WUHAN GREEN ELECTRONIC INSTRUMENTS

E650-JM-A Instrument Cluster Functional Specification

Version number V 0.0 3

Preparation:
Proofreading:
Audit:
Signature:
Approval:

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1 Preface

1.1 Specification of use

Due to the needs of product design and development, this specification can be selectively issued to the corresponding recipient or related departments within the group as the basis for design and development, and the external transmission of any other channels is prohibited.

2 Version history

version	chapter	Modify the description	date	Modified by
V0.1	all	On the basis of E650-JM modify the message: motor fault indication, motor overheating indication, tire pressure indication;	2021-8-7	Yang Hao
V0.2		Cancel the alarm that the small light is not turned off and increase the tire pressure alarm strategy	2021-11-24	Yang Hao
V0.3		Increase the tire pressure alarm strategy	2021-12-3	Yang Hao

3 Overview

3.1 Part number

name	The part number	quantity	Parts class	Importance
Instrument assembly	LJ3820101E66A00000	1		

3.2 Related Documentation

The following documents as a supplement to this specification, there may be some content and this specification conflict, the design engineer should be at the beginning of the development of the conflict content to be clearly defined, in order to improve the generalization of the instrument, should give priority to the provisions of this specification:

serial number	documentation	version
1	CAN protocol: Motorola format, baud rate: 500kbps;	
2		

3.3 Regulatory Requirements

The development of the instrument cluster should meet the corresponding regulatory requirements, and the instrument engineer shall check the regulatory requirements for the instrument itself; For the regulatory requirements of the corresponding system involving the combined instrument part, the corresponding system shall put forward, and the instrument engineer shall confirm the content of the part with the corresponding system engineer.

Instrument combinations should meet the following regulatory requirements:

GB 4094-2016 Marking of automotive manipulators, indicators and signalling devices

GB/T 4094.2-2017 Signs   of electric vehicle control parts, indicators and signaling devices

GB/T 19836-2019 Instrument for electric vehicles

GB/T 19515-2016 Calculation method   for reusability and recyclability of road vehicles

QC/T 727-2017 Instruments for automobiles and motorcycles

3.4 Terms

Battery electricity: the combination instrument is directly powered by the battery power circuit, not controlled by the ignition switch and the light circuit;

ON Electric: The power received by the instrument when the ignition key is in ON gear;

Ignition: The ignition key is transferred from ON   to START;

High level: 9v~16v;

Low level: -1v~1v;

CAN loss: The corresponding CAN signal was not received within the meter 1.5 S

ICU: The name of the CAN node of the instrument, which also refers to the software processing part of the instrumentation in this document;

Mechanical zero: the stepper motor pointer of the instrument gauge points to the limit position that the zero position of the motor can achieve;

Indicates the zero position: The stepper motor pointer of the instrument gauge points to the zero position displayed on the gauge dial.

4 General Requirements

4.1 Normal working environment

According to QC/T 413-2002 Requirements for basic technical conditions for automotive electrical equipment:

Temperature: 18°C~28°C

Relative humidity: 45% to 75%.

Air pressure: 86kpa ~ 106kpa

4.2 Temperature range

Working temperature: -30°C~85°C

Storage temperature: -40°C ~ 85°C

4.3 Electrical requirements

Instrument operating voltage range: 9V–16V, low voltage protection 8V@1s; High voltage protection 17V@1s; The recovery voltage is 8.5V/16.5V@1s, and the voltage is not more than 30V within 500ms. Enter Protected Mode and the battery voltage returns to normal

After that, the instrument   should resume normal display within 2s.

Bus operating voltage range: 7V–18V: The voltage range of one of the DTC   recording conditions associated with the CAN   network is 8-16V, 7-18V   hold   CAN network communication is normal.

The meter interface input and output current range is 3-20 mA.

Test voltage: 13.5v

Nominal voltage: 12v

Working current: 0.2A

Maximum operating current: 0.7A

Quiescent current: less than 3mA

5 Mechanical structure

5.1 Instrument renderings

5.2 Instrument explosion diagram

not

5.3 Surface treatment

The inner cover of the instrument is treated with skin grain treatment to prevent reflection.

5.4 Installation Methods

The instrument cluster adopts 2 mounting holes and 2 snap positions for the fixing of the instrument set.

5.5 Peripheral coordination

After the design and assembly of the instrument cluster, it is necessary to meet the vehicle vision check. The clearance with the peripheral parts meets the requirements of the whole workshop.

