IBS-DBS
Dual Battery System
Manual

Table of Contents

![IBS Intelligent Battery System — the ultimate Battery System]

Language / Sprache / Langue / Lingua

For manual in another language follow the path or scan QR-Code.
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English	Deutsch	Francais	Italiano
			Uscita prossimamente

http://www.ibs-tech.ch/download/manuals-ibs.html

Product description

The classic IBS-DBS Dual Battery System is used for charge distribution while driving (alternator charging) and disconnecting the batteries after driving (alternator off). For emergencies, the batteries can be manually connected for 30 minutes or 2 hours. For example, in the case of an empty / faulty starter battery (Main) the motor can be started from the additional battery Aux (RBM necessary). During the recovery winch operation, the batteries can be used to power the winch by manually connecting the batteries. With the new software 8.1, further functions, e.g. when used with the DBM20A or Li-type batteries.
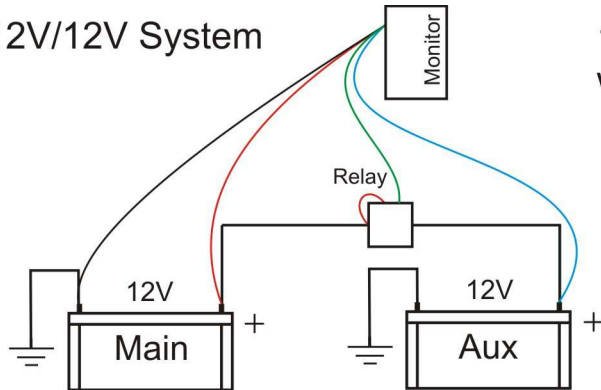
Warning

The installation and commissioning of IBS products should only be carried out by specialists with specialist knowledge in vehicle electronics and battery technology.

Various batteries produce explosive gases while charging; Fitting instructions for these batteries must be observed.

Applications

12V/12V System

Monitor

Relay

12V
Main −/+

12V
Aux −/+

12V/12V System with RBM

Monitor

Relay

RBM

12V
Main −/+

12V
Aux −/+

24V/24V System

Monitor

Relay

24V
Main −/+

24V
Aux −/+

24V/24V System with RBM

Monitor

Relay

RBM

24V
Main −/+

24V
Aux −/+
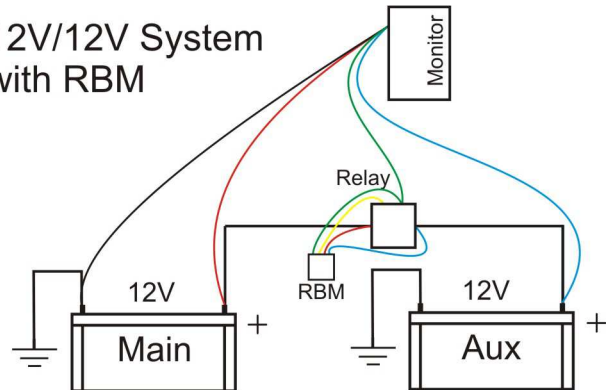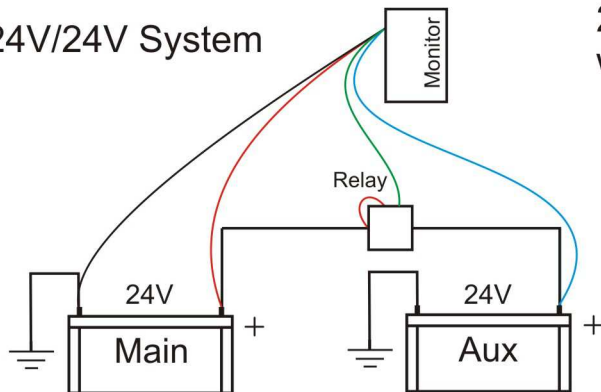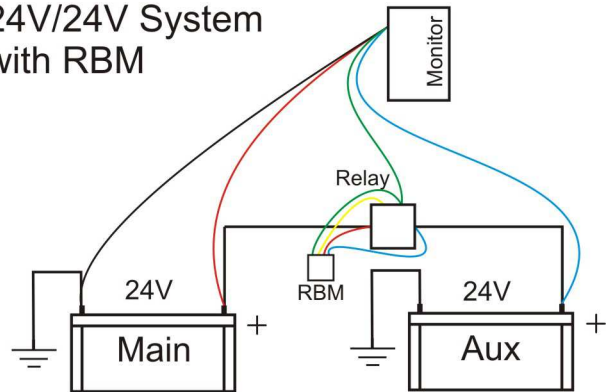
12V/12V/12V System Triple battery with DBR

