GPA/GPR PACKAGE – VERSION MIGRATION

Updates to this document since the initial version have a light yellow background.

GPA/GPR Package Version Migration December 2014 to July 2015

➡ Migration to the new package requires a new licence for the July 2015 version (GPA Part 23061, GPR Part 23072). There is no charge for the new licence.

Many improvements have been made to the GPA and GPR Packages since December 2014.

This Technical Note details the improvements, added features and the strategy to migrate to the July 2015 version.

Legend

Name in December 2014 version …… Name in July 2015 version …… Parameter value

IMPROVED FEATURES

The July 2015 package provides the following improved features:

- Sensor Calibrations : predefined configurations for many commonly used automotive sensors can be selected. If a given sensor is not available in the selection list, a manual configuration is still possible.
  - ➪ Sensor settings from a previous package based on a December 2014 version always migrate as a manual calibration. Sensor settings will only be exposed when Manual is selected.
- Object hiding : channels, tables and parameters will not be displayed in M1 Tune when an associated resource is not assigned or when the associated control system is Not in Use . That way only active objects are displayed.
- CAN Inputs can now be selected directly as a Resource.
- Test settings for output tests on:
  - *Air Conditioner Clutch*
  - *Auxiliary Outputs*
  - *Boost Actuator*
  - *Coolant Fan 1/2*
  - *Coolant Pump*
  - *Coolant Pump After Run*
  - *ECU Power Relay*
  - *Fuel Pump*
  - *Idle Actuator Solenoid*
  - *Inlet Camshaft Position Actuator*
  - *Intercooler Spray Pump*
  - *Tachometer*
  - *Transmission Pump*
  - *Warning Light.*
- Alternator control system added.
- Anti Lag (except GPA) : Recover and Enable Delay added.
- Brake Vacuum control system has been added.
- Coolant Pump After Run Disable Voltage and Delay have been added.
- Differential temperature control system has been added.
- Driver Boost Limit Disable Switch has been added.
- 2 switches and 4 rotary switches have been added for Driver interaction.
- ECU Receive (CAN): also compound messages can now be received.
- Engine Charge Temperature introduced, allows for correction of Inlet Air Temperature .
- Engine Output Test added, allows for improved injector and ignition output testing.
- Exhaust Camshafts : additional output added for VANOS support.
- Fuel Flow Supply Sensor and Fuel Flow Return Sensor added
- Fuel Temperature Estimate introduced as a fall back.

- Fuel Test introduced to improve fuel film calibration.
- Gear Position Sensor changed to a normalised sensor which allows for using two gear position sensors in parallel.
- Gear Throttle Limit added which allows for limiting the engine load in dependency of the active gear.
- Gear Ignition Timing Trim added.
- Idle Actuator Stepper added: idle system supports stepper motor output.
- Idle Throttle Pedal Blend allows for adjusting the driver's throttle pedal feel when exiting idle.
- Ignition Coil Charge Time Trim allows for load dependent trim of the charge time.
- Ignition Test parameter introduced for improved ignition testing.
- Inlet Air Temperature (was previously Inlet Manifold Temperature): Correction for sensor heat soak problems added.
- Inlet Camshafts : additional output added for VANOS support.
- Inlet Camshaft Position : additional engine speed threshold to deactivate the camshaft actuator above a certain engine speed.
- Inlet Manifold Flap support (actuator with 2 bank position feedback).
- Inlet Manifold Runner support (actuator with position feedback).
- Knock : it can be selected which frequencies contribute to the determined knock level.
- LTC Enable Message (CAN message 0x480) can be deactivated, thus leaving the LTC constantly powered on.
- Lap Time : can now also be sourced from a GPS input.
- Tachometer : Pin Peak Current and Pin Hold Current settings added.
- Throttle Pedal can now get its value also from a digital source. Also, non-linear tracking sensors are supported.
- Throttle Position uses a scalable default value as fall back in case of sensor faults
- Throttle Servo : non-linear tracking sensors are now supported. Additionally, a control loop model and a more flexible feed forward setup improve the control behaviour.
- Transmission Pump : time based alternated switch-on and switch-off in case of Transmission Temperature Sensor failures is possible.
- Turbocharger Bypass : support of a bypass valve control.
- Vehicle Speed Limit control system added (DBW-throttle based), can also be used for pit speed limiting.
- Warning system : can also be triggered by Vehicle Acceleration Lateral Sensor Diagnostic.