6 Interface definitions
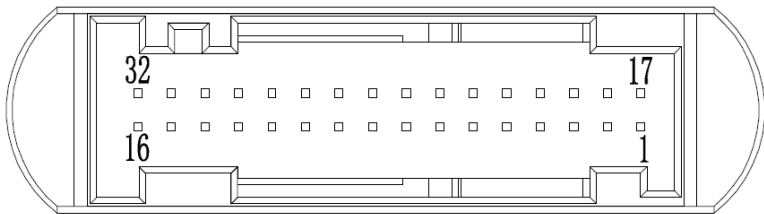
仪表插件型号：AMP 966658-1　绿色

To plug-in model:　　　socket AMP 1719059-1
　　　　　　　　　　　Sheath AMP　1719057-1 (green).
　　　　　　　　　　　Pin AMP 928999-1

6.1 Pin assignment

Main instrument pin definition

serial number	definition	serial number	definition
A1	empty	A17	empty

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A2	empty	A18	empty
A3	The seat belt is not fastened with the indication (12V-).	A19	empty
A4	empty	A20	Braking fault indication (12V-)
A5	empty	A21	empty
A6	empty	A22	empty
A7	empty	A23	empty
A8	CAN-H	A24	empty
A9	CAN-L	A25	empty
A10	GND	A26	empty
A11	BATT（12V+）	A27	empty
A12	TGN（12V+）	A28	empty
A13	empty	A29	empty
A14	empty	A30	empty
A15	empty	A31	empty
A16	empty	A32	empty

Table 6.1

6.2 Pin reservation

/

6.3 Circuit Connection

6.3.1 Basic Definitions

Power supply: There are two kinds of combination instrument power supply, one is battery power, and the other is ON electricity.

Grounding: The instrument cluster should remain in normal operation when the ground offset is "±0.5v".

CAN termination resistance: Yes, 120Ω.

6.3.2 Connection of the instrument cluster to the multi-function instrument

6.3.3 Normally current circuits

The LEDs are typically powered by ON electricity. The following LEDs are powered by battery power:

Table 6 2

serial number	Light	The meter is connected internally Pick it up	remark
1	Position lights	Earth	
2	Door indications	The battery is normally charged	

3	Rear fog lights	Earth	
4	High beams	Earth	
5	Turn left	Earth	
6	Turn right	Earth	
7	Charging status indication	Earth	
8	Charging cable indication	Earth	

7 Wake and sleep

This section only defines wake-up and sleep in terms of the instrumentation function.

For backlight controlled by position lights:

Positive control lights	CAN networking	ON 电	Gauge display function
Shut down	Shut down	Shut down	Sleep, which should be displayed when it receives information that needs to be displayed
Open	Shut down	Shut down	Wakes up, which displays the received information
/	Open	Shut down	Wake up, which displays the received CAN information that needs to be displayed
/	/	Open	Wakes up, which displays the received information

7.1 CAN wake-up and sleep

Sleep conditions: ON electrical disconnection, no 6.3.3 signal, no CAN signal conditions are met at the same time. When the meter enters sleep mode, all meter functions and CAN bus communication are stopped.

Wake-up conditions: ON is electrically switched on, there is a 6.3.3 signal, there is a CAN signal condition to meet one of them, the instrument enters normal working mode.

8 Lighting

The lighting parameters and control strategies of multifunctional meters should be consistent with those of the combination instrument.

8.1 Lighting logic

Instrument pointers, dials, LCD backlights for unified control.

Tactics:

ON 电	Position lights	LCD lighting	Dial, hand illumination
Shut down	Open it	Shut down	Shut down
Shut down	Shut down	Shut down	Shut down
Open it	Open it	Open and halve	Open and halve
Open it	Shut down	Open it	Open it

9 Indications

Neither the instrument indicator nor other indications such as LCD should have instructions prohibiting an operation. The response time of the indicator light should be within 100ms .

9.1 Indicator

Each indicator occupies a position of about 10*10mm, and the indicator should be invisible to the naked eye when it is not lit. In principle, the indicator light is displayed by LED lights, but it can also be arranged on the LCD as needed.

9.1.1 LED scheme

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A total of 29 indicators, see the table below:

