Operation Manual

ST25T

Suntech International Ltd.

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Disclaimer

We, at Suntech, announce that this document and all other related products (i.e. device, firmware, and software) have been developed by the company, Suntech International Ltd., which is hereinafter referred to as “Suntech”. The information in this manual is believed to be accurate and reliable at the time of releasing. We, at Suntech, also assume no responsibility for any damage or loss resulting from the use of this manual, and expressly disclaim any liability or damages for loss of data, loss of use, and property damage of any kind, direct, incidental or consequential, in regard to or arising out of the performance or form of the materials presented herein or in any software program(s) that may accompany this document. When this document is released, it is most compatible with a specified firmware version. Now that the functionalities of the devices are being developed and improved continuously from time to time by Suntech, any alteration on the protocol, the firmware functions, the hardware specifications of the product is subject to change without prior notice.

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Warning

Our customers are required to be aware that connecting the wire inputs can be hazardous to both of the installer and your vehicle’s electrical system(s) if not done by an experienced installer. This document assumes you are aware of the inherent dangers of working in installing the device on the vehicle(s) and the machinery.

Document Amendments

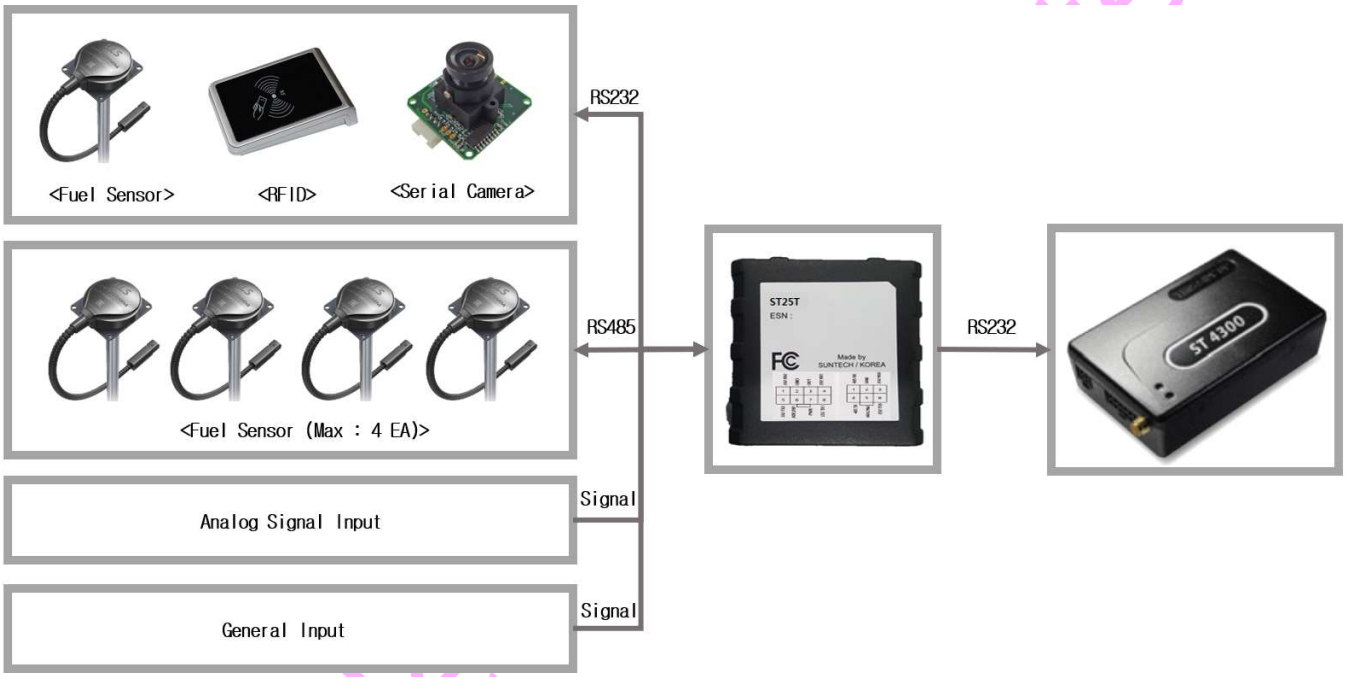
When it comes to the firmware version column with specific firmware number, any amendment(s) on the comments column should be made on this relevant firmware version (and the versions thereafter). Before applying any changes made in this protocol, you are required to make sure that you have upgraded the firmware suitable for the specified version.

