Air Ride Controller

Hardware

Height Sensors: Delphi ER10031 **Tank Pressure Sensor:** 150PSI
Processor: Arduino Micro Pro

Arduino Inputs

Item	Variable Name	Pin Number
Right Front Height Sensor	RFheightCurr	A0
Left Front Height Sensor	LFheightCurr	A1
Right Rear Height Sensor	RRheightCurr	A2
Left Rear Height Sensor	LRheightCurr	A3
Right Front Pressure Sensor	RFpresCurr	A6
Left Front Pressure Sensor	LFpresCurr	A7
Right Rear Pressure Sensor	RRpresCurr	A8
Left Rear Pressure Sensor	LRpresCurr	A9
Tank Pressure Sensor	TankPres	A10
IgnitionState	IgnState	D4 Open = Ignition Off Closed = Ignition On

Arduino Outputs

Item	Variable Name	Pin Number
Right Front Up	RFup	Pin 22
Right Front Down	RFdown	Pin 23
Left Front Up	LFup	Pin 24
Left Front Down	LFdown	Pin 25
Right Rear Up	RRup	Pin 26
Right Rear Down	RRdown	Pin 27
Left Rear Up	LRup	Pin 28
Left Rear Down	LRdown	Pin 29
Compressor Control	CompControl	Pin 30

EEprom – Stored User Data

Variable	Description	Type	Location
General			
Config	Status of system set-up	Binary Set bit 0 – Not Configured Set bit 1 – Configured	
Compressor Control			
CompOnPres	Compressor On Pressure	Numeric	
CompOffPres	Compressor Off Pressure	Numeric	
CompRunTimeSet	Maximum Compressor Run Time	Numeric	
CompRestTimeSet	Maximum Compressor Rest Time	Numeric	
CompFaultTime	Time to CompOff to pressure	Numeric	
TankPressHigh	High Tank Pressure	Numeric	
TankPressLow	Low Tank Pressure	Numeric	
Ride Height Input Control Type			
RideheightMode	Ride Height Mode	Binary Set to 0 for Height Sensor Control Set to 1 for Pressure Sensor Control	
RFheightMax	Right Front Maximum Height	Numeric	
LFheightMax	Left Front Maximum Height	Numeric	
RRheightMax	Right Rear Maximum Height	Numeric	
LRheightMax	Left Rear Maximum Height	Numeric	
RFheightMin	Right Front Minimum Height	Numeric	
LFheightMin	Left Front Minimum Height	Numeric	
RRheightMin	Right Rear Minimum Height	Numeric	
LRheightMin	Left Rear Minimum Height	Numeric	
RFheightTol	Right Front Tolerance %	Numeric	
LFheightTol	Left Front Tolerance %	Numeric	
RRheightTol	Right Rear Tolerance %	Numeric	
LRheightTol	Left Rear Tolerance %	Numeric	
PresetName1	Preset Name for first preset on screen	Alpha/Numeric	
RFheight1	Right Front User Stored Value	Numeric	
LFheight1	Left Front User Stored Value	Numeric	
RRheight1	Right Rear User Stored Value	Numeric	
LRheight1	Left Rear User Stored Value	Numeric	
PresetName2	Preset Name for 2nd preset on screen	Alpha/Numeric	
RFheight2	Right Front User Stored Value	Numeric	
LFheight2	Left Front User Stored Value	Numeric	
RRheight2	Right Rear User Stored Value	Numeric	
LRheight2	Left Rear User Stored Value	Numeric	
PresetName3	Preset Name for 3rd preset on screen	Alpha/Numeric	
RFheight3	Right Front User Stored Value	Numeric	
LFheight3	Left Front User Stored Value	Numeric	
RRheight3	Right Rear User Stored Value	Numeric	
LRheight3	Left Rear User Stored Value	Numeric	
PresetName4	Preset Name for 4th preset on screen	Alpha/Numeric	
RFheight4	Right Front User Stored Value	Numeric	
LFheight4	Left Front User Stored Value	Numeric	
RRheight4	Right Rear User Stored Value	Numeric	
LRheight4	Left Rear User Stored Value	Numeric	