serial number	name	icon	Display area	Signal Format	remark
1	Left turn indicator		Dial	CAN	Buzzer alarm
2	Turn right to the indication		Dial	CAN	Buzzer alarm
3	Run preparation	READY	LCD screen	CAN	
4	System failure		Dial	CAN	Buzzer alarm
5	Charge heating indicator		LCD screen	CAN	
6	Power battery failure		Dial	CAN	Buzzer alarm
7	Charging cable		Dial	CAN	
8	Door indications		LCD screen	CAN	Buzzer alarm
9	Seat belt indication		Dial	Low level	Buzzer alarm
10	Rear fog light indicator		Dial	CAN	
11	High beam indication		Dial	CAN	
12	Tire pressure monitoring indications		LCD screen	CAN	
13	Low battery indicator		LCD screen	CAN	Buzzer alarm
14	The position light indicates		Dial	CAN	Buzzer alarm
15	Motor overheating indication		LCD screen	CAN	
16	Brake fault indication		Dial	Low level	
17	handbrake		Dial	CAN	Buzzer alarm
18	EPS alarm		Dial	CAN	
19	Power down		Dial	CAN	
20	The battery is cut off		dial	CAN	
21	ABS indication		LCD screen	CAN	
22	Motor fault indication		dial	CAN	Buzzer alarm
23	Charging status indication		dial	CAN	
24	Airbag indications		dial	CAN	
25	Indication of insulation failure		dial	CAN	

26	DCDC indication		LCD screen		
27	S档	S	LCD screen	CAN	
28	D档	D	LCD screen	CAN	
29	N gear	N	LCD screen	CAN	
30	R gear	R	LCD screen	CAN	

9.1.1.1 Left turn indication

name	Turn left to the LED	image		color	green	source	CAN
description	When the vehicle's left and right steering switches hit the left steering gear, the instrument's left turn indicator flashes						
input	1) Power supply status: IGN ON, IGN OFF; 2）CAN info：Vehicle_Status1(0x302—BYTE0-BIT5)；						
tactics	1) The meter receives Vehicle_Status 1 = 0x1, the left turn indicator flashes, the frequency is 1HZ; 2) If the CAN data of 1) is not satisfied or the CAN is lost for more than 1.5S, the indicator light is off;						
output	1）The left turn LED flashes or turns off; 2）The buzzer is alarmed by the left and right steering alarms;						

9.1.1.2 Right turn indication

name	Turn right to the LED	image		color	green	source	CAN
description	When the vehicle's left and right steering switches hit the right turn gear, the meter's right turn indicator flashes						
input	1) Power supply status: IGN ON, IGN OFF; 2）CAN 信息：Vehicle_Status1(0x302—BYTE0-BIT4)；						
tactics	1) The meter receives Vehicle_Status 1 = 0x1, the left turn indicator flashes, the frequency is 1HZ;						

	2) If the CAN data of 1) is not satisfied or the CAN is lost for more than 1.5S, the indicator light is off;
output	1）Right turn the LED flashing or off; 2）The buzzer is alarmed by the left and right steering alarms;

9.1.1.3 Run Preparation

name	Run preparation	**image**	READY	**color**	green	**source**	CAN
description	When the vehicle status is ready for operation, the instrument lights this light.						
input	1) Power Status: IGN ON 2）CAN 信息：Vehicle_Status1(0x3C0—BYTE0-BIT0)；						
tactics	1）The meter receives a CAN signal Vehicle_Status1 = 0x1, light the indicator; 2）If the CAN data of 1) is not satisfied or the CAN is lost for more than 1.5S or IGN_OFF, the indicator light is off;						
output	1）The running readiness indicator lights on or off;						

9.1.1.4 System failure

name	System failure	**image**		**color**	red	**source**	CAN
description	When the vehicle system fails, the instrument lights this light.						
input	1) Power status: IGN ON 2）CAN 信息：Vehicle_Status1(0x3C0—BYTE3-BIT6)						
tactics	1) The instrument receives the CAN signal Vehicle_Status1 = 0x1, light the indicator; At the same time buzzer alarm. 2) does not meet 1) or 2) CAN data or IGN_OFF or CAN data loss more than 1.5S, the indicator lights out and the buzzer stops;						
output	1）The system fault indicator is lit; 2）The buzzer is alarmed by fault alarm;						

9.1.1.5 Auxiliary battery charge indication

name	Auxiliary battery charge indication	**image**		**color**	red	**source**	~~BAT power supply,~~ CAN
description	This indicator lights when the voltage of the vehicle's auxiliary battery (the battery used for the vehicle's normal battery) is too low.						
input	1) Power supply status: IGN ON; 2）CAN Info：Vehicle_Status(0x5B3—BYTE5-BIT1/BIT2/BIT3)(DCDC_Fault)						
tactics	1) The meter receives a CAN signal Vehicle_Status = 0x1 or 0x2 or 0x3 or 0x4 or 0x 5. Light up the indicator light; 2) does not meet the CAN data or IGN_OFF of 1), the indicator is off; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	1) DCDC indicator light up;						

