
BAI e

**Bus Analog Interface
(extended Version)**

**Installation and Operating Instructions
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PREFACE

Manual should always be kept on board!

Preface

In purchasing a module from the VDO Marine Programme, you have acquired a high quality product which was manufactured in accordance with the accepted standards of good engineering practice. Modern manufacturing processes and the consistent application of the latest quality assurance standards ensure that our products leave the works in perfect condition. Thank you for choosing VDO. We are sure that this system will enhance your comfort and safety at sea.

In order to ensure easy and safe operation of your VDO Bus Analog Interface (BAI), you should familiarise yourself with all the functions of the system.

Please take the time to read this manual carefully in full.

Should you then nevertheless have any questions or encounter any problems, your VDO Kienzle agency will be pleased to assist.

VDO Kienzle Vertrieb und Service GmbH

SAFETY NOTES

Notes on safety

Please follow all the instructions presented in this manual precisely.

Pay special attention to all passages marked with this symbol. These are notes which are particularly important for the operation of the system and for your safety.



Use of the system does not relieve you of responsibility for your vessel, and requires good seamanship. Always follow your nautical experience in the interpretation of the figures displayed!

Safety notes on installation:

You should have the system installed by your shipyard or by a trained specialist.

Do not wear any metal or conductive jewellery such as chains, bracelets or rings etc. when working on the on-board electrical system.

Disconnect the minus pole of the battery before starting work, as otherwise there is a risk of short-circuits. Short-circuits can cause cable fires, battery explosions and damage to other electronic storage systems. Please remember that disconnection of the battery causes all volatile electronic memories to lose their contents, and these must then be reprogrammed.

If work with the power supply connected is required, it is essential to use only insulated tools.

The electrical outputs of the BAle and the connected wiring must be protected from direct contact and damage. The lines used must have sufficient insulation and dielectric strength, and the contact points must be shockproof.

The electrically conductive parts of the connected loads must also be protected from direct contact. Laying of bare metal conductors and contacts is not permissible.

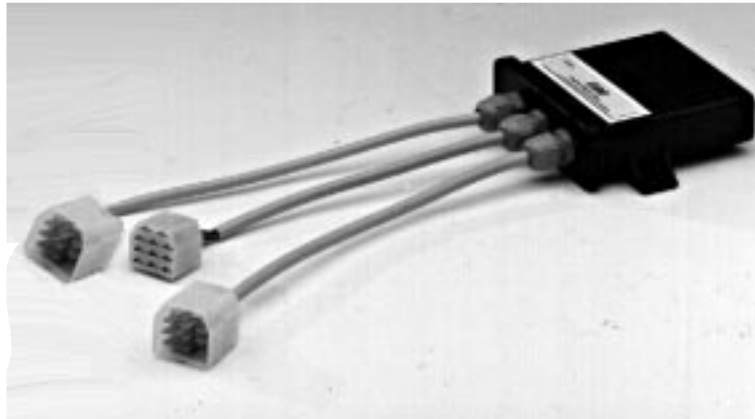
VDO BUS ANALOG INTERFACE

Safety notes on maintenance:

Repairs to the BAI may only be performed by specialists authorised by VDO Kienzle. The VDO BAI conforms to the relevant safety regulations.

Ensure that only fuses of the specified type and the specified current rating are used. Use of provisionally repaired fuses or bridging of the fuse holder are impermissible.

VDO Bus Analog Interface (BAIe)



The BAI is an interface used to receive digital sensor data in SAE J1708 / 1587 format from a GBI or an EDB. The data received are converted into analogue measurement signals and used to activate analogue display instruments.

All outputs can be programmed individually for various instrument characteristics. Programming is performed with special PC software which is available as an option.

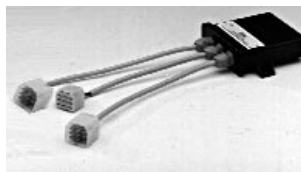
In addition, an alarm can be programmed for each output.

VDO BUS ANALOG INTERFACE / FUNCTIONS

The components of the system

The scope of supply comprises:

- Bus Analog Interface (extended Version)
- Installation instructions



Accessories (not included in the scope of supply):

GBI VDO No. N03 321 006
EDB VDO No. N03 321 002

Abbreviations

The following abbreviations are used in these installation instructions:

BAle:	Bus Analog Interface (extended Version)
GBI:	Gauge Bus Interface
EDB:	Engine Data Box
SAE:	Society of American Engineers
SAE J1708:	SAE document, description of hardware for data communication
SAE J1587:	SAE document, description of data transfer
MID:	Message Identifier – address of the data source (see SAE J1587)
PID:	Parameter Identifier – designation of the record (see SAE J1587)

The functions of the Bus Analog Interface (BAle)

The Bus Analog Interface (BAle) can receive digitised sensor data in SAE J1708/1587 format and use these data to activate analogue display instruments from the VDO Standard or VDO Ocean Line series.

The sensor data received are converted into the relevant measurement signals with the aid of programmed characteristic curves.
In addition, the BALE has 3 analogue inputs for pressure, temperature or fuel level sensors (impedance sensors).

