GPA/GPR/GPR-DI/GPR-DI Proportional Pump/GPRP/GPRP-DI PACKAGE - VERSION MIGRATION

GPA/GPR/GPR-DI/GPR-DI Proportional Pump/GPRP/GPRP-DI Package Version Migration to February 2016 v1.10.0010

➡ Migration to the new Package, from an existing February 2016 Package, does not require a new Licence. Migration from a Package prior to February 2016 will require a new Licence.

This Technical Note details the improvements, bug fixes and the strategy to migrate from the following Packages to the February 2016 v1.10.0010 Package.

Variant	From Version Name	From Version Number	To Version Name	To Version Number
GPA (M130) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPA (M150) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPA (M170) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPA (M190) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPR (M130) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPR (M150) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPR (M170) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPR (M190) (Public)	February 2016	1.07.0005	February 2016	1.10.0010
GPR-DI (M141) (Public Beta)	February 2016	1.00.0005	February 2016	1.10.0010
GPR-DI (M142) (Public)	February 2016	1.05.0005	February 2016	1.10.0010
GPR-DI (M182) (Public)	February 2016	1.05.0005	February 2016	1.10.0010
GPR-DI Proportional Pump (M141 Beta)	February 2016	1.00.0001	February 2016	1.10.0010
GPRP (M130) (Public)	February 2016	1.01.0009	February 2016	1.10.0010
GPRP (M150) (Public)	February 2016	1.01.0010	February 2016	1.10.0010

GPRP (M170) (Public)	February 2016	1.01.0009	February 2016	1.10.0010
GPRP (M190) (Public)	February 2016	1.01.0009	February 2016	1.10.0010
GPRP-DI (M141) (Public Beta)	February 2016	1.00.0005	February 2016	1.10.0010
GPRP-DI (M142) (Public)	February 2016	1.01.0004	February 2016	1.10.0010
GPRP-DI (M182) (Public)	February 2016	1.01.0005	February 2016	1.10.0010

Legend

- Name in both February 2016 (Pre 1.10.0010) and February 2016 1.10.0010 versions.
- Name in February 2016 1.10.0010 version only. Does not exist in February 2016 (Pre 1.10.0010) version.
- Name in February 2016 (Pre 1.10.0010) version only. Does not exist in February 2016 1.10.0010 version.
- Parameter value

▶ IMPROVED FEATURES

The February 2016 v1.10.0010 Package provides the following improved features:

- System updated to version 1.4.0.61.
- Added - Ambient Pressure Estimate Mode parameter. Ambient Pressure Estimate is only used if Ambient Pressure Estimate Mode is Enabled and an Inlet Manifold Pressure Sensor is in use and not at fault.
- Added - Boost Pressure Warning. This alerts users, through the Warning system, when Boost Pressure exceeds a predefined maximum value. Once active the warning can be configured to apply an engine speed limit and/or Throttle reduction (DBW equipped engines only).
- Added - **GPA/GPR/GPRP only:** Fuel Injector Duty Cycle Warning. This can be used, through the Warning system, to alert if a port injector exceeds a predefined maximum output duty cycle. Once active the warning can be configured to apply an engine speed limit and/or Throttle reduction (DBW equipped engines only).
- Added - **GPR/GPR-DI/ GPR-DI Proportional Pump/GPRP/GPRP-DI only:** Fuel Injector Secondary Duty Cycle Warning added to port injectors with Engine Speed and Throttle Limits.
- Fuel Closed Loop Fault Delay maximum allowed value limit removed to allow users to set fault times longer than 60 seconds.
- GPS Altitude channel maximum value, when received via CAN from a dash, increased from 3,276.7 to 32,767m at 1m resolution.
- Added - Hybrid resources to all pressure sensors.
- Added - Hybrid resources to Mass Air Flow Sensor with loadable calibrations.
- Added - Minimum Engine Speed parameter for Turbocharger Speed Sensor fault diagnostic.
- Added - 'Vs' channel to CAN receive from LTCN. This shows the sensor voltage used in the control calculation.
- Integral term removed from Wastegate Pressure Control. This is a self integrating control system.
- Dead band timer removed from Wastegate Pressure Control. Control stops the moment the dead band is entered.
- Wastegate Pressure Actuator Minimum setting split into Wastegate Pressure Actuator Increase Minimum and Wastegate Pressure Actuator Decrease Minimum settings respectively. This allows for independent settings for each resource.