9.1.1.6 Power battery failure

name	Power battery fault LED	**image**		**color**	red	**source**	CAN
description	When the vehicle power battery is in failure, the indicator light is lit; When the vehicle power battery failure is lifted, the indicator lights off;						
input	1) Power supply status: IGN ON; 2) CAN information: Vehicle_Status (0x3C3—BYTE 5-BIT 1) (Battery failure).						
tactics	1) The instrument receives the CAN signal Vehicle_Status = 0x1, light up the indicator; 2) does not meet the CAN data or IGN_OFF of 1), the indicator is off; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	1) Power battery fault indicator light on; 2) The buzzer is alarmed by fault alarm;						

9.1.1.7 Charging cable

name	Charging cable	**image**		**color**	red	**source**	CAN

name	safety belt	image		color	red	source	A3 (low)
description	When the main driver's seat belt is not fastened, the instrument lights this light; When the speed exceeds 10km/h, the indicator flashes, flashes at 1HZ, beeps the alarm frequency 1HZ, tweets 5 times, then stops 5S, cycles the alarm again; A total of 6 cycles. If the seat belt is fastened or IGN_OFF at this time, the alarm sound is lifted and the indicator light is off;						
input	1）Power Status: IGN ON ; 2) Port A3 pin to Single1 (low level); 3) Port A3 pin to Single2 (high level); 4) Port A3 pin to Single3 (suspended);						
tactics	1) When the instrument receives Single1, light the indicator; 2) Under 1) conditions, the speed exceeds 10km/h, the indicator flashes with a flashing frequency of 1HZ; At the same time, the buzzer alarm: alarm frequency 1HZ, tweet 5 times, then stop 5S, cycle alarm again; Stop after a total of 6 cycles; 3) Under 2) conditions, when the meter receives Single2 or Single3, the indicator light goes off; The buzzer stops chirping;						
output	1) The seat belt indicator light is on or flashing or off; 2) The buzzer is alarmed by the seat belt alarm method;						

9.1.1.10 rear fog lights

name	Rear fog lights	image		color	yellow	source	CAN
description	When the headlight switch hits the low beam gear, and then the fog light switch is hit from the OFF level to the rear fog switch, the instrument lights up the light.						
input	1）Power supply status: IGN ON; 2）CAN info：Vehicle_Status(0x302—BYTE0-BIT7)；						
tactics	1) When the instrument receives Vehicle_Status = 0x1, light the indicator; 2) does not meet the CAN data or IGN_OFF of 1), the indicator is off;						

	3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	The rear fog light indicator is on or off;

9.1.1.11 Power is too low indicator

name	Low battery LED	image		color	yellow	source	CAN
description	When the battery is too low, the meter lights this light.						
input	2）Power supply status: IGN ON; 2) CAN information: SOC;						
tactics	1The meter receivedSOC＜20%timeLight up the indicator;Simultaneous buzzer alarm; 2) does not meet 1) or IGN_OFF, the indicator is off;						
output	1）The low battery indicator lights up or off; 2）Buzzer alarm;						

9.1.1.12 High beam

name	High beams	image		color	blue	source	CAN
description	When the headlight switch hits the low beam level, then dial up without loosening, and light the indicator light; Release and the LED turns off. When the headlight switch hits the low beam level, then dial down to light up and change the indicator light; Dial up again and the light turns off.						
input	1）Power status: IGN ON, IGN OFF; 2）CAN info：Vehicle_Status(0x302—BYTE5-BIT7)；						
tactics	1) When the instrument receives Vehicle_Status = 0x1, light the indicator; 2) does not meet the CAN data or IGN_OFF of 1), the indicator is off; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	The high beam indicator is on or off;						

