



**FORD PERFORMANCE**

## **2017 Mustang Shelby FP350S**



**Official Owner's Manual**

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# 1. INTRODUCTION

### **ATTENTION!**

**This vehicle is for off-road use ONLY and is NOT street legal.**

**Before operating your FP350S, please read and understand this operation manual!**

**Register your FP350S! Without registration, you may be missing critical updates and helpful information!**

- The FP350S is a turn-key racing vehicle that requires proper race preparation.
- Prior to usage, "nut and bolt" your FP350S. See Appendix B for all torque specifications. This is a process of checking all the nuts, bolts, wiring, belts, hoses, tires, etc...on your vehicle. I.E. check your tire pressures, as they will change over time and need to be checked before every run. Beyond component specific maintenance, we recommend you regularly perform a "nut and bolt" inspection.
- Change your spark plugs regularly. Fouled plugs can cause your FP350S to run poorly and lead to engine damage. See section 6.1, Engine Maintenance, for full details.
- Ensuring the vehicle is legal for race competition, including SFI/FIA certification, is the responsibility of the racer. Familiarize yourself with the vehicle and the rulebook for your sanctioning body.
- It is the user's responsibility to equip themselves with the proper safety gear, including but not limited to a helmet, balaclava, HANS device, fire suit, gloves, fire shoes, fire-rated undergarments, and other applicable safety gear.
- Be diligent with the care and maintenance of your vehicle!



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### ATTENTION!

It is the sole responsibility of the driver to ensure they fit safely in the vehicle. This includes but is not limited to the adjustment of the steering column, seat position, and seatbelt adjustment, as well as proper padding of appropriate roll bars that the driver may come in contact with. Fire pin must be pulled before using vehicle.

## 1.1 Vehicle Specifications

### Engine

5.2-liter four-valve-per-cylinder V8 engine prepared by Ford Performance Parts  
Unique Ford Performance engine calibration  
Upgraded engine oil cooling system  
Upgraded cooling system  
Race-oriented exhaust system  
Firing Order: 1-5-4-8-6-3-7-2

### Driveline

Six speed Tremec manual transmission  
Transmission oil cooler with integral oil pump  
Torsen rear differential with upgraded differential pump and cooling system  
3.73 final drive ratio

### Chassis

Seam welded unibody chassis  
MSA/FIA certified rollcage  
Front: Monotube 2-way adjustable inverted struts  
Ford Performance front anti-roll bar  
Ford Performance adjustable camber plates  
Rear: Monotube 2-way adjustable coilover dampers  
Ford Performance rear adjustable anti-roll bar  
Race EPAS (Electronic Power Assist Steering) with user selectable modes

### Electrical

P.R.S./Ford Performance wiring harness  
Motec C127 data collection system with GPS  
Center console switch plate with power/ignition and 2 spare switches  
Master power cutoff per Trans-Am rules



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### Interior

- Race-prepared interior package
- Sparco Pro-ADV TS racing seat
- Sparco fire suppression system
- Sparco/Ford Performance quick release steering wheel
- Ford Performance window netting
- FIA side-impact energy absorption foam
- Sabelt/Ford Performance 6 point racing harness

### Exterior

- Ford Performance front splitter
- Ford Performance/APR adjustable carbon fiber rear wing
- Vented hood with flush-mount hood pins
- 19x10.5" front and 19x11" rear wheels for transportation
- Optional 18x11" front and 18x11" rear Forgieline/Ford Performance forged aluminum racing wheels
- Optional FP350S graphics package
- Front/Rear tow hooks

### Brakes

- AP Racing 6 piston fixed front calipers
- 2-piece floating 372mm front rotors
- Front brake cooling ducts
- AP Racing 4 piston fixed rear calipers
- 2-piece floating 340mm rear brake rotors
- Stainless steel braided brake hoses
- TRW/Ford Performance racing ABS system



## **2. START-UP PROCEDURES**

### **2.1 Pre-Start Up**

Ensure the engine is filled with all required fluids to the recommended levels. Ensure there is fuel in the vehicle.

**ATTENTION!**

Your FP350S is compatible with VP C20 and Sunoco GTX260 racing fuel **ONLY**. You must select the proper fuel through your Pro-Cal 3 tool. Use of other fuels is not recommended, and can cause serious damage to your engine! See Pro-Cal section for more information.

### **2.2 Start-Up Process**

1. Turn on the electrical system by switching on the master power switch located inside the vehicle near the A-pillar on the driver's side. Before running your vehicle, ensure the fire bottle safety pin is removed.

**ATTENTION!**

**DO NOT** use the master power switch to turn off the engine. Any stored codes **WILL** be lost.



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Figure 1: Master Power Switch and fire handle



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2. Locate the toggle switches on the center control panel.



Figure 2: Center Console

3. Toggle on the IGNITION switch
4. Toggle on the FUEL PUMP switch.
5. Depress the clutch. The car WILL NOT START if the clutch is not depressed.
6. Depress START button. Your FP350S is equipped with auto-start, and holding the START button is not required.





### Warm-up

The default screen of the Motec data collection system is designed to help you understand when your car is up to temperature and ready to race. This screen has color-coded lights to identify the current temperature states of these components at a cursory glance. The lights corresponding to each component are shown below, and are only lighted while in the WARMUP screen or if a component is overheating or failed.

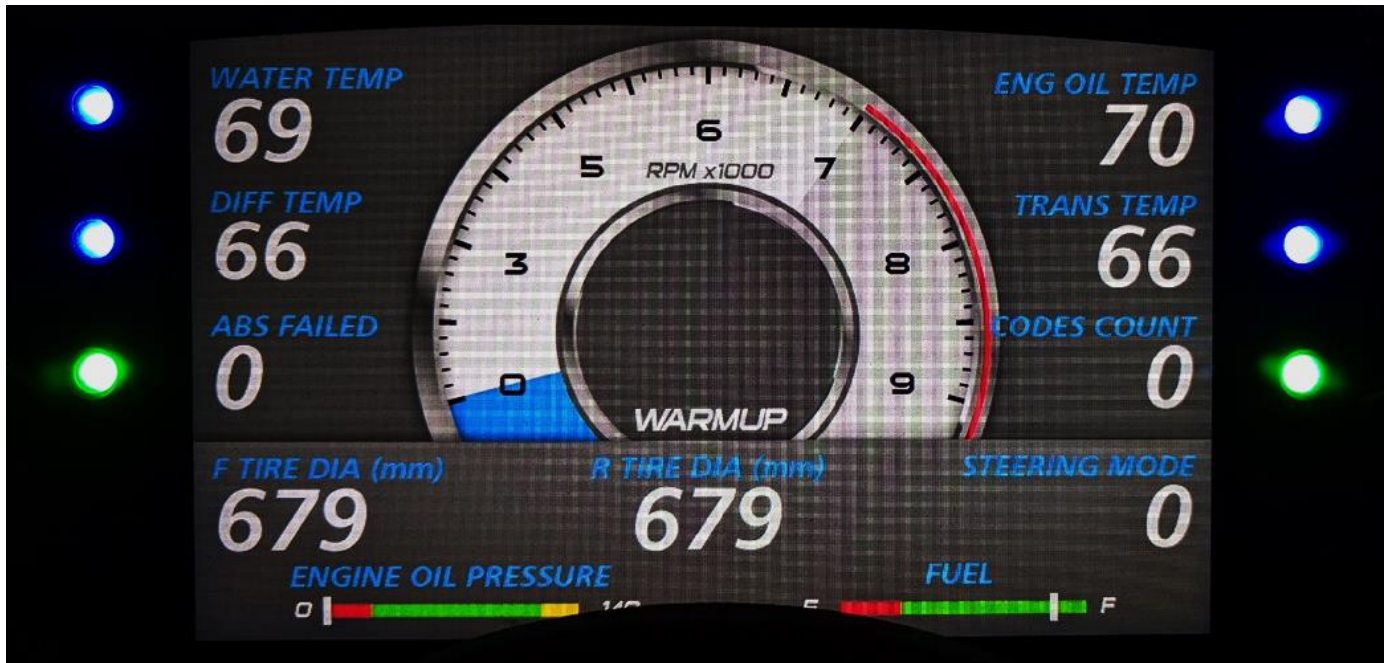


Figure 3: Motec C127 Dash Unit

**BLUE:** Component is currently below recommended operating temperature. Running at full performance may decrease the lifespan of components.

**GREEN:** Component is currently within recommended operating temperature range, or in an operational state.

**RED:** Component is currently over recommended operating temperature range or in an error state. Care should be taken to slow down and assess potential issues. Red lights may appear on any screen, not just the WARMUP screen.



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### Shutdown Procedure

When running your FP350S, the PCM will keep track of error codes. These codes will be stored ONLY if the car is shut down in the proper order.

1. Allow the car to idle for a few seconds to stabilize all readings
2. Shut off ignition switch
3. Wait approximately 5 seconds
4. Turn off master power switch

#### **ATTENTION!**

**DO NOT** use the master power switch to turn off the engine. Any stored codes **WILL** be lost.



## **3. CALIBRATION & PRO-CAL 3**

Your 2017 FP350S comes with a baseline calibration loaded on the PCM. The Pro-Cal 3 software has the capability to reflash the PCM with new calibrations, and adjust many key engine settings straight from your computer.

### **3.1 Pro-Cal 3 Setup**

In order to fully utilize Pro-Cal 3, you will need to first install the latest Pro-Cal 3 software from <https://performanceparts.ford.com/FP350S/>. You will need to register your FP350S in order to gain access to this software.