- All temperature hysteresis quantities changed to temperature delta to allow for improved correlation when using Fahrenheit or Kelvin.
- Added - Driver Fuel Mixture Aim Main Switch added to Alternative Fuel Mixture Aim axis.
- Added - Driver Fuel Ignition Timing Main Switch added to Alternative Fuel Ignition Timing and Alternative Fuel Ignition Timing Blend axis.
- Clutch Slip modified to be calculated as speed difference instead of a ratio.
- Added - Clutch Slip included in Traction Engine Speed Limit calculation to give improved traction control when launching manual transmission vehicles.
- Coolant Pressure and Transmission Pressure update rates increased to 50Hz.
- Engine Oil Pressure and Crankcase Pressure update rates increased to 100Hz.
- Added - Type parameter which allows Air Conditioner Request Switch and Transmission Brake Switch and Driver Switches to be used as latchable switches, for use with push buttons.
- Added - Engine Speed axes added to ECU Battery Diagnostic High and ECU Battery Diagnostic Low.
- Added - Warning ECU Battery Diagnostic Mode to alert users, through the Warning system, when the ECU Battery voltage is outside of its operating range.
- Added - Auxiliary Output 1-5 Output Duty Cycles added to ECU CAN Transmit message 0x6A0-1. This can be configured for use in a MoTeC dash using the "M1_General_0x6A0_Version_1" CAN template.
- Added - Driver Switches; Auxiliary Time, Boost Limit Disable, Engine Speed Limit Maximum, Fuel Mixture Aim Main, Auxiliary Time, Engine Speed Limit Maximum, Fuel Mixture Aim Main, Gear Shift, Anti Lag Mode, Gear Shift Automatic Drag, Ignition Timing Main, Race Time Reset, Throttle Pedal Translation, Transmission Brake Bump and Wheel Circumference added to ECU CAN Transmit message 0x64E.
- Added - Driver Rotary Switches 7 and Driver Rotary Switches 8 added to ECU CAN Transmit message 0x65C. This can be configured for use in a MoTeC dash using the "M1_General_0x650_Version_5" CAN template.
- Engine Run Time Total maximum value increased to 37,282 hours with 8s resolution.
- Added - Engine Oil Temperature Engine Speed Limit. This allows users to limit engine speed based on the engine oil temperature.
- Race Time Boost Limit modified to only be applied when Race Time is greater than 0 and less than the table's maximum Race Time axis site.
- Exhaust Lambda update rate increased to 100Hz.
- Race Time Fuel Mixture Aim modified to be applied only when Race Time is greater than 0 and less than the table's maximum Race Time axis site.
- Added - Anti Lag State Recovery added to Fuel Cut, Ignition Cut and Ignition Timing. This allows for improved transitions when Anti Lag is no longer Enabled.
- Fuel Composition and Exhaust Temperature Boost Limits modified to only apply when the associated sensor is in use and not at fault.
- Gear Estimate Delay modified to be applied only in Gear Estimate non-forward gear detection. This helps to improve false neutral detection in H-pattern gearboxes.
- Gear Estimate Tolerance converted to a table to give improved Gear Estimate detection for each gear.
- Added - Gear Reverse Switch to allow for reverse detection when using Gear Estimate.
- Added - Idle Actuator Stepper Test Mode Aim value that can be used to precisely position the Idle Actuator Stepper Motor for diagnostic and setup purposes.
- Added - Idle Mass Flow Disabled table that can be used to set the default position of an Idle Actuator Stepper Motor or Idle Actuator Solenoid when Idle State is Disabled.
- Ignition Test Timing validation limits increased.
- Added - Nitrous Bottle Pressure Fuel Mass Flow Trim for improved mixture tuning with varying Nitrous bottle pressures.
- Race Time Ignition Timing Trim, Race Time Fuel Mixture Aim, Race Time Boost Limit and Race Time Throttle Limit update rate increased to 100Hz.