9.1.1.13 Tire pressure monitoring status

name	Tire pressure monitoring status	image		color	yellow	source	CAN
description	When any of the four tires of the vehicle fails, the instrument lights this light.						
input	1) Power status: IGN ON 2)CAN 信息:Vehicle_Status1(0x228—BYTE0--BIT0/BIT1)(胎压复位状态)、Vehicle_Status2(0x228—BYTE0--BIT2)、Vehicle_Status3(0x228—BYTE0--BIT3)、 Vehicle_Status4(0x345—BYTE0-BIT0~2)、Vehicle_Status5(0x345—BYTE0--BIT3~5)、Vehicle_Status6(0x345—BYTE1--BIT0~2)、Vehicle_Status7(0x345—BYTE 1--BIT3~5)、Vehicle_Status8(0x345—BYTE2--BIT3)、Vehicle_Status9(0x345—BYTE2--BIT4)、Vehicle_Status10(0x345—BYTE2--BIT5)、Vehicle_Status 11(0x345—BYTE2--BIT6)						
tactics	1）The meter receives a CAN signal Vehicle_Status2 = 0x01 blinking 60S solid on; Vehicle_Status3 = 0x01 or Vehicle_Status 4 = 0x1 or 0x2 or 0x3 or 0x4 or Vehicle_Status 5 = 0x1 or 0x2 or 0x3 or 0x4 or Vehicle_Status 6 = 0x1 or 0x2 or 0x3 or 0x4 or Vehicle_Status7 = 0x1 or 0x2 or 0x3 or 0x4 the LED is on; Vehicle_Status 4 = 0x5 or 0x6 or 0x7 or Vehicle_Status 5 = 0x5 or 0x6 or 0x7 or Vehicle_Status 6 = 0x5 or 0x6 or 0x7 OR Vehicle_Status7 = 0x5 or 0x6 or 0x7 or Vehicle_Status 8 = 0 or Vehicle_Status 9 = 0 or Vehicle_Status10 = 0 or Vehicle_Status 11 = 0, the LED blinks 2HZ; Vehicle_Status1 = 0x01 blinking 3S off; 2）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3）If the above 1) CAN data loss exceeds 1.5S, the indicator light is off; 4）Priority: Flashing 60S Solid > Solid > Blinking 2HZ > Blinking 3S Off						
output	The tire pressure monitoring indicator is on or off;						

9.1.1.14 Position lights

name	Position lights	image		color	green	source	A8 (High)
description	When the headlight switch hits the small light position, the indicator light up and the meter backlight brightness is halved.						
input	1）Power status: IGN ON, IGN OFF;						

	2）CAN 信息：Vehicle_Status1(0x302—BYTE5--BIT5)~~、Vehicle_Status2(0x302—BYTE3--BIT0)~~
tactics	1) The instrument receives a CAN signal Vehicle_Status 1 = 0x01 ~~or Vehicle_Status2 = 0x01,~~ light up the indicator; 2) Do not meet 1) CAN data or IGN_OFF, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	The position indicator is on or off;

9.1.1.15 Motor overheating indication

name	The motor over heats	image		color	red	source	CAN
description	When the vehicle's power motor temperature is too high, the instrument lights this light.						
input	1) Power status: IGN ON 2) CAN information: Vehicle_Status1 (0x112 - BYTE6--BIT3) (motor temperature).						
tactics	1) The instrument receives the CAN signal Vehicle_Status1 = 0x1, light the indicator; At the same time buzzer alarm: 2) Do not meet 1) CAN data or IGN_OFF, turn off the indicator; 5）If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	1) The motor overheating indicator lights up or off; 2) The buzzer is alarmed by fault alarm;						

9.1.1.16 Brake failure

name	Brake fault light	image		color	red	source	A20 (low)
description	When the liquid level of the vehicle's brake fluid reservoir is lower than the specified liquid level, the instrument lights this light.						
input	1）Power supply status: IGN ON; 2) Port A20 pin to Single1 (low level);						

	3) Port A20 pin to Single2 (high level); 4) Port A20 pin to Single3 (suspended);
tactics	1) When the instrument receives Single1, light the indicator; 2) Under the condition of 1), when the meter receives Single2 or Single3 or IGN _OFF, the indicator light is off;
output	Brake fault lights up or off;

9.1.1.17 Park brake

name	handbrake	image		color	red	source	CAN
description	The handbrake is pulled up and the indicator light is lit; When the indicator light is lit, the speed exceeds 10km/h, the indicator flashes and flashes, the flashing frequency is 1HZ, and the buzzer alarm;						
input	1）Power supply status: IGN ON; 2）CAN 信息：Vehicle_Status1(0x3C0—BYTE5--BIT7)						
tactics	1) The instrument receives the CAN signal Vehicle_Status1 = 0x1, light the indicator; At the same time buzzer alarm: 2) Do not meet 1) CAN data or IGN_OFF, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	1) The parking brake lights up or flashes or goes off; 2) The buzzer is alarmed by the parking brake alarm method;						

9.1.1.18 EPS indications

name	EPS	image		color	yellow	source	CAN
description	When the vehicle's EPS system fails, the instrument lights this light.						
input	1）Power Status: IGN ON 2）CAN 信息：Vehicle_Status1(0x3C6—BYTE0--BIT0)；						

tactics	1) The instrument receives the CAN signal Vehicle_Status1 = 0x1, light the indicator; At the same time buzzer alarm: 2) Do not meet 1) CAN data or IGN_OFF, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	The EPS LED is on or off;