Monitor

Relay

DBR

Boutton

12V
Main −/+

12V
Aux −/+

12V
Aux −/+

12V/12V System DBM supporting

Monitor

Relay

DBM20A

24V
Main −/+

12V
Aux −/+
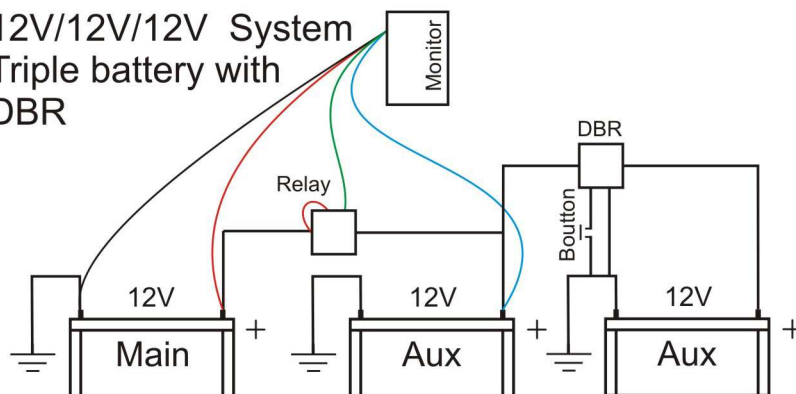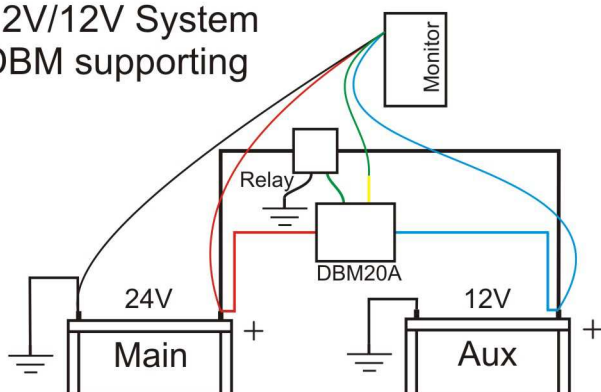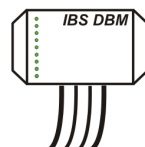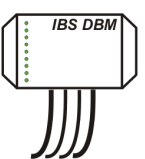
Combinations of IBS devices
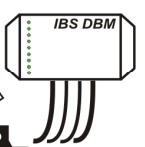
① IBS-DBS (DBi-DBS)

Dual battery bi-directional
200A/500A Link start
Battery status, charge, alarms
30/120 minutes manual Link (recovery winch support)

② IBS-DBS (DBi-DBS) +RBM

Dual battery bi-directional
200A/500A Link start with defective Main battery
Battery status, charge, alarms
30/120 minutes manual Link (recovery winch support)

③ IBS-DBR with Switch

Dual battery bi-directional
200A/500A Link start with defective Main battery
System Status
30 minutes manual Link
RBM is integrated

④ IBS-DBM20A

In-Car Charger 20A(DC/DC-converter) 3-4 stage charger
Dual battery uni-directional
Battery status, charge mode, system status
12V/12V-DC/DC 3-4 stage charger
24V/12V-DC/DC 3-4 stage charger
Trailer battery 3-4 stage charger

⑤ IBS-DBM20A
+ IBS-DBMLSK
(200A Relay
Link-button)

In-Car Charger 20A(DC/DC-converter) 3-4 stage charger
Dual battery bi-directional
Fast Charge up to 200A
12V/12V-DC/DC 3-4 stage charger
200A/500A Link start with defective Main battery
dynamic Link (recovery winch support)
30/120 minutes manual Link
RBM integrated

⑥ IBS-DBM20A
+ IBS-DBS/Mon

+ IBS 200A Relay

In-Car Charger 20A(DC/DC-converter) 3-4 stage charger
Dual battery bi-directional
Battery status, charge mode, system status
12V/12V-DC/DC 3-4 stage charger
Fast Charge up to 200A
200A/500A Link start with defective Main battery
dynamic Link (recovery winch support)
30/120 minutes manual Link with DBS Software 8.1
RBM integrated

Mounting

Install the relay with wires or connections facing downwards. Symmetry between power wires has no effect. Keep the wires between the batteries and the relay as short as possible to minimize the line resistance.

Relay power wire

The Relay power wires should have at least a cross section of 25mm^2!

Notes on installation

The installation steps are shown below. Follow these steps sequentially to ensure the device functions properly.

