Introduction

Thanks for purchasing FrSky GAS SUITE. As a multi-functional unit, Gas Suite is mainly used to monitor the operating status of gasoline engines. In order to fully enjoy the benefits of the product, please read the instruction manual carefully and set up the device as described below.

Overview

Gas Suite has several parts, including a sensor module (gas suite), a flowmeter (flow) and two temperature sensors (PT100 & TEMS).

Components

Gas Suite

Specifications:
- Dimension: 40×28×12.7mm (L×W×H)
- Weight: 18.5g
- Operating Voltage: DC 4~10V
- Operating Current: 30mA@5V

Flowmeter

PT100 & TEMS

Connection Diagram

Working State

<table>
<thead>
<tr>
<th>Flickering period (ms) of LED1</th>
<th>The state of LED2</th>
<th>The state of sensors</th>
<th>The state of S.Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>1</td>
<td>Cutting output of CDI ignition signal</td>
<td>X</td>
</tr>
<tr>
<td>100</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>200</td>
<td>X</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>500</td>
<td>X</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>X</td>
<td>Temperature excursion of PT100 (&gt;300°C)</td>
<td>X</td>
</tr>
<tr>
<td>X</td>
<td>flashing</td>
<td>Flowmeter operating</td>
<td>X</td>
</tr>
</tbody>
</table>

1° Operating 0° Inoperating X = don’t care
LED 2 indicates instantaneous gas flow. The larger the flow is, the higher flicker frequency will be and vice versa.

Special Function

The off-ignition of CDI:
Connection Method: connect the igniter trigger signal sensor to the CDI OUT and the Crankshaft Position Sensor (Hall signal output, 5V pulse) of the engine to CDI IN.
Operating mode: Speed-limiting Cutoff & Forced Cutoff
Speed-limiting Cutoff: When the engine works normally, Gas suite outputs the ignition signal synchronizing with Hall signal. However, the engine will cut off ignition when the engine speed exceeds the maximum speed limit. Also, the engine will return to normal working state when RPM falls into normal range.
Forced Cutoff: A certain channel on the transmitter controls the Gas suite, which ensures cutoff or working engine of similar to the flameout switch on motor cycles.
Performance: When off-ignition function is activated, the signal of ignition trigger will delay about 1.2ms when RPM is at 10000 rpm.

Alarm

<table>
<thead>
<tr>
<th>Types of Alarm</th>
<th>Tone of Alarm (Volume)</th>
<th>Duration</th>
<th>Time Span (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>small amount of gas</td>
<td>Low (400Hz)</td>
<td>Short (100ms)</td>
<td>Long (500ms+)</td>
</tr>
<tr>
<td>excess flow velocity</td>
<td>Low (400Hz)</td>
<td>Short (100ms)</td>
<td>Mid (300ms)</td>
</tr>
<tr>
<td>Over RPM</td>
<td>Mid (800Hz)</td>
<td>Extremely short—Mid (50-200ms) Depending on the D-value of RPM</td>
<td>From Short to Long (100-400ms) Depending on the D-value of RPM</td>
</tr>
<tr>
<td>Excess temperature of TEMPS1</td>
<td>High (2000Hz)</td>
<td>Mid (200ms)</td>
<td>Extremely Long (1000ms)</td>
</tr>
<tr>
<td>Excess temperature of TEMPS2</td>
<td>High (2000Hz)</td>
<td>Long (400ms)</td>
<td>Extremely Long (1000ms)</td>
</tr>
<tr>
<td>More than two alarms</td>
<td>Extremely High (2500Hz)</td>
<td>Short (100ms)</td>
<td>Short (200ms)</td>
</tr>
</tbody>
</table>

1° When the set value that activates alarm is zero, the corresponding alarm will be shut down.

Parameter configuration and data measurement

Parameter configuration:
- Configuration method
  1. Connect the gas suite to PC and configure through Freewill (the upper computer).
  2. Configure on the transmitter
  3. Connect gas suite to a receiver without augmentation function.

Enter into the second page of the system menu on the transmitter to which the receiver has been successfully bound.
Configure gas suite with the script in SD card.

