Battery packs

DEWESoft®

TECHNICAL REFERENCE MANUAL

BATTERY PACKS V23-1

1. Table of contents

About this document

This is the users manual for our Battery packs for our data acquisition systems. It includes:

- General information about batteries and battery packs
- Specifications of DS-BP-X accessories
- How to connect one or multiple battery packs, how to charge the batteries within the battery packs
- Other possibilities and functionalities of battery packs

Legend

The following symbols and formats will be used throughout the document.

Important
It gives you important information about the subject.
Please read carefully!

Hint
It gives you a hint or provides additional information about a subject.

Example
Gives you an example of a specific subject.

Online versions

Device Technical Reference Manual

The most recent version of this manual can be downloaded from our homepage:
https://download.dewesoft.com/list/manuals-brochures/hardware-manuals
In the *Hardware Manuals* section click the download link for the *Device® technical reference manual*.

DEWESoft® User Manual

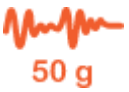
The DEWESoft® User Manual document provides basics and additional information and examples for working with DEWESoft® and certain parts of the program.
The latest version of the DEWESoft® tutorials can be found here:
https://download.dewesoft.com/list/manuals-brochures/software-manuals
In the Software Manuals section click the download link of the DEWESoft X User Manual entry.

4. DS Battery Packs

Battery packs for our data acquisition systems for stand-alone, in-vehicle or remote test and measurement applications.

IP30

0°C to +45°C



Shock rating 50g

Main features:

- **RUGGED AND RELIABLE:** Battery packs are built in rugged aluminum chassis, machined out of a single brick of aluminum for reliable operation on the field. Only high-quality Li-Ion batteries are used.
- **LARGE CAPACITY:** Battery packs ensure enough power for your on-road and field test and measurement applications so you don't have to worry about losing any data due to lack of power supply. DS-BP2i total capacity is 192Wh and DS-BP4i total capacity is rated to 384Wh, this will ensure 3 hours of operation for SBOX data logger with 32 channel SIRIUS DAQ system without replacing batteries.
- **HOT-SWAP FUNCTIONALITY:** Internal Li-Ion batteries are hot-swappable, meaning they can be replaced during the measurement to ensure your data acquisition system never runs out of power.
- **DAISY CHAIN:** Battery packs can be daisy chained together to further increase the autonomy.
- **ISOLATED POWER SUPPLY:** For in-vehicle measurements, an isolated power supply on battery packs will guard you against unwanted ground loops.
- **REVERSE POLARITY PROTECTION:** Battery packs are protected against wrong connections to the input power supply.
- **ADAPTIVE CHARGING:** Charging current is dynamically adapted, depending on the output load. When there is no significant load at the output, the batteries are charged with 2 A per battery. When external load increases and the power of external PSU rises close to the limit, charging current is reduced to 1 A per battery. If the load is still increasing, the charging of batteries is stopped. With this feature, we ensure that maximum required power from external supply is limited.
- **STATUS INDICATOR:** Battery pack comes with LCD status indicator as well as USB connection to the DAQ unit so you will always know how much power you have left.
- **USB:** Battery packs are equipped with a USB connector. It is used to connect the battery pack to the computer, where it introduces itself as native battery for windows (HID UPS Battery). Icon in the task bar also appears with the status of batteries. Battery pack information can also be observed in DEWESoft.

4.1. Specifications overview

General	DS-BP2i
Number of batteries	2
Total capacity at fully charged state	12.5 Ah
Battery life at max. rated power	> 1 h
Input wrong polarity protection	YES
Hot Swap	YES
	Recommended Hot swapping at > 15-20% total SOC Replace one-by-one all batteries with matched SOC
Max Hot Swap Output Power	75 W
Isolation	500 V
Power	
Power supply	12 - 36 V DC
Power consumption	Charging power 75 W - 85 W
Power out	
Maximum power	160 W
Output Voltage	14.4 V Nominal, 16.8 V Max. 24 V with external supply
Battery Output Current	7.5 A per battery
Output Current	15 A, LEMO 1B 2pin 17 A, LEMO 2B 3pin
Efficiency	85 % Typ.
Interfaces and options	
USB	USB-B mini Data, Battery status information
CAN	NO
Remote-On	In / Out on LEMO 3pin
Display	LCD, status display
Digital inputs	
Remote Input low level	< 1 V
Remote Input high level	4 V - 36 V
Remote Input high current	2 mA Typ.
Remote-Out	2 mA CCS
Display	
Type	Transflective LCD
Resolution	2 x 16 characters
Displayed information	Temperature, Voltage, Current, Status, Power, Capacity, Endurance
Display background color	Green @ 100 % State Of Charge Red @ 0 % SOC
Size	65 x 16 mm

General	DS-BP4i
Number of batteries	4
Total capacity at fully charged state	25 Ah
Battery life at max. rated power	> 1.5 h
Input wrong polarity protection	YES
Hot Swap	YES
	Recommended Hot swapping at > 15-20% total SOC Replace one-by-one all batteries with matched SOC
Max Hot Swap Output Power	220 W
Isolation	500 V
Power	
Power supply	12 - 36 V DC
Power consumption	Charging power 150 W - 160 W
Power out	
Maximum power	250 W
Output Voltage	14.4 V Nominal, 16.8 V Max. 24 V with external supply
Battery Output Current	7.5 A per battery
Output Current	15 A, LEMO 1B 2pin 25 A, LEMO 2B 2pin
Efficiency	85 % Typ.
Interfaces and options	
USB	USB-B mini Data, Battery status information
CAN	YES
Remote-On	In on CAN D9m
Display	LCD, status display
Digital inputs	
Remote Input low level	< 1 V
Remote Input high level	4 V - 36 V
Remote Input high current	< 5 mA
Remote-Out	NO
Display	
Type	Transflective LCD
Resolution	2 x 16 characters
Displayed information	Temperature, Voltage, Current, Status, Power, Capacity, Endurance
Display background color	Green @ 100 % State Of Charge Red @ 0 % SOC
Size	65 x 16 mm