1. Plug the included Vehicle Interface dongle into a USB port. Wait for Windows to install the device drivers.
2. Start the Pro-Cal 3 software. Wait for the lights on the Vehicle Interface dongle to blink rapidly, signifying that the software has communication with the dongle.
3. Load the included calibration file in the Pro-Cal 3 software by clicking **Load File** on the left side of the screen, and selecting the calibration (.pc3 file type).
4. Plug the Vehicle Interface dongle into your FP350S's OBD connector.
5. Power on the master power switch on your FP350S, and turn on the ignition switch (but do not start the engine).
6. Go to the Calibrate tab within Pro-cal 3, and click "Read Data"
7. Wait approximately 15 seconds. Pro-Cal 3 should retrieve the current settings from the PCM. The Pro-Cal 3 software should now be connected to your FP350S's PCM and ready for usage.

### **3.2 Pro-Cal 3 Settings**

The Calibration tab in the Pro-Cal 3 software allows you to make many changes to the engine settings. The current values will be shown in the value cell when the Pro-Cal tool is connected to your vehicle PCM. To use this function, select the cell of the value you would like to change, and type in your desired value. Note that you will only be able to send a value between the min and max limits defined in the software. After choosing your values, click the write data button to send the values to the PCM. The progress gauge on the top right will indicate when the process is finished.

#### **ATTENTION!**

Ensure that the battery voltage is at least 11.5V before writing to the PCM. Ensure that the write process is complete before unplugging the Vehicle Interface dongle.



Parameter	Value	Unit	Min	Max
Engine RPM Limit	3000	RPM	3000	8250
PLSC Enable	Disabled			
PLSC Vehicle Speed	30	MPH	30	60
Launch Control Enable	Disabled			
Launch RPM Set Point	2000	RPM	2000	6000
Idle Speed Adder	0	RPM	0	1000
Fuel Density Type	Sunoco GTX			
Fuel Density	5.000	lbm/gal	5.000	8.000
HUD Mode	Off			
HUD Shift Point	4000	RPM	4000	8100
HUD Intensity	0	%	0	100
HUD Tach Mode Min RPM	500	RPM	500	2050
HUD Tach Mode Max RPM	6000	RPM	6000	9150
HUD Tach Mode Over Speed Offset	0	RPM	0	750
HUD Road Race Offset	0	RPM	0	3150
Front Tire Diameter	22.52	in	22.52	40.08
Rear Tire Diameter	22.52	in	22.52	40.08

Figure 4: Pro-Cal 3 Adjustment Settings

The units, as well as min and max values, are shown for each adjustment.

### Engine RPM Limit

Sets the maximum engine speed.

### PLSC Enable/Vehicle Speed

Enables/disables the pit lane speed control. The vehicle speed set is determined through the PCM, and requires the correct tire diameter to be entered from within the Pro-cal software. If the tire size is not set correctly, the pit lane speed control will not work accurately!

### Launch Control Enable/Setpoint

Enables/disables launch control and sets the RPM setpoint. To activate launch control, the vehicle must be at a complete stop. Depress the throttle all the way and the engine will rev and stabilize at the setpoint RPM. Quickly release the clutch, and the car will launch. There is NO traction control or power limiting after the launch event.

### Idle Speed Adder

This increases the idle speed by the set value. The default value is 0 RPM.



### **Fuel Density Type/Value**

This setting allows for the changing of the fuel density depending on the fuel used. This value is used by the fuel totalizer on the Motec dash and is a very accurate counter of fuel used. Sunoco GTX 260 and VP C20 both have preset values. Custom allows for a user-entered fuel density, which can be found on the fuel data sheet.

#### **ATTENTION!**

This value should only be matched to the specific fuel used. Changing this value will significantly affect the fueling strategy.

### **HUD Mode**

There are 3 HUD modes included with your FP350S to suit each driver's preferences. The default mode is Road Race. In the Road Race mode, lights will illuminate from both sides, eventually meeting up in the middle and flashing when the shift point RPM is reached. The drag mode does not illuminate until the shift point RPM is reached. The tachometer mode will illuminate from left to right. More information about each mode is included in their respective configuration sections.

### **HUD Shift Point**

Point at which the HUD will flash all lights to display it is time to shift for the drag and road race tach modes only. The default set point is 7800 RPM

### **HUD Intensity**

This adjusts the relative brightness of the HUD in percentage. The default value is 100%. 100% is recommended for sunny days, and 50% is a good starting point for an overcast day, and 25% a good starting point for nighttime racing.

### **HUD Tach Mode Min/Max RPM**

This parameter sets the RPM at which the tachometer HUD mode begins to illuminate and fully fills up. For example, if the min/max are set at 2000 and 8000 RPM respectively, the first HUD light will illuminate at 2000 RPM and all HUD lights will be illuminated at 8000 RPM.

### **HUD Tach Mode Overspeed offset**

Sets the shift point for the tach mode where the lights will begin flashing. This number is the offset above the Tach max RPM value. For example, if the max value for the tach is set to 7000 RPM, and the offset is set for 500 RPM, all lights will be illuminated at 7000 RPM and will begin flashing at 7500 RPM.



### HUD Road Race Offset

Sets the number of RPM below the shift point the HUD will begin to illuminate in the Road Race mode. For example, if the shift point is set at 8000 RPM and the offset is set at 2000 RPM, the outside lights will illuminate at 6000 RPM.

### Front/Rear Tire Diameter

This sets the diameter of the front and rear tires. It is important to set this value accurately because it controls numerous parameters and systems, including but not limited to the ABS system, the indicated vehicle speed, and the lap distance calculator.

#### ATTENTION!

Important: Set the correct tire size. If is set incorrectly, it can cause a reduction in performance, causing loss of vehicle control. Verify the tire size is set correctly on the WARMUP screen of the Motec dash.

### 3.3 Pro-Cal 3 Diagnostics

The Pro-Cal 3 tool may also be used to read any error codes (DTCs) on your FP350S. Go to the Diagnostics tab and use the buttons to read or clear any codes. The Key On Engine Off (KOEO) and Key On Engine Running (KOER) self tests may be run to find any codes. \*Note: KOEO requires both the ignition and the fuel pump to be on to run this test.\*

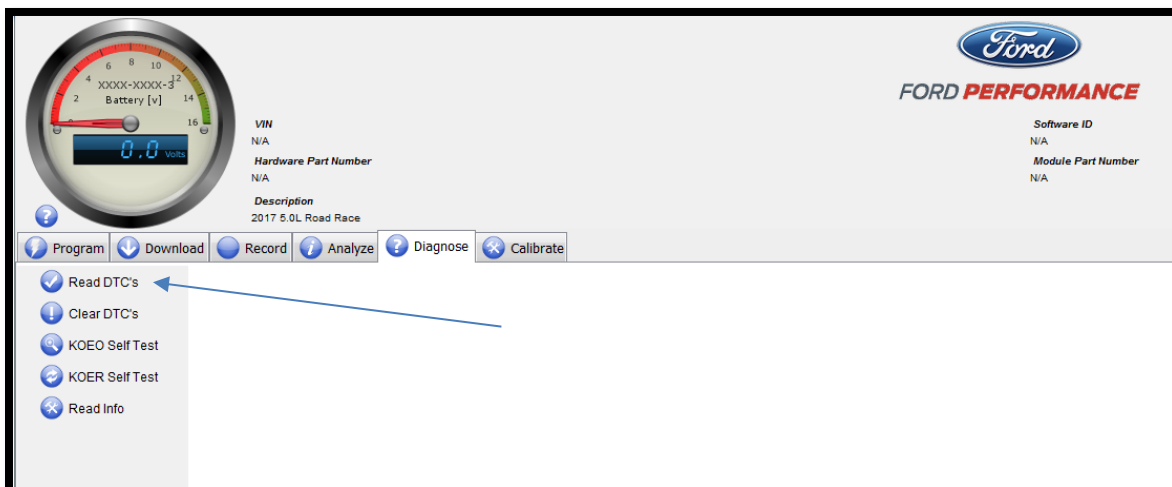


Figure 5: Pro-Cal 3 Diagnostics



## **4. MOTEC DATA SYSTEM**

### **4.1 Motec Overview**

The 2017 FP350S is equipped with a Motec C127 digital dash/data logger. This advanced unit collects data from various sources on the vehicle and logs it for future use by both the driver and mechanics. Additionally, your Motec C127 is equipped with 3 mode screens; WARMUP, QUALIFYING, and RACE. Each screen is intended to provide the driver with relevant information in each of these scenarios, and can be further customized to fit each driver's preferences using the Motec C127 dash manager software.

### **4.2 Motec Dash Manager**

Your Motec is accessible through the Motec C127 Dash Manager, which is available for download at <http://www.motec.com/c127/c127downloads/>. Installation support of the dash manager software is available through the Motec website. Through this software, you are able to change screen settings, logging settings, and shift light configuration, as well as retrieve any logged data from the device. It is important to regularly retrieve data off the device and label it properly, as the Motec software allows for comparisons between lap runs years apart from each other. The Motec file structure is based around "outings," and it is recommended data is retrieved, cataloged, and reviewed every stoppage of the vehicle.

Data can be retrieved from the device memory in the following way.