FrSky Electronic Co., Ltd
Add: F-4, Building C, Zhonggu Technology Park, No.3 Yuanmi Road, Wuxi, 214125, Jiangsu, China  Technical Support: sales4tech@gmail.com

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Diagram on FreeLink:

- Param
  - Physical ID (0~26): CDI Limit (*100/min) Residual Volume low alarm (%)
  - Application ID (0~25): Flow Pulse (*0.001ml/pulse) Over flow alarm (ml/min)
  - Flow firmware: Flow Trigger (ml/min) Over speed alarm (*100/min)
  - Data Rate (ms): Auto Reset Overtemp1 alarm (°C) Overtemp2 alarm (°C)
  - Volume (ml): Factory Settings

Diagram of measured data:

- Normal Configuration
  - Monitoring [ ] Configure [ ] Read [ ] Write [ ] Default Settings

- Special Configuration
  - Residual volume reset [ ] Maximum Flow reset [ ] Average Flow reset

Diagram of parameter:

- Data
  - Temperature 1 (°C): Flow (ml/min) 0 Maximum Flow (ml/min) 0
  - Temperature 2 (°C): Residual volume (ml) 0 Average Flow (ml/min) 0
  - Revolving Speed (r/min): Residual percent (%) 0

Data measurement:
- Real-time measured data feedback
  - The uplink parameter configuration of the Gas Suite (Gas Suite script in SD card).

Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range/Unit</th>
<th>Default Value</th>
<th>Explanation of parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI Limit</td>
<td>10~10000</td>
<td>100</td>
<td>Set CDI Limit at a certain value, the gasoline engine will work alternately if RPM reaches the value.</td>
</tr>
<tr>
<td>Flow Pulse</td>
<td>1~2000 (°0.001ml/pulse)</td>
<td>100</td>
<td>The default value of flow pulse is just for reference, Please fine-tune the value according to your own situation.</td>
</tr>
<tr>
<td>Volume</td>
<td>10~60000 ml</td>
<td>1000ml</td>
<td>Set the total oil volume</td>
</tr>
<tr>
<td>Flow trigger</td>
<td>5~30 ml/min</td>
<td>10ml</td>
<td>Set the flow velocity that triggers the refueling alarm.</td>
</tr>
<tr>
<td>Auto Reset</td>
<td>OFF</td>
<td>OFF</td>
<td>Set the flow trigger function on/off</td>
</tr>
<tr>
<td>Factory settings</td>
<td>YES/NO</td>
<td>YES</td>
<td>Set factory setting yes/no</td>
</tr>
<tr>
<td>Volume alarm</td>
<td>0~99%</td>
<td>10%</td>
<td>Set the volume percentage of alarm</td>
</tr>
<tr>
<td>Flow alarm</td>
<td>0~2000 ml/min</td>
<td>200ml/min</td>
<td>Set the flow velocity that triggers flow alarm.</td>
</tr>
<tr>
<td>RPM alarm</td>
<td>0~10000</td>
<td>90rpm</td>
<td>Set the RPM that triggers RPM alarm</td>
</tr>
<tr>
<td>TEMP 1 alarm</td>
<td>0°C<del>310°C (32°F</del>596°F)</td>
<td>200°C (392°F)</td>
<td></td>
</tr>
<tr>
<td>TEMP 2 alarm</td>
<td>0°C<del>250°C (32°F</del>482°F)</td>
<td>200°C (392°F)</td>
<td></td>
</tr>
</tbody>
</table>

Unit of temperature: °C/F

1. Select (+-) and press ENT button twice, then all values of Residual volume, Maximum flow and Average flow will be cleared out.
2. All measured data are read-only.
3. Auto Reset and Flow trigger function are bound to each other. Before each flight session, make sure the fuel tank is full and turn on Auto Reset. After the model is flying normally, turn off Auto Reset. According to displayed residual or fuel empty alarm, the model needs refueling. If flow velocity stabilizes below flow trigger value, it means the model is idling or stopping flying.
4. There are two situations that the model needs refueling:
   (1). Please refer to Note 3
   (2). The user refuels manually. When refueling completed, move the cursor to Residual Volume (refer to the diagram of Real-time measured data feedback) and reset it.

About the Gas Suite

To improve the accuracy of the measured value, users could modify the measurement coefficient of gas suite according to their own usage coupled with measurements.

FrSky is continuously adding features and improvements to our products. To get the most from your product, please check the download section of the FrSky website www.frsky-rc.com for the latest firmware updates and manuals.