Important

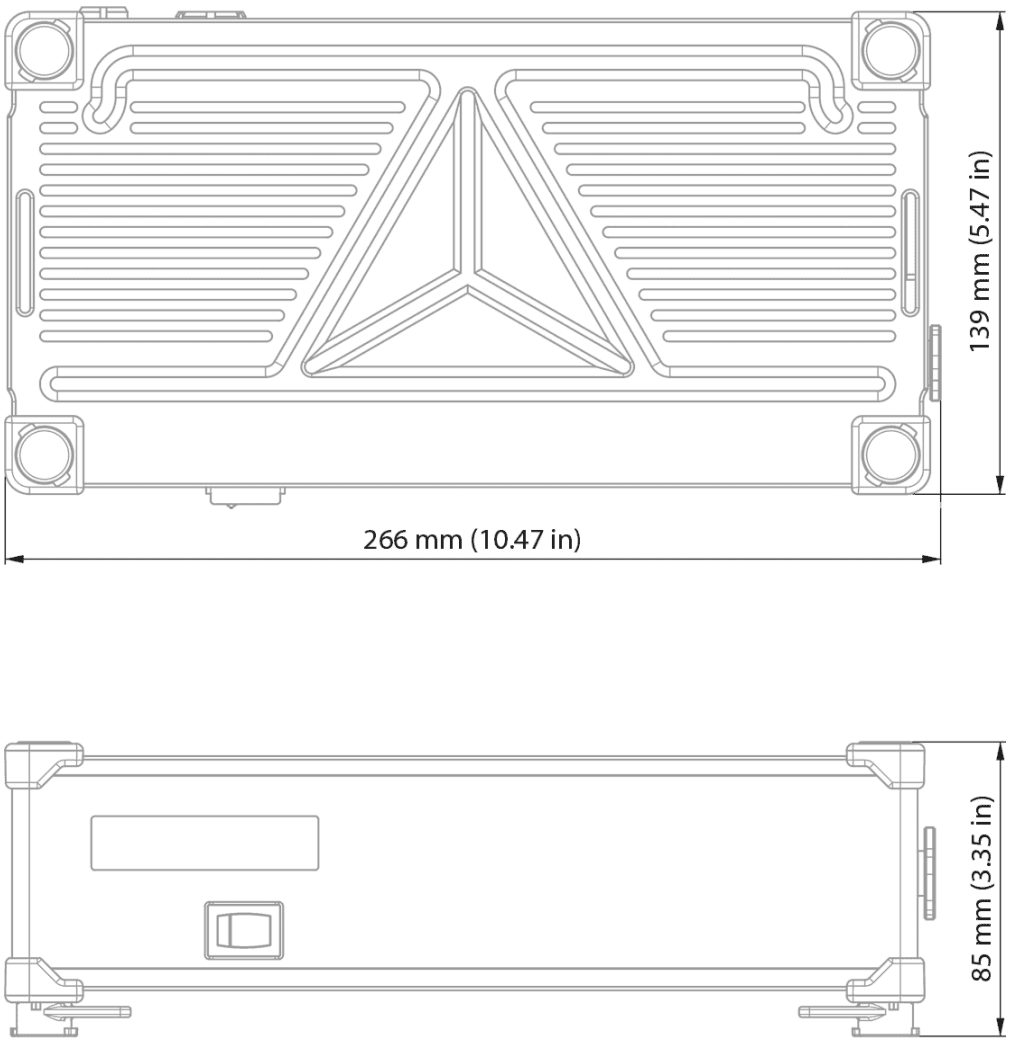
Expected discharge of battery packs is 3% - 5% per day if in standstill mode only with the latest firmware performed by the Service department or by contacting support@dewesoft.com for more information.

Battery packs currently have RRC, RRC2024 batteries. Older versions might have had batteries by Inspired Energy, NL2024HD22. Please make sure not to swap batteries between older and newer systems as the mechanics and the connectors are not compatible to avoid any damage.

Batteries	
Battery type	RRC2024 Li-Ion (4S/3P)
Compliance Information	IEC62133 / CE / UL2054 / FCC / PSE / KC / Gost / EAC / CQC / RCM / BIS / TISI / BSMI / UN38.3 / RoHS / REACH
Operating Temperature	0 °C to 45 °C Charge -20 °C to 60 °C Discharge
Storage Temperature	-20 °C to 50 °C Max. -20 °C to 25 °C Recommended Extended storage at temperature >40°C could degraded battery performance and life
Altitude	No restrictions, battery can be stored, charged and discharged between 0 – 15000 m
Voltage	14.4 V Nominal 16.8 V Max.
Nominal capacity	6.6 Ah
Discharge current	10 A
Safety	Over Charge: 17.2 V, 5.3 A Over Discharge: 11 A Over Temperature @ charging: 55 °C, 45 °C recovery Over Temperature @ discharging: 70 °C, 60 °C recovery Short circuit: YES, 35 A threshold (auto reset)
Dimensions	167.2 x 107.2 x 21.5 mm
Weight of single battery	0.6 kg
Environmental	
Operating Temperature	0 °C - 40 °C
Storage Temperature	-20 °C - 60 °C
Humidity	10 % to 90 % RH, no dew condensation
IP rating	IP30
Shock & Vibration	Vibration sweep sinus (EN 60068-2-6:2008) Vibration random (EN 60721-3-2: 1997 - Class 2M2) Shock (EN 60068-2-27:2009) MIL-STD-810D
Physical	
Dimensions	266 x 139 x 85 mm
Weight	1.6 kg 2.8 kg including batteries