Caution

Before installation

- For the installation with Lithium type batteries as auxiliary battery: make sure that the battery has 4 cells! (Caution: Use Li-type battery only as auxiliary battery!)
- Ensure which applications you are installing. Only follow the correct installation steps!

| The following installations are possible		
System	**Description**	Page
12V / 12V System	Classic 12V installation	10
12V / 12V System	Classic 12V with RBM	11
12V / 12V System	DBM Supporting installation	12
12V / 12V System	Triple battery installation (with DBR)	14
24V / 24V System	Classic 24V installation	15
24V / 24V System	Classic 24V with RBM	16

- Read the installation steps first.
- Please also read the notes on the **installation**, **relay, power wire** and **wire extension** on this page.

During installation

- The red wire always belongs to the starter (Main) battery and the blue to the auxiliary (Aux) battery!
- Connect the red wire directly to the positive pole of the starter battery and the blue wire directly to the positive pole of the additional battery! (Not on the relay connections).

After installation

Carry out the control steps (you can find the document on our website at www.ibs-tech.ch \ Downloads \ Testprocedures IBS-DBS_Test_e1.pdf or the QR code next to it).

Starting the Monitor

Adjustable modes

Setting options

	12V	24V	Li-type	DBM		Designation
1	X					12V Classic
2	X		X			12V Aux Li-type
3	X			X		12V DBM
4	X		X	X		12V DBM with Li-type
5		X				24V Classic
6		X	X			24V Aux Li-type
S						Silent

*Select the desired mode **1-6** or **S** and follow the instructions in **Setting the mode.**
The monitor may have already been set in advance. To find out which mode the DBS is in, follow the instructions in the **software display on page 9.
*** For Li-type wire installation follow the classic installation.

Setting the modes

The modes can be set via a **dip switch** in the device:

Dip switch positions

1	(1) off/off/off/off (default)	12V Classic**!
2	(1) off/off/off/**on**	12V Aux Li-type**!
3	(1) off/off/**on**/off	12V DBM
4	(1) off/off/**on**/**on**	DBM with Li-type
5	(1) **on**/off/off/off	24V Classic**!
6	(1) **on**/off/off/**on**	24V Aux Li-type**!
S	(1) off/**on**/off/off	Silent**

*ATTENTION: TO SWITCH TO A 24V SYSTEM A 24V RELAY (AND RBM) MUST BE USED! ACCORDINGLY A 12V RELAY (AND RBM) MUST BE USED TO SWITCH TO A 12V SYSTEM!
** The monitor can be configured to be silent in any mode. (silent mode for low battery alarm)

Where is the dip switch for setting the modes?

To access the DipSwitch, you must open the device. First remove the 2 screws on the back of the monitor to remove the mounting plate. Then loosen the 4 screws that hold the housing cover and the housing base together. Lift off the cover. The DipSwitch is located at the bottom left of the circuit board:

If the protective film is still present, remove it. Using tweezers or something similar, you can now adjust the positions as desired. The positions are marked on the DipSwitch (on the picture: leftmost -> position 1, rightmost -> position 4). (Default setting: All positions in "OFF" -> 12V Classic).
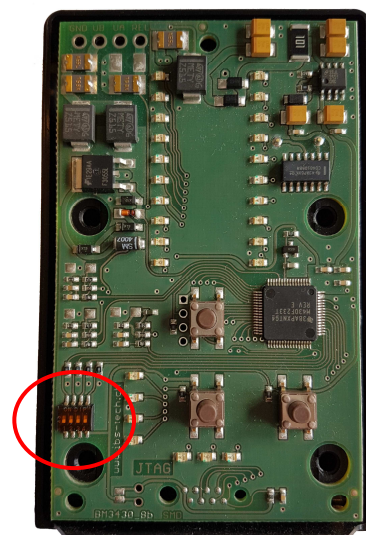
Software Display

As soon as you insert the monitor and it is connected to the starter battery, it will display the software version and the currently set mode for a few seconds as following:

Software version

The actual software version is indicated by the display bars Main and Aux. Number of luminous Led's of the Main-Bar, equals the first number and the number of Led's of the Aux-Bar give the second number of the actual device software version. Example: 8 LEDs on the main side and 1(one) LED on the aux side -> Version 8.1

Software mode

1	12V Classic	„linked" **on**
2	12V Li-type	„linked" **flashes**
3	DBM	"manually linked" **on**
4	DBM Li-type	„manually linked" **flashes**
5	24V Classic	„linked"**on**
6	24V Li-type	„linked" **flashes**
S	Silent	

Call up the software display

If you missed the display of the software version or if you would like to activate the display of the software version at a later time, you have two options:

1. Pushing the link and auto button simultaneously causes a system reset and rebooting of the monitor, with the monitor re-displaying the software version.
2. The monitor is also reset by unplugging the monitor at the grey connector and re-connecting it, which causes re-displaying the software version.

