

# RLink Lite Case Study

**TOPDON<sup>®</sup>**



# BMW Headlight Fault Detection Case

**How to Use TOPDON RLink Lite and ISTA-D  
to Perform BMW 3 series Diagnostics**

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# Vehicle Fault Problems

01

## Vehicle Fault Problems

**Vehicle Information:** BMW F30, manufactured in 2016, equipped with B48 engine and a driving mileage of 68823 km.

**Customer Feedback:** The vehicle's headlights reported malfunction. Both headlights cannot light up. The vehicle has been flooded before.



### Preliminary determine the possible cause of the failure

1. Start the vehicle and check that both headlights cannot light up.
2. The instrument shows headlights failure.
3. The headlights failure will seriously affect driving safety. Let's see how to check this fault.

# Devices Required for Diagnostics

02

## Devices Required for Diagnostics



**Computer with BMW OEM Software**



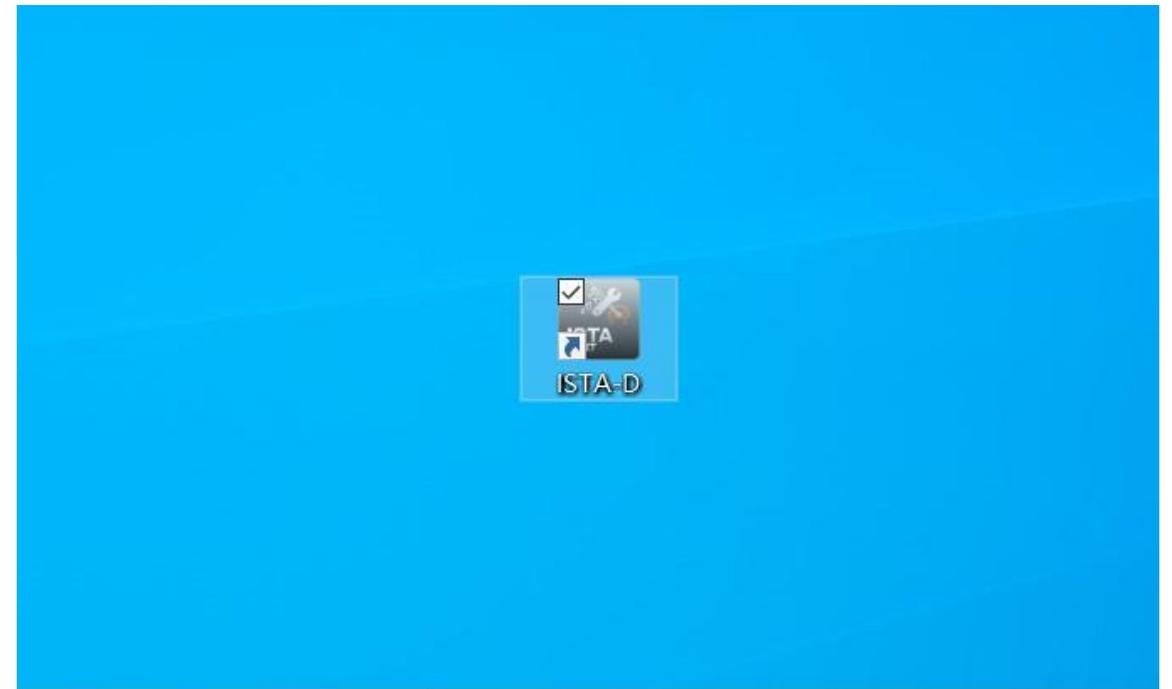
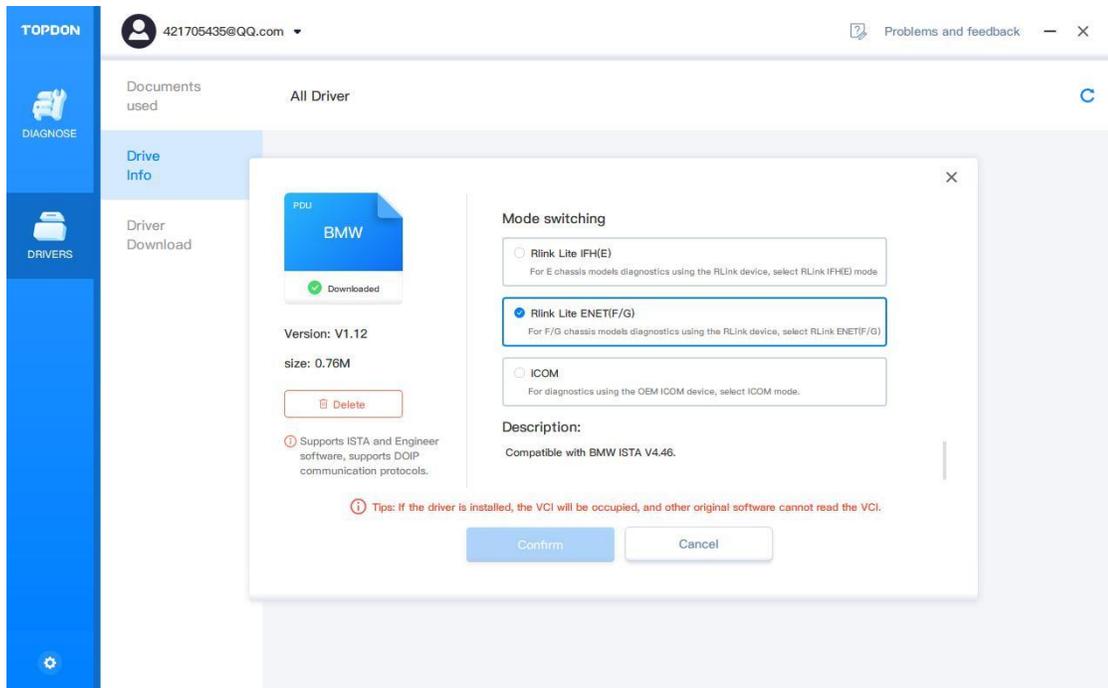
**RLink Lite**

