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SUBJECT: End of Line (EOL) Programming System Modifications Related to Allison Transmission FuelSense® 2.0 with DynActive™ Shifting

MODELS AFFECTED: 1000, 2000, 3000, 4000 Series Product Families (Including B and T Models), and TC10® Series Transmissions

Introduction:

Allison Transmission, Inc. (ATI) is pleased to announce the release of FuelSense® 2.0 with DynActive™ Shifting (reference WATCH #519). This Global Programming Release Notification (GPRN) describes how these calibration changes may affect End of Line (EOL) programming systems. FuelSense® 2.0 features are included as part of the BCD 171 Production Calibration (PC) software and calibration.

Discussion:

1. FuelSense® 2.0 Packages (1000/2000/3000/4000/TC10®): Three additional FuelSense® packages are released. Refer to [Table 1](#) for FuelSense® 2.0 feature and package designations.

Table 1. FuelSense® 2.0 Features and Package Designations with Vehicle Electronic Programming Stations (VEPS) Parameters

FuelSense® 2.0 Feature	VEPS Parameter(s)	FuelSense® 2.0	FuelSense® 2.0 Plus	FuelSense® 2.0 Max
DynActive™ Shifting	17690, 17610, 17670, 17600, 17620, 17680, 17605	Required in one or both shift schedules	Required in one or both shift schedules	Required in one or both shift schedules
Dynamic Shift Sensing	16000	Optional	Optional	Optional
Neutral at Stop	25270	Not allowed	Required	Optional
Coasting Neutral at Stop	17700	Not allowed	Optional	Optional
Acceleration Rate Management	12000	Not allowed	Not allowed	Required
Custom Acceleration Rate Management	12010, 12012, 12013, 12016, 12017	Not allowed	Not allowed	Optional

2. 16100 FuelSense® (1000/2000/3000/4000/TC10®): The following additional choices are available for the FuelSense® parameter 16100:

40 = FuelSense® 2.0
41 = FuelSense® 2.0 Natural Gas
50 = FuelSense® 2.0 Plus
51 = FuelSense® 2.0 Natural Gas Plus
60 = FuelSense® 2.0 Max

Action Required: No action necessary. If FuelSense® 2.0 features are desired, set parameter 16100 to the desired FuelSense® 2.0 value. Comply with the conditions and rules described elsewhere in this document to ensure a successful EOL programming event.

3. 17690 DynActive™ Shifting (1000/2000/3000/4000/TC10®): DynActive™ Shifting must be specified in at least one of the shift schedules when a FuelSense® 2.0 package is used. DynActive™ shifting may be specified in either primary or secondary shift schedule, or both.

0 = Disabled (default)
1 = Enabled in Both Primary and Secondary Modes
2 = Enabled in Primary Mode Only
3 = Enabled in Secondary Mode Only

Action Required: Set parameter 17690 to 1, 2, or 3 when any one of the FuelSense® 2.0 packages (16100 = 40, 41, 50, 51, or 60) is selected. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.

4. DynActive™ Shifting Trim Settings (1000/2000/3000/4000/TC10®): Use the following parameter values and settings to adjust performance of the DynActive™ Shifting feature. DynActive™ Shifting may be enabled in the Primary shift schedule, Secondary shift schedule, or both.

Primary Mode DynActive™ Shifting trim settings.

- a. 17610 Primary Mode DynActive: Flat Ground Economy Bias
0 = Min
100 = Max
- b. 17670 Primary Mode DynActive: Grade Ground Economy Bias
0 = Min
100 = Max
- c. 17600 Primary Mode DynActive: Minimum Engine Speed Operation (RPM)
4 = 900
5 = 950
6 = 1000
7 = 1050

8 = 1100
9 = 1150
10 = 1200
11 = 1250
12 = 1300
13 = 1350
14 = 1400
15 = 1450
16 = 1500

Action Required: No action necessary. Set DynActive™ Shifting trim parameters to adjust performance of the feature, as desired.

Secondary Mode DynActive™ Shifting trim settings.

- a. 17620 Secondary Mode DynActive: Flat Ground Economy Bias
 - 0 = Min
 - 100 = Max
- b. 17680 Secondary Mode DynActive: Grade Ground Economy Bias
 - 0 = Min
 - 100 = Max
- c. 17605 Secondary Mode DynActive: Minimum Engine Speed Operation (RPM)
 - 4 = 900
 - 5 = 950
 - 6 = 1000
 - 7 = 1050
 - 8 = 1100
 - 9 = 1150
 - 10 = 1200
 - 11 = 1250
 - 12 = 1300
 - 13 = 1350
 - 14 = 1400
 - 15 = 1450
 - 16 = 1500

Action Required: No action necessary. Set DynActive™ Shifting trim parameters to adjust performance of the feature, as desired.