1. Introduction

The ST25T is highly featured multi-functional telematics box sending values of external sensors a tracking device such as ST600M/ST600MD or ST4300. By being connected with a tracking device such as ST600M/ST600MD or ST4300, it provides to the tracking device any information of fuel level values and the tracking device reports which can be sent to the server via the tracking device.

2. Overview

The ST25T device from Suntech supports two RS232 and one RS485 interface ports as well as two ADC or INPUT ports. The diagram below shows how the Suntech ST25T device is connected to external sensors and device:



2-1. Parameter change

Parameters which have already been set on the device can be changed via RS232 connected with PC if a user needs to do so. Some controlling functions can also be implemented in the same way.
Please refer to the Commands Sections 4 below for details on the commands required to change these parameters.

2-2. Features

Key features of the ST25T device are as follows:

- Power Saving Modes (Power Down Mode)
The device will go to sleep when host go to sleep or deepsleep to prevent draining the vehicle battery.

- LED Indicators

Red LED:
Main mcu data transmitting & receiving operation indication.

Blue LED:
Sub mcu data transmitting & receiving operation indication.

- RS232 interface
It handles RS232 sensor and device data communication.

- RS485 interface
It handles RS485 fuel sensor data communication.
The maximum number of RS485 fuel sensors supported by the ST25T device is four.

- ADC or INPUT ports

Device has:

- 2 ADC ports
- 2 INPUT ports

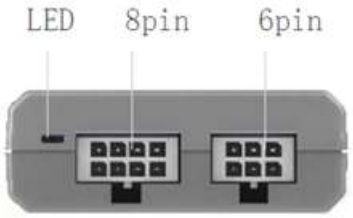
- Upgrading Firmware

Device firmware can be upgraded to provide the user with newly implemented services through the host RS232 connection. (Refer to Section 7)

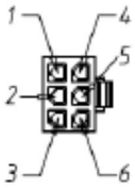
Host RS232 baud rate is 115200 bps for upgrading firmware.

3. Event Cables

Event cable has 14 wires.



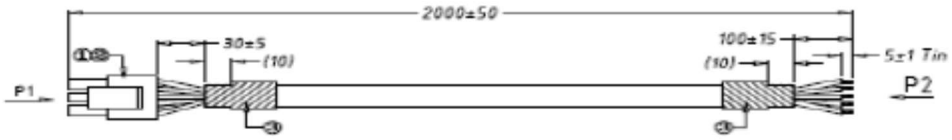
ST25T Event line Description



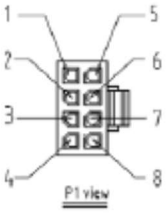
6 pin Event line

BLK	PIN1	RS485 RX	Tin
PURP	PIN2	GND	Tin
Orange/Red	PIN3	RS232 RX3	Tin
NC	PIN4	RS485 TX	Tin
GRAY	PIN5	ADC/Input2	Tin
Red/Blue	PIN6	RS232 TX3	Tin

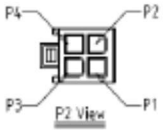
P1 view

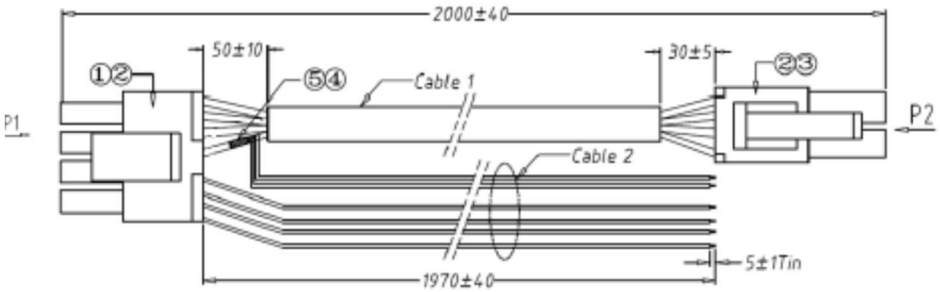


8pin Event line



WHT	PIN1	RS 232 RX2	
BLK	PIN2	GND	P3
Brown/White	PIN3	OUT	
Blue/Red	PIN4	RS232 RX1	P2
Ligth Orange	PIN5	RS232 TX2	
Blue/Black	PIN6	ADC/INPUT1	
RED	PIN7	Power 5V	P4
Orange/Red	PIN8	RS232 Tx1	P1