- Added - Eight extra mappable positions (ten position switch) to the Throttle Pedal Translation table.
- Various help updates.
- Bosch ABS M4 updated (renamed to Bosch ABS), to allow both M4 and M5 Bosch ABS units.
- Added - Bosch Wiper system to control a Bosch WDA LIN wiper.
- Added - LIN system to run Bosch Wiper.
- Added - Bosch Sensor which receives CAN messages from a Bosch Inertial Sensor MM5.10.
- Added - Vehicle Yaw, Roll and Pitch rate sensors.
- Added - Duty Cycle parameter to Coolant Pump Test.
- Added - Engine Speed axis to Coolant Pressure Warning.
- Added - Gear Shift Throttle Aim can be set for upshifts. This allows for torque reductions, during an upshift, by reducing the throttle opening.
- Added - Gear Shift Engine Speed Mode (i.e. Up, Down, Power On, Power Off) and Gear Shift Current (Current Gear as updated by Gear Shift) axes added to Gear Shift Engine Speed Limit Ignition Range, Fuel Range and Fuel Margin.
- Added - Idle Mass Flow Disabled parameter to fix the position of an Idle Stepper Motor or Solenoid when Idle is Disabled.
- Added - Inlet Air Temperature axis added to Engine Charge Cooling Primary and Engine Charge Cooling Secondary tables. The purpose of this extra axis is to compensate for the change in fuel evaporation which occurs due to change in inlet air temperature.
- Added - Engine Speed axis to Engine Overrun Ignition Timing Target table.
- Added - Condition to exit Idle when the Gear value changes and Engine Speed is above Idle Aim.
- Added - Boost Pressure Default with modified fallback strategy.
- Boost Pressure Warning enabled when Boost Pressure is above Boost Activate (was previously enabled above 0).

▶ BUG FIXES

The February 2016 v1.10.0010 Package provides the following bug fixes:

- Fuel Closed Loop going into fault after long overrun bug fixed.
- GPS Valid channel value incorrect when received from dash bug fixed.
- Warnings reactivating before the reset delay expires (stays in Limit) bug fixed.
- Warning hysteresis validation bug fixed.
- Large value for Wastegate Pressure could be displayed when the sensor was not in use or in fault bug fixed.
- Faulty Inlet Manifold Pressure Sensor causing incorrect calculation of Fuel Injector Differential Pressure bug fixed.
- Auxiliary Output inverted duty cycle bug fixed.
- Fuel Used Correction reverted to parameter to fix calculation bug.
- Fuel Injector Secondary Contribution affecting primary injectors when no secondary injector resources are assigned bug fixed.
- Idle Actuator Stepper holding incorrect position bug fixed.
- Nitrous Engine Speed Limit condition incorrectly disabled if Traction State is Enabled bug fixed.
- Nitrous Fuel Volume Compensation replaced with Nitrous Fuel Mass Flow to fix calculation bug.
- Transmission Brake Bump not working when no Throttle Servo assigned bug fixed.
- Fuel Pump Relay Hold and Alternative Fuel Pump Relay Hold minimum validation not allowing zero values bug fixed.
- Transmission Pump Relay cycling when in fault mode bug fixed.
- Boost Maximum not working when only using a Boost Pressure Sensor.
- Various other minor bug fixes.