- 1: Open up C127 Dash Manager.
- 2: Connect the computer to the data port located in the closed duct near the passenger A-pillar using a standard Ethernet cable.
- 3: Select Online -> Get Logged Data (or press key F8)

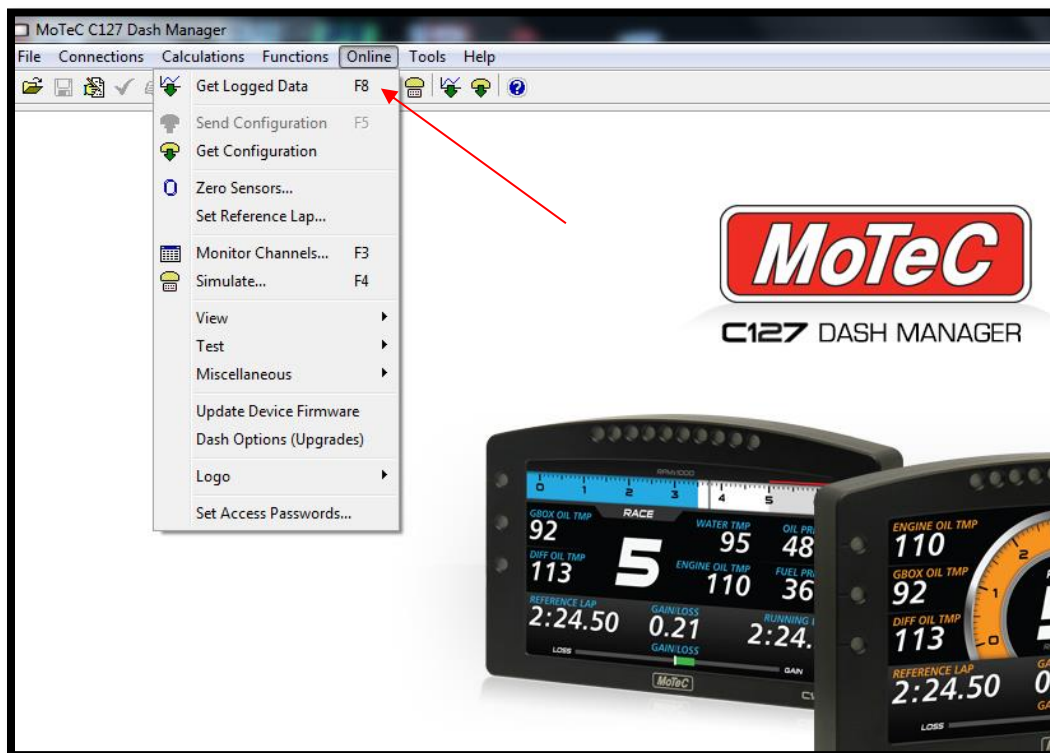


Figure 6: Motec Dash Manager – Get Logged Data Location

4: Enter relevant outing information. Your FP350S comes with the vehicle information already entered, and will be available in the vehicles tab after retrieving data the first time. Common North American venues are included on the dash configuration, and will be available in the venues after retrieving the data the first time.





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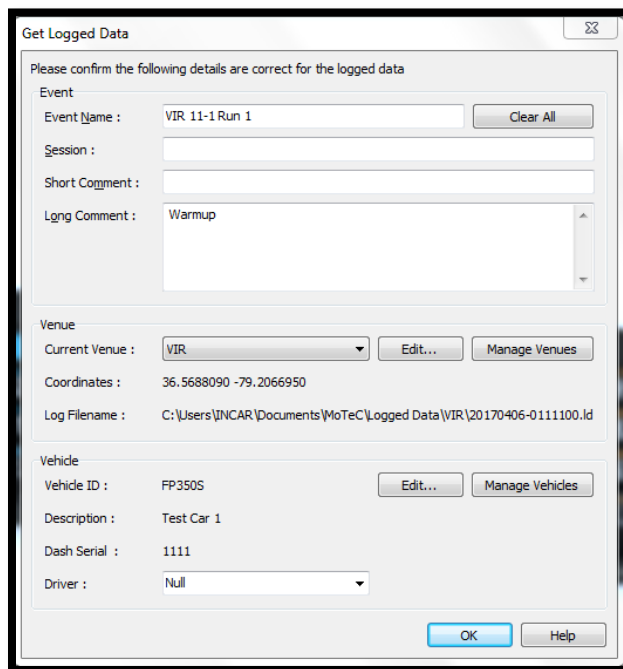


Figure 7: Motec get logged data screen

5: By default, Motec will save data to C:\Users\\$username\My Documents\MoTeC\Logged Data\, where \$username is the unique username for that particular user of the computer.

### 4.3 Motec i2

Files generated on your Motec C127 and downloaded through Motec dash manager are read through the Motec i2 Standard program. From the factory, your FP350S Motec dash will generate i2 standard files, not i2 Pro files. Motec i2 Standard is available for download at <http://www.motec.com/i2/i2downloads/>. Installation instructions and additional help is available on the Motec website. Additional advanced tutorials and data analysis strategies not covered in this manual are also available on the Motec website. Below is a quick introduction to the Motec i2 software.

1: After installation, launch the Motec i2 Standard software.

2: Here you will be greeted with a screen to select a workspace. I2 Standard allows for 4 default workspaces to suit various needs. It is recommended to use the circuit workspace as a starting point. Each workspace is adjustable to an individual user's preferences.



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Figure 8: Motec i2 Standard launch screen

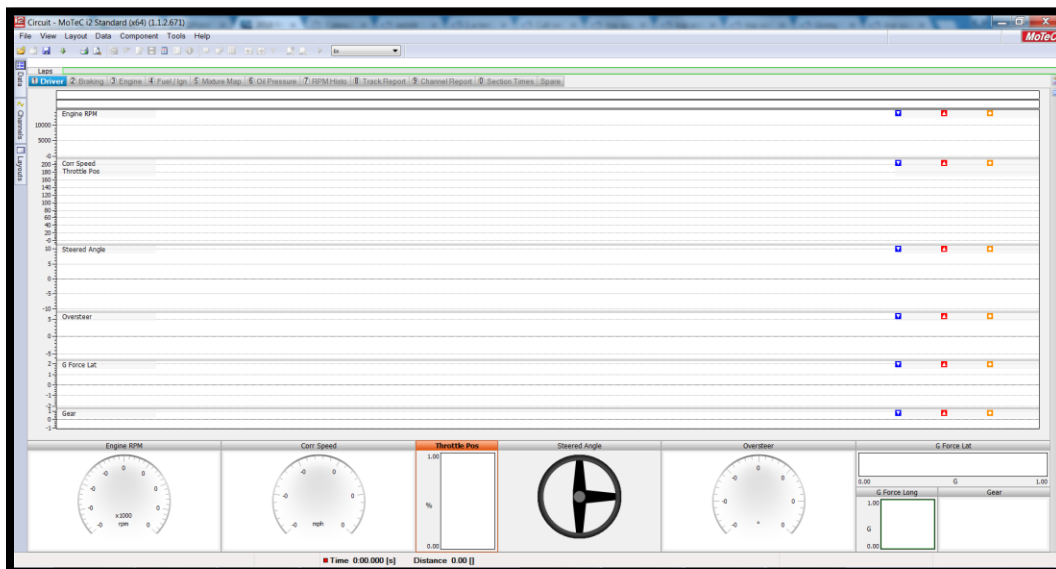


Figure 9: Motec screen upon open

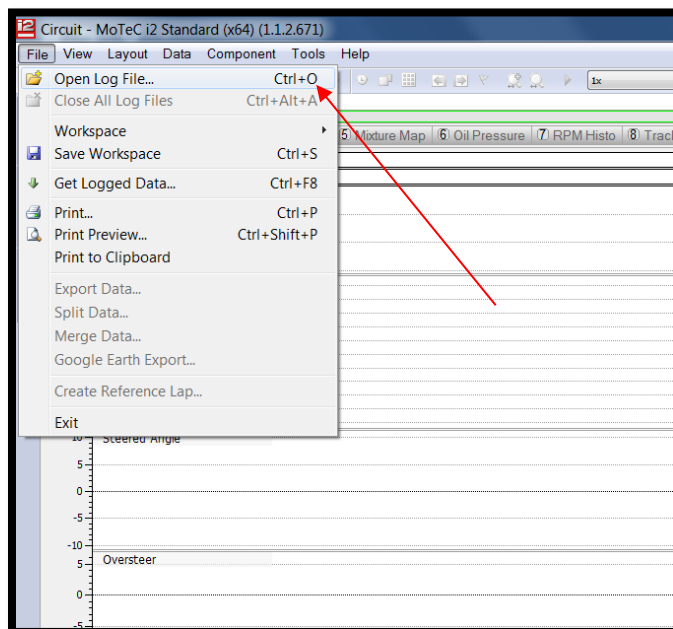
4: Open a file by selecting open in the top left corner, also found under File -> Open.



