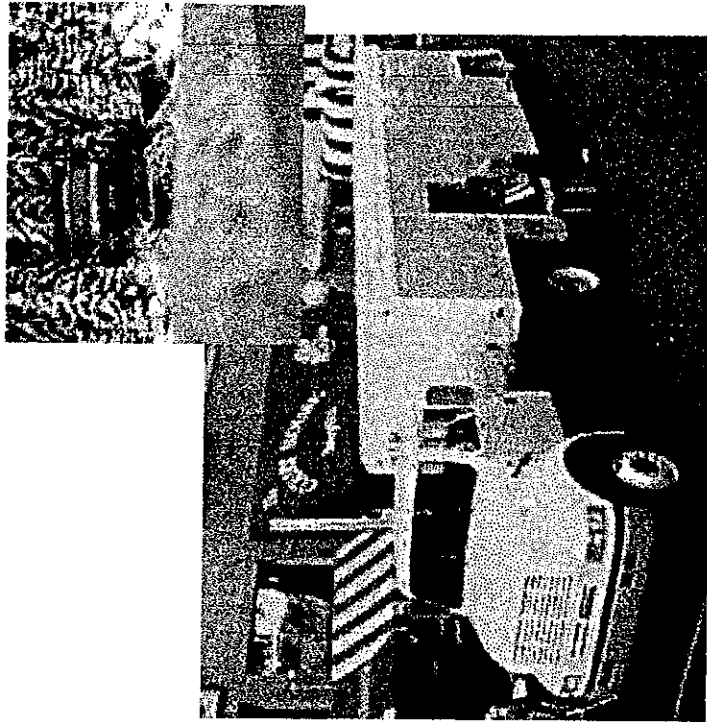
**“Clutchless data link shifting”**

**Autostar**

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**The Perfect Transmission for Drivers  
Who Have More to Do than Just Drive**

- **Shift-intensive applications**
- **Route sales/delivery**
- **Municipal operations**

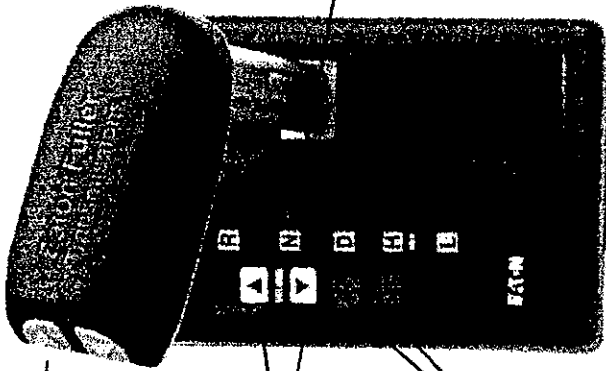






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# Driver Interface



Shift buttons

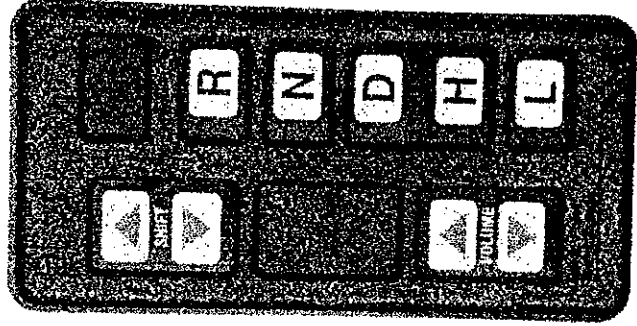
Shift tone volume control buttons

Indicator lamps

Gear select lever position indicator



Gear Display



Shift Lever

Push Button

- R — Reverse
- N — Neutral
- D — Drive
- H — Hold
- L — Lo



## **Operating Modes — Forward Gears**

- D — Drive** Fully automatic gear shifting. Programmable start gear selection. Second gear normally used for start-up.
- H — Hold** Holds current gear. Allows the driver to perform push button automatic shifts on demand to select the gear of their choice when they want it.
- L — Lo** Transmission remains in Lo until Hold or Drive is selected. No upshifts occur in this mode. Downshifts will be performed for maximum engine braking.

**WESLEY**

**PT 40**

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**Many of the Advantages of an Automatic,  
Without the Weight, Cost, or Complexity**

- **Enhanced vehicle performance**
- **Enhanced safety**
- **Reduced operating costs**
- **Simplified service**

# Performance Advantages

<u>Feature</u>	<u>Advantage</u>
<ul style="list-style-type: none"><li>• Automated shifting</li></ul>	<ul style="list-style-type: none"><li>• Easier shifting, faster, smoother shifts</li><li>• "Best" gear selection, consistent operation</li></ul>
<ul style="list-style-type: none"><li>• Start gear restrictions</li></ul>	<ul style="list-style-type: none"><li>• Reduced driveline abuse, no accidental high range starts</li></ul>
<ul style="list-style-type: none"><li>• Driver override feature</li></ul>	<ul style="list-style-type: none"><li>• Choose proper gear for adverse conditions</li><li>• Gear hold feature</li></ul>
<ul style="list-style-type: none"><li>• Reduced weight</li></ul>	<ul style="list-style-type: none"><li>• Significantly less weight than automatics</li><li>• Within 25 lbs. of base mechanical</li></ul>
<ul style="list-style-type: none"><li>• Cruise control compatible</li></ul>	<ul style="list-style-type: none"><li>• Maintains speed setting while shifting</li></ul>
<ul style="list-style-type: none"><li>• Engine brake integration</li></ul>	<ul style="list-style-type: none"><li>• Faster uphill downshifts</li><li>• Optimized engine braking effect in Hold and Low mode</li></ul>