# Operations for Diagnostics

03

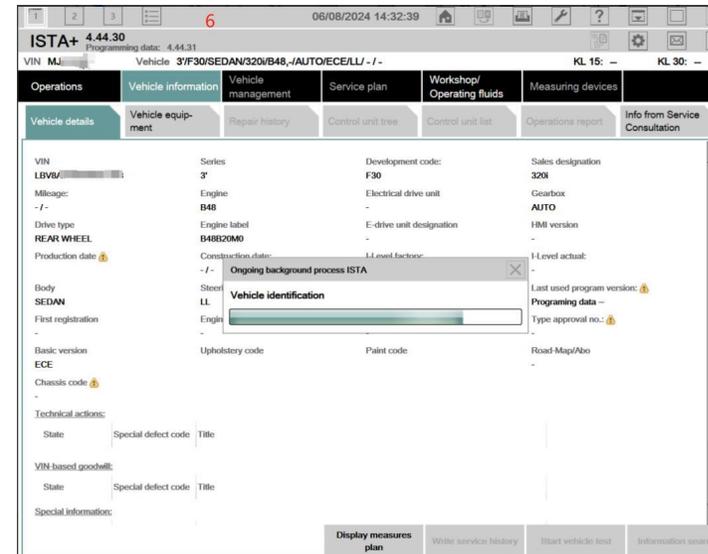
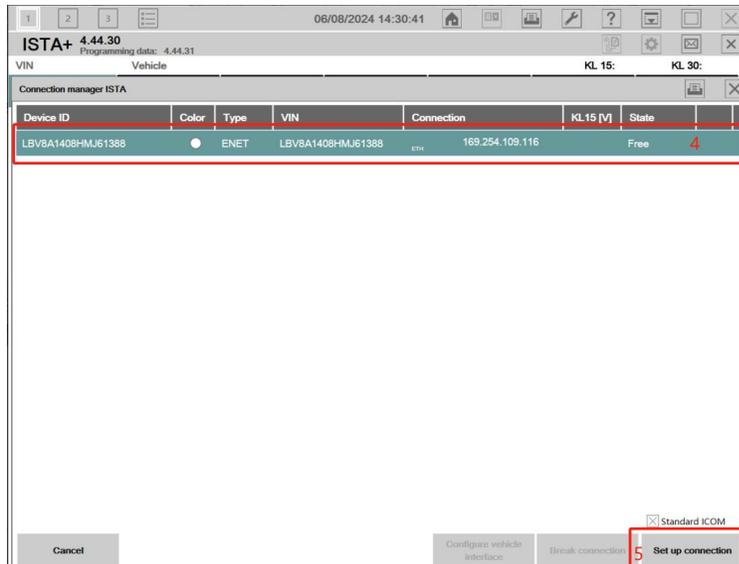
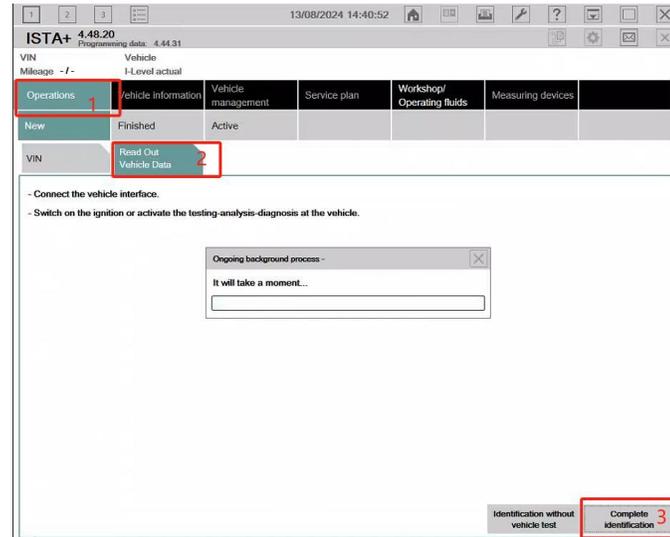
# Operations for Diagnostics