4. Omnicomm Fuel Sensor Setting

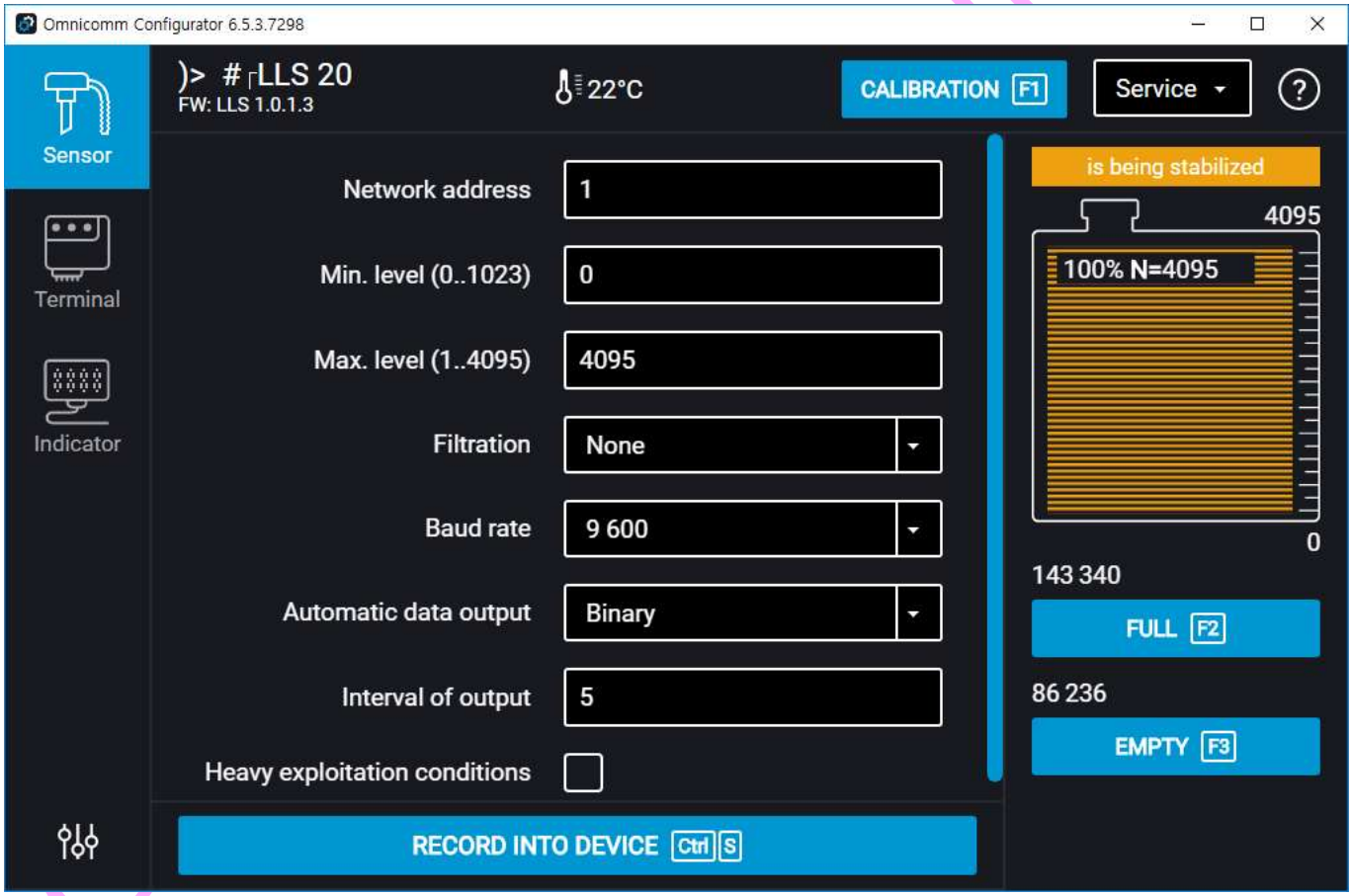
If you use omnicomm fuel sensor, you will have to set to like below:

1. Network address : 0 ~ 6
2. Baud rate : 9600 or 19200 or 38400 or 115200 bps
3. Automatic data Output : Binary
4. Interval of output : 5

To configure the fuel sensor, download the omnicomm configurator program from the URL below.