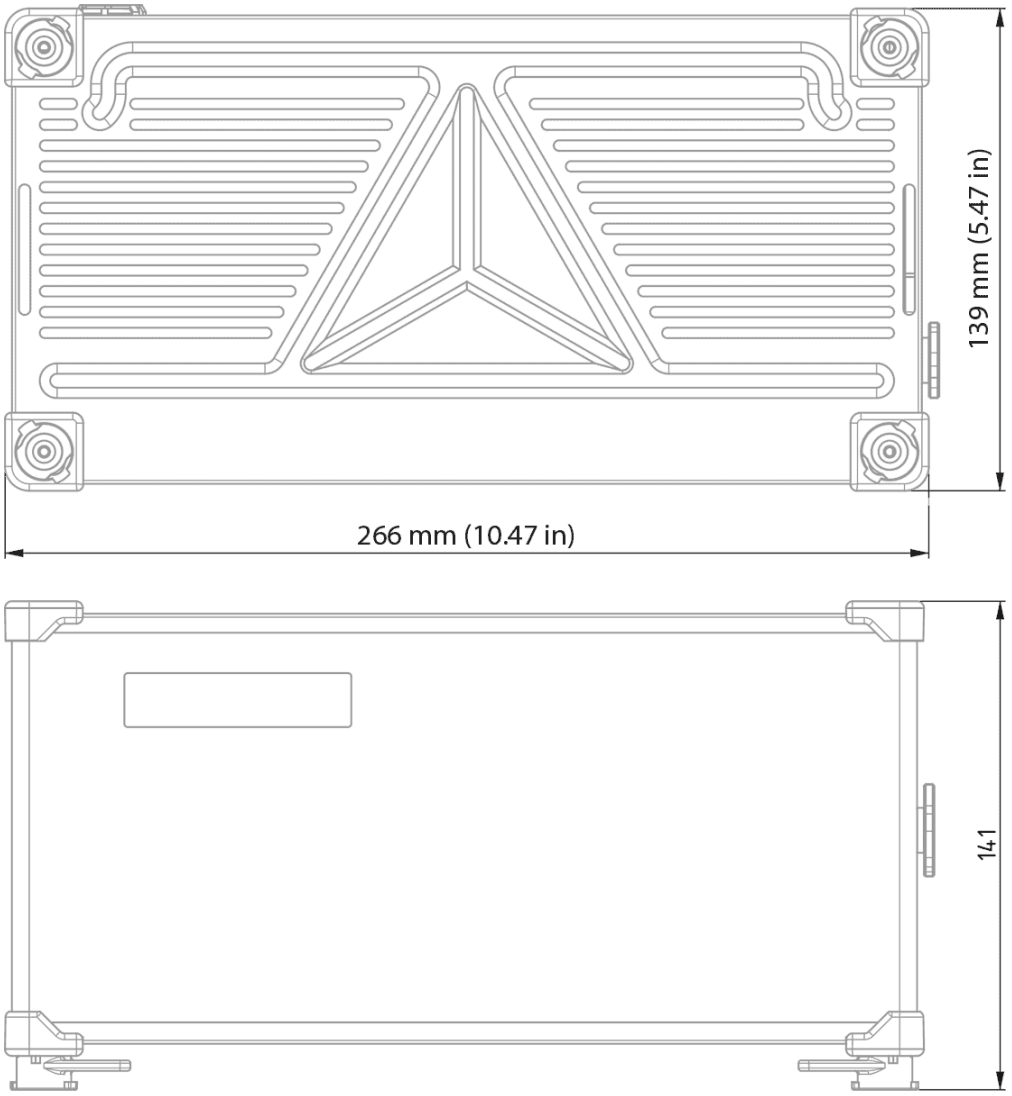
4.1.1. Dimensions

4.1.1. DS-BP2i



Dimensions : DS-BP2i

4.1.2. DS-BP4i



Dimensions : DS-BP4i

4.1.3. General information

Daisy Chain

Battery pack has additional connectors for daisy chain connection of multiple units. Total capacity, autonomy and power capability is increased.
Please see chapters: “Daisy chain connection” for details:

- Connection diagram
- Cable types
- Capability and limitations

Batteries

Li-Ion rechargeable Smart Battery packs are used. The battery is composed of twelve (12) Lithium Ion rechargeable 18650 cells, assembled in a 4 series / 3 parallel (4S/3P) design. Each cell has an average voltage of 3.60V and a nominal capacity of 2200mAh, providing a battery pack of 14.40V and 6600mAh nominal. The battery is designed to communicate with a host or a charger through the System Management Bus (SMBus) protocol. The battery is SMBus and SBDS Revision 1.1 compliant. The battery design includes protection for over charge, over discharge and short circuit. Additional safety measures are designed into the battery to protect against over temperature and over current situations.

Hot swapping

Battery pack is designed so that batteries can be hot-swapped while still providing output power. When hot swapping batteries, output voltage and state of charge must be taken into account. When there is one full battery in the system and another one is empty, the full one takes all the load. To prevent battery damage, maximum output current from a single battery is limited.

Important

- Recommended Hot swapping at > 15-20% total SOC.
- Replace one-by-one all batteries with matched SOC.
- Single battery will not support full load or long duration between swapping.

Caution

Output current from a single battery is limited to 7.0 A - 7.5 A.
Maximum power out when Hot swapping:

- DS-BP2i: 75 W
- DS-BP4i: 220 W

Isolation

Input and output electrical ground are galvanically isolated. This allows us to use BP on the different ground potentials and thus protecting from unwanted ground loops.

Warning

Isolation shall be considered as **BASIC INSULATION**. Basic insulation forms a single level of insulation that provides basic protection against shock.

Caution

Isolation voltage specification (500 V) should be considered as MINIMUM ISOLATION PEAK TEST VOLTAGE. Maximum isolation peak test voltage level could be two to four times higher.

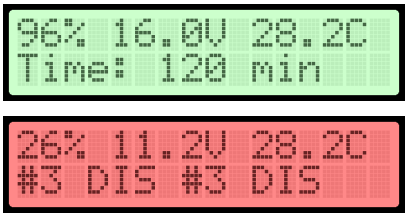
Stacking

Hint

Both battery packs - DS-BP2i and DS-BP4i are built in standard SIRIUS form factor, so you can stack your power supply under your DAQ device. Clever click mechanism will enable the battery to attach to SIRIUS and/or SBOX instruments. This ensures safe placing into the measurement environment, to prevent rolling and bouncing around.

LCD information

Important
The LCD screen on the new battery pack is displaying the most important information about the system.



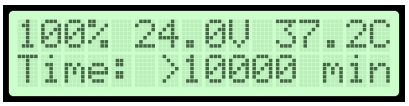
Example of LCD information

Top row			
Info	89% 16.0V 28.2C		
Details	State Of Charge (SOC) 0% to 100%	Output Voltage 24 V when plugged in 10.5 V to 16.6 V maximum when on batteries.	Highest internal measured temperature (Battery cells or input DC/DC)

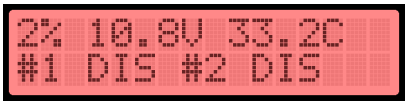
Bottom row	**(Toggled)**	
Info	Time: 250 min	
Details	Estimated time to empty depending on load >10000 min when plugged in	
Info	#1 DIS #2 DIS	
Details	Top battery is discharging	Second battery is discharging
Info	#3 CHG #4 CHG	
Details	In BP4 third battery is charging	In BP4 bottom battery is charging
Info	#1 #2 DIS	
Details	Top battery slot is empty or no battery detected	Second battery is discharging

Hint

State of charge is also indicated with LCD backlight colour and dimming. When full, the backlight is bright green and when empty, the LCD backlight is red.