PresetName5	Preset Name for fifth preset on screen	Alpha/Numeric
RFheight5	Right Front User Stored Value	Numeric
LFheight5	Left Front User Stored Value	Numeric
RRheight5	Right Rear User Stored Value	Numeric
LRheight5	Left Rear User Stored Value	Numeric
PresetName6	Preset Name for sixth preset on screen	Alpha/Numeric
RFheight6	Right Front User Stored Value	Numeric
LFheight6	Left Front User Stored Value	Numeric
RRheight6	Right Rear User Stored Value	Numeric
LRheight6	Left Rear User Stored Value	Numeric

Ignition Rise to Preset

IGN_On_Height	Ignition on height preset Set to 0 for no preset	Numeric

Stance Preset

StancePreset	Ignition Off height preset Set to 0 for no preset	Numeric

Time to Stance

StanceTime	Ignition off - Time in seconds	Numeric

Pulse Air Valves - Speed Lift and Drop

RFSpeedLift	Pulse frequency for Right Front – Lift	Numeric
LFSpeedLift	Pulse frequency for Left Front – Lift	Numeric
RRSpeedLift	Pulse frequency for Right Rear – Lift	Numeric
LRSpeedLift	Pulse frequency for Left Rear – Lift	Numeric
RFSpeedDrop	Pulse frequency for Right Front – Drop	Numeric
LFSpeedDrop	Pulse frequency for Left Front – Drop	Numeric
RRSpeedDrop	Pulse frequency for Right Rear – Drop	Numeric
LRSpeedDrop	Pulse frequency for Left Rear – Drop	Numeric

Pulse Speed

PulseSpOn1	Pulse frequency in seconds	Numeric
PulseSpOn2	Pulse frequency in seconds	Numeric
PulseSpOn3	Pulse frequency in seconds	Numeric
PulseSpOn4	Pulse frequency in seconds	Numeric
PulseSpOn5	Pulse frequency in seconds	Numeric
PulseSpOn6	Pulse frequency in seconds	Numeric
PulseSpOff1	Pulse frequency in seconds	Numeric
PulseSpOff2	Pulse frequency in seconds	Numeric
PulseSpOff3	Pulse frequency in seconds	Numeric
PulseSpoff4	Pulse frequency in seconds	Numeric
PulseSpOff5	Pulse frequency in seconds	Numeric
PulseSpOff6	Pulse frequency in seconds	Numeric

Pulse on Manual Control

PulseSpMan	Set pulse speed to Man/Auto	Binary - Set bit 0 – Auto Set bit 1 - Manual

Compressor Control

Compressor Control Variables

CompControl = Controls Compressor - Set Output to:	High = On Low=Off
CompOnPres = Compressor On Pressure	Default - 90PSI *
CompOffPres = Compressor Off Pressure	Default - 120PSI *
CompRunTime = Compressor Run Time Duty Cycle	
CompRunTimeSet = Maximum Compressor Run Time per cycle	Default - 5 mins *
CompRestTime = Compressor Rest Time Rest Cycle	
CompRestTimeSet = Maximum Compressor Rest Time per cycle	Default -20 mins *
CompFaultTime = Time to CompOff pressure	Default - 10 mins *
TankPressHigh = High Tank Pressure	Default –150PSI *
TankPressLow = Low Tank Pressure	Default –TBD *

Operation

Compressor activation is controlled by the Tank Pressure Sensor(TankPressure).