1. Open RLink Platform to download the BMW driver. According to the vehicle model, choose the RLink Lite ENET (F/G) mode.
2. Double-click to open the BMW ISTA-D diagnostic software shown in the figure below.



**(Tips: The BMW driver is a tool to enable ISTA-D to work properly with RLink Lite for diagnostics.)**

- Open the ISTA-D. Connect the vehicle according to the order shown below. Enter the vehicle diagnostic interface.



# Fault Cause Analysis

04

# Fault Cause Analysis

After connecting the vehicle, enter the vehicle fault code interface, and the vehicle fault description will be displayed. This information allows you to further analyze the fault.

## Vehicle malfunctions are currently expected to have three reasons:

1. Wiring reasons. Something is wrong with some of the wiring causing these faults.
2. Internal damage to the ECU causing chain failures.
3. Insufficient voltage causing all sensors and ECUs to report faults.

ISTA+ 4.44.30  
Programming data: 4.44.31  
VIN: [redacted] Vehicle: 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

Code	Description	Mileage	Existent	Class
D90C13	LIN-bus headlight driver modules: No communication	-1 km / 0 mls	yes	
D90D01	FBD receiver 1 (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D0A	Exterior mirror, left (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D0D	Exterior mirror, right (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D17	Light operating unit (BEL), (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D26	Interior rear-view mirror: no LIN component	-1 km / 0 mls	yes	
D90D29	Rain-light-solar-condensation sensor: Missing LIN slave	-1 km / 0 mls	yes	
D90D2F	Headlight driver module (TMS) left (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D32	Headlight driver module (TMS), right (LIN): No LIN-slave	-1 km / 0 mls	yes	
D90D38	Interior light electronics: No LIN-slave	-1 km / 0 mls	yes	
D91497	No message (status, Precrash Master, 0x97), receiver FEM, transmitt	-1 km / 0 mls	yes	

Number of fault memories: 89 / 89 No. fault patterns: 0 Filter: Default

Show fault code Delete fault memory Filter fault memory Delete filter Show completely Calculate test plan

ISTA+ 4.44.30  
Programming data: 4.44.31  
VIN: MJ61388 Vehicle: 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

FEM D90D32 Headlight driver module (TMS), right (LIN): No LIN-slave ISTA

Description	Details	System context
<b>Fault description</b>	No communication with right headlight driver module.	
<b>Condition for fault memory entry</b>	Supply voltage between 9 and 16 volts. Terminal 30 on None	
<b>Measure in service</b>	1) Check connector of headlight driver module, reconnect if necessary. 2) Check for short circuit and line disconnection on K-LIN-x. 3) Check supply and grounding cable. 4) Replace headlight driver module.	
<b>Perceptible effect on customer</b>		

Back Forward Close

Tips: Double-click the fault code (as shown in the red box on the left) to check the detailed fault description (as shown on the right).

