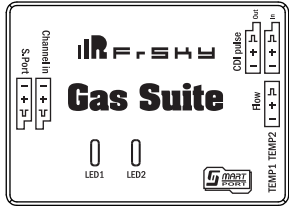


## Introduction

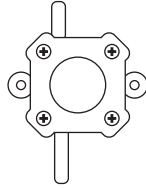
Thanks for purchasing FrSky GAS SUITE. As a multi-functional unit, Gas Suite is mainly used to monitor the operating state of gasoline engines. In order to fully enjoy the benefits of the product, please read the instruction manual carefully and set up the device as described below.

## Overview

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



Gas Suite



Flowmeter



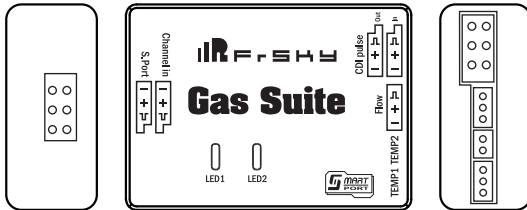
TEMS



PT100

## Components

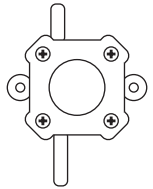
### Gas Suite



#### Specifications:

- Dimension: 40\*28.8\*12.7mm (L×W×H)
- Weight: 18.5g
- Operating Voltage: DC 4~10V
- Operating Current: 30mA@5V

### Flowmeter



#### Measured Range:

- RPM: 100~100000 r/min
- Flow Velocity: 20-800ml/min
- Degree of accuracy: 2% (The value is influenced by the installation of flowmeter, liquid characteristics, etc.)

### PT100 & TEMS



PT100

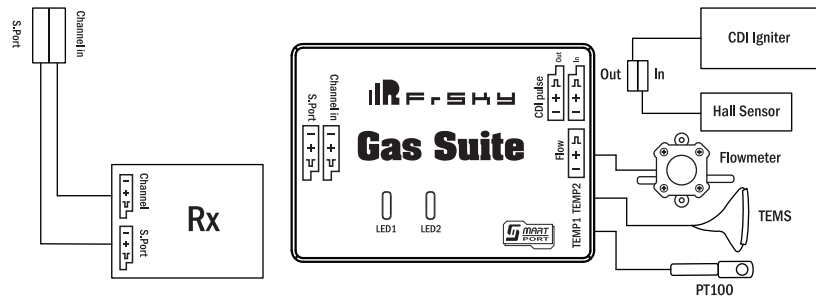


TEMS

#### Measured Range:

- TEMP1 (PT100) : -20 C ~ 310 C  
Deviation: ±1%
- TEMP2 (TEMS) : -20 C ~ 250 C  
Deviation: ±1%

## Connection Diagram



## Working State

Flickering period(ms) of LED1	The state of LED2	The state of sensors	The state of S.Port
20	1	Cutting output of CDI ignition signal	X
100	X	X	0
200	X	0	1
500	X	1	1
50	X	Temperature excursion of PT100 (>300 C)	X
X	flashing	Flowmeter operating	X

! 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 of engine (similar to the flameout switch on motor cycles).

**Performance:** When off-ignition function is activated, the signal of ignition trigger will delay about 1.2μs when RPM is at 10000 r/min.

## Alarm

Types of Alarm	Tone of Alarm (Volume)	Duration	Time Span (ms)
small amount of gas	Low (400Hz)	Short (100ms)	Long (500+ms) residual value
excess flow velocity	Low (400Hz)	Short (100ms)	Mid (300ms))
Over RPM	Mid (800+Hz) The value here is D-value of over RPM	Extremely short— Mid(50-200ms) Depending on the D-value of RPM	From Short to Long (100-400ms) Depending on the D-value of RPM
Excess temperature of TEMP1	High (2000Hz)	Mid (200ms)	Extremely Long (1000ms)
Excess temperature of TEMP2	High (2000Hz)	Long (400ms)	Extremely Long (1000ms)
More than two alarms	Extremely High (2500Hz)	Short (100ms)	Short (200ms)

! 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 Freelink (the upper computer).
2. Configure on the transmitter

① Connect gas suite to a receiver without augmentation function.