To turn on Compressor
If CompRestTime => CompRestTimeSet & If CompOnPres => TankPres set CompControl = High
CompRunTime = 0 and Start counter for CompRunTime

To turn off Compressor
If CompOffPres=> TankPres set CompControl = Low
If CompRunTime => CompRunTimeSet set CompControl = Low and display Error Msg “Compressor Fault”
Stop counter for CompRunTime
CompRestTime = 0 and Start counter for CompRestTime

Error Messages

Compressor Fault - If the pressure fails to rise in CompRunTimeSet to CompOffPres
High Pressure Warning – If the tank pressure overshoots TankPressHigh pressure
Low Pressure Warning – If the tank pressure is below TankPressLow

Ride Height Variables

Ride Height Mode

RideHeightMode – Ride Height Mode – Binary
Set to 0 for Height Sensor Control
Set to 1 for Pressure Sensor Control

Current Ride Height

RFheightCurr – Current Ride Height from Right Front Sensor
LFheightCurr – Current Ride Height from Left Front Sensor
RRheightCurr – Current Ride Height from Right Rear Sensor
LRheightCurr – Current Ride Height from Left Rear Sensor

Maximum Height

RFheightMax – Right Front Maximum Height *
LFheightMax – Left Front Maximum Height *
RRheightMax – Right Rear Maximum Height *
LRheightMax – Left Rear Maximum Height *

Minimum Height

RFheightMin – Right Front Minimum Height *
LFheightMin – Left Front Minimum Height *
RRheightMin – Right Rear Minimum Height *
LRheightMin – Left Rear Minimum Height *

Height Tolerance

This adjustment controls the height tolerance of the Height Sensors. This controls how close the system will try to get to the target preset height.

RFheightTol – Right Front Tolerance *
LFheightTol – Left Front Tolerance *
RRheightTol – Right Rear Tolerance *
LRheightTol – Left Rear Tolerance *

Ride Height Presets

PresetName1 = Preset Name for first preset on screen *
RFheight1 = Right Front User Stored Value *
LFheight1 = Left Front User Stored Value *
RRheight1 = Right Rear User Stored Value *
LRheight1 = Left Rear User Stored Value *

PresetName2 = Preset Name for second preset on screen *
RFheight2 = Right Front User Stored Value *
LFheight2 = Left Front User Stored Value *
RRheight2 = Right Rear User Stored Value *
LRheight2 = Left Rear User Stored Value *

A total of 6 presets. Naming convention to follow above.

Ignition Rise to Preset

IGN_On_Height = After turning on Ignition automatically goes to a predetermined preset. If this variable is set to 0, then no preset is selected.

Stance Preset *

StancePreset = After turning off Ignition automatically goes to one of the six presets. If this is set to 0 then no action.

Time to Stance *
StanceTime = After turning off Ignition automatically goes to a predetermined preset in the stored time. Time in seconds.

Pulse Air Valves

Speed Lift
This adjustment controls the pulse frequency for when the vehicle is lifting an airbag. This speed control only applies when using the height presets buttons and when Pulse On Manual Controls is turned on. The settings range from 1-6.

RFSpeedLift – Pulse frequency for Right Front – Lift *
LFSpeedLift – Pulse frequency for Left Front – Lift *
RRSpeedLift – Pulse frequency for Right Rear – Lift *
LRSpeedLift – Pulse frequency for Left Rear – Lift *

Speed Drop
This adjustment controls the pulse frequency for when the vehicle is dropping an airbag. This speed control only applies when using the height presets and when Pulse On Manual Controls is turned on.
The settings range from 1-6.

RFSpeedDrop - Pulse frequency for Right Front – Drop *
LFSpeedDrop - Pulse frequency for Left Front – Drop *
RRSpeedDrop - Pulse frequency for Right Rear – Drop *
LRSpeedDrop - Pulse frequency for Left Rear – Drop *

Recommended Settings

Settings	Valve On Time Secs	Valve Off Time Secs
1	Full	0
2	0.1 secs	0.1 secs
3	0.5 secs	0.3 secs
4	0.1 secs	0.5 secs
5	0.5 secs	0.8 secs
6	0.1 secs	1.0 secs

Pulse on Manual Control *

PulseSpMan - When set to ON – Use Air Valve Duty Cycle - When set OFF – Air Valves stay on constantly.
This only applies to the manual controls.