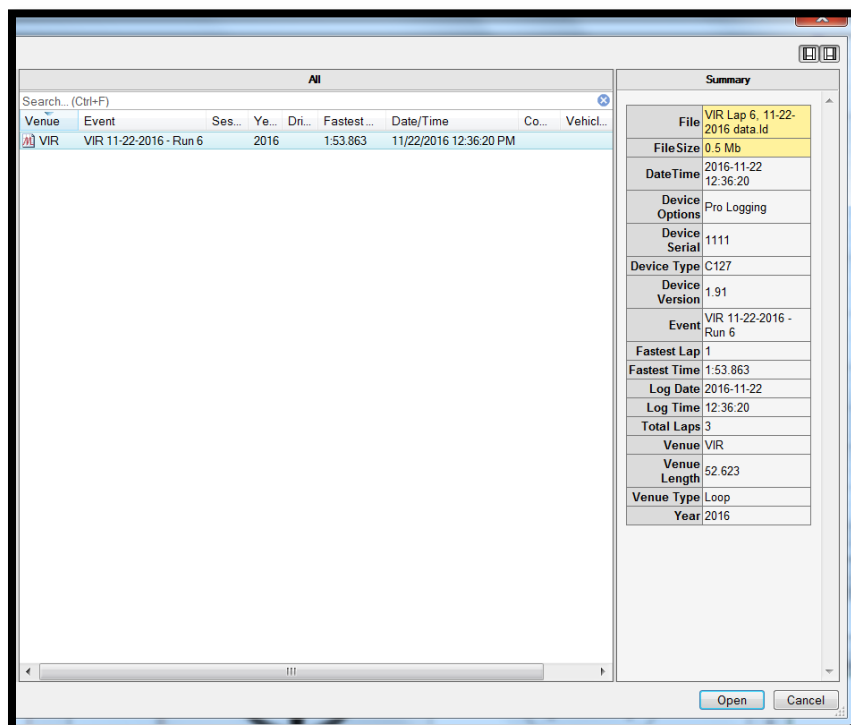
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5: In this screen, i2 will list each individual file, along with any notes input at the time the data was saved. Shown below is a sample of data on the included Motec configuration.



6: To add channels viewed, click CHANNELS on the left side. Additionally, which group channels appear in can be modified by right clicking and selecting properties, or pressing F5. Groups can only be modified when a file is opened. For additional help with Motec i2, consult Motec help documentation available on the Motec website.



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### 4.4 Included Data Screens

From the factory, your FP350S Motec calibration includes 3 screen modes. Each screen mode is intended to be used for a specific purpose, and can be further customized to a racer's individual preference. In this section, each screen will be covered, along with its intended use case. To download the configuration loaded on the dash, use the C127 Dash Manager software and click Online -> Get Configuration. From here, you can then edit the dash configuration and re-upload the modified configuration to the display. For more information on the customization of the display, refer to the Motec website.



### Warmup

This screen mode is the default screen that your FP350S will open up to when turning on master power. The purpose of this screen is to communicate the temperature and status of various systems of your vehicle. The 6 status lights will always be illuminated in either blue, green, yellow, or red. For the 4 temperature status lights, blue will indicate the system is under temperature, green indicates it's within the recommended operating temperature range, and red indicates it's over temperature. For the ABS and engine code lights, green will indicate the system is operational, while red indicates a fault. In the event of an ABS failure, the lights at the top of the screen will also flash red. For all lights, an additional flashing pattern is incorporated to convey information quickly. Blue lights will pulse slowly, green lights will be on steadily, and red lights will flash quickly. Full details about the WARMUP screen are shown below.



Figure 10: Warmup Screen



### Qualifying

This screen is the next screen the Motec dash will cycle to when pressing the PAGE button. Qualifying mode is intended to be used when attempting to set an ultimate lap time, and includes features such as a gain/loss numerical value and fastest lap time display. Additionally, critical engine parameters such as oil pressure and coolant temp are displayed to ensure the health of the engine. The full layout of the QUALIFYING screen is shown below.

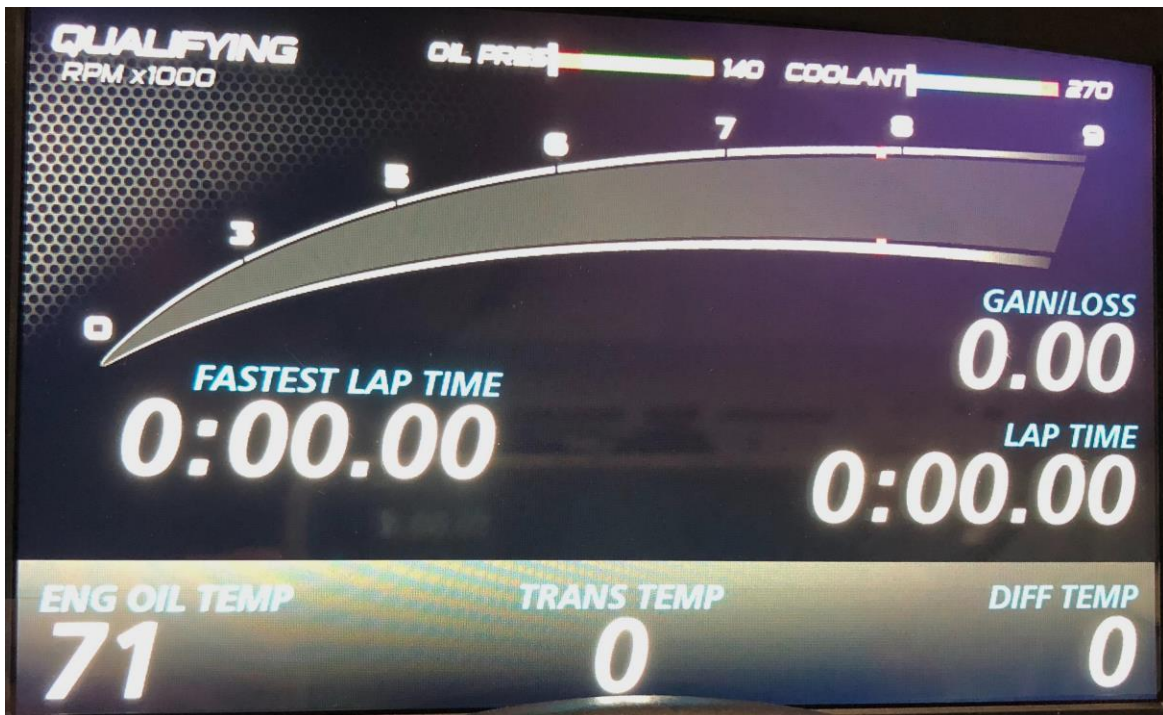


Figure 11: Qualifying screen



### Race

This screen is the next screen the Motec dash will cycle to when pressing the PAGE button. Race mode is intended to be used on long runs by logging the number of laps completed and displaying the most recent laptime. A lap gain/loss will track the current predicted laptime against the fastest lap time. Fuel used is included in liters, and is a very accurate measure of used fuel if fuel density is set properly in the Pro-Cal 3 software. It has been noted that the car will begin to stumble at around 53L of fuel used on high lateral G tracks. Only critical engine parameters are included to minimize the distraction to the driver during extended running and close quarters to other vehicles. The full layout of the RACE screen is shown below.



Figure 12: Race screen



## **4.5 Additional Motec Functions/Features**

### **Changing the display**

The dash unit is shipped with a generic setup to account for most situations. If there are changes the driver needs, they can be adjusted in the Functions -> Display menu. All changes will require re-uploading the modified configuration to the display. For additional help changing anything regarding the display, consult Motec help documentation available at the Motec website.

### **Changing Motec brightness**

To change the brightness of the display, go to Functions -> Display. In the popup window, choose the Backlight tab near the top of the window. Here you can adjust the brightness of the screen. The default value is 100% fixed brightness. For nighttime racing, a value around 25% is recommended as a starting point.

To change the brightness of the Motec lights, go to Functions -> Shift Light Module. Near the middle, there is a slider for various brightness settings. The default value is 100% fixed brightness. For nighttime racing, a value around 25% is recommended as a starting point.

### **Shift lights on the Motec Dash**

#### **Upshift lights**

The Motec C127 unit includes 10 lights across the top of the screen. These will light up with 1 successive light from 7200-8100 RPM in the default setting. To change this behavior, change values in C127 dash manager under Functions -> Shift Lights. For more help, consult Motec help documentation.

#### **Downshift lights**

To assist in understanding when it is applicable to downshift, the leftmost 3 lights will illuminate green at 4000 RPM. Below this RPM value, it is advantageous to downshift to assist in corner out acceleration performance.





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### Alarms

The Motec dash unit is constantly vehicle systems. If any temperature exceeds the alarm value, the specific alarm will display across the bottom with a red background telling you of the specific overtemperature alarm. In addition, the light associated with that temperature will flash red until the temperature is below the alarm threshold and the alarm cleared. For oil pressure, if the pressure drops below the low pressure alarm threshold, the top 10 shift lights will flash oscillating red lights, alerting the driver to stop immediately or face catastrophic engine damage. If the light associated with a temperature is flashing yellow, this signifies a sensor/ circuit failure. Transmission, differential, and oil sump temperatures are set up this way to alert the driver and allow for easy diagnostics. The flashing yellow light will be accompanied by a warning message at the bottom of the screen. . In the event of an ABS failure, the lights at the top of the screen will flash red.

### Zeroing the accelerometer

Your Motec C127 dash unit includes an internal accelerometer to log acceleration of the vehicle. Since the Motec dash is mounted on the steering column, it should be re-zeroed every time the steering column is adjusted. This is done with the car sitting on a flat level surface after all suspension adjustments are done and with the driver in the vehicle. There is a built in calibration that calibrates all 3 axes of the accelerometer at once. To calibrate, follow the directions below.

- 1: Ensure the vehicle is on a flat surface, set up as intended, and with the driver in the seat.
- 2: Ensure master power is on
- 3: Plug computer into the DATA port using an Ethernet cable as described above
- 4: In the Motec C127 Dash Manager software, open the Zero Sensors screen as shown
- 5: Click "Zero Sensors." The calibration for the car sitting level is already preprogrammed into the dash unit.

**For additional assistance, please contact Motec at  
[mse.dasupport@motec.com](mailto:mse.dasupport@motec.com) or  
+1 704 799 3800**



## 5. ELECTRICAL SYSTEM

### 5.1 OBDII & Motec Data port

The OBDII connector and Motec Data (RJ-45 ethernet) ports are both located on the passenger side dash vent.