# Troubleshooting

05

# Troubleshooting

I. Select LED headlight (red box in the figure below) and double-click to enter the service plan.

II. Follow the service plan on the figure below to perform the test.

06/08/2024 16:16:39

ISTA+ 4.44.30  
Programming data: 4.44.31

VIN [redacted] Vehicle 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

Operations	Vehicle information	Vehicle management	Service plan	Workshop/ Operating fluids	Measuring devices
Hit list	Test plan	Programming plan			

Supply, DME engine electronics			4
ABL	Voltage supply for engine electronics	<input type="checkbox"/>	4
Supply, DSC Dynamic Stability Control			4
ABL	Dynamic Stability Control (DSC) supply	<input type="checkbox"/>	4
Voltage supply for telecommunications			4
ABL	Voltage supply for telecommunications	<input type="checkbox"/>	4
Electrochromic mirror			5
ABL	Electrochromic outside mirror	<input type="checkbox"/>	5
LED headlight			5
ABL	LED headlight	<input type="checkbox"/>	5

LED\_Scheinwerfer\_FLE2\_FEM (20000452956332)

06/08/2024 16:23:19

ISTA+ 4.44.30  
Programming data: 4.44.31

VIN MJ61388 Vehicle 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

SSP-SSP-SP0000059633 - LED headlight - V.6

Procedure | Wiring Diagram | Functional Description

Problem with data transfer to following control units:  
FLEL Frontal Light Electronics Left, FLER Frontal Light Electronics Right

Continue troubleshooting in test plan with the test module for checking the voltage supply and the bus connection.

Documents | Zoom in | Zoom out | Hotspot | Full Screen | Continue

### III. Detailed description in the service plan

06/08/2024 16:21:08

ISTA+ 4.44.30  
Programming data: 4.44.31

VIN MJ61388 Vehicle 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

SSP\_SSP\_SP0000059633 - LED headlight - V.6

Wiring Diagram Functional Description

Documents Zoom in Zoom out Overview Full Screen

1. In the service plan, you can check the wiring diagram of the headlights. According to the wiring diagram, confirm the wiring of the headlights, the positions of the headlights and related modules.

06/08/2024 16:26:45

ISTA+ 4.44.30  
Programming data: 4.44.31

VIN MJ61388 Vehicle 3/F30/SEDAN/320i/B48,-/AUTO/ECE/LL/2016/11 KL 15: - KL 30: -

FUB-FUB-FB-610002-K11 - Front electronic module - V.9

Procedure Wiring Diagram Functional Description

Problem with data transfer to following control units:  
FLEL Frontal Light Electronics Left, FLER Frontal Light Electronics Right  
Continue troubleshooting in test plan with the test module for checking the voltage supply and the bus connection.

**Front Electronic Module (FEM)**  
The Front Electronic Module (FEM) represents a new generation which supersedes existing control units and their result of the modular principle, the Front Electronic Module (FEM) can be installed in all series. The Front Electronic Module (FEM) is the central control unit in the vehicle electrical system. At the same time, the Front Electronic Module (FEM) is the other control units. The Front Electronic Module (FEM) provides functions from the previous control units footwell (FRM), Car Access System (CAS), Junction Box Electronics (JBE) and central gateway module (ZGM). The central gateway module (ZGM) is installed in the Front Electronic Module (FEM) as an independent control unit reduce the number of control units and improve component networking. At the same time, the optimisation of the wiring reduces the physical bus capacity. The following functions of the Car Access System (CAS) have been integrated in the Front Electronic Module (FEM):

- Terminal control
- Electronic immobiliser
- Comfort Access
- Electric steering lock
- Central locking system

The following functions of the Junction Box Electronics (JBE) have been integrated in the Front Electronic Module (FEM):

- Power window regulator
- Wash/wipe system
- Washer jet heating
- Climate control
- Seat heating
- Mirror heating
- Automatic air recirculation control
- Rain-light-solar-condensation sensor