Batteries are full



Batteries are empty

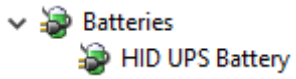
FAN operation

Internal fans will activate if one of the below conditions are met.

Condition	Fan ON	
Power	Power supply is plugged in	
Temperature	Internal temperature sensors detected > 35 ℃	Battery 1, Battery 2, (Battery 3, Battery 4), input DC/DC
Output	Discharging current from either battery > 600 mA	

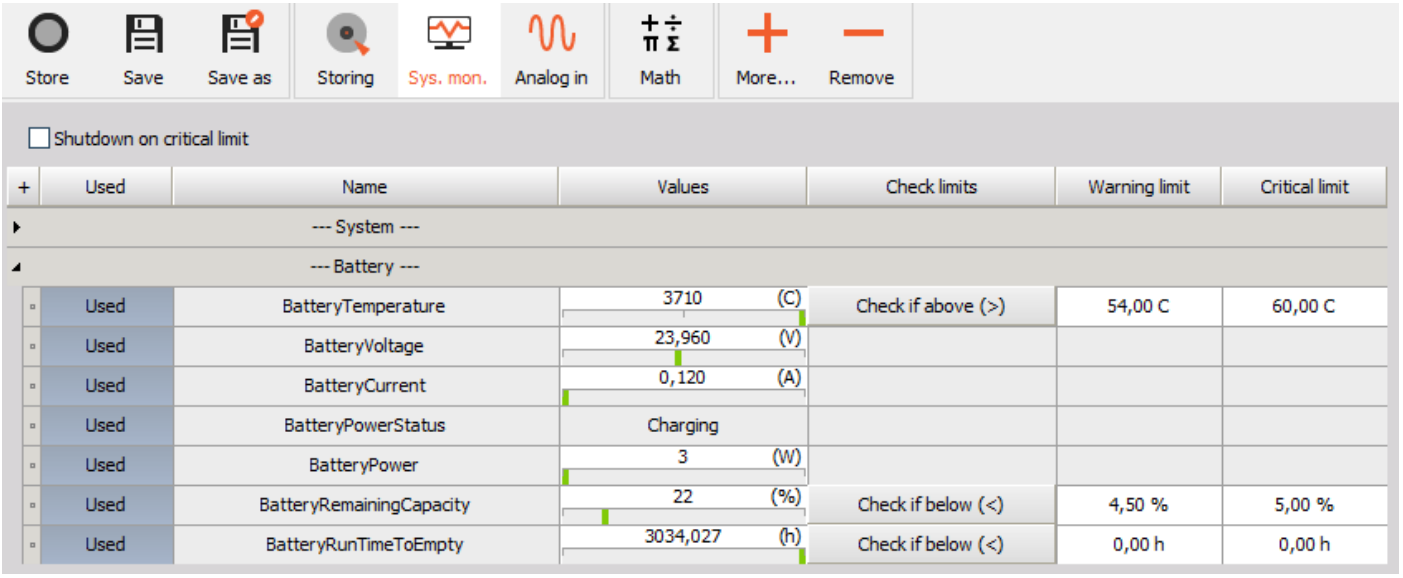
System Monitor

Connect DS-BP with USB to PC. BP is recognised as: HID UPS Battery.



OS Device manager information

Start DEWESoft and select System monitor in Channel setup screen.



+	Used	Name	Values	Check limits	Warning limit	Critical limit
		--- System ---				
		--- Battery ---				
	Used	BatteryTemperature	3710 (C)	Check if above (>)	54,00 C	60,00 C
	Used	BatteryVoltage	23,960 (V)			
	Used	BatteryCurrent	0,120 (A)			
	Used	BatteryPowerStatus	Charging			
	Used	BatteryPower	3 (W)			
	Used	BatteryRemainingCapacity	22 (%)	Check if below (<)	4,50 %	5,00 %
	Used	BatteryRunTimeToEmpty	3034,027 (h)	Check if below (<)	0,00 h	0,00 h

DEWEsoft System monitor information

CAN

Battery pack DS-BP4i has a dedicated CAN connector and Remote-On functionality. See chapter: “CAN connector” under DS-BP4i for details.

4.2. DS-BP2i: Battery pack

DS-BP2i front side

DS-BP2i rear Side

Example

DS-BP2i autonomy:

- Single ACC+ slice for over 12 hours (e.g. when you use it with an external laptop)
- SBOX and an ACC+ slice for over 2 hours

4.2.1. Rear side

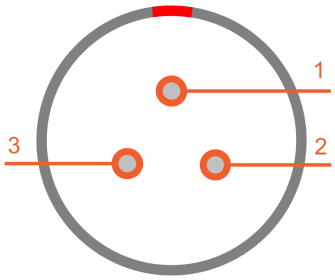
DS-BP2i back connectors

Connector assignment from left to right.

Name	Type
OUT	2x LEMO 1B 2 pin Female (SIRIUS type)
OUT	2x LEMO 2B 3pin Female (SBOX type)
Name	**Type**
IN/OUT	LEMO 2B 3pin Female
IN	LEMO 2B 3pin Male
Name	**Type**
USB	USB Mini B with side screw locks.

See chapter “Power in connector” and “Power out connector” for details.

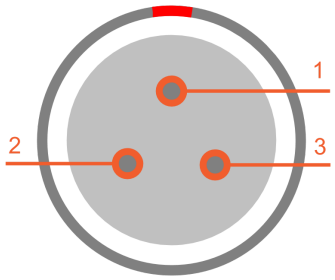
4.2.2. Power IN and IN/OUT connector



Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	Remote - In	Remote - In pin

Power IN connector: pin-out (3-pin LEMO male)

Connector type (on the battery pack): EEJ.2B.303.CLA
Mating connector type (for the cable): FGJ.2B.303.CLL*
* more collets and bend reliefs for cable variant are available



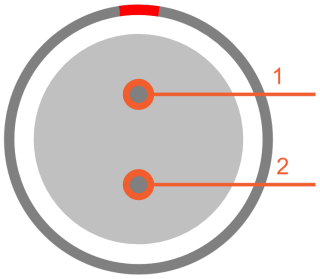
Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	Remote - In	Remote - In pin

Power IN/OUT connector: pin-out (3-pin LEMO female)

Connector type (on the battery pack): EEG.2B.303.CLL
Mating connector type (for the cable): FGG.2B.303.CLA*
* more collets and bend reliefs for cable variant are available

Important
Supply, Ground and Remote-In are connected together for both connectors.