Downloadable URL :
https://www.omnicomm-world.com/fms-providers/resource-center/?group=386289&field=&type=387330

The ST25T device scans omnicomm fuel sensor network address from 0 to 6 only.
The data output mode and output interval of the omnicomm fuel sensor are set in the ST25T device.



5. Commands

All command and response string is ended with CR/LF characters.

5-1. From Host to Device

5-1-1. Presence Request

Field	Value	Format	Description
CMD	$REQ_PRESENCE	String	Command
RS232_EXT1_DEV	0 ~ 3	1byte int	RS232 Ext 1 Device 0 = None 1 = Omnicomm Fuel Sensor 2 = RFID 3 = Serial Camera
RS232_EXT2_DEV	0 ~ 3	1byte int	RS232 Ext 2 Device 0 = None 1 = Omnicomm Fuel Sensor 2 = RFID 3 = Serial Camera
RS232_EXT1_BAUD	0 ~ 6	1byte int	RS232 Ext1 Baudrate 0 = None 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps 4 = 19200 bps 5 = 38400 bps 6 = 115200 bps
RS232_EXT2_BAUD	0 ~ 6	1byte int	RS232 Ext2 Baudrate 0 = None 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps 4 = 19200 bps 5 = 38400 bps 6 = 115200 bps
RS232_EXT1_FUEL_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs232 ext1 fuel level for alert report
RS232_EXT2_FUEL_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs232 ext2 fuel level for alert report
RS485_FUEL_BAUD	0 ~ 6	1byte int	RS485 Fuel Sensor Baudrate
RS485_FUEL1_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel1 level for alert report
RS485_FUEL2_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel2 level for alert report
RS485_FUEL3_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel3 level for alert report
RS485_FUEL4_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel4 level for alert report
ADC1_USING	0 ~ 1	1byte int	Support ADC 1 0 = Disable, 1 = Enable
ADC2_USING	0 ~ 1	1byte int	Support ADC 2 0 = Disable, 1 = Enabl
INPUT1_TYPE	0 ~ 3	1byte int	Support Input 1

			0 = None 1 = Falling Edge 2 = Rising Edge 3 = Both Edge
INPUT1_CHAT	0 ~ 9999	2bytes int	Input 1 chattering time Default = 3 sec (unit : 100 ms) If 0, input 1 is not checked.
INPUT2_TYPE	0 ~ 3	1byte int	Support Input 2 0 = None 1 = Falling Edge 2 = Rising Edge 3 = Both Edge
INPUT2_CHAT	0 ~ 9999	2bytes int	Input 1 chattering time Default = 3 sec (unit : 100 ms) If 0, input 2 is not checked.
END_OF_LINE	\r\n	String	
[Command] $REQ_PRESENCE;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0			

5-1-2. Handshake Message Acknowledge

Field	Value	Format	Description
CMD	$ACK_HANDSHAKE	String	Command
END OF LINE	\r\n	String	
[Command] $ACK_HANDSHAKE			

5-1-3. Version Request

Field	Value	Format	Description
CMD	$CMD_REQ_VERSION	String	Command
END OF LINE	\r\n	String	
[Command] $CMD_REQ_VERSION **[Response]** $RES_REQ_VERSION;ST25T;M.01.00.00;M.01.00.00 (Refer to Section 5-2-2)			

5-1-4. Host Parameter Change

Field	Value	Format	Description
CMD	$CMD_CHANGE_PARAM	String	Command
RS232_EXT1_DEV	0 ~ 3	1byte int	RS232 Ext 1 Device 0 = None 1 = Omnicomm Fuel Sensor 2 = RFID