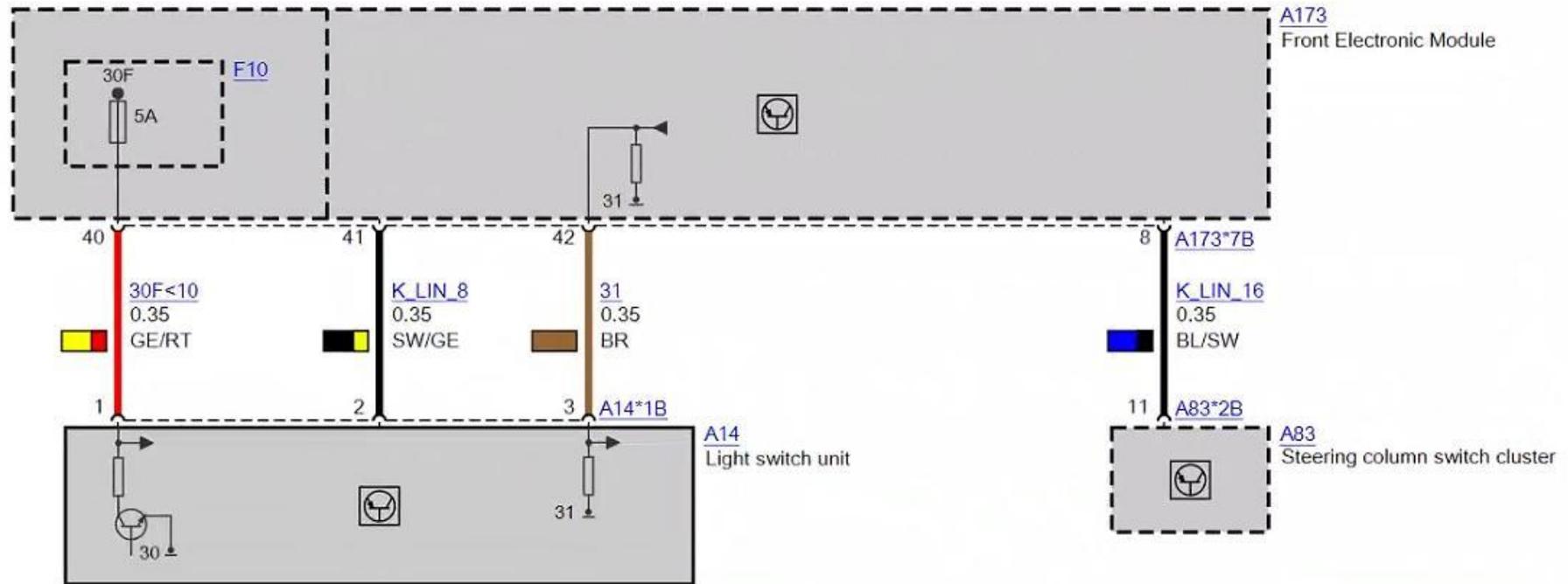
The following functions of the footwell module (FRM) have been integrated in the Front Electronic Module (FEM):