Installation / Wiring

Classic 12V Installation

Please read the installation steps before performing for a better understanding.

If possible, install the wire in a protective tube and fasten with wire ties.
Do not attach to hot engine parts: **Risk of fire!**

1. Route the wires from the wire set from the driver's cab into the engine compartment.
2. Crimp the wire lugs.
3. Install the monitor wire as shown:
   - Screw the black lead to the minus starter battery.
   - Screw the red lead on the positive starter battery.
   - Screw the blue lead to a plus board (Aux) battery.
4. Connect green wire to terminal 86 of the relay.
5. Install the relay (see the mounting instructions under **mounting** page 7).
6. Install the Relay power wire (not supplied, see **Relay power wire** page 7) as shown:
   - Install a short red wire from the wire kit as a connection wire between terminals 85 and 87.
   - Install the power wire from the Plus starter battery (Main) on terminal 87 of the relay.
   - Install the power wire from the Plus of the board battery (Aux) to Terminal 30 of the Relay.
7. Insert the monitor (see **Starting the Monitor** on page 8).

Classic 12V with RBM

Please read the installation steps before performing for a better understanding.

If possible, install the wire in a protective tube and fasten with wire ties.
Do not attach to hot engine parts: **Risk of fire!**

1. Route the wires from the wire set from the driver's cab into the engine compartment.
2. Crimp the wire lugs.
3. Install the monitor wire as shown:
   - Screw the black lead to the minus starter battery.
   - Screw the red lead on the positive starter battery.
   - Screw the blue lead to a plus board (Aux) battery.
4. Connect green wire to terminal 86 of the relay.
5. Install the relay (see the mounting instructions under **mounting** page 7).
6. Install the Relay power wire (not supplied, see **Relay power wire** page 7) as shown:
   - Install the power wire from the Plus starter battery (Main) on terminal 87 of the relay.
   - Install the power wire from the Plus of the board battery (Aux) to Terminal 30 of the Relay.
7. Mount the RBM near the relay:
   - Yellow wire on terminal 85.
   - Green line on terminal 86.
   - Red wire on terminal 87.
   - Blue wire on terminal 30.
8. Insert the monitor (see **Starting the Monitor** on page 8).

DBM Supported Installation

Additional functions / applications with IBS-DBS

It is necessary to have a micro controlled version of the IBS-DBS to access all the extra functions. There has to be the light blue **µC-**sign on the cover of the IBS-DBS.

Advantages of a DBM supporting installation (additional installation to DBM20A):

1 Link Start:
Vehicle can be started from Aux battery by pushing Link-Button from IBS-DBS.

2 Automatic Winch Support:
The DBM20A recognises Winch usage and switches to Relay Support Mode for optimal load sharing on both batteries.

3 Manual Winch Support/Link:
Activation of 30 minutes manual Link by pushing Link-Button (on DBS) **once**.
By pushing Link Button **twice** within 3 seconds the 2 hours manual Link can be activated.
Manual reset by pushing Auto button on DBS.

4 Solar Charge:
With installed solar panel on Aux battery the Main battery will be charged as well when Aux voltage is higher than 13.5V.

5 Fast Charge:
When the car is started the alternator first charges both Main and Aux battery (Fast Charge) and then the DBM20A switches to DC/DC Charge to get a 100% full Charge as configured.