FUNCTIONS / BASIC SETTINGS

The following instruments can be connected to the output channels:

- 2 rev counters
- 6 gauges (impedance) e.g. temperature pressure, fuel level
- 2 gauges (4-20mA) e.g. water level

The basic settings

The basic settings required for correct operation can be established by programming the BAle with the aid of PC software which is available as an option.

The programming process is described in detail in the documentation for the software.

The works settings of the BAle are as listed below:

MID = 112 (BAle address)

Plug 1:

Pin No.	Designation	MID	PID	Remarks
1.5	Alarm silent	112	254	Alarm silent

Plug 2:

Pin No.	Designation	MID	PID	Gauge type
2.1	Temperature 1	120	105	Temp. 120°C / 250°F
2.2	Temperature 2	120	176	Temp. 150°C / 300°F
2.3	Pressure 1	120	102	Pressure 2 Bar / 48 Psi
2.4	Pressure 2	121	100	Pressure 10 Bar / 150 Psi
2.5		120	168	Any (impedance)
2.6	Fuel level	120	96	Level gauge (lever)
2.7	Fresh water level	120	38	Water level (4...20mA)
2.8		1	254	Any (4...20mA)
2.9	Rev counter 1	120	190	4000 rpm / 250Hz
2.10	Rev counter 2	121	190	4000 rpm / 250Hz

If terminal 1.5 is connected to +U_{Batt} any activated alarms are deactivated and the BAle sends an Alarm silent command to the bus.

BASIC SETTINGS

Plug 3: Alarm outputs

Pin No.	Designation	Alarm Low	Alarm High
3.1	Alarm 1	OFF	ON : 100°C
3.2	Alarm 2	OFF	ON : 132°C
3.3	Alarm 3	ON : 0.48 Bar	OFF
3.4	Alarm 4	ON : 1.90 Bar	OFF
3.5	Alarm 5	ON : 10.8V	ON : 16V
3.6	Alarm 6	ON : 10%	OFF
3.7	Alarm 7	ON : 10%V	OFF
3.8	Alarm 8	ON	

Alarm output 8 is the collective alarm for alarms 1-7.

Fault:

VDO BAle does not function

Cause / Remedy:

- Check the electrical connections against the installation diagram.
- Check the on-board voltage. Supply voltage 10.8...32 V DC
- Examine contact and isolating points for corrosion and soiling.

INSTALLATION

Maintenance of the Bus Analog Interfaces (BAle)

The BAlE is maintenance free.

Installation of the Bus Analog Interfaces (BAle)



Before you commence installation, please read the notes on safety on pages 30 and 31.

Installation of the BAlE

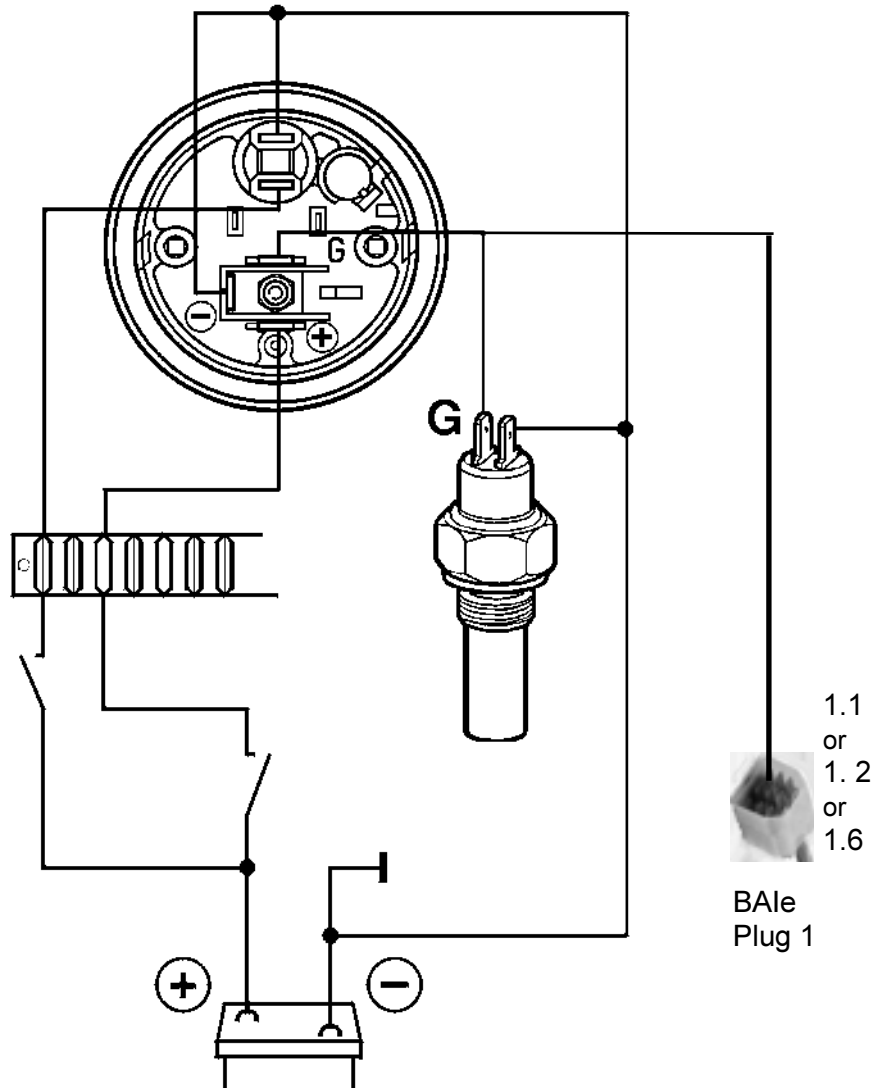
Mount the BAlE in the vicinity of the instruments. When selecting the installation location, remember that the cable between the BAlE and the analogue instruments may be max. 5 m long.