- Exterior lighting
- Brake light
- Interior lighting
- Exterior mirrors

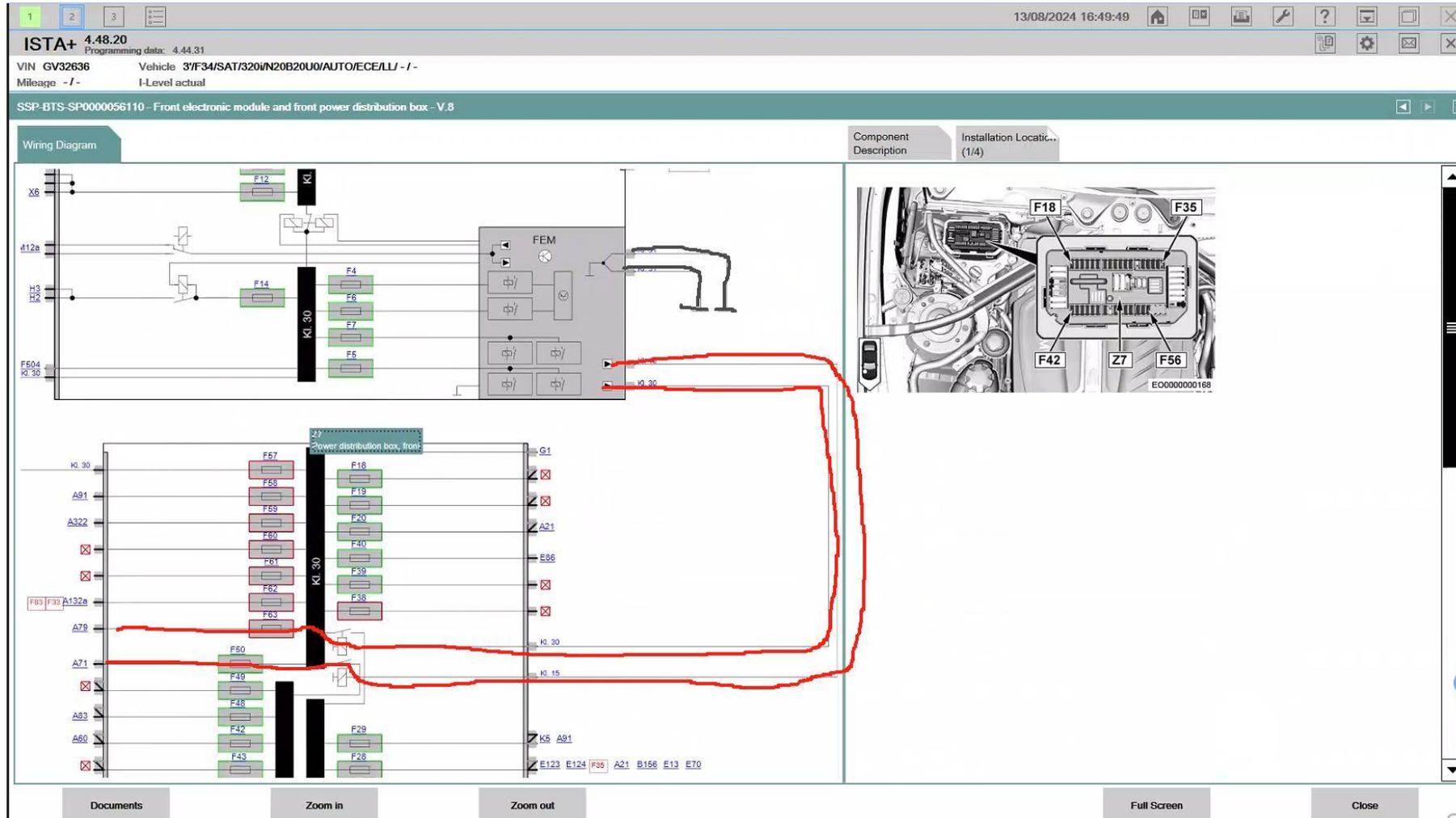
Back Measuring devices Keyboard Full Screen Continue

2. You can check the functional description of headlights and other related modules to analyze the working principle of headlights. According to the working principle of headlights, analyze the fault of headlights in stages, eliminate the parts that work normally step by step, and finally confirm the cause of the fault.