6 RBM function:
Relay Booster Module Function for Link Start when a low Main battery is detected.

For a better understanding of the programming of the system, please first read page 6 of the DBM20A manual. Otherwise, the system may have to be reinstalled.
Please read the instructions for mounting and wire extension on page 8 of the DBM20A manual.
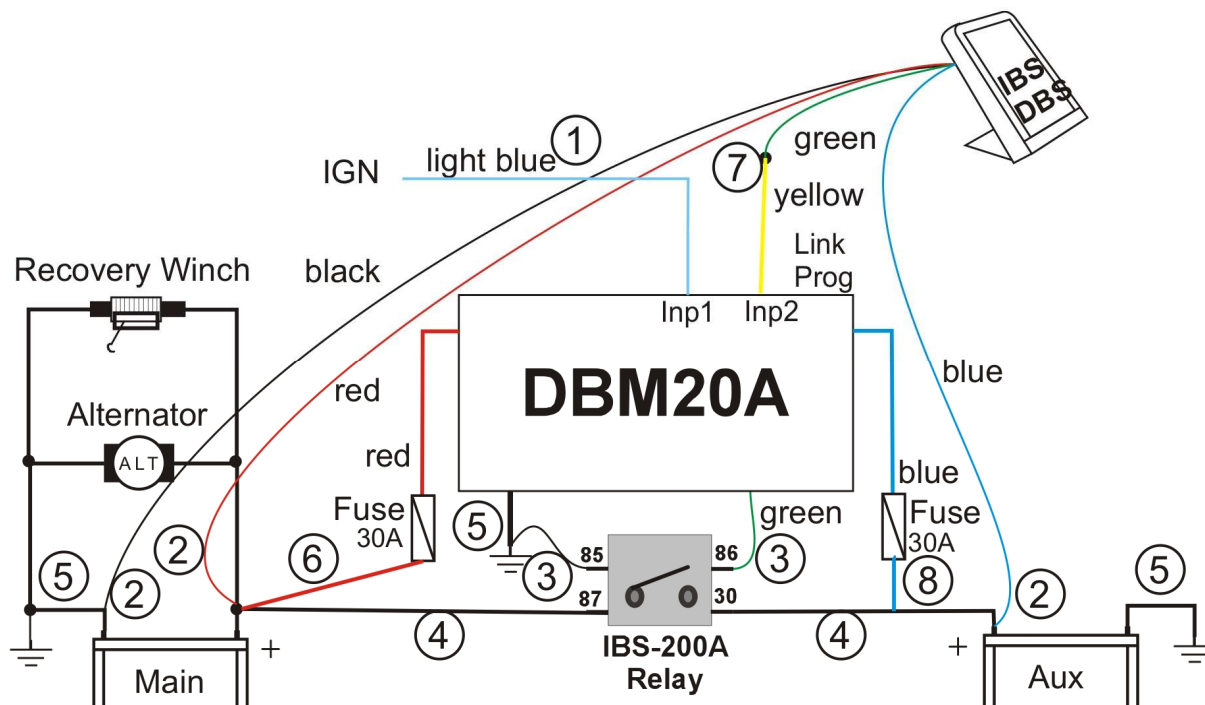
Please read the installation steps before performing for a better understanding.

Choice of the connection of the light blue wire **IGN:**
- For an alternator with charge cut-off, connect IGN to ignition (terminal 15). When the alternator is switched off, DC / DC charging is carried out until the main voltage reaches 11.9V. The DC / DC charge starts automatically when Umain is more than 13.3V.
- For all other alternators: do not connect IGN, charge is switched off at main voltage 12.7V. The DC / DC charge starts automatically when Umain is more than 13.3V.

1. **If necessary**, connect light blue lead IGN to ignition (terminal 15). Leave open without need.
2. Connect the IBS-DBS as shown above (red to Plus Main, blue to Plus Aux, black to minus).
3. Connect the relay to the green line (terminal 86) and the negative line (terminal 85).
4. Route the power wires (minimum 25mm2) from **Main Plus to Relay** and **Aux Plus to Relay**.
5. Connect the black (GND) wires.
6. Then connect the red (+ Main) wire (NOTICE: System starts up → see page 6 Programming the system in the DBM20A manual). (Do not continue installation until standby mode is activated).
7. Now connect the green line of the IBS-DBS to the yellow Link / Prog line of the DBM20A.
8. Finally connect the blue (+ Aux) line.

If the relay was not detected during the programming step, because the Aux line was connected afterwards, see the steps under **Relay not recognized - what to do?**

Note

To ensure a safe installation, fuses must be installed in the red path (+ Main: 30A) and in the blue path (+ Aux: 30A)!

Triple battery installation (with DBR)

Please read the installation steps before performing for a better understanding.

If possible, install the wire in a protective tube and fasten with wire ties.
Do not attach to hot engine parts: **Risk of fire!**

1. Route the wires from the wire set from the driver's cab into the engine compartment.
2. Crimp the wire lugs.
3. Install the monitor wire as shown:
   - Screw the black lead to the minus starter (Main) battery.
   - Screw the red lead on the positive starter (Main) battery.
   - Screw the blue lead to a plus board(Aux) battery.
4. Connect green wire to terminal 86 of the relay.
5. Install the relay (see the mounting instructions under **mounting** page 7).
6. Install the Relay power wire (not supplied, see **Relay power wire** page 7) as shown:
   - Install a short red wire from the wire kit as a connection wire between terminals 85 and 87.
   - Install the power wire from the Plus starter battery (Main) on terminal 87 of the relay.
   - Install the power wire from the Plus of the board battery (Aux) to Terminal 30 of the Relay.
7. Monitor Insert the monitor (see Starting the Monitor on page 8).
8. Connect the IBS-DBR to the power wire:
   - From battery bord (Aux) plus to terminal 87.
   - From plug or trailer / box battery terminal to terminal 30.
   - From terminal 85 to minus.
9. Connect IBS-DBR button to terminal 86 and minus.