9.1.1.19 Power reduction

name	Downpower indication	image		color	yellow	source	CAN
description	When the vehicle is in motion, the power battery voltage is too low or the power is insufficient, the motor controller can reduce the speed of the vehicle, and the instrument lights up this light.						
input	1) Power status: IGN ON 2) CAN information: Vehicle_Status (0x3C0 - BYTE1 - BIT0) (power down indicator).						
tactics	1）The meter receives a CAN signal Vehicle_Status = 0x1, lights up the indicator; 2）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	The power down indicator is lit or off;						

9.1.1.20 Battery cut-off

name	Power battery cut-off indication	image		color	yellow	source	VCU
description	When the main relay switch of the vehicle power battery is not closed, the BMS detects the switching status and transmits data to the meter.						
input	1) Power status: IGN ON 2) CAN 信息：Vehicle_Status1(0x3C3—BYTE5—BIT3)；						
tactics	1）The meter receives a CAN signal Vehicle_Status 1 = 0x1, lights the indicator;						

	2）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	The battery cut-off LED is lit

9.1.1.21 motor fault indication

name	Motor fault indi cation	image		color	red	source	CAN
description	When the vehicle motor fails, the instrument needs to light the indicator light;						
input	1) Power status: IGN ON 2) CAN information: Vehicle_Status (0x112—BYTE 6-BIT 4) (motor failure)						
tactics	1) The instrument receives the CAN signal Vehicle_Status = 0x1, light up the ind icator; 2) Do not meet 1) CAN data or IGN_OFF, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	1）The motor fault indicator is lit; 2）The buzzer is alarmed by fault alarm;						

9.1.1.22 Charge status indication

name	Charging status indicator	image		color	yellow	source	CAN
description	When the charging gun is plugged in, the charging state is always on when the v ehicle is charged.						
input	1) Power supply status: IGN ON, IGN OFF 2） CAN 信息：Vehicle_Status1(0x3C3—BYTE3-BIT4/BIT5)、Vehicle_Status2(0x3C3—BY TE3-BIT6/BIT7)						
tactics	1) The meter receives a CAN signal Vehicle_Status 1 = 0x 1 or Vehicle_Status2 = 0x 1, the LED Flashing; Vehicle_Status1 = 0x 2 or Vehicle_Status1 = 0x2, the ind icator is solid on; 2) Do not meet the CAN data of 1) and turn off the indicator;						

	3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	1）The charging status indicator flashes or turns off;

9.1.1.23rd gear

name	Gears	image	S N D R	color	D gear--white N --white R-white S Gear - White	source	CAN
description	The gear device hits the D file, and the instrument shows the D file; The gear device hits N gear, and the instrument shows N gear; The gear stopper hits the R gear, and the instrument shows the R gear; The gear device hits the S gear, and the instrument shows the S file;						
input	1) Power status: IGN ON 2) CAN information: Vehicle_Status (0x3C0—BYTE6—BIT0/BIT1/BIT2) (gear Indication), Vehicle_Status1 (0x3C0—BYTE0—BIT4) (Gear effective position)						
tactics	1) The instrument receives the CAN signal Vehicle_Status 1 = 0x1 and Vehicle_Status = 0x 0, light up the R file; 2) The instrument receives the CAN signal Vehicle_Status 1 = 0x1 and Vehicle_Status = 0x1, and lights up the N file; 3) The instrument receives the CAN signal Vehicle_Status 1 = 0x1 and Vehicle_Status = 0x2, lights up the D file; 4) The instrument receives the CAN signal Vehicle_Status 1 = 0x1 and Vehicle_Status = 0x3, light up the S file; 5) If Vehicle_Status1= 0x0, the corresponding gear blinks; 6) If the above CAN data loss exceeds 1.5S, the instrument gear is not displayed; 7) Under IGN_OFF conditions, the instrument position is not displayed;						

output	D/N/R/S gears are lit or off;

9.1.1.24 ABS indication

name	ABS status	**image**		**color**	yellow	**s o u r c e**	CAN
description	When the ABS unit is faulty, the meter lights this light.						
input	1) Power status: IGN ON 2) CAN information: Vehicle_Status (0x226—BYTE0--BIT1) (ABS system status).						
tactics	6）The meter receives a CAN signal Vehicle_Status = 0x01, light the indicator; 7）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	The ABS LED is on or off;						

9.1.1.24 Indication of insulation failure

name	Insulation failure status	**image**		**color**	red	**s o u r c e**	CAN
description	When the vehicle insulation fails, the instrument lights this light.						
input	1) Power status: IGN ON 2）CAN Info：Vehicle_Status(0x3C3—BYTE5--BIT2)						
tactics	8）The meter receives a CAN signal Vehicle_Status = 0x01, light the indicator; 9）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	The insulation alarm indicator is lit or off;						