▶ UPGRADING

Customers purchasing any of the GP configurations will receive this latest Package version (February 2016 v1.10.0010). Existing customers can upgrade their existing February 2016 GP configurations free of charge by following these steps:

1. Download the latest Packages by clicking Help -> Check for Updates.
2. Follow the on screen prompts to download and install the latest Packages.
3. Open the existing Package that is to be upgraded
4. The Upgrade icon (1) will be visible showing that there is now an upgrade for your existing Package. Click the Upgrade Icon to display the Package Migrate Window.
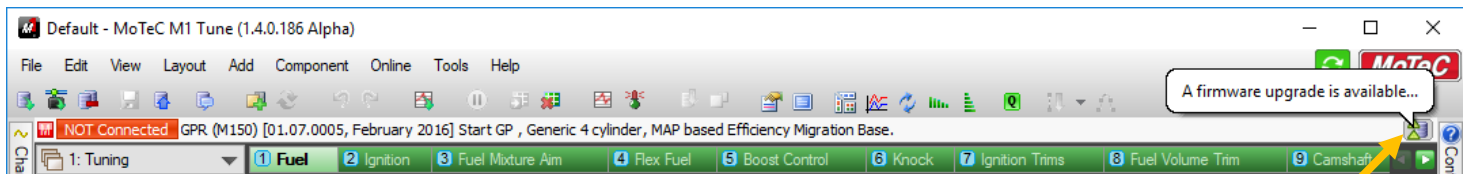
5. Ensure the "Show major revisions" check box (2) is selected.
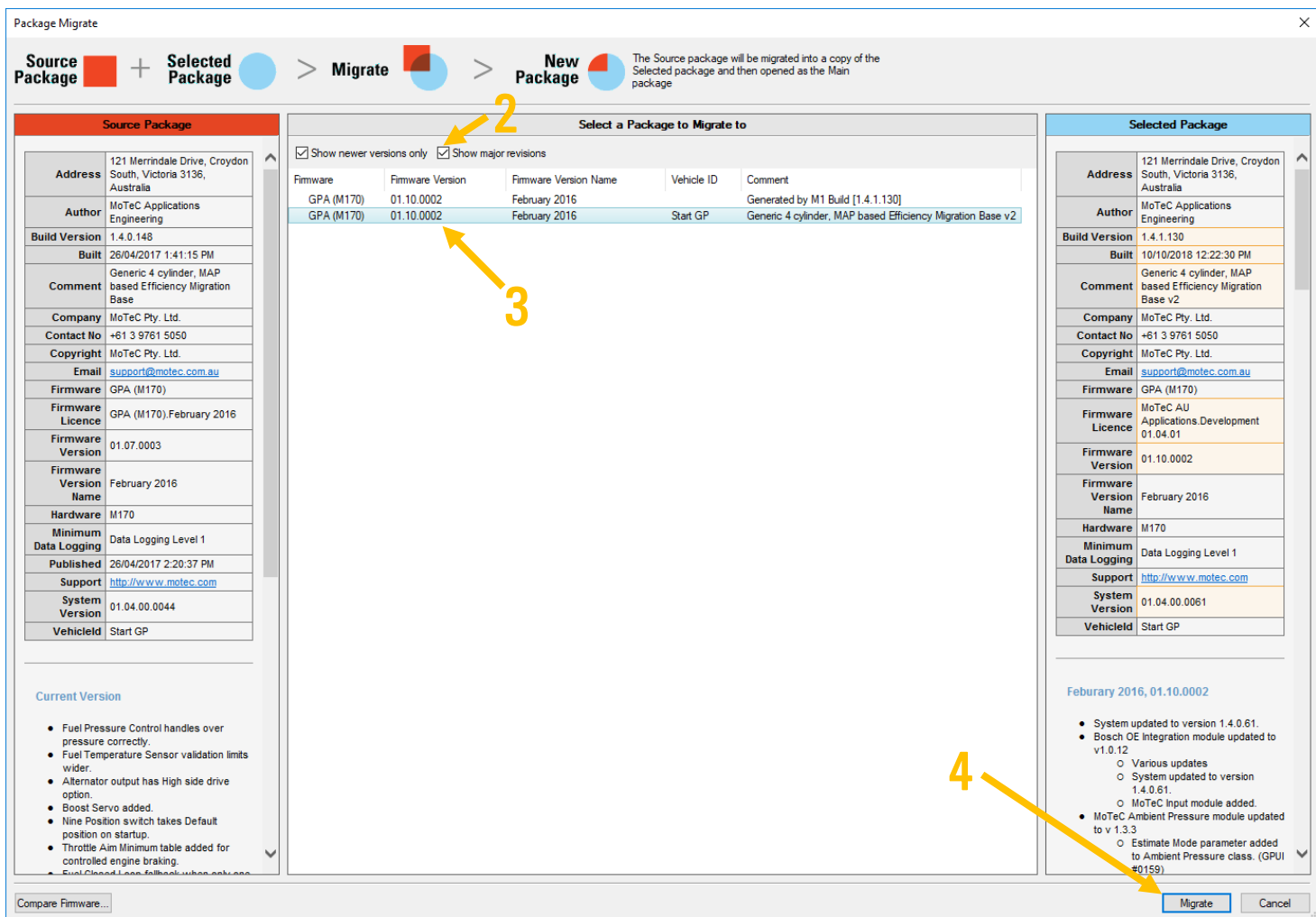
6. Select the new February 2016 v1.10.0010 Firmware Version (3).
7. Click Migrate (4).