Figure 13: Ethernet and OBDII connections

### 5.2 Vehicle PDB

The Vehicle Power Distribution Block (PDB) shown in Figure 14 below contains fuses/relays for all electronics in the vehicle. The PDB is located in the passenger side front of the engine bay. Refer to the wiring diagrams in the appendix at the end of this document for fuse/relay locations within the PDB.



Figure 14: Vehicle Power Distribution Block (PDB)

### 5.3 Center Control Panel

The center control panel contains multiple switches for control of starter motor, ignition, fuel pump, and many others. Each switch is in the ON position when in the UP position. Figure 15 is a map of the center console.

**NOTE!**

None of the electrical systems will function unless the master power switch is turned on. See Section 2.2 for more information.



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Figure 15: Center console switches and buttons

1. Start Switch – Depressing the starter switch will trigger the auto-start operation. The clutch must be depressed, otherwise the start sequence will not occur.
2. Ignition Switch – The ignition switch is the master start/run control. It must be on before any vehicle run operation will be allowed.
3. Fuel Pump Switch – Allows the fuel pumps to run. It must be on for the vehicle to run.
4. Lights Switch – Turns lights on/off. Up engages high-beams, down engages standard lights.
5. Wiper Switch – Turns wipers on/off. Wipers operate on single high speed.
6. Spare 1 & 2 – These are user customizable switches to connect other electrical accessories such as cool suits, drink bottles, or other accessories.
7. Page Button – This changes the page on the Motec dash between WARMUP, QUALIFYING, and RACE screens.



8. Alarm Button – This will clear alarms that show up on the Motec dash. Alarms are displayed on a red background at the bottom of the dash. Press button to clear single alarm.
9. Steering Button – This will cycle your FP350S between the 3 user selectable steering modes. More information about steering modes can be found in section 7.4 Steering
10. Map Button – Currently not active. For future expansion.
11. PLSC – Pressing this button will trigger the Pit Lane Speed Control. For information on setting or disabling the PLSC feature, consult the Pro-Cal 3 section of the manual.
12. Diff/Laps Button – This is a dual-purpose button. While the engine is off, pressing and holding this button will activate the differential pump. To fully drain and refill the differential fluid, it is necessary to use the pump to fill the lines and cooler. For more information on servicing the fluid in the differential, consult the maintenance section of the manual. While the engine is on, pressing this button will reset the lap counter to zero and reset all reference lap times.
13. Fuel button – This is a dual-purpose button. When the engine is off, holding this button activates the fuel pump to facilitate pumping fuel out of the tank. When the engine is on, pressing this button will reset the fuel totalizer value.



## 6. ENGINE

Your 2017 FP350S is equipped with a hand built Ford Performance 5.2L V8 engine. This is a performance racing engine that requires diligent care and maintenance to ensure optimum performance over time. Figure 16 shows an annotated view of the engine bay.

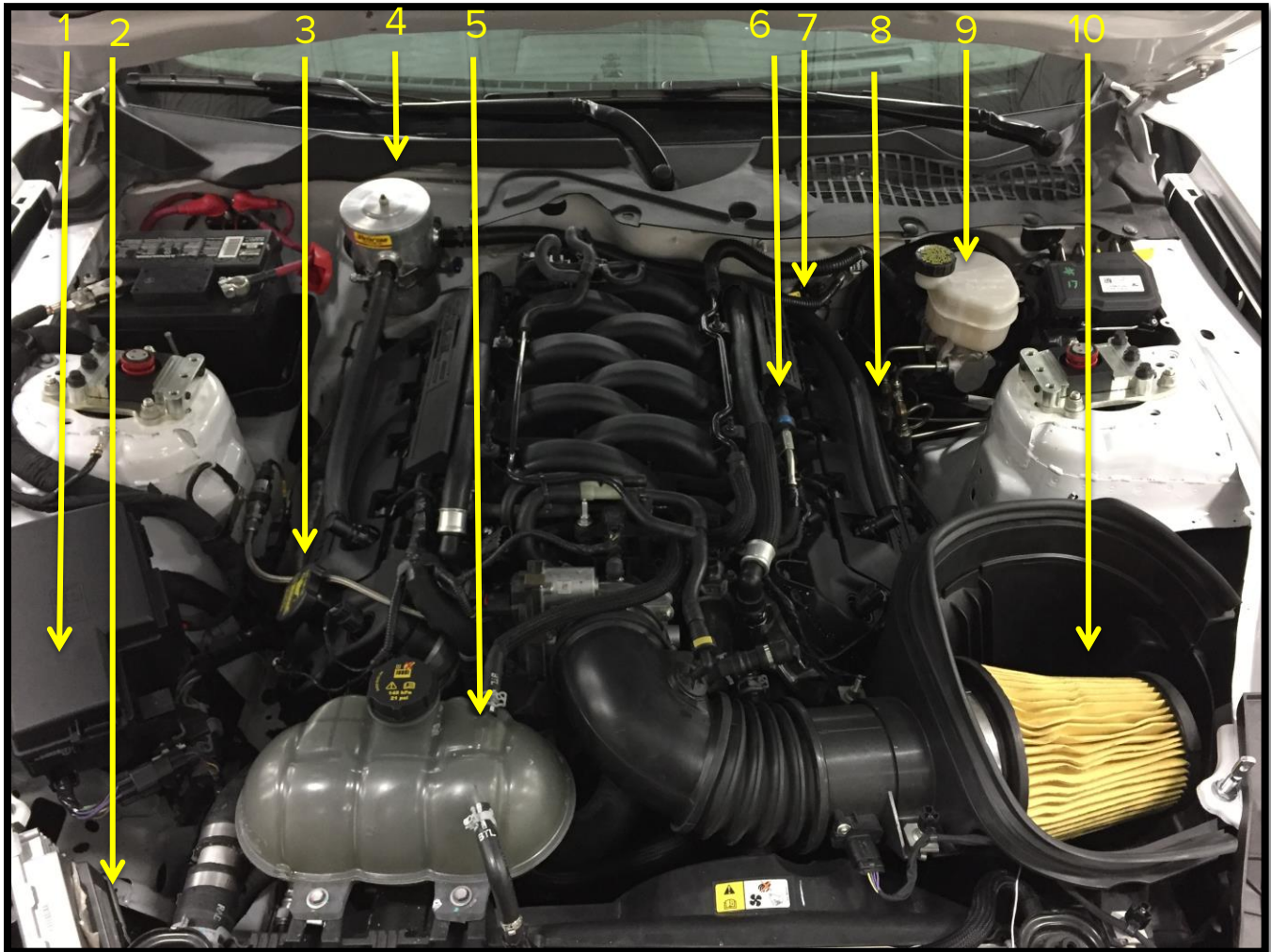


Figure 16: Engine bay

1	Vehicle PDB	6	Fuel Pressure Test Port
2	Vehicle PCM	7	Transmission dipstick/fill tube
3	Engine Oil Fill Cap	8	Engine Oil Dipstick (Not Visible)
4	Oil Catch Can	9	Brake Master Cylinder/ Fluid Reservoir
5	Engine Coolant Reservoir	10	Air Filter



## 6.1 Engine Maintenance

Racing puts extreme loads on engine components that will require unique maintenance performed on a regular basis. Ford Performance recommends the following:

1. Fill oil to the upper hole on the dipstick (Start with 14 qts of oil and add until intended level is reached).
2. Change engine oil and filter after every race event, or 4 hours of operation, whichever is sooner.
3. Spark plugs have a limited life expectancy and should be replaced after every event. Upon any misfire, plugs should be changed immediately.
4. Monitor engine oil pressure over time to understand engine bearing wear by picking a consistent RPM and temperature to look for deviations.
5. Check cylinder compression and leakage after every race event to monitor engine condition.
6. Replace O2 sensors every 20 hours of usage.
7. Complete engine maintenance is required after 40 hours of usage. This includes the replacement of the following parts:
  - pistons and rings,
  - main and rod bearings,
  - valves, valve springs, valve seals and spring retainers

In addition, the following parts should be checked for excess wear and/or cracks:

- Block
- Crank
- Heads
- Chain guides (primary and secondary)

After 2 seasons of usage, the cylinder block should be evaluated for replacement.

**See your engine builder for further recommendations.**



## 7. CHASSIS

### 7.1 Brakes

Your 2017 FP350S comes equipped with 4-wheel disc brakes, specially engineered and built for the FP350S by AP Racing. More information regarding the specific compounds and part numbers are in the Bill of Materials section.

### 7.2 Brakes Break-in Procedure

After start-up, prior to any runs, be sure to properly break-in your brake system by bedding your brake pads and rotors. (For bedding procedure and additional information or services, refer to: <https://www.essexparts.com/> ). Failure to do so may result in loss of control of your vehicle, serious damage as well as injury or death.

Allow the brakes to cool between runs, without applying pressure to the brake pedal. After the last stop, allow the brakes to completely cool before making an initial run in your vehicle.

### 7.3 Dampers

The front and rear dampers are manufactured by Sachs Racing specifically for the FP350S. There are adjustment knobs for both compression and rebound for each damper. Do not force adjusters beyond initial contact with stop or damage to the adjuster valve seats will occur.