5. 17700 FuelSense® 2.0: Coasting Neutral at Stop (1000/2000/3000/4000/TC10®): Optional Neutral at Stop with Coast Mode is available in FuelSense® 2.0 Plus and Max packages. The following additional choices are available for parameter 17700:

0 = Disabled (default)

1 = Enabled

Action Required: No action necessary. Set parameter 17700 to the desired value to enable or disable Neutral at Stop with Coast Mode. Parameter 17700 may be set to 0 or 1 when 16100 = 50, 51, or 60. Parameter 17700 will not be functional whenever 16100 = 0, 10, 11, 20, 21, 30, 31, 40, or 41.

6. 12010 Acceleration Rate Management: Level of Acceleration Control (1000/2000/3000/4000/TC10®): Only available in the FuelSense® 2.0 Max package, the acceleration control level may be customized by setting parameter 12010 = 0; thereby, enabling variable trim settings in lieu of fixed acceleration levels for more precise control of the feature.

0 = Custom (new)

1 = Base Economy

2 = Intermediate Economy

3 = High Economy

4 = Super Economy

5 = Ultra Economy

Action Required: No action necessary. Set parameter 12010 = to 0 when FuelSense® 2.0 Max is enabled, and customization of acceleration control level is desired. Parameter 12010 will only function parameter 16100 (FuelSense®) is set to 60.

7. Acceleration Rate Management Custom Trim Settings (1000/2000/3000/4000/TC10®): Use the following parameter values and settings for finer control of Acceleration Rate Management. These optional parameters are only functional when FuelSense® 2.0 Max package is selected, and 12010 is set to 0 = Custom.

- a. 12013 Acceleration Rate Management: Custom Low Speed Acceleration Limit (m/s²) (1000/2000/3000/4000/TC10®): Parameter 12013 sets the low speed acceleration limit. Units are in meters per second squared.

0.2235 = Min

1.7 = Default

5 = Max

- b. 12012 Acceleration Rate Management Custom Low Speed Breakpoint (KPH) (1000/2000/3000/4000/TC10®): Parameter 12012 sets the low speed breakpoint value. Units are in kilometers per hour.

0 = Min

10.8 = Default

18 = Max

- c. 12017 Acceleration Rate Management: Custom High Speed Acceleration Limit (m/s²) (1000/2000/3000/4000/TC10®): Parameter 12017 sets the high speed acceleration limit. Units are in meters per second squared.
- 0.2235 = Min
0.75 = Default
5 = Max
- d. 12016 Acceleration Rate Management Custom High Speed Breakpoint (KPH) (1000/2000/3000/4000/TC10®): Parameter 12016 sets the high speed breakpoint value. Units are in kilometers per hour.
- 18 = Min
39.6 = Default
162 = Max

Action Required: No action necessary. Set Acceleration Rate Management Custom Trim parameters, as desired. Parameter 12012, 12013, 12016, and 12017 are only functional when parameter 16100 (FuelSense®) is set to 60, and parameter 12010 (Level of Acceleration Control) is set to 0 (Custom).



NOTE: Paragraphs 8 through 12 only apply when selecting a value less than or equal to 16 for parameter 11020 Engine Make & Model. If 11020 value is greater than 16, skip to paragraph 13.

8. 17900 DynActive: Engine Torque Curve (1000/2000/3000/4000): The DynActive™ Shifting algorithm uses the engine's torque curve to calculate an optimum fuel economy shift profile. Use parameter 17900 to select whether the DynActive™ Shifting algorithm learns the engine torque curve, or whether the specific engine torque curve will be manually entered. Parameters 17901 – 17920 and 17941 – 17960 are used to define the engine torque curve manually, as described below.
- 0 = Learned (Default)
1 = Defined
- Action Required: No action necessary.** Set parameter 17900 to the desired value. See instructions for using FuelSense® 2.0 and DynActive™ Shifting with basic (SEM & LRTP OFF) engines.
9. FuelSense® 2.0 and DynActive™ Shifting with basic (SEM & LRTP OFF) engines (1000/2000/3000/4000): When engine make & model is known and selected in the calibration, the transmission control system can rapidly and efficiently learn the engine's torque curve. However, when a basic (SEM & LRTP OFF) engine is used, one of the following two options must be used to provide the TCM with engine torque information if DynActive™ Shifting is enabled:
- a. Option 1 Engine Torque Curve Defined (preferred): Set parameter 17900 = 1 and manually enter the engine torque curve by entering between six (6) and twenty (20) engine speed and torque pairs, as described in following paragraphs 10 and 11 .
- b. Option 2 Engine Torque Curve Learned: Set parameter 17900 = 0 and select the appropriate value (13, 14 or 15), as described in following paragraph 12.

10. 17901 – 17920 DynActive: Defined Engine Curve – Speed Point (RPM) (1000/2000/3000/4000): When parameter 17900 is set to 1, use parameters 17901 through 17920 in conjunction with parameters 17941 through 17960 to define the engine's torque curve. A minimum of six (6) torque/speed pairs are required but up to twenty (20) pairs may be used.