			3 = Serial Camera
RS232_EXT2_DEV	0 ~ 3	1byte int	RS232 Ext 2 Device 0 = None 1 = Omnicomm Fuel Sensor 2 = RFID 3 = Serial Camera
RS232_EXT1_BAUD	0 ~ 6	1byte int	RS232 Ext1 Baudrate 0 = None 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps 4 = 19200 bps 5 = 38400 bps 6 = 115200 bps
RS232_EXT2_BAUD	0 ~ 6	1byte int	RS232 Ext2 Baudrate 0 = None 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps 4 = 19200 bps 5 = 38400 bps 6 = 115200 bps
RS232_EXT1_FUEL_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs232 ext1 fuel level for alert report
RS232_EXT2_FUEL_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs232 ext2 fuel level for alert report
RS485_FUEL_BAUD	0 ~ 6	1byte int	RS485 Fuel Sensor Baudrate
RS485_FUEL1_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel1 level for alert report
RS485_FUEL2_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel2 level for alert report
RS485_FUEL3_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel3 level for alert report
RS485_FUEL4_ ALT_LEVEL	0 ~ 4095	2bytes int	Value of changing rs485 fuel4 level for alert report
ADC1_USING	0 ~ 1	1byte int	Support ADC 1 0 = Disable, 1 = Enable
ADC2_USING	0 ~ 1	1byte int	Support ADC 2 0 = Disable, 1 = Enable
INPUT1_TYPE	0 ~ 3	1byte int	Support Input 1 0 = None 1 = Falling Edge 2 = Rising Edge 3 = Both Edge
INPUT1_CHAT	0 ~ 9999	2bytes int	Input 1 chattering time Default = 3 sec (unit : 100 ms) If 0, input 1 is not checked.
INPUT2_TYPE	0 ~ 3	1byte int	Support Input 2

			0 = None 1 = Falling Edge 2 = Rising Edge 3 = Both Edge
INPUT2_CHAT	0 ~ 9999	2bytes int	Input 1 chattering time Default = 3 sec (unit : 100 ms) If 0, input 2 is not checked.
END OF LINE	\r\n	String	
[Command] $CMD_CHANGE_PARAM;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0			

5-1-5. Reset

Field	Value	Format	Description
CMD	$CMD_RESET	String	Command
END OF LINE	\r\n	String	
[Command] $CMD_RESET			

5-1-6. Disconnected Check

Field	Value	Format	Description
CMD	$CMD_DISCON_CHECK	String	Command
END OF LINE	\r\n	String	
[Command] $CMD_DISCON_CHECK **[Response]** $ACK_DISCON_CHECK;ST25T (Refer to Section 5-2-3)			

5-1-7. Uart Fuel Sensor Param Request

Field	Value	Format	Description
CMD	$REQ_FUEL_PARAM	String	Command
END OF LINE	\r\n	String	
[Command] $REQ_FUEL_PARAM **[Response]** $RES_FUEL_PARAM;ST25T;0;0;0;0;0;0;0;0;0;0;0;0 (Refer to Section 5-2-9)			

5-2. From Device to Host

5-2-1. Handshake Message

Field	Value	Format	Description
CMD	$MSG_HANDSHAKE	String	Command
MODEL	ST25T	String	Model Name
END OF LINE	\r\n	String	
[Command] $MSG_HANDSHAKE;ST25T			

5-2-2. Version Request Response

Field	Value	Format	Description
CMD	$RES_REQ_VERSION	String	Command
MODEL	ST25T	String	Model name
MAIN_MCU_VERSION	M.01.00.00	String	
SUB_MCU_VERSION	M.01.00.00	String	
END OF LINE	\r\n	String	
[Command] $RES_REQ_VERSION;ST25T;M.01.00.00;M.01.00.00			

5-2-3. Disconnected Check Acknowledge

Field	Value	Format	Description
CMD	$ACK_DISCON_CHECK	String	Command
MODEL	ST25T	String	Model name
END OF LINE	\r\n	String	
[Command] $ACK_DISCON_CHECK;ST25T			

5-2-4. Uart Fuel Sensor Connected Event

Field	Value	Format	Description
CMD	$EVT_UART_FUEL_CON	String	Command
MODEL	ST25T	String	Model name
FUEL_NUM	0 ~ 5	1byte int	Fuel sensor number 0 = RS232 Fuel 1 1 = RS232 Fuel 2 2 = RS485 Fuel 1 3 = RS485 Fuel 2 4 = RS485 Fuel 3 5 = RS485 Fuel 4
FUEL_LEVEL	0 ~ 4095	2bytes int	Fuel sensor level

END OF LINE	\r\n	String	
[Command] $EVT_UART_FUEL_CON;ST25T;0;0			

5-2-5. Uart Fuel Sensor Disconnected Event

Field	Value	Format	Description
CMD	$EVT_UART_FUEL_DISCON	String	Command
MODEL	ST25T	String	Model name
FUEL_NUM	0 ~ 5	1byte int	Fuel sensor number 0 = RS232 Fuel 1 1 = RS232 Fuel 2 2 = RS485 Fuel 1 3 = RS485 Fuel 2 4 = RS485 Fuel 3 5 = RS485 Fuel 4
FUEL_LEVEL	0	2bytes int	Fuel sensor level
END OF LINE	\r\n	String	
[Command] $EVT_UART_FUEL_DISCON;ST25T;0;0			