DATA MIGRATION

In addition to auto-migration (Tools > Migrate package) the following manual adjustments are necessary to achieve the same behaviour as with the December 2014 version.

New parameters that are not mentioned in this list have to remain at their initial value (0). Tune migration summary warnings can be ignored when following the procedure below.

➪ Objects will be shown as different in the M1 Tune Migration window if their names are different, even if their values have been successfully migrated (the new packages now have a function that allows migration of data from predecessor objects with different names).

- ADR : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Airbox Mass Flow Sensor Digital Decode Resource : copy the value from Airbox Mass Flow Sensor Digital Pin Resource.
- Airbox Mass Flow Sensor Digital Decode Type : compare with Airbox Mass Flow Sensor Digital Type to determine the correct setting.
- Airbox Temperature : if the previous package used a CAN input the Sensor Resource has to be set matching the previous CAN Slot .
- Airbox Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Air Conditioner Refrigerant Pressure : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Air Conditioner Refrigerant Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Ambient Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Ambient Temperature : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Anti Lag (except GPA) : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- Boost Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Boost Control Integral Minimum / Maximum : set to -100%/100%. See section on **Behaviour Changes** for additional comment.
- Brake Pressure Front : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Brake Pressure Front Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Brake Pressure Rear : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Brake Pressure Rear Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- CAN Bus 1 , CAN Bus 2/3 (except M130/M170): Mode and Speed have been integrated into one parameter. Check both values in the old package and set Mode accordingly.
- Clutch Pressure : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Clutch Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.

- Clutch Position : if the previous package used a CAN input, the Sensor Resource has to be set to match the previous CAN Slot .
- Clutch Position Sensor : Offset and Scale have to be set to match the old values of the Calibration table. A linear calibration is assumed with 2 axis points and values in the Calibration table: X1 and Y1, X2 and Y2. Scale is then (Y2-Y1)/(X2-X1). Offset is X1-(Y1/ Scale).
- Coolant Temperature Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Coolant Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Driver CAN Switches have been deleted since all resources can also now can be a CAN input. Check previously used Driver CAN Switches and assign their CAN Slots to the respective Resources .
- E8X : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- ECU Receive : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Engine Load Average Ignition Timing Trim : the table size has been reduced. Check that no values have been truncated. Also, the y axis has been changed from Inlet Manifold Pressure to Engine Load Normalised .
- Engine Oil Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Engine Crankcase Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Engine Overrun : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- Exhaust Lambda : on all LTCs the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Exhaust Pressure Bank 1/2 Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Exhaust Camshaft Bank 1/2 Control Derivative Gain : due to a unit change this does not migrate automatically. Copy the previous value manually.
- Fuel Closed Loop : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- Fuel Film : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- Fuel Pressure Default : copy the value of Fuel Pressure Sensor Default and ignore the unit mismatch.
- Fuel Pressure Regulator Type/Reference : compare with the old values of Fuel Pressure Regulator Reference and set the values appropriately.
- Fuel Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Gear Position : the sensor type has been changed to a normalised sensor. All settings for the sensor and the gears have to be adjusted. See the Gear Position Sensor help on how to set up the sensor.
- Gear Shift Mode (except GPA) : If the gear shift system has been in use in the previous package this parameter must be set to Enabled .
- GPS CAN ID Base has to be set to match the first GPS message ID. Also see the **Behaviour Changes** section.
- Inlet Manifold Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.