## Advantages

77

### Feature

- Two hands on wheel
- Automatic shifts
- Driver control
- Starter inhibit

### Advantage

- Driver aware of surroundings
- Concentrate on operation of vehicle
- Focus on "primary job" responsibilities
- Reduced physical and mental workload
- Right gear for every situation
- Eliminates shifting errors
- Enhanced driver confidence
- Driver maintains clutch and throttle control
- Driver-selected shifts in Hold mode
- Transmission verifies neutral before engaging starter

# st Advantages



## Feature

- Ease of operation
- "Best" gear selection
- Initial price
- Reliability built-in

## Advantage

- Less shifting skill required
- Faster from street to seat (reduced training)
- Reduced driveline abuse
- Potential for improved fuel economy
- Advantages of automatic, at lower cost
- Faster payback over competitive automatics
- Proven base mechanical transmission



# Advantages

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## Feature

- Eaton® Fuller® base transmission
- Self-diagnosing automation
- Modular design
- Fault management
- Eaton field support

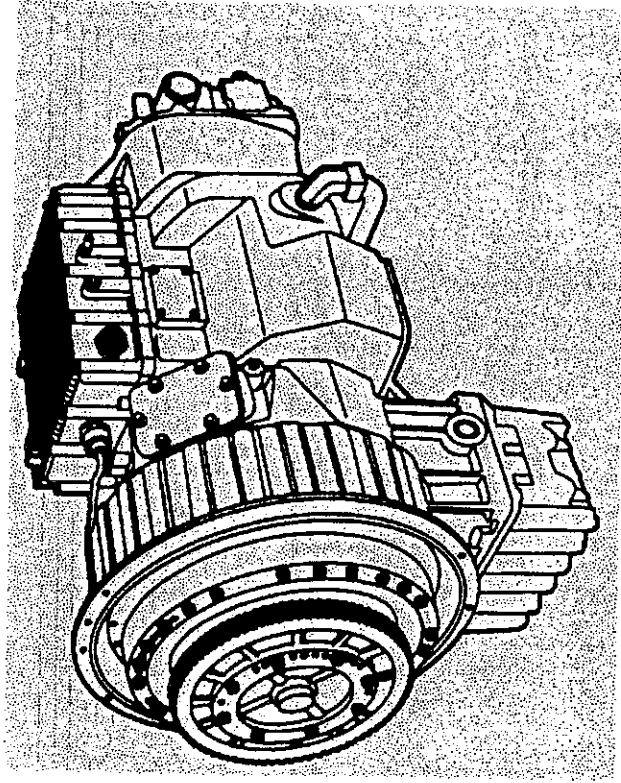
## Advantage

- Serviceable through normal channels
- Readily-available service parts
- Few special tools required
- Rapid, accurate diagnosis
- Simple fault isolation procedures
- Continuous self-evaluation
- Easy component R&R
- Service electronics in-chassis
- Alert driver to problem
- Automatic fault analysis
- Multiple "limp home" modes
- Factory trained professionals
- Service training
- Diagnostics and failure analysis

**CEEMAT<sup>®</sup>**

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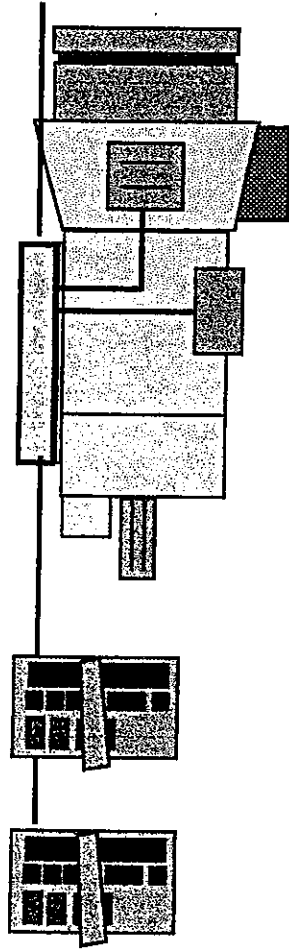
**The ideal transmission for shift-intensive  
vocational applications where drivers need  
“hands-free” automatic operations.**





# CEEMAT

## RTO-LXI09B-ATE



SAE J1922 Engine communication or  
Air Throttle System

### Full automatic for vocational applications

- ✓ Fuller B ratio 9 speed
- ✓ Torque converter for fully automatic shifting and starting
- ✓ Dual station electronic controls available - no cable
- ✓ Low profile oil pan available
- ✓ Compatible with mechanical or electronic engines
- ✓ System optimises shifting w/engine control
- ✓ 34 : 1 overall ratio available using torque converter