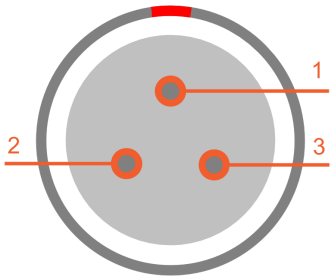
4.2.3. Power OUT connectors



Power out connector: pin-out (2-pin LEMO female)

Pin	Name	Description
1	V +	Supply
2	GND	Ground

Connector type (on the battery pack): EEG.1B.302.CLL
Mating connector type (for the cable): FGG.1B.302.CLA*
* more collets and bend reliefs for cable variant are available



Power out connector: pin-out (3-pin LEMO female)

Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	Remote - Out	Remote - Out

Connector type (on the battery pack): EEG.2B.303.CLL
Mating connector type (for the cable): FGG.2B.303.CLA*
* more collets and bend reliefs for cable variant are available

Important
Supply, Ground and Remote-Out are connected together for all connectors.
Ground is isolated from IN, IN/OUT Ground!

Example
Use large cross-section and short cables for maximum efficiency. With 1.5mm^2 (AWG 15) 2 Watts on every meter of cable (Lead & Return wires) is wasted at 10 A.

Hint

Remote on will not turn on DS-BP2i, only powered DAQ instruments will be controlled.
To power the DAQ system on, press the Power switch OR apply a voltage between 4 V and 36 V with at least 2 mA to the Remote-In pin. To power off the system press the Power switch or reduce the voltage on Remote-On below 0.5 V.
Remote-Out output is a 2 mA constant current source that is following the Remote-In state. Remote-Out is capable of driving the Remote-In of the next daisy chained device. Remote-Out and Remote-In are isolated.

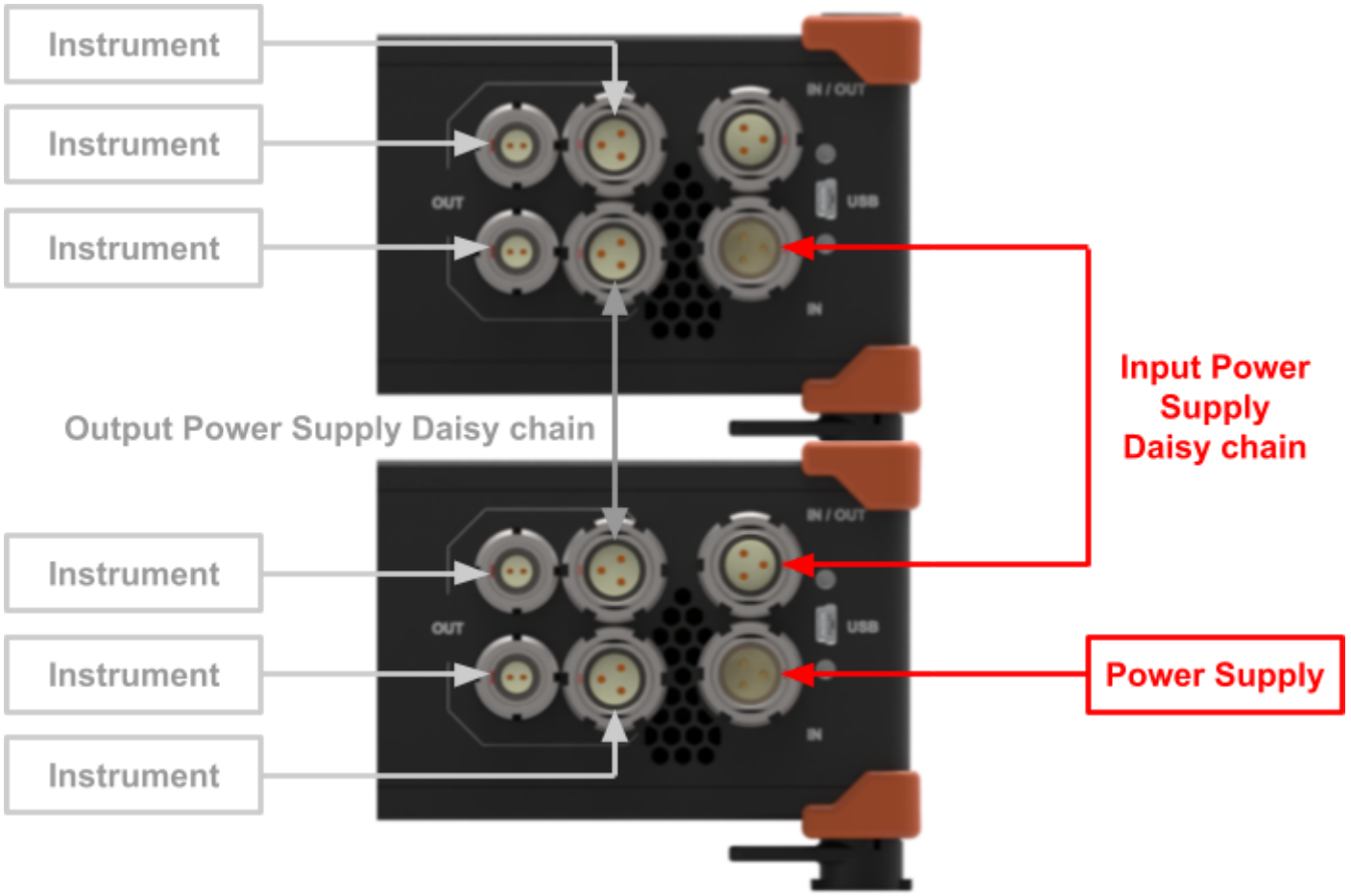
4.2.4. BP2i Daisy chain connection

Warning

Power off all instruments and battery packs before making and changing connections.