- Inlet Camshaft Bank 1/2 Control Derivative Gain : due to a unit change this does not migrate automatically. Copy the previous value manually.
- Inlet Camshaft Position Threshold High : set to a value higher than maximum engine speed of the engine.
- Idle Throttle Pedal Blend : set to 50%.
- Ignition Coil Charge Time Trim : set to 0%trim.
- Knock : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- Knock Mode : set to Enable A B C D .
- Lap BR2 : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Lap Mode : if the lap timing system was in use in the previous package set Lap Mode to Enabled.
- Launch (except GPA) : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .
- LTC Enable Message : set to Enabled .
- PDM : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- SLM : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Steering Pressure Sensor : table size of Translation has been reduced compared to the previous Calibration table which is the migration source. Check that no values have been truncated.
- Throttle Servo : the control functionality has been improved.

  ➪ **It is strongly recommended not to migrate data across from previous packages but select the respective throttle in Throttle Servo Calibration. If the throttle in use is not listed there, please contact MoTeC. The following Throttle Servo migration guidelines should be seen as general information only, and any migration is at your own discretion.**

  – Throttle Servo Bank 1/2 Control Feed Forward : set the table up in the following manner. Set a table value of 0 for an x axis value of 0%. Set the previous value of Throttle Servo Bank 1/2 Control Feed Forward Gain as the table value for an x axis value of 100%.
  – Throttle Servo Bank 1/2 Model Time Constant : set to 7ms.
  – Throttle Servo Bank 1/2 Position Sensor Tracking Linearisation : set 2 axis values of 0% and 100%. The table value at 0% must be 0%. The table value at 100% must be 100%.
- Traction Mode (except GPA) : if the Traction system was used in the previous package set this value to Enabled .
- Transmission Pump : to get the exact behaviour of the previous package set Fault On Time to a non-zero value and Fault Off Time to zero if the previous Transmission Temperature Sensor Default was above Transmission Pump Threshold , or set Fault Off Time to a non-zero value and Fault On Time to zero if the previous Transmission Temperature Sensor Default was below Transmission Pump Threshold . However, the (new) option to run the pump alternately in case of a Transmission Temperature Sensor failure should be considered to prevent overheating of the pump.
- VCS : the previous CAN Bus and Mode parameter have been combined. If Mode has been Disabled , set CAN Bus to Not in Use .
- Vehicle Speed Limit Pit Mode : if the pit speed limiting system was in use in the previous package set the value to Engine Speed Limit .
- Race Time : if the previous Mode parameter has been Disabled , double check that the value now is Not in Use . If not, set to Not in Use .

BEHAVIOUR CHANGES

In items listed below behave differently in the July 2015 package compared to the December 2014 package. It is recommended to check the respective systems for consistency.

- Anti Lag (except GPA) : tables for Ignition Cut , Fuel Cut , Ignition Timing Limit Advance have their axis changed from Throttle Position to Throttle Pedal .
- Boost Control Integral : Minimum and Maximum have previously been calculated according to the remaining control range after the proportional and derivative parts have been applied. Now these are tables that define the integral range, and additionally, the integral is stopped from winding further up or down when the control output is already 0 or 100%.
- Exhaust Temperature Warning now uses Exhaust Temperature Maximum (the highest of the available exhaust temperatures) instead of Exhaust Temperature .
- Launch Ignition Timing Limit Advance Control Integral (except GPA) : Minimum and Maximum have previously been calculated according to the remaining control range after the proportional and derivative parts have been applied. Now Launch Ignition Timing Limit Advance Minimum and Ignition Timing Normal define the integral minimum and maximum values, and additionally, the integral is stopped from winding further up or down when the control output is already at one of these limits.
- GPS : when using a CAN input, the messages are received in a defined format starting at the GPS CAN ID Base .
- Traction Engine Speed Limit Fuel Range (except GPA) is now calculated the same way as Traction Engine Speed Limit Ignition Range , not a fixed parameter as in the previous package.
- Warning Mode Fuel Cylinder N Primary Pin Diagnostic : one parameter to activate all primary injector pin diagnostic warnings instead of individual cylinder diagnostic warning activation.
- Warning Mode Fuel Cylinder N Secondary Pin Diagnostic : one parameter to activate all secondary injector pin diagnostic warnings instead of individual cylinder diagnostic warning activation.