The cable exit side of the BAlE must point downwards. If the BAlE is to be installed horizontally, the cable exit side must be angled downwards by $>5^\circ$.

INSTALLATION

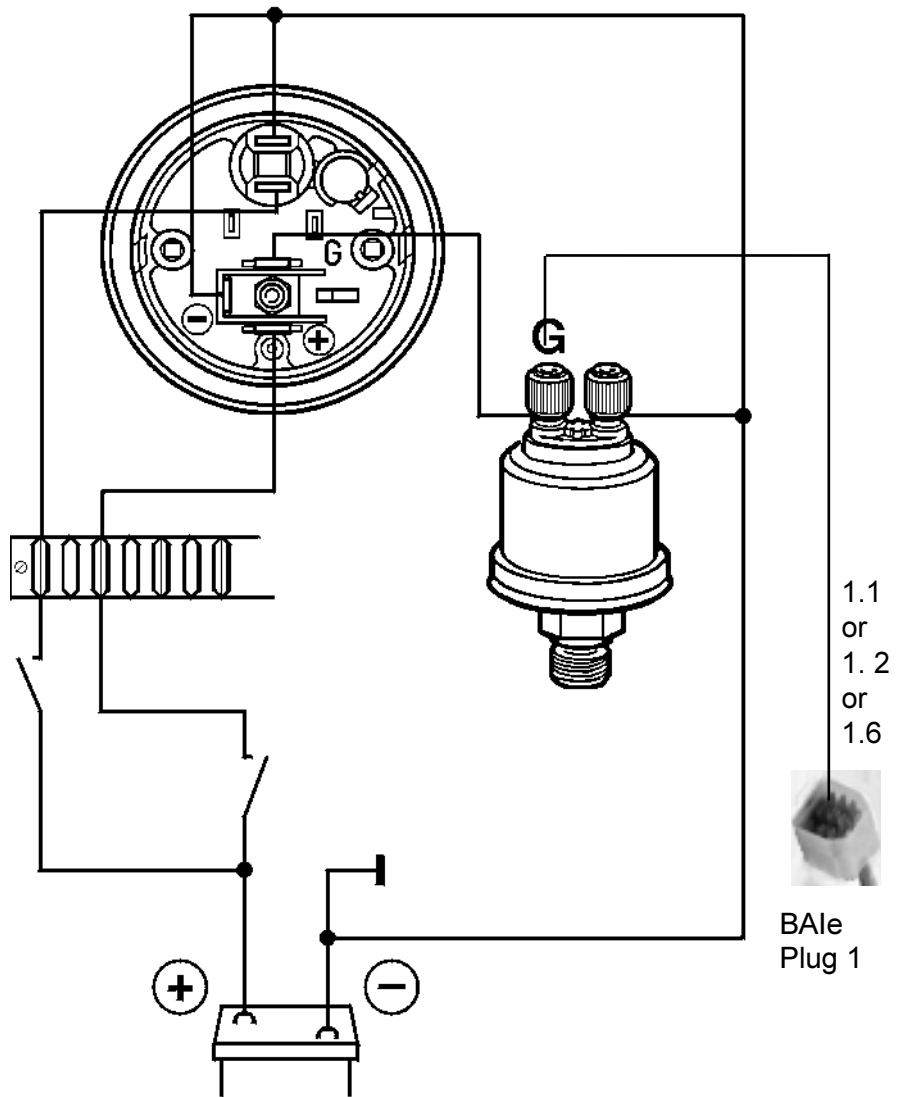
Electrical installation

Connection of a temperature sensor to the BAle