Important

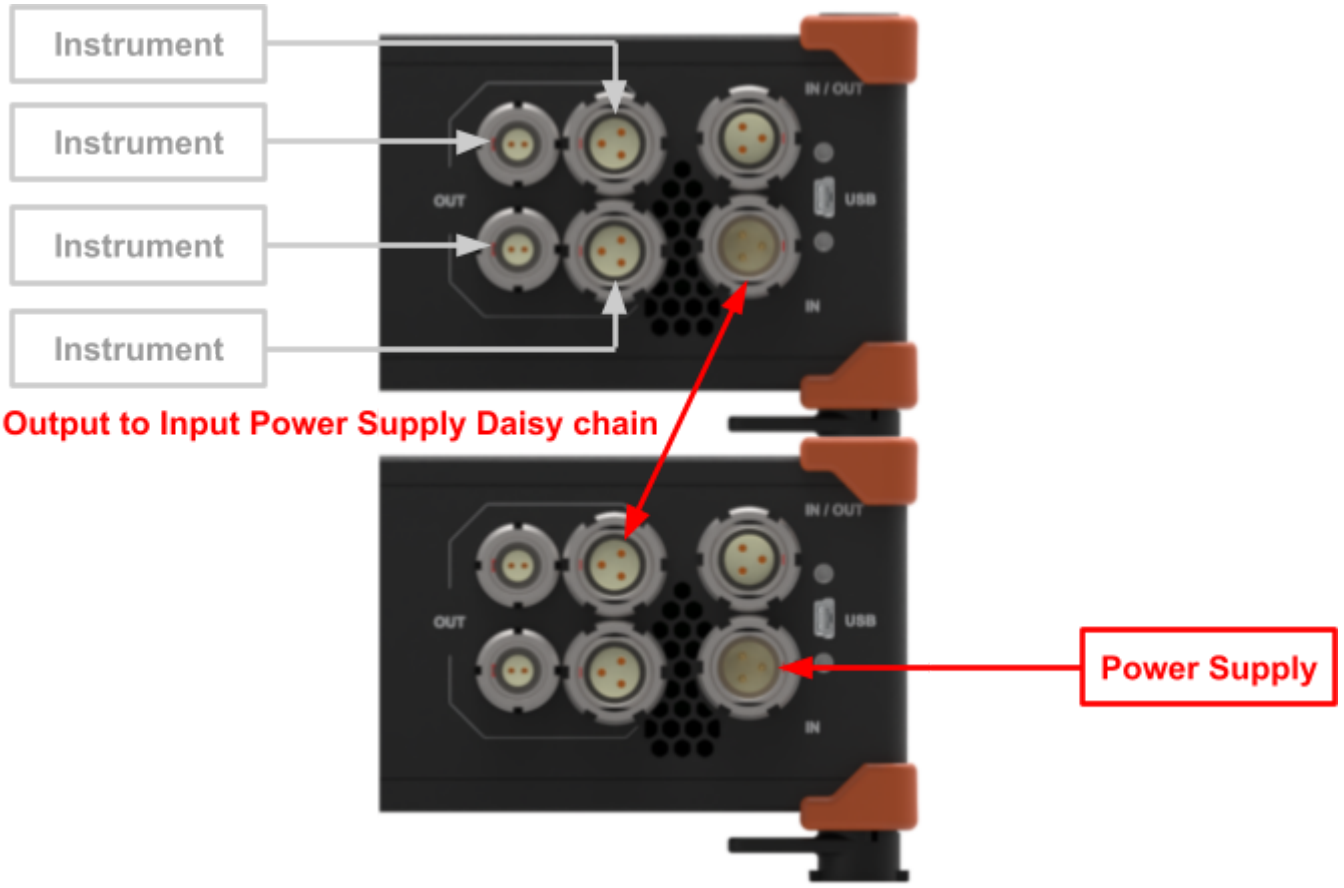
Please follow the connection diagram below. Note that Inputs and Outputs are in parallel. Output capabilities will increase with daisy chain connection. Input power supply requirements also double.



DS-BP2i daisy chain : Paralel Input & Output

Hint

Output Power Supply Daisy chain may be omitted. Output capabilities will be limited to a single device.



DS-BP2i daisy chain : Not recommended : Series Input & Output

Caution

Above connection is not recommended. Due to efficiency losses input charging power is increased, autonomy and capacity is decreased. Output power is limited to a single device. Bottom BP will be discharged first and will be charging the top device and providing power to instruments.

4.2.5. Scope of supply

Short name	Name	Quantity
CABLE-USBASmini-USBBS-1m	USB AMS - Mini USB BMS 1m USB AMS-BMS 1m	1
L2B3f-OPEN-5m	Open end DC power supply cable	1
L2B3m-L2B3f-0.4m	Power supply daisy chain cable	1
PS-200W-L2B3f	AC/DC power supply adapter	1

4.3. DS-BP4i: Battery Pack

DS-BP4i front side

DS-BP4i rear Side

Example

DS-BP2i autonomy:

- Single ACC+ slice for over 24 hours (e.g. when you use it with an external laptop)
- SBOX and an ACC+ slice for over 4 hours

4.3.1. Rear side

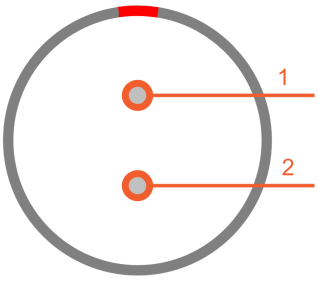
DS-BP4i back connectors

Connector assignment from left to right.

Name	Type
OUT	2x LEMO 1B 2 pin Female (SIRIUS type)
OUT	2x LEMO 2B 2pin Female (R8 type)
Name	**Type**
IN/OUT	LEMO 2B 2pin Female
IN	LEMO 2B 2pin Male (R8 type)
Name	**Type**
USB	USB Mini B with side screw locks.
CAN	DSUB9 Male

See chapter “Power in connector” and “Power out connector” for details.

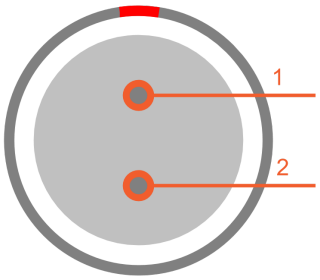
4.3.2. Power IN and IN/OUT connector



Power IN connector: pin-out (2-pin LEMO male)

Pin	Name	Description
1	V +	Supply
2	GND	Ground

Power connector (on the battery pack): EEJ.2B.302.CLA
Mating connector (for the cable): FGJ.2B.302.CYM*
* more collets and bend reliefs for cable variant are available



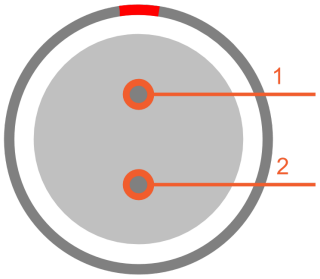
PowerIN/OUT connector: pin-out (2-pin LEMO female)

Pin	Name	Description
1	V +	Supply
2	GND	Ground

Connector type (on the battery pack): EEG.2B.302.CLL
Mating connector type (for the cable): FGG.2B.302.CYC*
* more collets and bend reliefs for cable variant are available

Important
Supply and Ground are connected together for both connectors.
Ground is isolated from OUT Ground!