Classic 24V Installation

Please read the installation steps before performing for a better understanding.

If possible, install the wire in a protective tube and fasten with wire ties.
Do not attach to hot engine parts: **Risk of fire!**

1. Route the wires from the wire set from the driver's cab into the engine compartment.
2. Crimp the wire lugs.
3. Install the monitor wire as shown:
   - Screw the black lead to the minus starter (Main) battery.
   - Screw the red lead on the positive starter (Main) battery.
   - Screw the blue lead to a plus board(Aux) battery.
   - Connect green wire to terminal 86 of the relay.
4. Install the relay (see the mounting instructions under **mounting** page 7).
5. Install the Relay power wire (not supplied, see Relay power wire page 7) as shown:
   - Install a short red wire from the wire kit as a connection wire between terminals 85 and 87.
   - Install the power wire from the Plus starter battery (Main) on terminal 87 of the relay.
   - Install the power wire from the Plus of the board battery (Aux) to Terminal 30 of the Relay.
6. Insert the monitor (see Starting the Monitor on page 8).
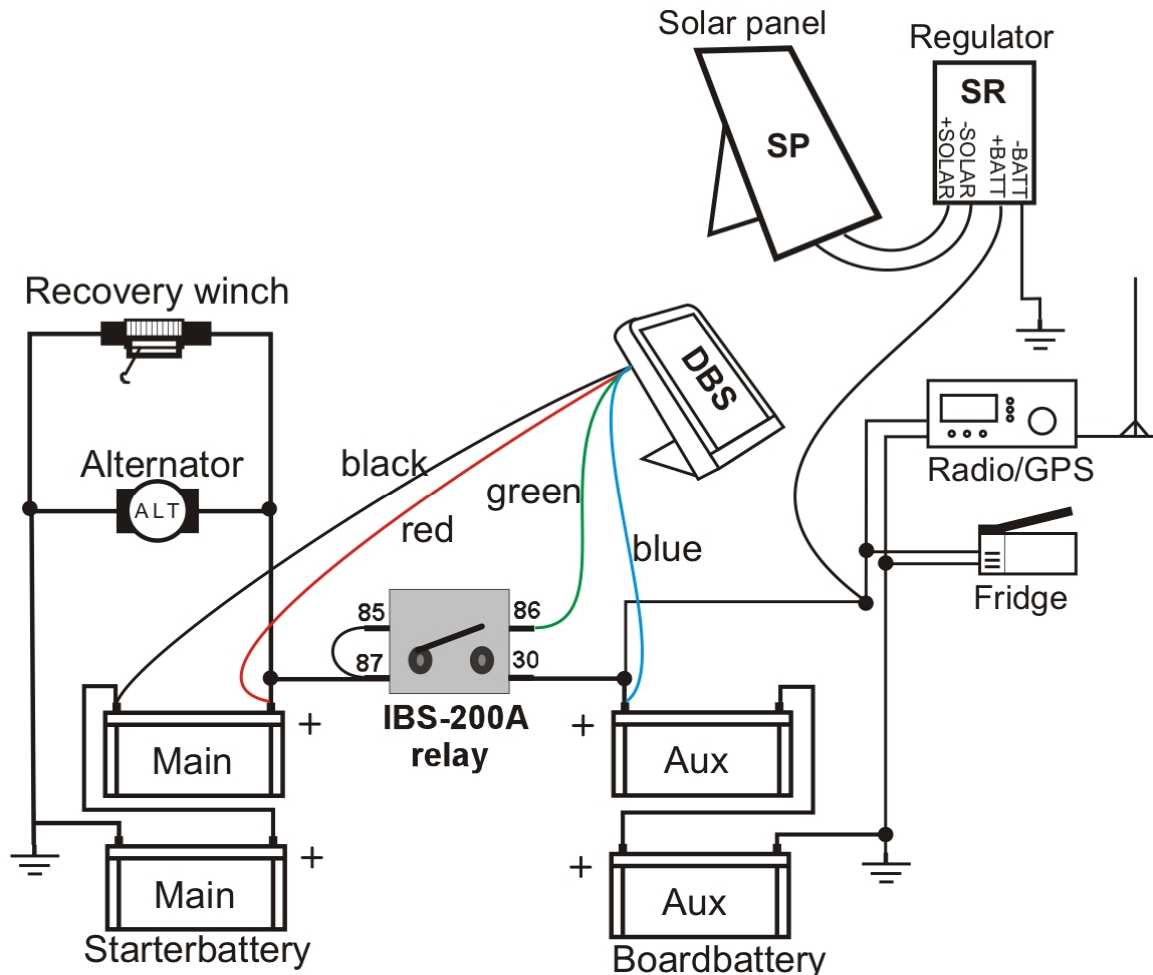
Classic 24V with RBM

Please read the installation steps before performing for a better understanding.

