

**JH-ACU-4A**

**Diagnostic Communication Specification**

**For S(Special Command)-Mode**

北京锦恒佳晖汽车电子有限公司

**Beijing Jinheng Great Idea Automotive Electronic System Co., Ltd**

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## 1. Introduction

This document specifies the requirements of communication for Special mode of JHA 4A ACU (Airbag Control Unit). The special mode(S-Mode) is used for test and production line. This document should not be distributed out of our company or others, because it is very confidential.

## 2. System Configuration

### 2.1 Communication Line

It is used to K-line interface. Line K is bi-directional line.

### 2.2 Communication Specification

#### 2.2.1 Transmission rate (Baud Rate)

9600 bps

#### 2.2.2 Bit Format

LSB first

1 start bit - logic '0' for one bit duration

8 data bits - the LSB being sent first

1 stop bit - logic '1' for one bit duration

#### 2.2.3 Message Format

1 byte	2 byte	3 ... N bytes	N+1 byte
Length byte	Function Code	Address & data	Checksum(XOR)

##### 2.2.3.1 Length byte

This byte defines the length of a message from the beginning of the Function Code field to checksum byte. A data length of 1 to 255 bytes is possible.

##### 2.2.3.2 Function Code byte

This byte defines the functional request of a message. This byte is converted to complement at a returned message from ACU.

##### 2.2.3.3 Address & data byte

This byte defines the start address of hardware memory map to read or write a data or

returned information of a request.

#### 2.2.3.4 Checksum byte

The checksum byte (CS) inserted at the end of the message block is defined as the simple 8-bit calculate series of all bytes in the message by XOR, excluding the checksum.



### 3 Communication Services

#### 3.1 Starting S-Mode

This service shall necessary to enter the S-Mode communication. If a current communication mode is C-Mode, the tester shall send the unlock command to connect the S-Mode communication.

##### Initial Process

Step	Parameter Name	Hex value	Bytes	Transfer status
1	Function Code(FC)	53	1	Tester → ACU
2	Length	13	1	ACU → Tester
	Complement Function Code(CFC)	8F	1	
	ACU ID <sup>1</sup>	xx : xx	17	
	Checksum	xx	1	
3	Checksum returned	xx	1	Tester → ACU
4	OK	4F	1	ACU → Tester
	NOK	4E		

메모 [J1]: 2006-09-20  
changed from 12

메모 [J2]: 2006-09-20  
changed from 16

##### 3.1.1 S-Mode unlock command in C-Mode communication

This message format is separated by current C-mode type. If the current C-mode type is KWP2000, this message format follows the requirement of KWP2000 message format.

##### KWP2000 C-mode

Byte	Parameter Name	Hex Value
1	Format byte	80
2	Target address byte	58
3	Source address byte	F1
4	Additional length byte	03
5	Unlock Request Service Id	FE
6	Key Byte 1	53
7	Key Byte 2	4D
6	Checksum <sup>2</sup>	xx

<sup>1</sup> Refer to following The ECU identification service

<sup>2</sup> It is not used to XOR method. Refer to ACU Diagnostic communication spec., document no is ES-JHA-4A-C01

## ISO9141 C-mode

Byte	Parameter Name	Hex Value
1	Priority byte	68
2	Target address byte	6A
3	Source address byte	F1
4	Test Mode byte	FE
5	Key Byte 1	53
6	Key Byte 2	4D
7	Checksum <sup>3</sup>	xx

## 3.2 S-Mode Functional Services

## 3.2.1 ACU Identification Service

## Request Message

Byte	Parameter Name	Hex Value
1	Length byte	02
2	Function Code byte	71
3	Checksum	xx

## Response Message

Byte	Parameter Name	Hex Value
1	Length byte	13
2	Complement Function Code byte	8E
3 ~ 4	ROM Checksum (2 bytes)	xx xx
5 ~ 8	ROM Version (4 bytes)	Xx xx xx xx
9 ~ 10	ACU Label Version (2 bytes)	xx xx
11 ~ 12	Parameter Version (2 bytes)	xx xx
13 ~ 15	MLFB (3 bytes, ASCII)	xx xx xx
16 ~ 19	ACU Serial No, (4 bytes)	xx xx xx xx
20	Checksum	xx

메모 [J3]: 2006-09-20  
changed from 12 bytes  
due to MLFB length  
changed.