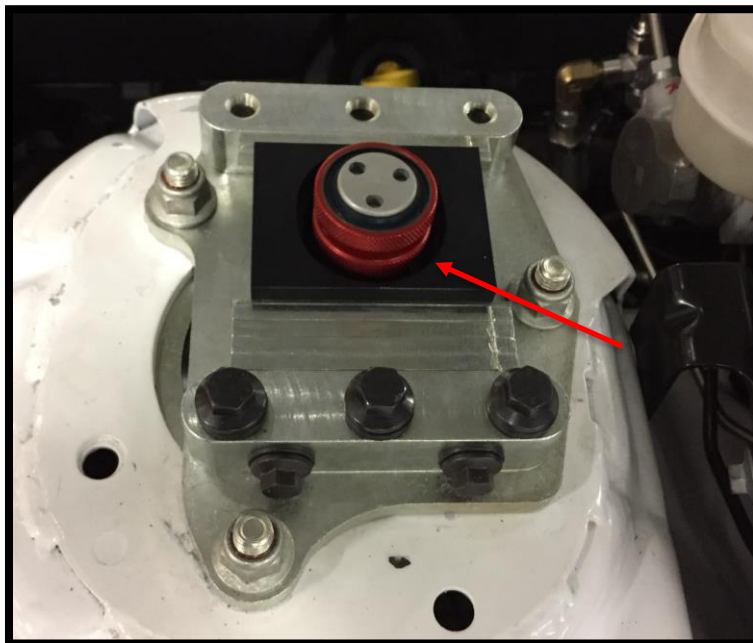


Figure 17: Front compression adjustment. Clockwise = more damping





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Figure 18: Front rebound adjustment. Clockwise = more damping

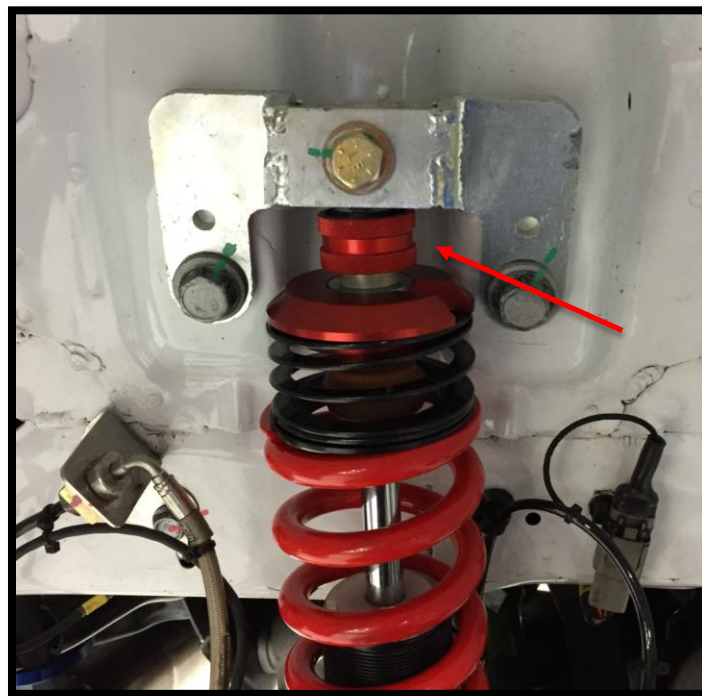


Figure 19: Rear rebound adjustment. Clockwise = more damping

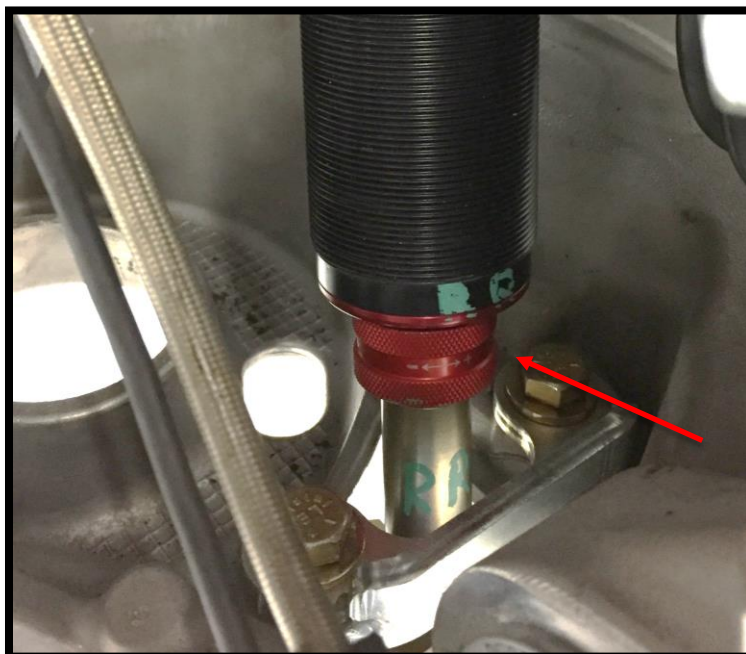


Figure 20: Rear compression adjustment. Clockwise = more damping

See section 8.4 for the chassis setup guide, including guidelines for setting the dampers. Also in appendix E. DAMPER SERVICE INFORMATION is additional information pertaining to damper servicing, replacement parts, and cleaning procedures.

### 7.4 Steering Modes

Your FP350S is equipped with 3 different steering modes. The modes in order are NORMAL, SPRINT, and ENDURANCE. It is toggled by pressing the STEERING (Black) button on the center console. When the master is powered on, the car will be in NORMAL steering mode. Pressing the STEERING button once will change the steering mode to SPRINT, and the word SPRINT will display on the bottom of the screen on a red background for approximately 1 second. The current mode is displayed on the warmup screen. The steering mode is logged in the Motec dash unit. The table below can be used to equate the steering mode to the logged number.

Number	Steering Mode
0	NORMAL
1	SPRINT
2	ENDURANCE



Each steering mode has different weighting and damping characteristics. NORMAL steering mode is the standard steering mode. SPRINT will have lower assist resulting in the heaviest steering feel. ENDURANCE will have the most assist resulting in the lightest steering feel.

## 7.5 Seat Belts

### **ATTENTION!**

The seat belts in the FP350S are NOT PRE SET. Before driving the vehicle, set belt lengths. They will need to be adjusted for each individual that operates this vehicle. These belts MUST be used with a HANS device. Belts are date stamped and will need to be replaced with your sanctioning body's rules and regulations.

## 7.6 Tire Care

To ensure optimum safety and performance of your FP350S, care should be taken in storage of any racing tires. Racing tires should NOT be stored near high temperatures, in direct sunlight, around welding areas, in overhead garage areas or around high-voltage electric motors. For specific concerns, please consult with your tire manufacturer regarding additional tire information.

Some general race tire care tips:

1. Remove the tires from the vehicle.
2. Remove the air from the tires and store them on their side in a cool/dark/dry environment.
3. Place tires in a black plastic bag when stored during the "off-season".
4. Make sure the temperature range in the storage location is between 50-80 degrees Fahrenheit.

Always check over your tires for proper pressure, cracking and uneven wear. Ensure that there are sufficient tread depth marks before running your FP350S.



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## 8. SETUP AND RECOMMENDATIONS

As delivered, your FP350S is intended for Trans-Am TA3 and SCCA T1 classes. With a restrictor and different front splitter, your FP350S is also legal for the Trans-Am TA4 class.

Because rules change over time, the classes your FP350S is legal for can change. Please consult the Trans-Am, SCCA, or other sanctioning bodies for the most up to date rules regarding the classes your FP350S is legal for.

### 8.1 Fuel Sample Port

The recommended area for a fuel sample port is located on the driver's side of the engine in line with the fuel line. The recommended fitting is a quick connect fitting. The combination of parts found to work best is the Fuel Rail Adaptor SKU 5-0040 from Central Florida Motorsports (A, pictured), coupled with an Eaton FD90 Series Diagnostic Coupler (B, pictured) (Male PN: FD90-1012-02-04 , Female PN FD90-1021-02-04).

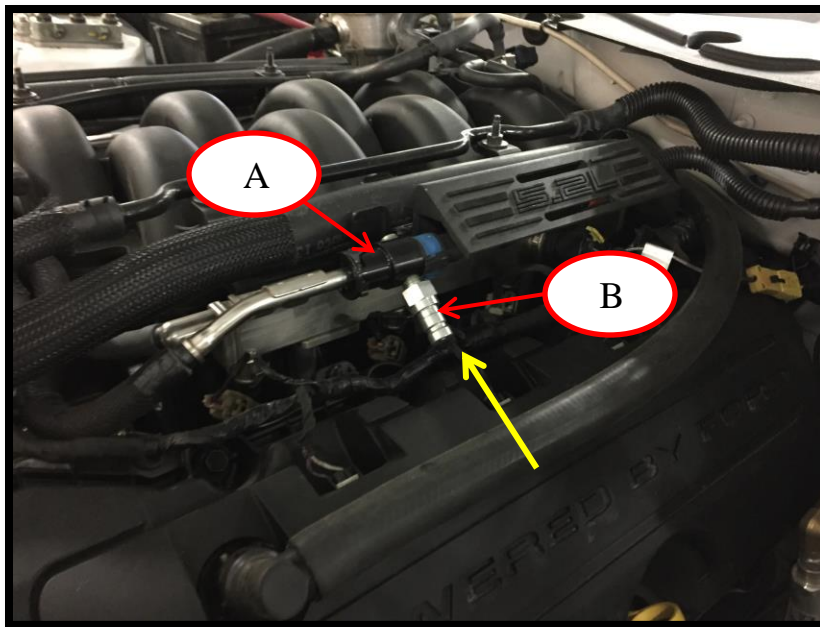


Figure 21: Fuel Sample Port installation area

If your racing series requires fuel pump-out, your vehicle is equipped to handle this procedure. With the engine off but power, ignition, and fuel switches on, depress the FUEL button, and continue to press the button as long as you want to pump out fuel. This will command the fuel pumps to run as long as there is no fuel rail pressure.