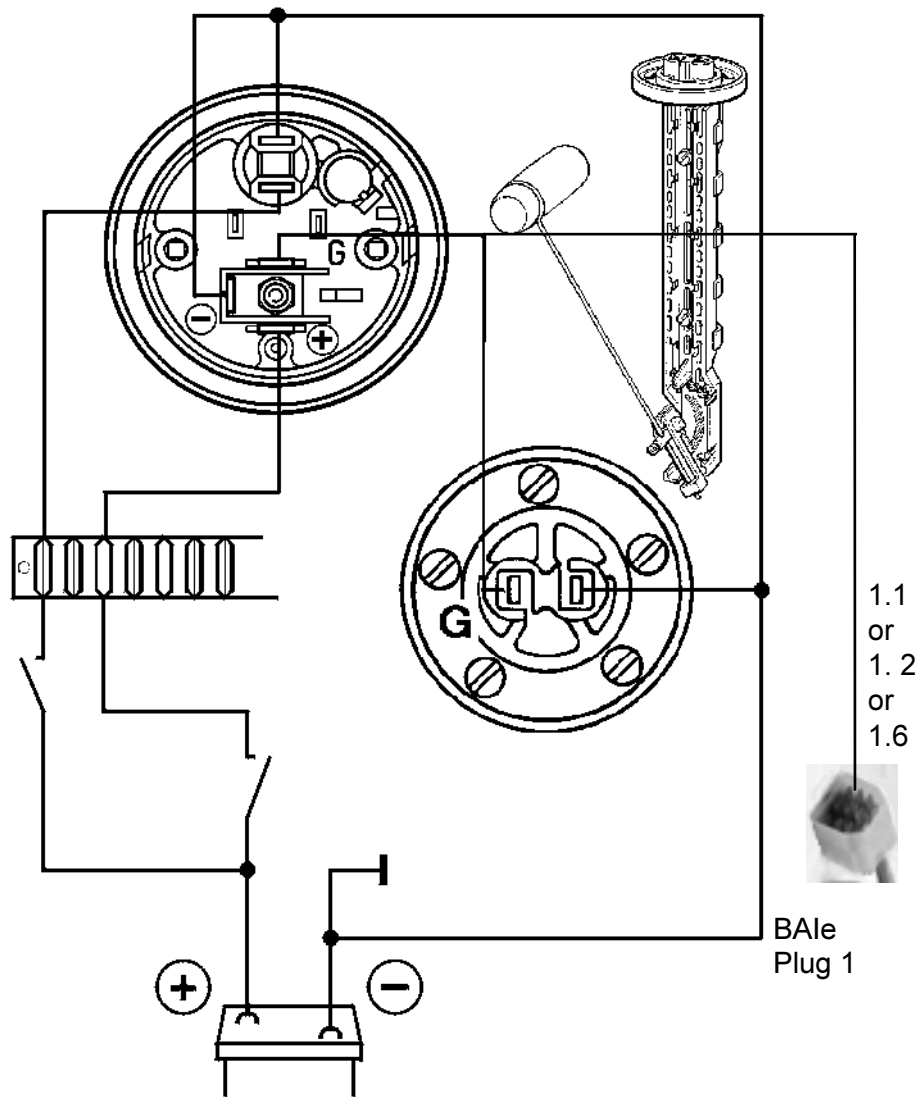
INSTALLATION

Connection of a pressure sensor to the BAle



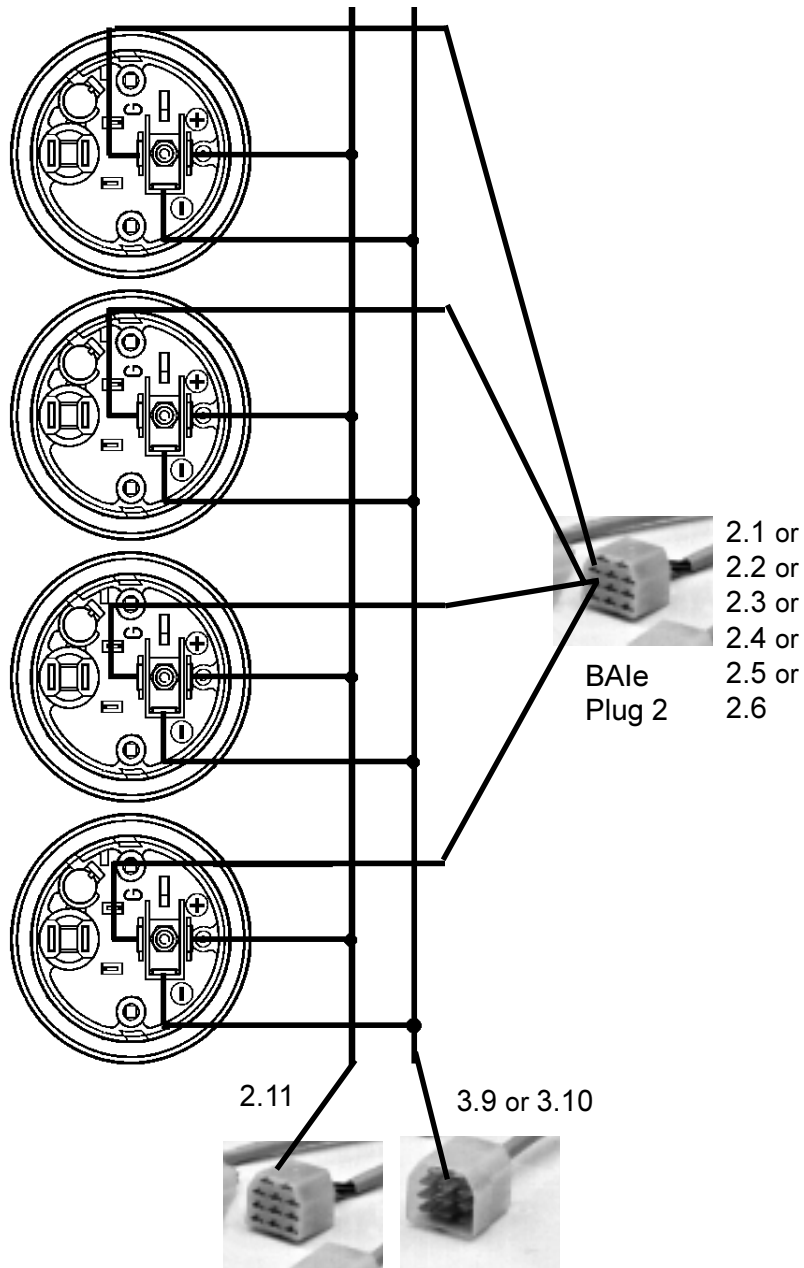
INSTALLATION

Connection of a fuel level sensor to the BAle



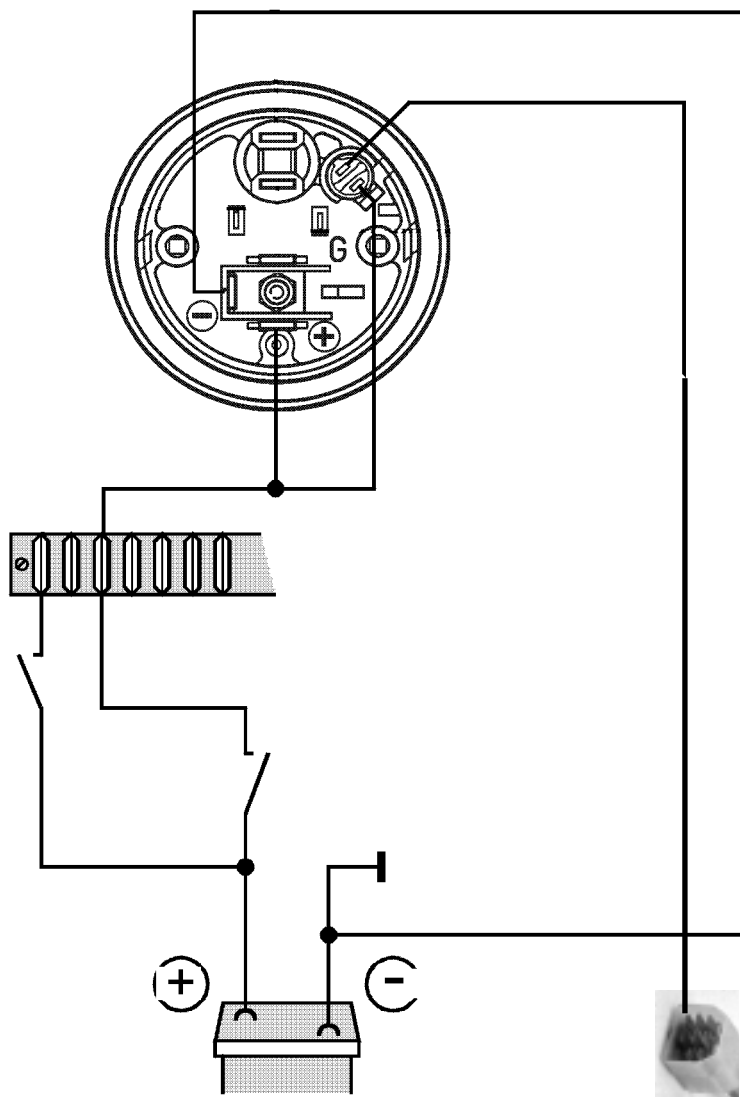
INSTALLATION

Electrical installation



INSTALLATION