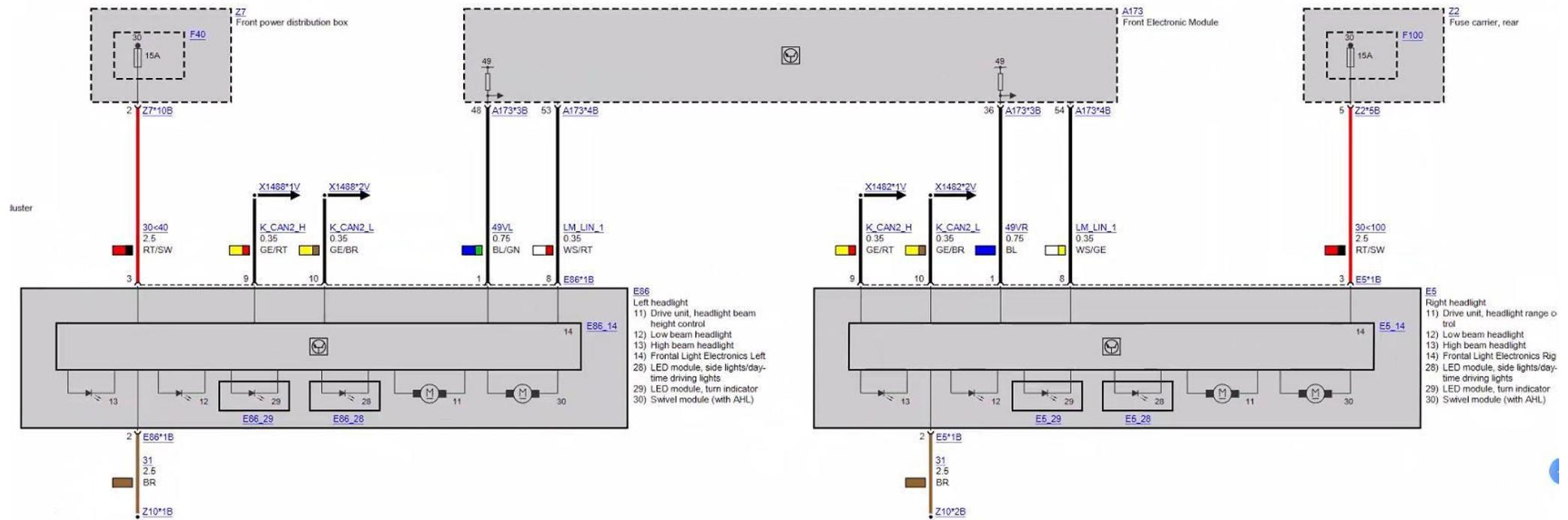
3. Headlight switch test: Check that the headlight switch fuse, the bond strap of power supply, and the test switch signal are normal. (As shown in the figure above, F10 indicates fuse, red wire indicates positive, gray wire indicates negative, black wire indicates signal wire.)