메모 [J4]: 2006-09-20  
Changed from 2bytes

<sup>3</sup> It is not used to XOR method. Refer to ACU Diagnostic communication spec., document no is ES-JHA-4A-C02

### 3.2.2 Read Memory Service

This service is to read saved data in ACU memory. You can read the specific data of each kind from EEPROM or FRAM, another memory using this service, fault status and crash recorded information, algorithm parameters, etc. The number of maximum read bytes is 249 during one cycle.

#### Request Message

Byte	Parameter Name	Hex Value
1	Length byte	05
2	Function Code byte <sup>4</sup>	72
3	Start Address High byte	xx
4	Start Address Low byte	xx
5	Read bytes number (n)	xx
6	Checksum	xx

#### Response Message

Byte	Parameter Name	Hex Value
1	Length byte	n+05
2	Complement Function Code byte <sup>5</sup>	8D
3	Start Address High byte	xx
4	Start Address Low byte	xx
5	Read bytes number (n)	xx
6	n Read data	xx
:		:
n+6		xx
n+7	Checksum	xx

<sup>4</sup> FRAM access hex code is 7A

<sup>5</sup> FRAM access hex code is 85

### 3.2.3 Write Memory Service

This service is to write OR change specific data to memory in ACU. You can write or change the specific data in any place of memory address. The number of maximum write bytes is 249 during one cycle.

#### Request Message

Byte	Parameter Name	Hex Value
1	Length byte	n+05
2	Function Code byte <sup>6</sup>	73
3	Start Address High byte	xx
4	Start Address Low byte	xx
5	Write bytes number (n)	xx
6	n Write data	xx
:		:
n+6		xx
n+7	Checksum	xx

#### Response Message

Byte	Parameter Name	Hex Value
1	Length byte	n+05
2	Complement Function Code byte <sup>7</sup>	8C
3	Start Address High byte	xx
4	Start Address Low byte	xx
5	Write bytes number (n)	xx
6	n returned Write data	xx
:		:
n+6		xx
n+7	Checksum	xx

<sup>6</sup> FRAM access hex code is 7B

<sup>7</sup> FRAM access hex code is 84



### 3.2.4 Real Time Fault & Status Service

This service is to receive continuously some data which are fault code and device status from ACU. Its data is sent every 400ms to Tester. It shall be sent break signal from Tester to stop communication.

#### Request Message

Byte	Parameter Name	Hex Value
1	Length byte	02
2	Function Code byte	75
3	Checksum	xx

#### Response Message

Byte	Parameter Name	Hex Value
1	Fault and status code	xx

### 3.2.5 Real Time Value Check Service

This service is to check periodically some values which are battery voltage and another device voltage or resistance from ACU. It shall be sent break signal from Tester to stop communication.

#### Request Message

Byte	Parameter Name	Hex Value
1	Length byte	03
2	Function Code byte	77
3	Check value code byte	xx
4	Checksum	xx

#### Response Message

Byte	Parameter Name	Hex Value
1	Measurement Result Value	xx

## 3.2.6 User Function Service

## Request Message

Byte	Parameter Name	Hex Value
1	Length byte	03
2	Function Code byte	79
3	User Function Code byte	xx
4	Checksum	xx

## Response Message except for ACU Reset Request

Byte	Parameter Name	Hex Value
1	Length byte	03
2	Complement Function Code byte	86
3	User Function Code byte	xx
4	Checksum	xx

## Response Message for ACU Reset Only

Byte	Parameter Name	Hex Value
1	User Function Code byte	FF

## User Function Codes

Function Codes	Description
0	Clear Fault Record
1	Clear EEPROM Crash Record
2	Clear FRAM Crash Record
3	Start Diag.
4	Stop Diag.
5	Start Data Injection Mode
6	Transferring Data Injection Mode
7	Stop Data Injection Mode
8	Crash Output
10	Clear Operation Timer Counter Area
11	Clear FRAM IGN Counter
13	EEPROM Mass Erase
20	WL1 On
21	WL1 Off

22	WL2 On
23	WL2 Off
30	Front / Side Algorithm Reset
255	ECU Reset