Alarm outputs

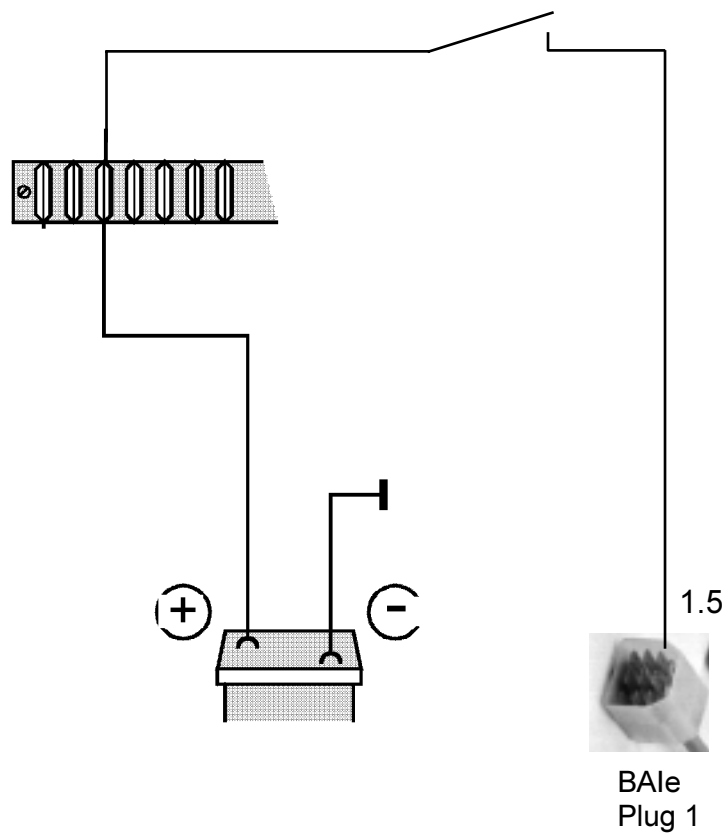
BAle
Plug 3

See page 50 for
pin assignment

INSTALLATION

Alarm button

If terminal 1.5 is connected to $+U_{\text{Batt}}$ any collective alarm activated (Plug 3 Pin 8) is deactivated and the BAle sends an Alarm silent command to the bus.