If possible, install the wire in a protective tube and fasten with wire ties.
Do not attach to hot engine parts: **Risk of fire!**

1. Route the wires from the wire set from the driver's cab into the engine compartment.
2. Crimp the wire lugs.
3. Install the monitor wire as shown:
   - Screw the black lead to the minus starter (Main) battery.
   - Screw the red lead on the positive starter (Main) battery.
   - Screw the blue lead to a plus board(Aux) battery.
   - Connect green wire to terminal 86 of the relay.
4. Install the relay (see the mounting instructions under **mounting** page 7).
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   - Install the power wire from the Plus starter battery (Main) on terminal 87 of the relay.
   - Install the power wire from the Plus of the board battery (Aux) to Terminal 30 of the Relay.
6. Mount the RBM near the relay:
   - Yellow wire on terminal 85.
   - Green line on terminal 86.
   - Red wire on terminal 87.
   - Blue wire on terminal 30.
7. Insert the monitor (see **Starting the Monitor** on page 8).

Explanation: Display

Battery Voltage & Charge

The voltages of the connected batteries can be read on the respective LED bar. As soon as charge is present on a battery, this is indicated by the charge LED.

Linked LED

The **linked** LED indicates whether the batteries are linked via the relay or not. (steady on -> linked)

Manually linked LED

The **manually linked** LED indicates whether the link has been set manually (LED lights up red) or automatically (LED is off). (In case of 2h link LED blinks every 30 seconds accompanied with an audible signal)
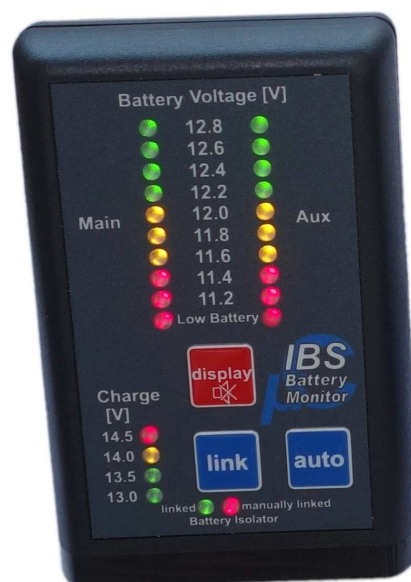
Voltage indication

Display bar	Classic 12V	12V Li-type*	Classic 24V	24V Li-type*
	Main and Aux	Aux	Main and Aux	Aux
Led 1	Low Battery	Low Battery	Low Battery	Low Battery
Led 2	11.2V	11.6V	22.4V	23.2V
Led 3	11.4V	11.8V	22.8V	23.6V
Led 4	11.6V	12.0V	23.2V	24.0V
Led 5	11.8V	12.2V	23.6V	24.4V
Led 6	12.0V	12.4V	24.0V	24.8V
Led 7	12.2V	12.6V	24.4V	25.2V
Led 8	12.4V	12.8V	24.8V	25.6V
Led 9	12.6V	13.0V	25.2V	26.0V
Led 10	12.8V	13.2V	25.6V	26.4V
Charge Led 1	13.0V	13.0V	26.0V	26.0V
Charge Led 2	13.5V	13.5V	27.0V	27.0V
Charge Led 3	14.0V	14.0V	28.0V	28.0V
Charge Led 4	14.5V	14.5V	29.0V	29.0V

The open-circuit battery voltage of lead batteries is approx. 12.5V, the LiFePO battery is about 13.2V.

*When set with Li-type as an Aux battery, the "Aux-LED Display bar " from the monitor is adapted to the higher open-circuit voltage of the LiFePO batteries. The "Main- LED Display bar " remains as in the classic system!
(For Li-type, 0.4V, or 0.8V for 24V systems, are deducted from the effective battery voltage for the display)

Explanation: Buttons

Display button

- By briefly pushing the display button, the display is activated (which automatically turns off after 30 seconds).
- Push and hold the display button for approx. 2 seconds, the display can be dimmed (back to full brightness by repeatedly holding the display button for approx. 2 seconds).
- In case of an undervoltage audible signal (error 1, see **Error description** p. 19), the device can be muted by pushing the display button (If device audible signal changes instead of being muted immediately charge the respective battery due to super low voltage!)