0 = Min

0 = Default

5000 = Max

Action Required: At least six (6) torque/speed pairs must be defined when parameter 17900 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event. Enter speed points in ascending order. Consult with Allison Application Engineering for other requirements associated with these parameters.

11. 17941 – 17960 DynActive: Defined Engine Curve – Torque Point (N·m) (1000/2000/3000/4000): When parameter 17900 is set to 1, use parameters 17941 through 17960 in conjunction with parameters 17901 through 17920 to define the engine's torque curve. A minimum of six (6) torque/speed pairs are required but up to twenty (20) pairs may be used.

0 = Min

0 = Default

5000 = Max

Action Required: At least six (6) torque/speed pairs must be defined when parameter 17900 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event. The first torque value pairs with the first speed value, and so on; i.e., parameter 17901 pairs with 17941, 17902 pairs with 17942, etc. Consult with Allison Application Engineering for other requirements associated with these parameters.

12. 11020 Engine Make & Model (1000/2000/3000/4000): Three new parameter values were added to parameter 11020 to signify when using an engine that is not listed by name elsewhere on the list of engines. Values 13, 14 and 15 are used when accurate engine torque information is available for use by the DynActive™ Shifting algorithm.

13 = SEM & LRTP OFF – Other Engine – Diesel – Peak Learned – Accurate Engine Torque

14 = SEM & LRTP OFF – Other Engine – Diesel – Accurate Engine Torque

15 = SEM & LRTP OFF – Other Engine – Spark Ignited – Accurate Engine Torque

Action Required: Values 13, 14 and 15 require Allison Application Engineering approval to confirm accurate engine torque information is available to the DynActive™ Shifting algorithm. Two selections exist for Diesel engines and another for Spark Ignited engines. Consult with Allison Application Engineering for engine validation requirements associated with the use of these parameters.

13. 17800 DynActive: Input Ratings (1000/2000/3000/4000/TC10): Use parameter 17800 when another vehicle controller is limiting engine torque below the engine's rated value; for example, to protect drive line components. Imposed engine torque limitations must be provided to the TCM so the DynActive™ algorithm can calculate the optimum shift schedule.
- 0 = As Defined by the Vocational Model (Default)
 - 1 = Custom
- Action Required:** Set parameter 17800 to 1 when another controller in the vehicle is limiting engine torque. When 17800 is set to 1, input torque values greater than 0 N·m must be entered for parameters 17805, 17807, 17810, and 17811 through 17820 (if available in the programming guide). PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.
14. 17805 DynActive: Custom Rating Gross Input Power (1000/2000/3000/4000/TC10®): Parameter 17805 defines the gross input power used when parameter 17800 is set to 1 = Custom. Units are in Kilowatts.
- 0 = Min
 - 0 = Default
 - 2000 = Max
- Action Required:** Set parameter 17805 to the appropriate value when parameter 17800 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.
15. 17810 DynActive: Custom Rating Gross Input Torque LOW (3000/4000 7-speed models only): Parameter 17810 defines the gross input torque limit in Low gear of 3000/4000 7-speed transmission models when parameter 17800 is set to 1 = Custom. Units are in Newton-meters.
- 0 = Min
 - 0 = Default
 - 3000 = Max
- Action Required:** Set parameter 17810 to the appropriate value when parameter 17800 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.
16. 17811 - 17816 DynActive: Custom Rating Gross Input Torque First through Sixth (1000/2000/3000/4000/TC10®): Parameters 17811 through 17816 define the gross input torque limit in first through sixth gear (second through seventh of 3000/4000 7-speed transmission models) when parameter 17800 is set to 1 = Custom. Units are in Newton-meters.
- 0 = Min
 - 0 = Default
 - 3000 = Max
- Action Required:** Set parameters 17811 through 17816 to the appropriate value when parameter 17800 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.

17. 17817 - 17820 DynActive: Custom Rating Gross Input Torque Seventh through Tenth (TC10®): Parameters 17817 through 17820 define the gross input torque limit in seventh through tenth gear when parameter 17800 is set to 1 = Custom. Units are in Newton-meters.

0 = Min

0 = Default

3000 = Max

Action Required: Set parameters 17817 through 17820 to the appropriate value when parameter 17800 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.

18. 17807 DynActive: Custom Rating Net Turbine Torque (1000/2000/3000/4000/TC10®): Parameters 17807 defines the net turbine torque limit when parameter 17800 is set to 1 = Custom. Units are in Newton-meters.

0 = Min

0 = Default

5000 = Max

Action Required: Set parameter 17807 to the appropriate value when parameter 17800 is set to 1. PAR files that do not satisfy this condition will result in an unsuccessful EOL programming event.

Release Plan Timing:

Table 2. Release Plan Timing

Description	Release Date
FuelSense® 2.0 with DynActive™ Shifting is available with the BCD 171 PC	April, 2017