② Enter into the second page of the system menu on the transmitter to which the receiver has been successfully bound.

③ Configure gas suite with the script in SD card.

## Diagram on FreeLink

Param	Physical ID (0~26) <input type="text"/>	CDI Limit (*100r/min) <input type="text"/>	Residual Volume low alarm (%) <input type="text"/>
	Application ID (0~25) <input type="text"/>	Flow Pulse (*0.001mL/pul) <input type="text"/>	Over flow alarm (mL/min) <input type="text"/>
	Firmware <input type="text"/>	Flow Trigger (mL/min) <input type="text"/>	Over speed alarm (*100r/min) <input type="text"/>
	Data Rate (ms) <input type="text"/>	Auto Reset <input type="text"/>	Over temp1 alarm (C) <input type="text"/>
	Volume(mL) <input type="text"/>	Factory Settings <input type="text"/>	Over temp2 alarm (C) <input type="text"/>

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	Temperature1 (°C) <input type="text"/>	Flow (mL/min) <input type="text"/>	Maximum Flow (mL/min) <input type="text"/>
	Temperature2 (°C) <input type="text"/>	Residual volume (mL) <input type="text"/>	Average Flow (mL/min) <input type="text"/>
	Revolving Speed (r/min) <input type="text"/>	Residual percent (%) <input type="text"/>	<input type="text"/>

Diagram of Normal and Special Configuration

## Data measurement:

### Real-time measured data feedback

The uplink parameter configuration of the Gas Suite (Gas Suite script in SD card).

Parameter	Range/Unit
TEMP 1	-20 C ~ 310 C
TEMP 2	-20 C ~ 250 C
RPM	100~100000 r/min
Residual volume	0~60000ml
Residual percent	100%
Flow velocity	20-800 ml/min
Max Flow	800ml/min
Average Flow	20-800 ml/min

## The value of parameter

Product Information (read only)	Displayed range of value	Value
Software Version		1.0
Ph. ID	0~26	22
APP ID	0~15	0
Data Rate	1~255 ms (*100 ms)	1

## Configuration Parameter

The downlink parameter configuration of the gas suite (SD card Gas Suite script).The table below is according to the interface on the transmitter.

Parameter	Range/Unit	Default Value	Explanation of parameter
CDI Limit	10~10000 (*100 r/min)	100	Set CDI Limit at a certain value, the gasoline engine will work alternately if RPM reaches the value.
Flow Pulse	1~2000 (*0.001 mL/pulse)	100	The default value of flow pulse is just for reference. Please fine-tune the value according to your own situation.
Volume	10~60000 mL	1000mL	Set the total oil volume
Flow trigger	5~30 mL/min	10mL	Set the flow velocity that triggers the refueling alarm.
Auto Reset	ON/OFF	OFF	Set the flow trigger function on/off
Factory settings	YES/NO	YES	Set factory setting yes/no
Volume alarm	0~90%	10%	Set the volume percentage of alarm
Flow alarm	0~2000 mL/min	200mL/min	Set the flow velocity that triggers flow alarm
RPM alarm	0~10000 (*100 r/min)	90r/min	Set the RPM that triggers RPM alarm
TEMP 1 alarm	0 C ~ 310 C (32 F ~590 F)	200 C (392 F)	
TEMP 2 alarm	0 C ~ 250 C (32 F ~482 F)	200 C (392 F)	
Unit of temperature C / F	C / F	C	

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 refuelling. If folw velocity stabilizes below flow trigger value, it means the model is idling or stopping flying.
4. There are two situations that the model needs refuelling.
  - (1). Please refer to Note 3
  - (2). The user refuels manually. When refuelling 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](http://www.frsky-rc.com) for the latest update firmware and manuals