Link button

- By briefly pushing the link button, the **manual 30 minute Link**, can be executed.
- By pushing twice briefly within 3 seconds, the **manual 2 hours Link** can be triggered (monitor confirms activation with a "beep").
- By pushing and holding the link button for approx. 10 seconds, the automatic Link can be suppressed or prevented: **No Link mode** (For the return to the automatic function, see the **Auto button**)

Auto button

- By briefly pushing the Auto button, an active manual link can be aborted. The monitor returns to the **Auto mode**.
- By pushing and holding the Auto button for approx. 10 seconds, the **No Link mode** (for releasing this mode, see **Link button**) can be switched off. Thus, the monitor operates again in the automatic mode.

Error description

List of errors

The DBS Monitor shows errors as follows

Error	Illustration	Description
0	No flashing lights, no acoustic signal	No error
1	**Low Battery** Led flashing, acoustic signal	Deep discharge **Charge and check the batteries, possibly defective battery**
2	**Linked** Led flashing, audible signal	Link error Possible faulty battery or defective relay.
3	**Top** Charge Led flashing, audible signal	Over-voltage The batteries are charged with excessive voltage. If this happens too long, the batteries can be over-charged. Check the load voltage and check.

*Acoustic signal can be suppressed (see **Setting the modes** on page 8).
Acoustic signal of under-voltage error 1 can be muted (see **Explanation: Buttons p. 18). If device audible signal changes instead of being muted immediately charge the respective battery due to super low voltage!

Measures / Suspension

There are two ways to perform a **system reset**:

- Pushing the **Link- and Auto-button** simultaneously will cause a system reset and restart the monitor.
- The monitor is also reset by pulling the monitor out and plugging it back in again (the plug is about 15cm behind the monitor).

In case of a not fully working system please check the configuration in **starting the monitor** on page 8.

Specifications

Technical specifications

Input voltage	6V-32V			
Link voltage Main to Aux	**12V**	**12V Li-type**	**24V**	**24V Li-type**
	13.1V	13.3V	26.2V	26.6V
Link voltage Aux to Main	**12V**	**12V Li-type**	**24V**	**24V Li-type**
	13.1V	13.5V	26.2V	27.0V
De-link voltage	**12V**	**12V Li-type**	**24V**	**24V Li-type**
	13.0V	13.2V	26.0V	26.4V
Over-voltage	**12V**	**12V Li-type**	**24V**	**24V Li-type**
	15.0V	15.5V	30.0V	31.0V
Under-voltage	**12V**	**12V Li-type**	**24V**	**24V Li-type**
	12.0V	12.4V	24.0V	24.8V
Relay manual linking times	30 min / 2 h			
Standby power consumption monitor	< 5 mA			
Power consumption display active (30s)	< 20 mA			
PCB quality	IPC3 RoHS (Military standard)			
Efficiency	Typical 95%			
Temperature range	-40 °C - +80°C			
Dimensions monitor	100 x 65 x 24 mm			
Protection type housing monitor	IP40			
Weight monitor	0.1 kg			
Wire cross-section blue / green	0.5mm^2			
Wire cross-section black / red	1.0mm^2			
Sealing relay	Silikon			
Dimensions relay	46 x 46 x 45 (78) mm			
Protection type housing relay	IP52			
Weight relay	0.1 kg			
Current consumption relay active	0.6 A		0.18 A	
Nominal current relay	200 A		100 A	
Peak current relay	500 A		250 A	
Relay working voltage	9...15 V		20...30 V	
Material power contacts relay	silver AgSnO2			
Housing material relay	NYLON Pa 6,6			
Life relay (cycles)	100'000 @ 200 A		100`000 @ 100A	
Tighten torque relay M6 bolts	8 Nm max			
Dimensions packaging	80 x 92 x 215 mm			
Weight packaged	0.75 kg			
Guarantee	5 Jahre			
EMV	Nach CISPER 25 (Automotive)			
Homologation	E24 ECE 10R			
Production standard	ISO9001:2008			
Click on installation system	IBS RMS System			

Accessories

IBS Partnumber	Designation
IBS-RBM 12V/24V	RBM **R**elay **B**ooster **M**odul 12V or 24V
IBS-DBR 12V/24V	DBR **D**ual **B**attery **R**elay 12V or 24V
IBS-DBM20A	DBM20A **D**ual **B**attery **M**anagement 20A

Notes

Delivery content

- IBS-DBS Monitor
- IBS-Relay
- IBS-RMS Mounting bracket
- Terminal kit
- Wire kit
- Manual

IBS-DBS Manual from 15.08.2017

Manual Version 1.2.2

Software Version 8.1

RoHS OK CE

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