## 8.2 Fueling

Your 2017 FP350S is equipped with the standard 16 gallon 2017 Mustang fuel tank. For more information on adding a fuel cell to the vehicle, please contact the Ford Performance TechLine.

## 8.3 Baseline Setup

For optimum performance of your FP350S, a full chassis setup should be performed. It is recommended that this setup be done at an experienced race shop with proper equipment. A basic outline of the procedure for a full chassis setup is detailed here.

Tools required:

- Level drive-on vehicle lift or scale platform
- Wrenches and torque wrench
- Sockets/socket wrench
- SmartStrings or equivalent toe alignment system
- Camber gauge
- Corner weighting scales

## 8.4 Setup Guide

### **ATTENTION!**

It is necessary to properly set up your FP350S chassis prior to any performance driving. Failure to do so may result in loss of control of your vehicle, potentially causing serious damage as well as injury or death.

It is highly recommended that a full baseline chassis setup is performed before running your FP350S. Additionally, there are many adjustments that can be made to the chassis to optimize performance under varying track conditions.

The suspension and aerodynamics of your FP350S are adjustable. The table below contains the baseline settings and will perform well in most situations. It is recommended to adjust parameters one at a time to isolate individual parameters.



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Adjustment	Minimum	As delivered	Maximum
Front Rebound*	20 clicks from full stiff	9 clicks from full stiff	0 clicks from full stiff
Front Compression*	10 clicks from full stiff	4 clicks from full stiff	0 clicks from full stiff
Rear Rebound*	20 clicks from full stiff	6 clicks from full stiff	0 clicks from full stiff
Rear Compression*	10 clicks from full stiff	6 clicks from full stiff	0 clicks from full stiff
Front Tire Pressure**	Consult tires**	30 psi cold**	Consult tires**
Rear Tire Pressure**	Consult tires**	30 psi cold**	Consult tires**
Front Camber	-2.5 deg	-4.10 deg	-4.25 deg
Rear Camber	-.25 deg	-1.75 deg	-2.00 deg
Front Caster	7 deg	7.5 deg	8 deg
Front Toe	Toe out recommended	.12 deg out	<.35 deg out recommended
Rear Toe	Toe in recommended	.25 deg in	< .4 deg in recommended
Front Swaybar	Single position	Single position	Single position
Rear Swaybar	Soft position	Soft position	Hard position
Front Splitter	.5 deg down	.25 deg down	.5 deg up
Rear Wing	0 degrees	10 degrees	14 degrees

\*Values given are reference values, as individual units will vary slightly and change with use. Follow all upkeep and rebuild directions given in Appendix E.

\*\*Your FP350S is shipped with Pirelli P-Zero street tires at 30 psi of pressure. These tires are recommended ONLY as transportation, storage, and setup tires. The recommended Hoosier or Pirelli racing slicks on page 42 are only intended for track use.

For all measurements, care should be taken to measure on a flat and level surface. Additionally, all suspension parameters are best taken with equalized corner weights with a driver in the car if possible. When adjusting dampers, all the way tightened (clockwise) is considered “0 clicks,” and the first solid click when backing off (counter-clockwise) is “1 click.” The rear wing angle is measured using a straight edge resting on the top of the wing.



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### 9. KEY CONTACTS

**ATTENTION!**

If you haven't already registered your FP350S it is critical you contact the TechLine to ensure we have up-to-date contact information. This allows us to contact you in the event of any FP350S updates.

**Phone**

Ford Performance Tech Line

**1-(800)-367-3788**

**Websites**

[www.performanceparts.ford.com](http://www.performanceparts.ford.com)

[www.performanceparts.ford.com/FP350S](http://www.performanceparts.ford.com/FP350S)

All Ford Performance racing parts

Your source for all FP350S information

**Contacts**

Contingency

[fcntgcy@ford.com](mailto:fcntgcy@ford.com)

R-plan Vehicle PIN

[fcntgcy@ford.com](mailto:fcntgcy@ford.com)

Facebook

[www.facebook.com/FordPerformance](http://www.facebook.com/FordPerformance)

Fast News

[www.performanceparts.ford.com/register](http://www.performanceparts.ford.com/register)

**Supplier Contact Info**

Watson Racing

Brownstown Charter Twp, MI 48193

(734)-759-0555

ZF Race Engineering

For a service request, please visit

[www.zf.com/motorsport](http://www.zf.com/motorsport)

(USA) ZF Sachs Automotive of America Inc.

15811 Centennial Drive

48168 Northville, MI.

phone: (734)-416-6200

Motec

<http://www.motec.com/corporate/contactUS>

(704)-799-3800



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### A. SERVICE SPECIFICATIONS

**\*GUIDELINES BASED ON A COMPETITION RACE SCHEDULE\***

#### Engine Oil

Motorcraft 5W-50 Full Synthetic XO-5W50-QGT

Capacity: Approximately 15 quarts

Replace every 4 hours or after every event weekend

#### Oil Filter

Motorcraft FL500S

Replace after 4 hours of usage or after every event weekend

#### Engine Coolant

Motorcraft Premium Gold with Bittering Agent

Ford P/N: VC-3-B

\*Comes concentrated and needs to be diluted to a 50/50 mixture

Capacity: 14 quarts

Replace annually and follow guidelines on container for freeze protection

#### Air Filter

Ford P/N: FR3Z-9600-E

Replace after every 12 hours of usage or 3 event weekends

#### Spark Plugs

Ford P/N: M-12405-M50A (Heat Range 0)

Gap: .032" (0.8mm)

Replace after every 6-8 hours of usage or every 2 events

#### O2 Sensor

Ford P/N: 8F9Z-9F472-D

Replace after 20 hours of usage or 5 event weekends

#### Transmission Oil

Ford P/N: XT-10-QLVC Mercon LV

Capacity: 3.3 qts

Replace after every event weekend

#### Differential Oil

Motorcraft Heavy Duty SAE 75W-85 Gear Oil

Ford P/N: XY-75W85-QL Capacity: 5.5 quarts

\*Fill instructions in section A1

Replace after every event weekend

#### Differential Oil Filter

Flow Ezy 8731-01

Replace with differential fluid change

#### Brake Fluid

Ford P/N: DOT3 PM-1-C

Bleed brake fluid as needed. Replace fluid after 2 events or 2 months, whichever is sooner

#### Wheel Studs

Replacement of wheel studs and nuts is recommended after 10 events or one full season. Use caution not to exceed specified torque. For endurance racing, Ford Performance Wheel Stud and Nut kit is recommended.





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### Tire Sizes (square-fitment)

#### Transportation (as-delivered) Tires

Pirelli P-Zero 275/40/ZR19

#### Recommended race slicks

Hoosier 315/30/18

Pirelli 305/680/18

### Wheel Sizes

#### Transportation Wheels

Front: 19 x 10.5"

Rear: 19 x 11"

**Optional FP350S Forgeline Wheels - Visit <http://performanceparts.ford.com/> for more details**

Front: M-1007-F1811GF

Rear: M-1007-F1811GR

### Fuel

VP C20 or Sunoco GTX260

### A1 Differential Fill Procedure

The FP350S includes a differential cooling system that requires a specific draining and filling procedure. Both procedures are outlined below.

#### Draining the differential fluid

1. Raise the vehicle on a hoist or jack stands
2. Remove the drain plug at the bottom of the differential casing (1)
3. Remove the upper differential cooler hose (2)
4. Turn on master power, but do NOT start the engine. Depress the DIFF/LAPS button (yellow) to engage the differential pump. Continue to pump until there is no more differential fluid coming out of the line. DO NOT run the pump dry for more than 5 seconds
5. Reattach the return line, replace the drain plug, and proceed to the fill instructions

#### Filling the differential fluid

1. If not already complete, raise the vehicle on a hoist or jack stands
2. Remove the fill plug approximately halfway up the rear differential cover
3. Add differential fluid until it is filled up to the fill plug hole level
4. Run the differential pump by depressing the DIFF/LAPS button as outlined above in drain step 4
5. Repeat steps 3 and 4 of adding and pumping fluid until the fluid level does not drop between fill actions
6. Replace the fill plug and torque to 25 lb-ft.



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### **B. ENGINE SPECIFICATIONS**

See <https://performanceparts.ford.com/FP350S/> for Engine BOM, Tolerances and Clearances, and Torque Specifications.

### **C. WIRING DIAGRAMS**

See <https://performanceparts.ford.com/FP350S/> for Wiring Diagrams

### **D. VEHICLE BILL OF MATERIALS**

See <https://performanceparts.ford.com/FP350S/> for Vehicle Bill of Materials, Quantities, Manufacturers, and Corresponding Torque Specifications.



