K_LowPresEnge = A/C Pressure above which the A/C Compressor may be re-enabled if it had been disabled due to low A/C Pressure.

Minimum Range: 0 to 4096 kPa

Minimum Resolution: 14 kPa

Typical Value: 215 kPa

Location: Powertrain

Owner: Platform

K_LowSpeedDsnge = Engine speed below which the A/C Compressor is disabled to protect the compressor from inadequate lubrication.

Minimum Range: 0 to 8192 RPM

Minimum Resolution: 32 RPM

Typical Value: 450 RPM

Location: Powertrain

Owner: Platform

K_LowSpeedEngeOff = Engine speed offset from K_LowSpeedDsnge above which re-engagement of the A/C Compressor is allowed.

Minimum Range: 0 to 8192 RPM

Minimum Resolution: 32 RPM

Typical Value: 125 RPM

Location: Powertrain

Owner: Platform

K_LowVehSpdDsnge = Vehicle speed below which a heavy launch condition is defined.

Minimum Range: 0 to 50 km/h

Minimum Resolution: 1 km/h

Typical Value: 22 km/h

Location: Powertrain

Owner: Platform

K_LowVehSpdEnge = Hysteresis to K_LowVehSpdDsnge.

Typical Value: 25 km/h

Location: Powertrain

Owner: Platform

K_LowVoltDsnge and **K_LowVoltEnge** = Hysteresis pair of calibrations that define the voltage below which the A/C Compressor is disabled.

Minimum Range: 0 to 25.5 volts

Minimum Resolution: 0.1 volts

Typical Values: 9.5 and 11.0 volts respectively

Location: Powertrain

Owner: Platform

K_MaxAntiSlugTme = Maximum amount of time allowed to engage A/C Compressor for anti-slugging action.

Minimum Range: 100 to 7000 ms.

Minimum Resolution: 100 ms.

Typical Value: 500 ms.

Location: Powertrain

Owner: Platform

K_MaxFullPedDsblTme = Maximum amount of time the A/C Compressor is allowed to be disabled for the wide open throttle disable function. This is a Powertrain-owned calibration.

Minimum Range: 0 to 10 s.

Minimum Resolution: 0.1 s.

Typical Value: 6 s

Location: Powertrain

Owner: Platform

K_MinCompDsblTme = Minimum compressor off time as a function of engine speed (see GMW8762 Section 4 PPEI Serial Data Signal and Definitions and Framing Requirements for usage description).

Minimum Range: 0 to 10 s

Minimum Resolution: 0.1 s

Table Breakpoints: 0 to 8192 RPM; every 512 RPM

Typical Values: 0 RPM = 8 s

1024 RPM = 8 s

Location: Platform

Owner: Platform/Powertrain

K_MinFullPedDsblCycTme = Minimum amount of time before the wide open throttle disable can be activated since the last time the A/C Compressor was disabled for a wide open throttle condition. This is a Powertrain-owned calibration.

Minimum Range: 0 to 10 s.

Minimum Resolution: 0.1 s.

Typical Value: 6 s

Location: Powertrain

Owner: Powertrain

K_MinFullPedDsblTme = Minimum amount of time the A/C Compressor will be disabled due to a wide-open throttle condition.

Minimum Range: 0 to 10 s.

Minimum Resolution: 0.1 s.

Typical Value: 2 s

Location: Powertrain

Owner: Powertrain

K_ShutdownReqMax = The maximum duration that the A/C Compressor can be disabled for Powertrain specific reasons such as engine load management, transmission shift events, engine stall prevention, engine speed stabilization for a start, transition to closed throttle, etc (this excludes service device control or Crank Angle Sensing Error (CASE) Learn during Dynamic Vehicle Test.

Minimum Range: 0 – 25.5

Minimum Resolution: 0.1 s

Typical Value: 5 s (when executing CATMON, “No Change Allowed” overrides this value)

Location: Powertrain

Owner: Platform/Powertrain

K_SlugCoolTempThrsh = Maximum engine coolant temperature to engage anti-slugging action.

Minimum Range: -40 to 150 °C.

Minimum Resolution: 1 °C.

Typical Value: 25 °C.

Location: Powertrain

Owner: Platform

K_SlugIgnVoltThrsh = Minimum vehicle system voltage to engage A/C Compressor for anti-slugging.

Minimum Range: 0 to 25.5 volts

Minimum Resolution: 0.1 volts

Typical Value: 9.5 volts

Location: Powertrain

Owner: Platform

K_SlugKoffMnfdTempThrsh = Maximum Intake air temperature at end of last ignition cycle to enable anti-slugging action.

Minimum Range: -40 to 150 °C.

Minimum Resolution: 1 °C.

Typical Value: 14 °C.