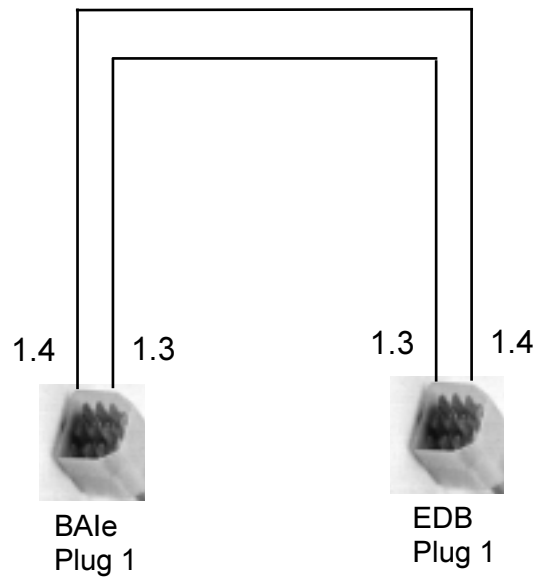


INSTALLATION

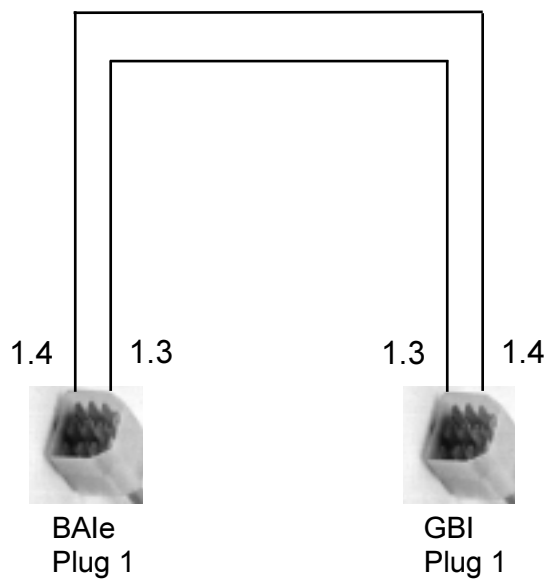
Data bus

One of the following connections is necessary for receipt of the digitised data:

1. BAle to EDB

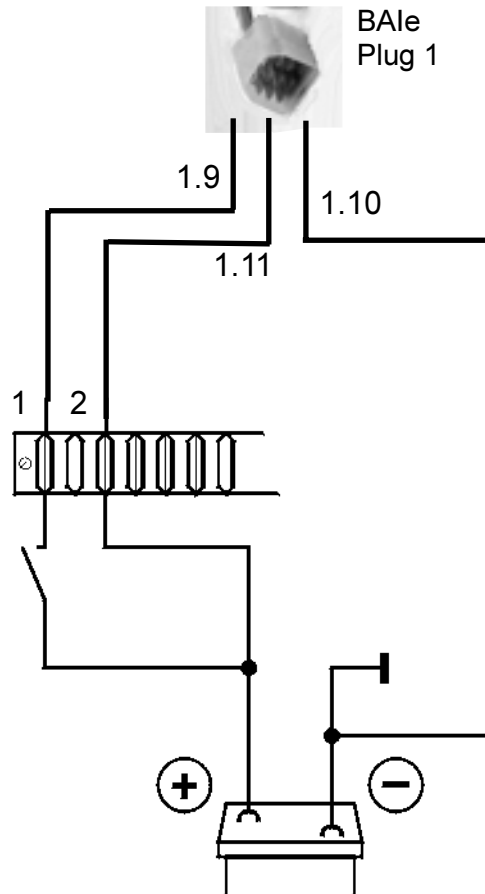


2. BAle to GBI



INSTALLATION

Power supply



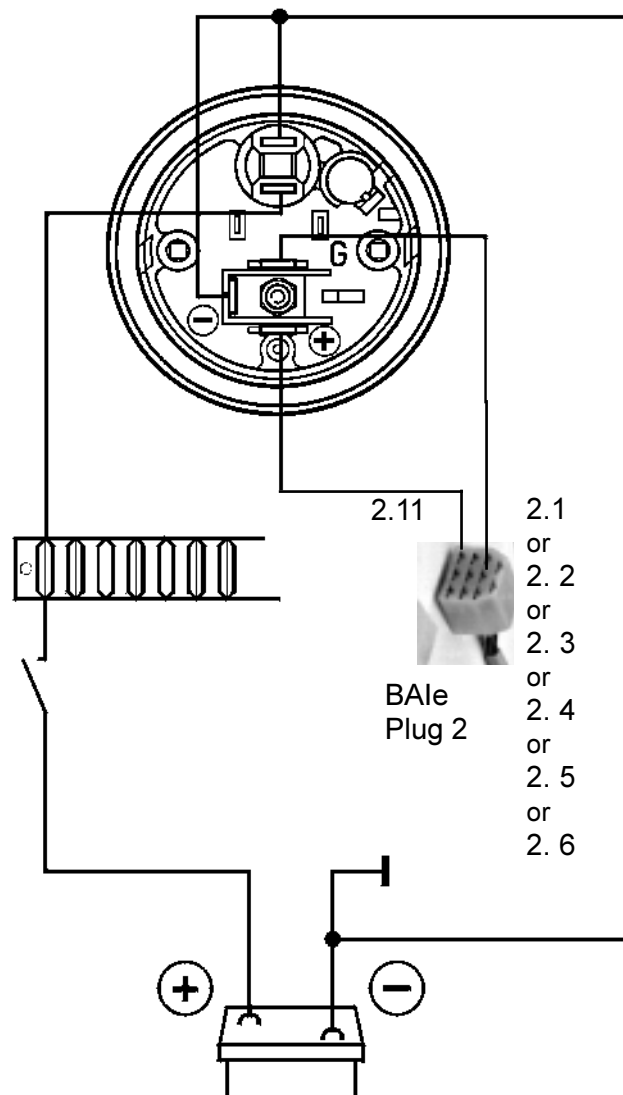
Selection of fuses:

Fuse 1	5 A
Fuse 2	5 A

INSTALLATION

Connection of R-type gauges

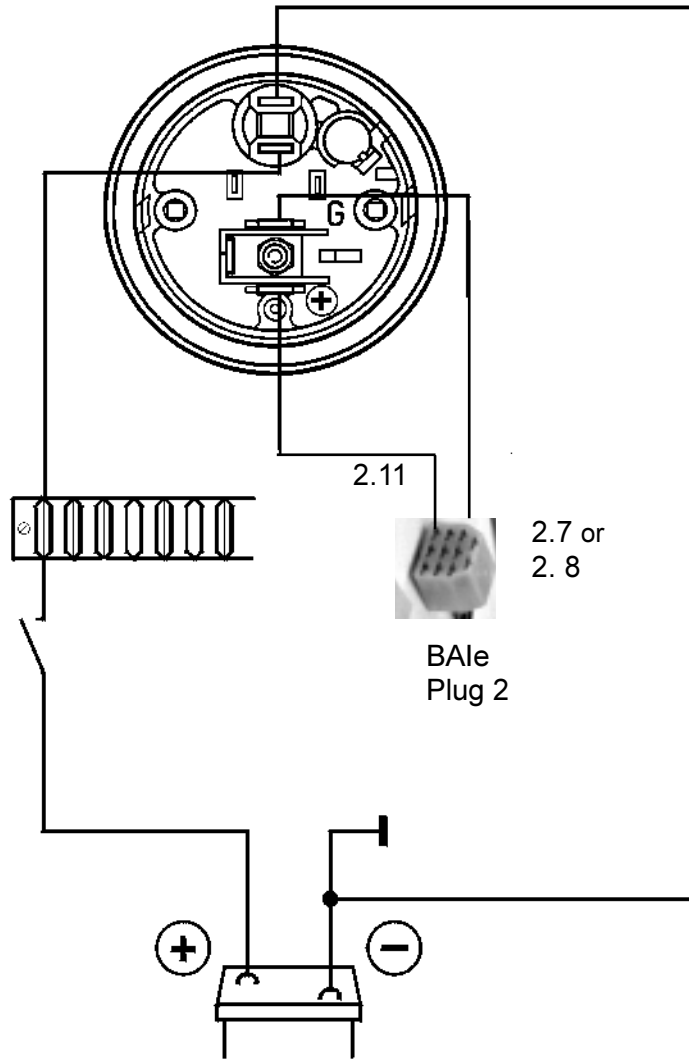
R-type gauges are temperature, pressure or fuel level gauges.