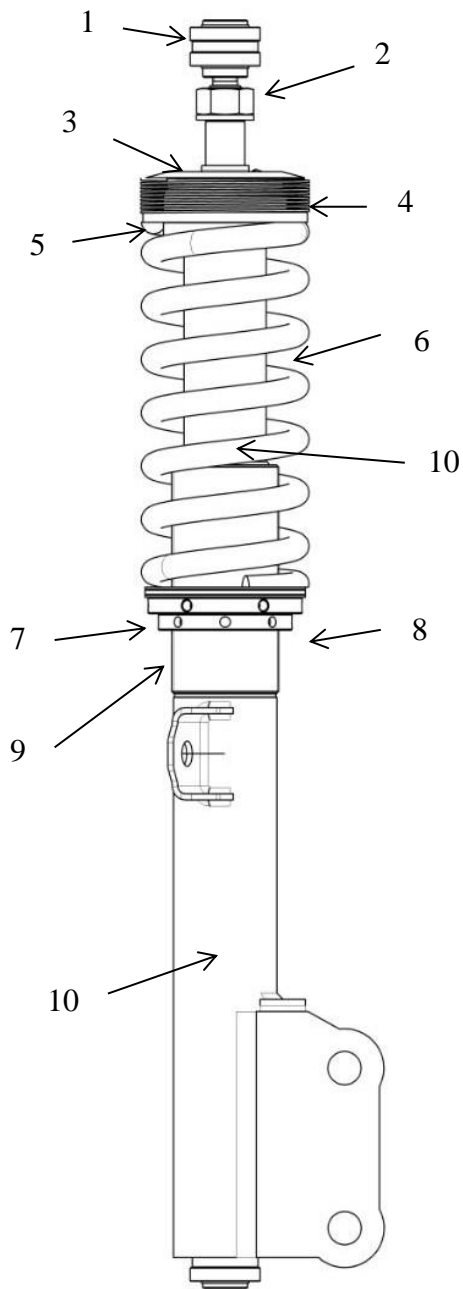
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### E. DAMPER SERVICE INFORMATION

#### E1 Front Strut Part Numbers



Number	Description	Part Number
1	Adjuster Assy	00 1770 001 520
2	Top Nut M16x1.5	00 1530 999 014
3	Spring Seat	00 1733 001 225
4	Helper Spring	00 1713 000 797
5	Center Ring 225	00 1733 001 301
6	Spring 2.25x7x650	00 1713 000 795
7	Torsion Release Bearing	00 1735 000 050
8	Spring Seat M52x1.5	00 1733 999 370
9	Counter Ring M52x1.5	00 1733 999 371
10	Upside Down Cartridge	88 1500 000 575
11	Damper Assy FL Damper Assy FR	88 1500 000 573 88 1500 000 574

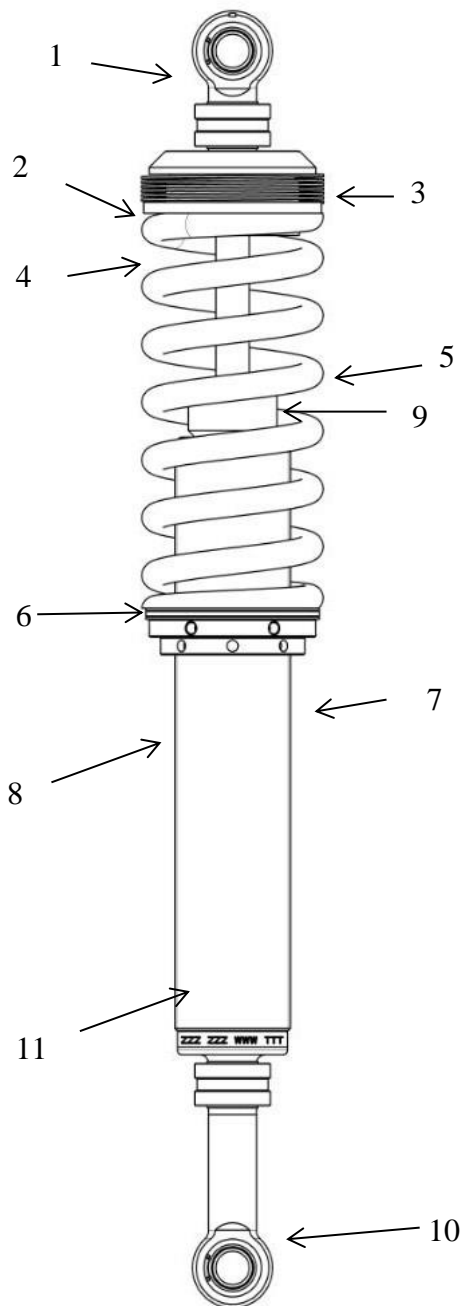


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### E2 Rear Damper Part Numbers



Number	Description	ZF Part Number
1	Top End Eye Assy	00 1771 001 393
2	Spring Seat	00 1733 000 715
3	Helper Spring	00 1713 000 797
4	Center Ring 225	00 1733 001 301
5	Spring 2.25x7x600	00 1713 000 796
6	Torsion Release Bearing	00 1735 000 050
7	Spring Seat M52x1.5	00 1733 999 370
8	Counter Ring M52x1.5	00 1733 999 371
9	Bump Stop	00 1748 000 175
10	Lower End Eye Assy	00 1771 001 642
11	Damper Assy	88 1700 017 722



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### E3 Damper Maintenance, Tools, and Service

#### Recommended inspection and maintenance intervals:

Do not use detergent, like brake cleaner or thinner for cleaning the shock absorber!  
In general, we recommend a damper service after 3000 miles or once a year.

#### Inspection points:

- 1 check the upper uniball joint for clearance
- 2 check the lower uniball joint for clearance
- 3 check the surface of the piston rod for scratches, dirt and oil leakage
- 4 check the damper body for any damage or leakage
- 5 check the bumps stop for excessive wear
- 6 check the bolting of the upper and lower spring seat

#### Tools:

Hook spanner for counter ring: 001795 000 049

Hook spanner for spring seat: 001795 000 050

1 full turn of spring seat = 1.5mm change in preload

For exact adjustment of the spring preload you should make a mark on the spring seat, in order to change the preload for the exact value.

Pin Spanner for Adjuster Assy: 901 001 12

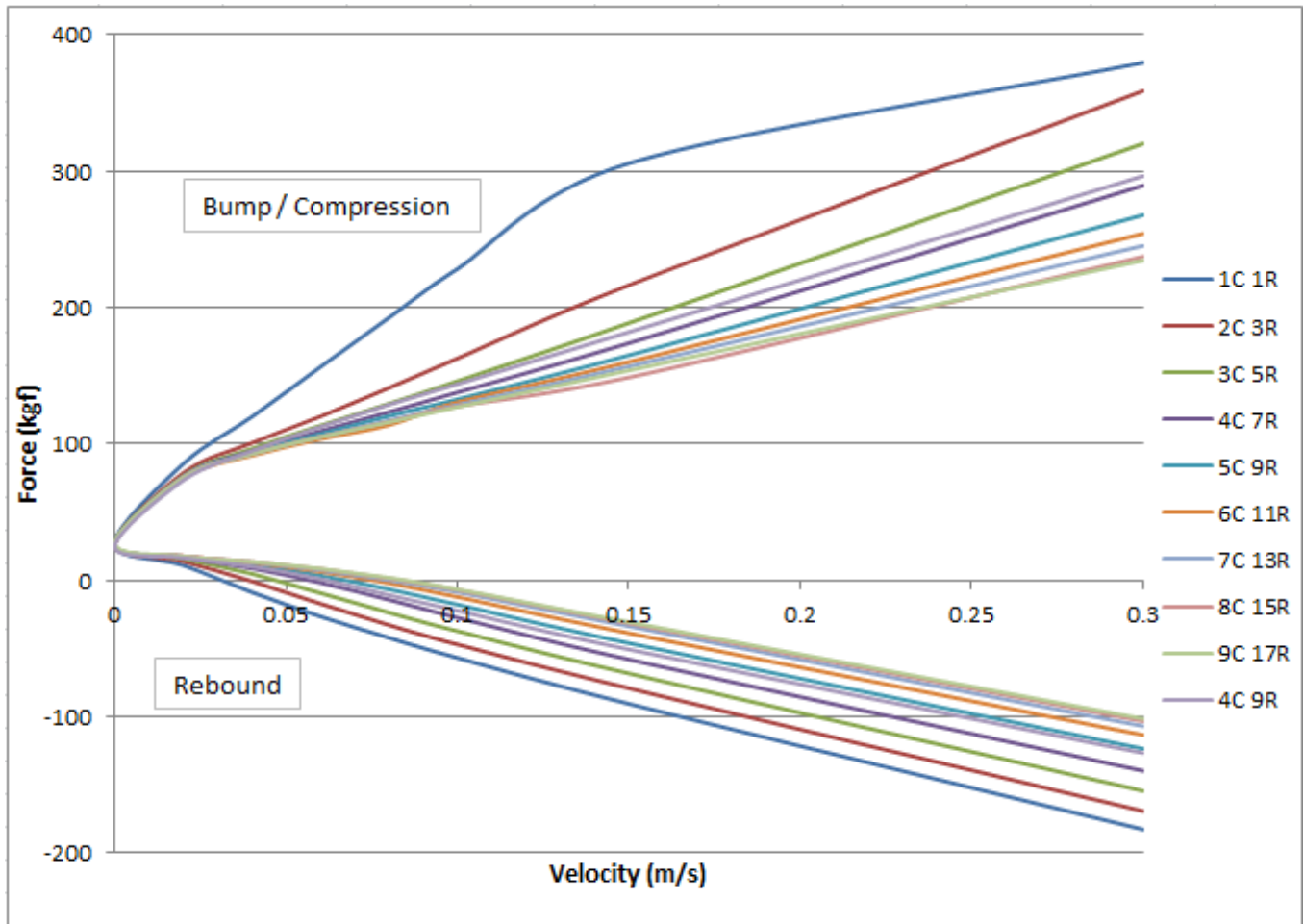
#### Service

For a service request, please visit:

[www.zf.com/motorsport](http://www.zf.com/motorsport)  
(USA) ZF Sachs Automotive of America Inc.  
15811 Centennial Drive  
48168 Northville, MI.  
phone: (734)-416-6200



### E4 Front Damper Tuning Guide





### E5 Rear Damper Tuning Guide