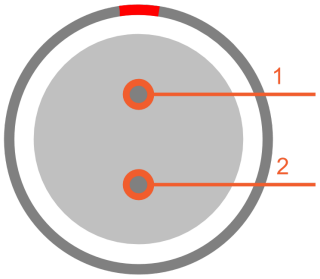
4.3.3. Power OUT connectors



Power out connector: pin-out (2-pin LEMO female)

Pin	Name	Description
1	V +	Supply
2	GND	Ground

Connector type (on the battery pack): EEG.1B.302.CLL
Mating connector type (for the cable): FGG.1B.302.CLA*
* more collets and bend reliefs for cable variant are available



Power out connector: pin-out (2-pin LEMO female)

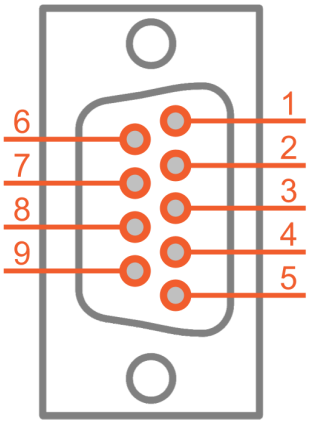
Pin	Name	Description
1	V +	Supply
2	GND	Ground

Connector type (on the battery pack): EEG.2B.302.CLL
Mating connector type (for the cable): FGG.2B.302.CYC*
* more collets and bend reliefs for cable variant are available

Important
Supply and Ground are connected together for all connectors.
Ground is isolated from IN, IN/OUT Ground!

Example
Use large cross-section and short cables for maximum efficiency. With 2.5mm^2 (AWG 13) 8 Watts on every meter of cable (Lead & Return wires) is wasted at 25 A.

4.3.4. CAN connector



CAN connector (DSUB-9 male)

Pin	Name
1	CAN +5 V (isolated, 100 mA, polyfuse and RP diode)
2	CAN LOW (isolated)
3	GND (Power OUT GND)
4	Not connected
5	Not connected
6	CAN GND (isolated)
7	CAN HIGH (isolated)
8	Remote-ON
9	+5 V (100 mA, polyfuse and RP diode)

Important

Remote-ON functionality is supported on the CAN port of the DS-BP4i.

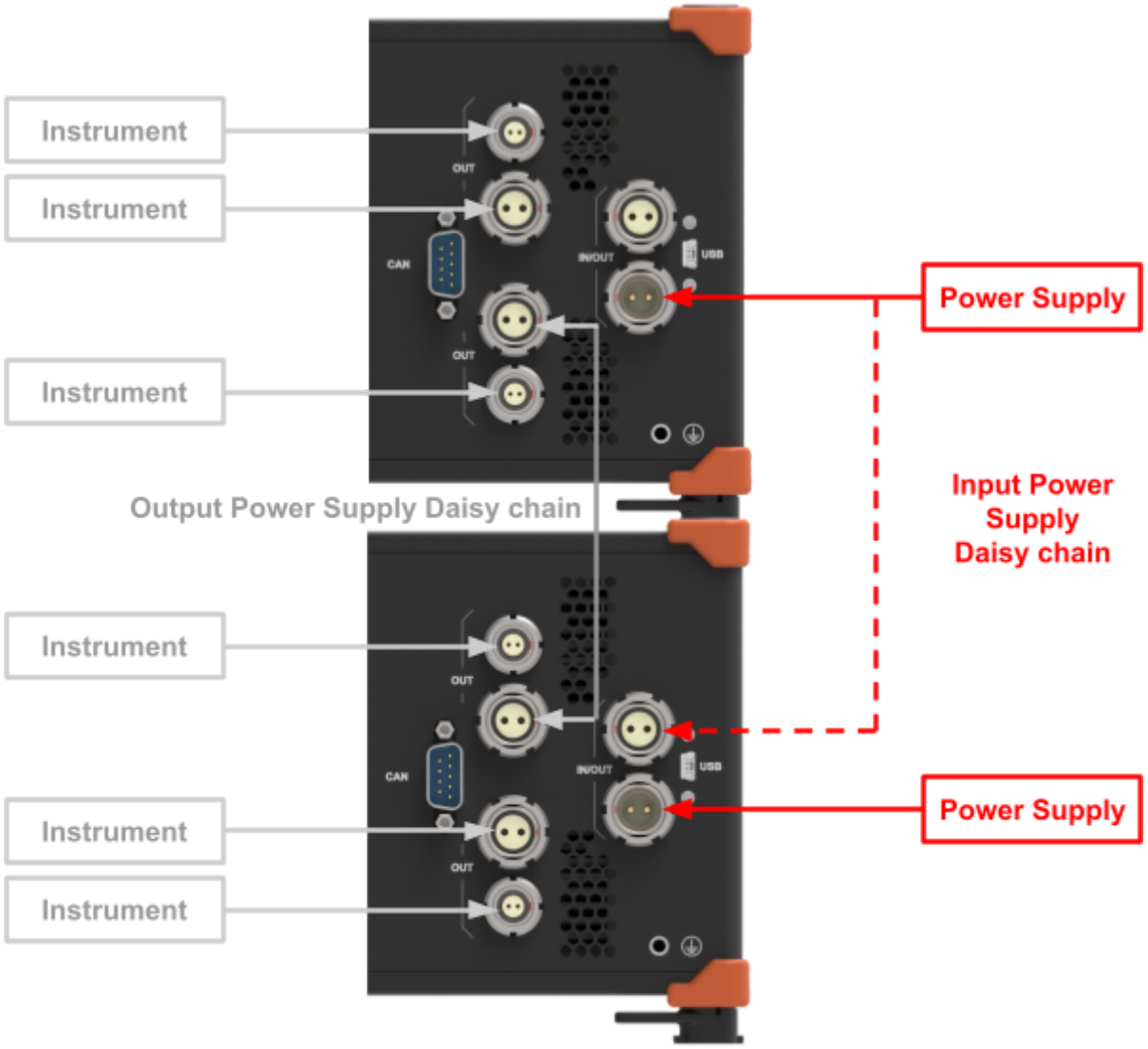
Hint

To power the Battery Pack system on, press the Power switch OR apply a voltage between 4 V and 36 V to the Remote-On pin. To power off the system press the Power switch or reduce the voltage on Remote-On below 0.5 V. CAN +5 V and GND is provided on CAN connector pin 1 and pin 6.