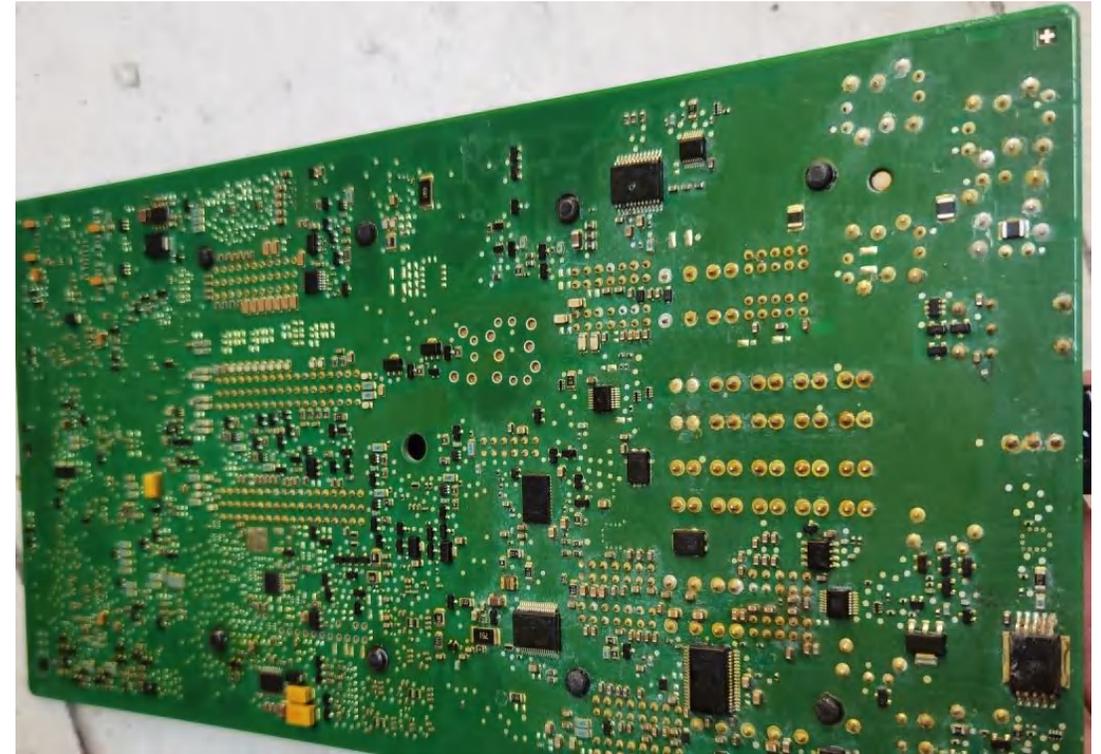
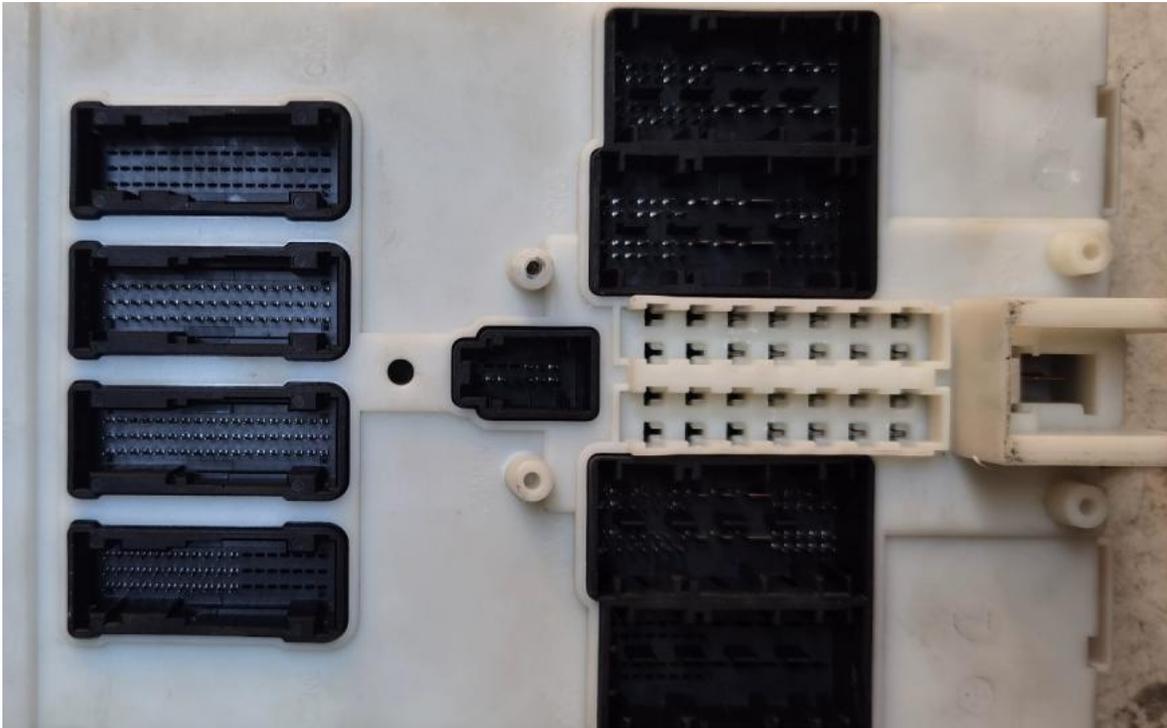
4. Check that the fuse, power supply, and the bond strap of the FEM module are normal. (Red wire indicates FEM power supply wire, black wire indicates bond strap, F50 and F63 indicates fuses, and the upper right is fuse box.)



5. Check that the power supply and fuse of the headlights are normal. Turn on the headlights for testing. The signal from FEM to the headlight is abnormal and no voltage passes. (As shown in the figure above, the two red wires are the positive poles of the left and right headlights, the two gray wires are the negative poles of the left and right headlights, and the others are signal wires.)
6. Check the power status of the FEM to the left headlight signal wire. Pin 1 and Pin 48, Pin 8 and Pin 53 are normal. Check the power status of the FEM and the right headlight signal wire. Pin 1 and Pin 36, Pin 8 and Pin 54 are normal. Suspect that the FEM is faulty.



7. Remove the FEM and find traces of water immersion. Disassemble the FEM and find serious corrosion inside the FEM. Confirm that the FEM is damaged.
8. Replace the FEM and the fault is solved.



Tips: Replacing the FEM requires programming. If you use engineer programming, you need to copy the old FEM data first and then write to the new FEM.

THANKS