M1 Tune will now upgrade the Package to the new firmware. Features which need to be manually migrated are listed in the Data Migration section below.

▶ DATA MIGRATION

In addition to the above auto-migration the following manual adjustments are necessary to achieve the same behaviour as with the February 2016 v1.10.0010 version.

The following tables require manual migration since axis channels have changed:

- **GPA/GPR/GPRP only**: Fuel Used Primary Correction.
- **GPR/GPR-DI/ GPR-DI Proportional Pump/GPRP/GPRP-DI only:** Fuel Used Secondary Correction.
- Throttle Pedal Translation.

Ambient Pressure Estimate Mode needs to be set to Enabled.

Boost Pressure Enable has been added and needs to be set. See Boost Pressure Enable help for a functional description. Suggest 0% as a start value.

Boost Pressure Control Integral Rate has been added and needs to be set. See Boost Pressure Control Integral Rate help for a functional description. Suggest 0%/s as a start value.

Idle Mass Flow Disabled has been added. This only needs to be set if Idle Actuator Stepper Motor or Idle Actuator Solenoid are configured. See Idle Mass Flow Disabled help for a functional description and suggested start values.

Wastegate Pressure Actuator Increase Minimum and Wastegate Pressure Actuator Decrease Minimum replace Wastegate Pressure Actuator Minimum. Both values need to be set. See Wastegate Pressure Actuator help for a functional description.

Due to a change in the Unit quantity the following Hysteresis values need to be set:

- Air Conditioner Enable Coolant Temperature Hysteresis
- Air Conditioner Enable Ambient Temperature Hysteresis
- Coolant Temperature Warning Hysteresis
- Coolant Fan 1 Enable Coolant Temperature Hysteresis
- Coolant Fan 2 Enable Coolant Temperature Hysteresis
- Differential Pump Hysteresis
- Engine Oil Temperature Warning Hysteresis
- Exhaust Temperature Warning Hysteresis
- Inlet Air Temperature Warning Hysteresis
- Intercooler Spray Enable Intercooler Temperature Delta Hysteresis
- Intercooler Spray Enable Ambient Temperature Delta Hysteresis
- Transmission Pump Hysteresis

In addition to the adjustments listed above, the calibration of features listed in the 'Improved Features' section should be checked, as some of the feature modifications may require adjustment of their calibration.