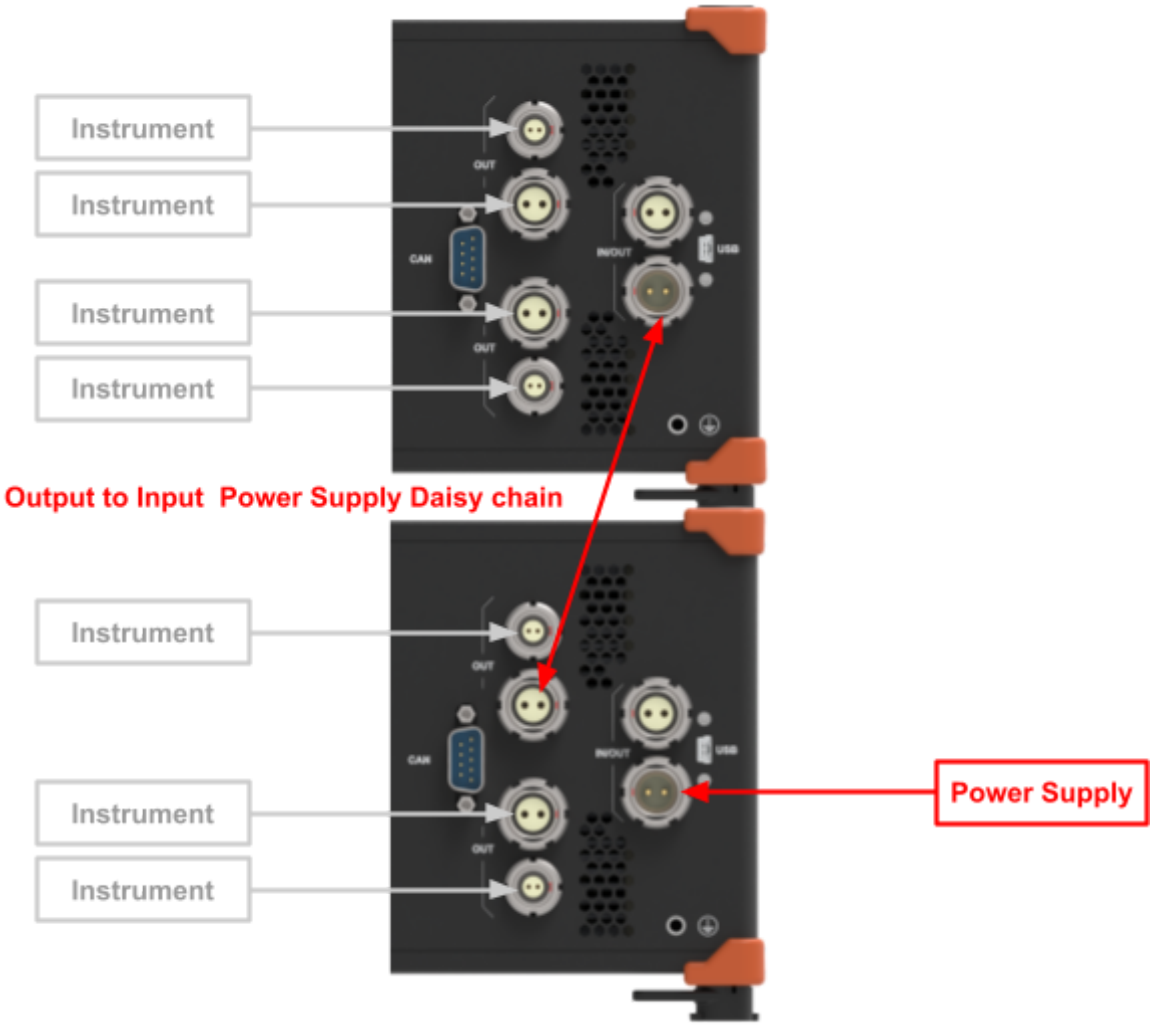
4.3.5. BP4i Daisy chain connection

Warning
Power off all instruments and battery packs before making and changing connections.

Important
Please follow the connection diagram below. Note that Inputs and Outputs are in parallel. Output capabilities will increase with daisy chain connection. Input power supply requirements also double. Please respect maximum ratings for single connector.



DS-BP4i daisy chain : Paralel Input & Output



DS-BP4i daisy chain : Not recommended : Series Input & Output

Caution

Above connection is not recommended. Due to efficiency losses input charging power is increased, autonomy and capacity is decreased. Output power is limited to a single device. Bottom BP will be discharged first and will be charging the top device and providing power to instruments.

4.3.6. Scope of supply

Short name	Name	Quantity
CABLE-USBASmini-USBBS-1m	USB AMS - Mini USB BMS 1m USB AMS-BMS 1m	1
L2B2f-OPEN-5m	DC power cable with 2pin LEMO with open end	1
L2B2m-L2B2f-0.4m	Power supply daisy chain cable, LEMO 2pin, R8 to DS-BP4i	1
L2B2m-L2B3f-0.4m	Power supply daisy chain cable, LEMO 2pin to 3pin, SBOX to DS-BP4i	1
PS-250-L2B2F	Power Supply 250W 24V 10,41A	1

Warranty information

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The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit https://dewesoft.com/support/distributors.

Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300
Web: http://www.dewesoft.com
Email: Support@dewesoft.com
The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on https://dewesoft.com/support/rma-service.

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Safety instructions

Your safety is our primary concern! Please be safe!

Safety symbols in the manual

Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death

Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

General Safety Instructions

Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

Environmental Considerations

Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.

This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

Restriction of Hazardous Substances
This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.

- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange noises. The system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!

- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from this link.
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008
IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

Documentation version history

Version	Date	Notes
V23-1	27.09.2023	- First version of the manual, content is as in the previous Accessories manual - Added information on discharge - Added information of mechanical (in)compatibility of newer and older batteries