Location: Powertrain

Owner: Platform

K_SlugMaxRefPulses = number of engine reference pulses to engage the A/C Compressor for anti-slugging action during engine crank.

Minimum Range: 0 to 255 pulses

Minimum Resolution: 1 pulse

Typical Value: 15 pulses

Location: Powertrain

Owner: Platform

K_SlugMnfdTempThrsh = Maximum Intake air temperature to enable anti-slugging action.

Minimum Range: -40 to 150 °C.

Minimum Resolution: 1 °C.

Typical Value: 5 °C.

Location: Powertrain

Owner: Platform

K_SlugUnderPresLmt = Minimum A/C high side pressure to enable anti-slugging action.

Minimum Range: 0 to 500 kPa

Minimum Resolution: 14 kPa

Typical Value: 150 kPa

Location: Powertrain

Owner: Platform

K_Torq_M_CltchlessAC_NormTrq = Calibration is not required for Clutch based A/C compressor control systems. This calibration replaces the serial data signal of Air Conditioning Compressor Normalized Load during the off to on sequence (anticipated A/C load).

Minimum Range: 0.00 to 10.00 dm^3/minute

Minimum Resolution: 0.1

Typical Value: 3

Location: Powertrain

Owner: Platform

K_TransientGearDsngeOff = Engine speed offset above K_ContinuousPN_Dsnge at which the A/C Compressor is immediately disabled when the transmission is in gear, to protect the A/C Compressor.

Minimum Range: 0 to 8192 RPM

Minimum Resolution: 32 RPM

Typical Value: 750 RPM

Location: Powertrain

Owner: Platform

K_TransientPN_DsngeOff = Engine speed offset above K_ContinuousPN_Dsnge at which the A/C Compressor is immediately disabled when the transmission is in Park or Neutral, to protect the A/C Compressor.

Minimum Range: 0 to 8192 RPM

Minimum Resolution: 32 RPM

Typical Value: 750 RPM

Location: Powertrain

Owner: Platform

4.1.8.2 Variables

AC_Pressure = variable reflects the A/C refrigerant high side fluid sensor value as determined from the ECM hardware interface.

Minimum Range: 0 to 3570 kPa

Minimum Resolution: 14 kPa

AC_Compressor_Actual_Torque = See Section 4.1.3.8 for more information).

Engine_Coolant_Temperature = Temperature of the engine coolant as determined by the I/O interface of the Powertrain Controller.

Minimum Range: -40 to +140 °C

Minimum Resolution: 0.2 °C

Engine_Speed = Engine speed as determined by Powertrain. Used to determine A/C Compressor Torque load on the engine.

Minimum Range: 0-8192 RPM

Minimum Resolution: RPM

Fault_Active_AC_Pressure = This flag is set when Powertrain has detected a fault with the AC Pressure Sensor signal. Fault_Active_AC_Pressure shall be set equal to “True” upon detection of an error in the AC_Pressure value. Fault_Active_AC_Pressure shall remain set for the current ignition cycle.

Minimum Range: N/A

Minimum Resolution: True or False

Vehicle_Speed = speed of the vehicle as determined by Powertrain

Minimum Range: 0 – 255 KPH

Minimum Resolution: 1 KPH

4.1.8.3 Compressor Sequence/Event Chart.

Description:

- Yellow cells – Events and signals sent by Platform.
- Blue values – Variable/state change.
- *Engine Load Compensation* indicates what information PowerTrain might use for their estimation.
- TIME / EVENT, no information about how long time/ many frames that passes between the event is considered.

Compressor engagement overview

TIME / EVENT	DEFAULT 1	AC REQ	ECU prep	app. Engagement	Engaged	app. Norm Operation	Norm operation
Air Conditioning Compressor Mode Request	DISENG im	ENABLE	ENABLE	ENABLE	ENABLE	ENABLE	ENABLE
Air Conditioning Compressor Command	OFF	OFF	OFF	ON	ON	ON	ON
Air Conditioning Compressor Normalized Load	0	0	0	0	MIN VALUE	MIN VALUE	OPERATIONAL
Air Conditioning Compressor Normalized Load Validity	VALID	VALID	VALID	VALID	VALID	VALID	VALID
Air Conditioning Compressor normalized Load Gradient Allowed	0.0	0.0	MIN VALUE	MIN VALUE	MIN VALUE	OPERATIONAL	OPERATIONAL
Engine Load Compensation	NONE	NONE	use Calibration	use Calibration	use serial data	use serial data	use serial data