9.1.1.25 Power battery heating indication

name	Power battery heating	**image**		**color**	green	**s o u r c e**	CAN
description	When the battery is heated while the vehicle is charging, the instrument lights this light.						
input	1) Power status: IGN ON						

	2）CAN 信息：Vehicle_Status(0x3C3—BYTE6--BIT0/BIT1)
tactics	10）The meter receives a CAN signal Vehicle_Status = 0x01, light the indicator; 11）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;
output	The power battery heating indicator is lit or off;

9.1.1.26 DCDC indication

name	DCDC	image		color	red	source	CAN
description	When the small battery fails, the meter lights this light.						
input	1) Power status: IGN ON 2）CAN Info：Vehicle_Status(0x5B3—BYTE5--BIT1/BIT2/BIT3)						
tactics	12）The instrument receives a CAN signal Vehicle_Status = 0x01 to 5, light the indicator; 13）1) CAN data or IGN_OFF is not satisfied, turn off the indicator; 3) If the above 1) CAN data loss exceeds 1.5S, the indicator light is off;						
output	The DCDC LED is on or off;						

9.1.2 Self-test

The ignition switch is switched from ACC to ON and the instrument cluster should perform a self-test (all LEDs illuminate 3S) to alert the driver to the health of the vehicle.

10 scales

Combination meter meters include speedometers, tachometers, fuel gauges, ammeters, voltmeters, mileage, power meters, total mileage, and subtotal mileage.

10.1 Scale overview

10.1.1 Scale type

Full broken code screen LCD;

10.2 Speedometer

10.2.1 Speed calculation

Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark

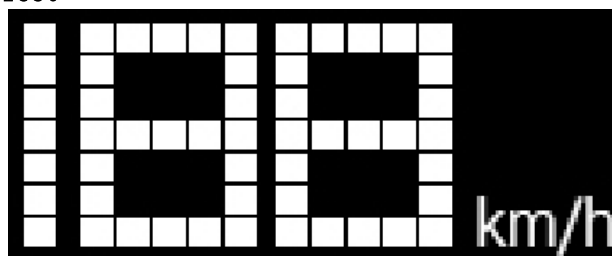| Speed	0x226	Byte2-bit0	Byte1-bit6	16	0.05625	0	Unit: km/h

10.2.2 Display Policies

1) IGN ON display;
2) Display the maximum value of 199km/h;
3) Speed CAN signal loss more than 1.5S, display 0km/h;

10.2.3 Parameter definitions

Table 10.2

Actual speed (km/h).	Displays the speed of the vehicle (km/h)	Error range (km/h).	Checkpoints
0	0	0	√
20	20	+2	√
40	40	+2	√
60	60	+2	√
80	80	+2	√
100	100	+2	√
120	120	+2	√

10.2.4 Display effect

10.3 Tachometer

10.3.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
rotate speed	0x101	Byte1-bit0	Byte0-bit7	16	1	-15000	Unit: rpm

10.3.2 Displaying Policies

1) IGN ON display;
2) The maximum value displayed is 9900rpm;
3) Speed CAN signal loss exceeds 1.5S, showing 0;

10.3.3 Display Effects

10.4 Fuel gauge

10.4.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
Electricity	0x251	Byte4-bit0	Byte4-bit7	8	1	0	Unit: %

10.4.2 Display Policies

1) IGN ON display;

2) The instrument receives the SOC and displays the corresponding number of squares; Maximum display 100%;

3) The CAN signal loss of power exceeds 1.5S, showing 0%;

4) Color display:

display	color	SOC
First block	red	<20%
Second grid	white	<40%
Third tile	white	<60%
Fourth grid	white	<80%
Fifth grid	white	≥80%

Requirements: The last bar shows flashing, flashing frequency 1HZ;

10.4.3 Display Effects

10.5 Voltage gauge

10.5.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
Voltage (VOL).	0x251	Byte1-bit0	Byte0-bit7	16	0.01	0	Unit: V

10.5.2 Displaying Policies

1) IGN ON display;

2) The instrument receives the voltage CAN signal and displays the corresponding value;

3) The voltage of the CAN signal is lost more than 1.5S, showing 0%;

4) Display range: 0~500V;

5) Accurate to 1V;

10.5.3 Parameter definitions
10.5.4 Display Effects

10.6 Current meter
10.6.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
Current (Curr).	0x251	Byte3-bit0	Byte2-bit7	16	0.1	-500	Unit: A

10.6.2 Display Policies

1) IGN ON display;

2) When the instrument receives the CAN signal current, the corresponding value and the number of cells are displayed;

3) Display 0 A when the current CAN signal is lost more than 1.5S;

4) Display range: -500A~999A;

5) Accurate to 1A;