INSTALLATION

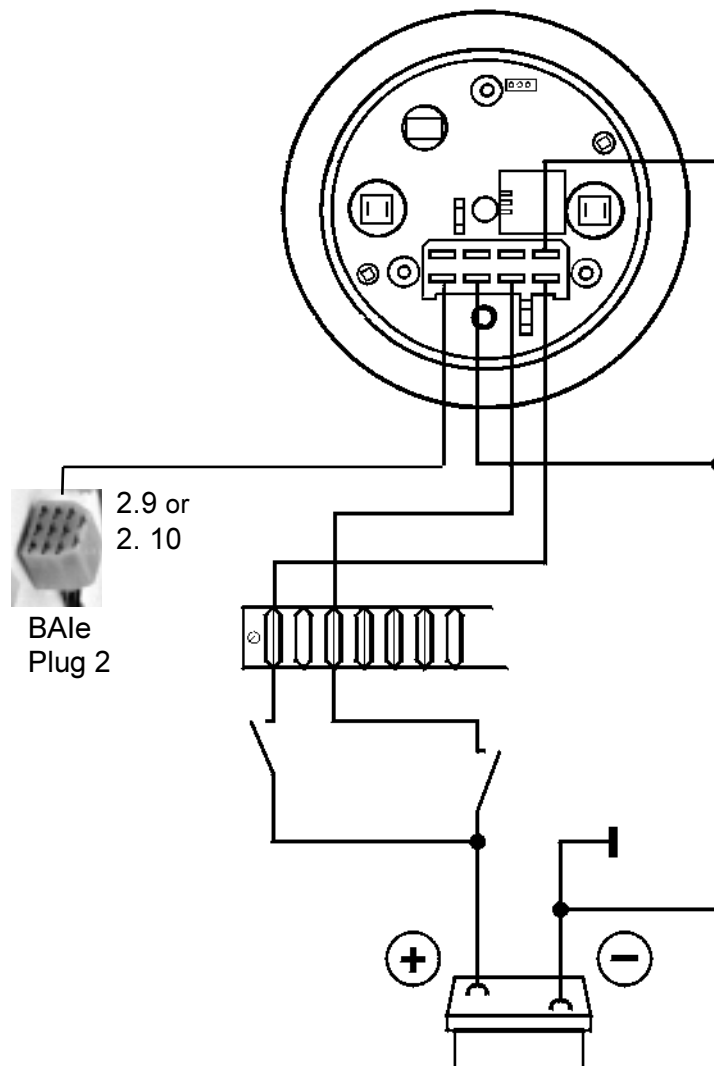
Connection of 4-20 mA gauges

4-20mA gauges are pyrometers, voltmeters and fresh water level gauges.



INSTALLATION

Connection of rev counter terminal W



The rev counter must be set to the following number of pulses:
3.75 pulses/rev.

INSTALLATION

Pin assignment

Plug 1 Power



Pin No.	Colour	Function	Remarks
1.1	brown	Analog in A	Impedance input
1.2	pink	Analog in B	Impedance input
1.3	yellow	BUS B	J1708
1.4	green	BUS A	J1708
1.5	white	Test	Alarm silent / System Test
1.6	grey	Analog in C	Impedance input
1.7	blue	GND2_(term. 31)	Chassis earth
1.8	white/brown	Vcc2 (term. 30)	Permanent plus
1.9	violet	Vcc (term. 15)	Ignition plus
1.10	black	GND1_(term. 31)	Chassis earth
1.11	red	Vcc1 (term. 30)	Permanent plus

Plug 2 Gauges



Pin No.	Colour	Function	Remarks
2.1	brown	Gauge 1	Gauge terminal "G"
2.2	pink	Gauge 2	Gauge terminal "G"
2.3	yellow	Gauge 3	Gauge terminal "G"
2.4	green	Gauge 4	Gauge terminal "G"
2.5	white	Gauge 5	Gauge terminal "G"
2.6	grey	Gauge 6	Gauge terminal "G"
2.7	blue	Gauge 7	Gauge terminal "G"
2.8	white/brown	Gauge 8	Gauge terminal "G"
2.9	violet	Rev counter 1	Gauge terminal "W/1"
2.10	black	Rev counter 2/Tacho1	Gauge terminal "W/1"
2.11	red	Vcc (term. 30)	Power supply for 10 gauges

INSTALLATION

Plug 3 Alarms



Pin No.	Colour	Function	Remarks
3.1	brown	Alarm 1	
3.2	pink	Alarm 2	
3.3	yellow	Alarm 3	
3.4	green	Alarm 4	
3.5	white	Alarm 5	
3.6	grey	Alarm 6	
3.7	blue	Alarm 7	
3.8	white/brown	Alarm 8	
3.9	violet	GND	Chassis earth for gauge
3.10	black	GND	Chassis earth for gauge
3.11	red	Term. 30	Output for warning lamps

All alarm outputs are internally limited to 300mA.

Cable lengths / cable cross sections



The permissible cable lengths for the BAle are:

Cable between gauge and BAle < 5m

Cable between sensor and BAle < 5m

The cable cross sections required for the BAle are:

- Sensor cable min. 0.5 mm²
- Gauge cable min. 0.5 mm²
- Power supply min. 0.5 mm²
- Data bus min. 0.5 mm²

TECHNICAL DATA

Technical data

Supply voltage:	10.8 to 32 V DC
Current consumption:	< 70 mA (without gauge)
Service temperature:	-20 to +80°C
Storage temperature:	-30 to +85°C
Protection:	DIN 40050 - IP 65
EMC protection:	CE: EN 50081-1, EN 50082-1, ISO 7637-2
Vibration	max. 1g eff. (25 Hz - 500 Hz), 8 h
Shock	15 g, 1.5 ms half sine wave
Dimensions:	100 x 110 x 30 mm
Plug type:	AMP 6.3 mm Faston
Input:	Sensor data in SAE J1708/15873 format Inputs for impedance sensors Accuracy +/- 3°C Sensor VDO sensor
Outputs:	6 outputs for R-type gauges Gauge type: VDO Ocean Line 2 outputs for 4-20 mA gauges Gauge type: VDO Ocean Line 2 rpm outputs dynamo terminal W Gauge type: VDO Ocean Line 8 alarm outputs Current carrying capacity 300 mA

We reserve the right to make technical modifications