5-2-6. Uart Fuel Sensor Upper Event

Field	Value	Format	Description
CMD	$EVT_UART_FUEL_UPPER	String	Command
MODEL	ST25T	String	Model name
FUEL_NUM	0 ~ 5	1byte int	Fuel sensor number 0 = RS232 Fuel 1 1 = RS232 Fuel 2 2 = RS485 Fuel 1 3 = RS485 Fuel 2 4 = RS485 Fuel 3 5 = RS485 Fuel 4
FUEL_LEVEL	0 ~ 4095	2bytes int	Fuel sensor level
END OF LINE	\r\n	String	
[Command] $EVT_UART_FUEL_UPPER;ST25T;0;0			

5-2-7. Uart Fuel Sensor Lower Event

Field	Value	Format	Description
CMD	$EVT_UART_FUEL_LOWER	String	Command
MODEL	ST25T	String	Model name
FUEL_NUM	0 ~ 5	1byte int	Fuel sensor number 0 = RS232 Fuel 1

			1 = RS232 Fuel 2 2 = RS485 Fuel 1 3 = RS485 Fuel 2 4 = RS485 Fuel 3 5 = RS485 Fuel 4
FUEL_LEVEL	0 ~ 4095	2bytes int	Fuel sensor level
END OF LINE	\r\n	String	
[Command] $EVT_UART_FUEL_LOWER;ST25T;0;0			

5-2-8. Uart Fuel Sensor Error Event

Field	Value	Format	Description
CMD	$EVT_UART_FUEL_ERROR	String	Command
MODEL	ST25T	String	Model name
FUEL_NUM	0 ~ 1	1byte int	Fuel sensor number 0 = RS232 Fuel 1 1 = RS232 Fuel 2
ERROR_NUM	0 ~ 1	1byte int	Fuel error number 0 = Fuel net address scan fail 1 = Fuel max level excess
END OF LINE	\r\n	String	
[Command] $EVT_UART_FUEL_ERROR;ST25T;0;0			

5-2-9. Uart Fuel Sensor Param Request Response

Field	Value	Format	Description
CMD	$RES_FUEL_PARAM	String	Command
MODEL	ST25T	String	Model name
RS232_FUEL1_LEVEL	0 ~ 4095	2bytes int	RS232 fuel 1 level
RS232_FUEL2_LEVEL	0 ~ 4095	2bytes int	RS232 fuel 2 level
RS485_FUEL1_LEVEL	0 ~ 4095	2bytes int	RS485 fuel 1 level
RS485_FUEL2_LEVEL	0 ~ 4095	2bytes int	RS485 fuel 2 level
RS485_FUEL3_LEVEL	0 ~ 4095	2bytes int	RS485 fuel 3 level
RS485_FUEL4_LEVEL	0 ~ 4095	2bytes int	RS485 fuel 4 level
RS232_FUEL1_STATUS	0 ~ 1	1byte int	RS232 fuel 1 status
RS232_FUEL2_STATUS	0 ~ 1	1byte int	RS232 fuel 2 status
RS485_FUEL1_STATUS	0 ~ 1	1byte int	RS485 fuel 1 status
RS485_FUEL2_STATUS	0 ~ 1	1byte int	RS485 fuel 2 status
RS485_FUEL3_STATUS	0 ~ 1	1byte int	RS485 fuel 3 status
RS485_FUEL4_STATUS	0 ~ 1	1byte int	RS485 fuel 4 status
END OF LINE	\r\n	String	
[Command] $RES_REQ_FUEL_PARAM;ST25T;0;0;0;0;0;0;0;0;0;0;0;0			

5-2-10. Input State Event

Field	Value	Format	Description
CMD	$EVT_INPUT_STATE	String	Command
MODEL	ST25T	String	Model name
INPUT_NUM	0 ~ 1	1byte int	Fuel sensor number 0 = INPUT 1 1 = INPUT 2
STATE	0 ~ 1	1byte int	Input state 0 = Falling 1 = Rising
END OF LINE	\r\n	String	
[Command] $EVT_INPUT_STATE;ST25T;0;0			

Revisions

Rev. No.	Date	Modifications were made on:	Writer
1.00	19-01-15	Construct Protocol.	JH Sim

Information to the user.
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

§15.21 Information to user.
The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

Caution
Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC Compliance Information : This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- End of the Document -