10.6.3 Display Effects

10.7 Range

10.7.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
Cruising range	0x3C0	Byte5-bit0	Byte4-bit2	10	1	0	Unit: km

10.7.2 Displaying Policies

1) IGN ON display;

2) Display 0 km when the current CAN signal is lost more than 1.5S;

3) Display range: 0-500km;

10.7.3 Display Effects

10.8 Total mileage/subtotal mileage

Total/subtotal mileage is displayed by toggle by pressing the button;

10.8.1 Input signal

Conversion by speed conversion;

10.8.2 Display Effects

ODO Trip
888888.8 km

10.9 Power

10.7.1 Input signal (CAN signal: extended frame, baud rate 500K).

Signal Name	ID number	The start bit	The stop bit	length	precision	The offset	remark
power	0x101	Byte5-bit0	Byte5-bit0	8	1	0	Unit: km

10.7.2 Displaying Policies

1) IGN ON display;

2) Display 0% when the current CAN signal is lost more than 1.5S; ；

3) Display range: 0-100%;

10.7.3 Display Effects

8.8% POWER

11 buzzer alarm

Adopt 12V, passive buzzer;

1	Heat diffusion beep warning	CAN signal, buzzer beeps, power battery fault light lit, release condition for IGN power-down, or for 5 min. Priority up to 1.		
2	Turn to the beep sound	Synchronize with the turn signal indication. Priority 2.		
3	Fault beep	CAN signal, audio: 0.5 Hz (duty cycle 50 %). Priority 3.		
4	Crew leaving beeps	CAN signal, audio: 2 Hz (duty cycle 50 %). Priority 4. (After the vehicle enters READY mode, the left front door signal is on)		
5	Door not closed beep warning	CAN signal, at a speed > 10 km/h, any door opens. Audio: 2 Hz (duty cycle 50 %). Priority 4.		
6	The seat belt is not plugged to the beep alarm	At speeds > 10 km/h, the seat belt is not fastened. Audio: 1 Hz (duty cycle 50 %). Priority 5.		
7	Parking is not loose beep warning	Braking system fault hard-wire signal, effective low. At speeds > 10 km/h, the brakes are not loose. Audio: 1 Hz (duty cycle 50 %). Priority 5.		
8	Low battery beep warning	CAN signal, audio: 1 time at intervals of 3 seconds, 1 second sound. Priority 6.		

		When it is determined that the SOC < 20%, light the indicator; At the same time, the buzzer alarms and stops at 3 sounds.		
9	~~The small light is not turned off and the beep warning is off~~	~~Small light CAN signal, triggered when the power gear is OFF, the small light is turned on, and the left front door is opened. The buzzer beeps for a long time, close the left front door or turn off the small lights or power gear IGN to discharge.~~		

12 button function

	IGN status	Status (first-time)	function
keystroke	**IGN_ON**	**Press and hold (> 3 seconds).**	**Zero mileage for** subtotal
	IGN_ON	**Short press（＜1 秒）**	**Voltage/current, subtotal/total mileage switching display**
	IGN_OFF→IGN_ON	**Press and hold (>5 seconds).**	**The total mileage is cleared (within 100km, twice**).

12.1 Subtotal mileage clearance

In the subtotal mileage interface, long press the button, the subtotal mileage can be cleared;

12.2 Subtotal/Total Mileage toggle display

In the normal display of the instrument, short press the button, voltage/current, subtotal/total mileage switching display;

12.3 Total mileage clearance

When the total mileage is less than 100km; During the IGN_OFF→IGN_ON, long press the right button, the total mileage can be cleared to zero, and there are two opportunities;

13 meter data output

(CAN signal: extended frame, baud rate 500K).

Signal Name	cycle	ID number	The start bit	The stop bit	length	precision	The offset	remark
Accrued miles	1000ms	0x623	Byte2-bit0	Byte0-bit7	24	1	0	Unit: km

safety belt	1000ms	0x623	Byte4-bit6	Byte4-bit6	1	1	0	0x0: Close 0x1: Open
Brake failure	1000ms	0x623	Byte4-bit7	Byte4-bit7	1	1	0	0x0: Normal 0x1:Fault
Production traceability code	1000ms	0x624	Byte3-bit0	Byte0-bit7	32	1	0	Production traceability number Example 2001090001: Marking the first unit on January 9, 2020
The hardware version number	1000ms	0x624	Byte5-bit0	Byte4-bit7	16	1	0	Hardware version number: Vxx.xx
The software version number	1000ms	0x624	Byte7-bit0	Byte6-bit7	16	1	0	Software version number: Vxx.xx

Hardware and software version numbers are detailed in the Software Management Measures.