Compressor disengage immediate overview
Requested by Engine

TIME / EVENT	Comp engaged	Im. Shutdown Req	Im. Shutdown	DEFAULT
Air Conditioning Compressor Mode Request	ENABLE	ENABLE	Im Disengage	Im Disengage
Air Conditioning Compressor Command	ON	OFF	OFF	OFF
Air Conditioning Compressor Normalized Load	OPERATIONAL	OPERATIONAL	0	0
Air Conditioning Compressor Normalized Load Validity	VALID	VALID	VALID	VALID
Air Conditioning Compressor normalized Load Gradient Allowed	OPERATIONAL	MAX VALUE	MAX VALUE	0.0
Engine Load Compensation	use serial data	use serial data	NONE	NONE

Compressor immediate disengage overview
Requested by HVAC

TIME / EVENT	Comp engaged	Im. Shutdown Req	Im ShutDown App	Im. Shutdown	DEFAULT
Air Conditioning Compressor Mode Request	ENABLE	Im Disengage	Im Disengage	Im Disengage	Im Disengage
Air Conditioning Compressor Command	ON	ON	OFF	OFF	OFF
Air Conditioning Compressor Normalized Load	OPERATIONAL	OPERATIONAL	OPERATIONAL	0	0
Air Conditioning Compressor Normalized Load Validity	VALID	VALID	VALID	VALID	VALID
Air Conditioning Compressor normalized Load Gradient Allowed	OPERATIONAL	OPERATIONAL	MAX	MAX VALUE	0.0
Engine Load Compensation	use serial data	use serial data	use serial data	NONE	NONE

Compressor disengage overview
Requested by Engine

TIME / EVENT	Comp engaged	Shutdown Req	Rampdown	Shutdown	Shutdown	DEFAULT
Air Conditioning Compressor Mode Request	ENABLE	ENABLE	Disengage	Disengage	Disengage	Im Disengage
Air Conditioning Compressor Command	ON	OFF	OFF	OFF	OFF	OFF
Air Conditioning Compressor Normalized Load	OPERATIONAL	OPERATIONAL	MIN VALUE	0	0	0
Air Conditioning Compressor Normalized Load Validity	VALID	VALID	VALID	VALID	VALID	VALID
Air Conditioning Compressor normalized Load Gradient Allowed	OPERATIONAL	OPERATIONAL	OPERATIONAL	OPERATIONAL	0.0	0.0
Engine Load Compensation	use serial data	use serial data	use serial data	use serial data	NONE	NONE

Compressor disengage overview
Requested by HVAC

TIME / EVENT	Comp engaged	Shutdown Req	Rampdown app	Rampdown	Shutdown	Shutdown	DEFAULT
Air Conditioning Compressor Mode Request	ENABLE	Disengage	Disengage	Disengage	Disengage	Disengage	Im Disengage
Air Conditioning Compressor Command	ON	ON	OFF	OFF	OFF	OFF	OFF
Air Conditioning Compressor Normalized Load	OPERATIONAL	OPERATIONAL	OPERATIONAL	MIN VALUE	0	0	0
Air Conditioning Compressor Normalized Load Validity	VALID	VALID	VALID	VALID	VALID	VALID	VALID
Air Conditioning Compressor normalized Load Gradient Allowed	OPERATIONAL	OPERATIONAL	OPERATIONAL	OPERATIONAL	OPERATIONAL	0.0	0.0
Engine Load Compensation	use serial data	use serial data	use serial data	use serial data	use serial data	NONE	NONE

5 Provisions for Shipping

Not Applicable.

6 Notes

6.1 Glossary

None.

6.2 Acronyms, Abbreviations, and Symbols.

See GMW8762 Appendix Section A.3

7 Additional Paragraphs

7.1 All materials supplied to this specification must comply with the requirements of GMW3001, **Rules and Regulations for Materials Specifications.**

7.2 All materials supplied to this specification must comply with the requirements of GMW3059, **Restricted and Reportable Substances for Parts.**

8 Coding System

This specification shall be referenced in other documents, drawings, VTS, CTS, etc. as follows:

GMW8771

9 Release and Revisions

9.1 Release. This general specification originated in June 2003; approved by The Global PPEI Core Team in December 2003 and initially published in February 2004 for the Global PPEI Version 3.4.

9.2 Revisions.

Rev	Approval Date	Description (Organization)
A	Aug 2004	Global PPEI Version 3.5 Release.
B	Jul 2005	Global PPEI Version 3.6 Release.
C	Mar 2006	Global PPEI Version 3.7 Release.

Appendix A

The following are approved Change Requests (CRs) for the Global PPEI Version 3.6 Release that impacted the GMW8771 Air Conditioning Compressor Control Subsystem.

Sections Changed	Description of Change	Rationale/ Authorization
	No changes were made to GMW8771 PPEI Air Conditioning Compressor Control Subsystem Standard for the Global PPEI Version 3.7 Release.	

Deviations

None.