



Nordisch
Technical industrial products



BCS BCS 5400/5401 basic

Multiple charging device for batteries up to 36V

Mixed charging (NiCd/NiMH/Li-Ion)

Interface for updates

Operating Manual

(V. 1.7d)



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Technical details:

Cell detection:	NiCd and NiMh batteries automatically up to 14 cells, Li-Ion batteries automatically up to 7 cells, special types able to be programmed via update.	
Charge:	Microprocessor-controlled electronic charge based on precise impedance measurement at the electrode-electrolyte transition.	
Charging current:	up to max. 5 amperes (effective)	
Capacities (battery):	0.1 to > 100 Ah.	
Battery voltage:	NiCd and NiMh	to 16.8 V (optionally higher)
	Li-Ion	up to 36 V
Connection:	EU: 230 V - 50 Hz (mains fuse 3.15 A) US: 110 V - 60Hz (mains fuse 6.30 A) Mains connection via cooling device plug connector	
Cooling:	Thermo-management: Charge-independent ventilation with cooling automation.	
Dimensions:	<u>W x H x D in cm</u>	<u>weight in Kg</u>
BCS 5400 (m) +	49.5 x 20.0 x 30.5	8.8
BCS 5401 (m) +	30.0 x 32.5 x 30.5	8.8

(Technical changes reserved!)



Foreword:

About the charging process

The applied charging process is patented worldwide and has received innovation awards. Starting with series **BCS 5400/5401 (m) +**, we are working with a new and unique technology for charging batteries, especially for detecting the causal 100% charge level of a battery. Analogous to the current process, fully new methods are applied to charge batteries. This enables the 100% full charge level to be specified for batteries featuring different types of technology (NC, NMH, Lilon, Pb, and more). This was possible because an alternating current equivalent circuit diagram has been used for the first time to calculate the process inside the cell (interior impedance at the electrode-electrolyte transition). Originally used for applications with maximum reliability requirements, e.g. involving medical technology like life-support systems, and this technology is also found in other applications like safety equipment, UPS systems, electrical vehicles, radio stations, data collection devices, mobile telephones, laptops, and specific applications in the automotive industry.

Thank you for choosing this Nordisch charging station, which is a highly developed charging device. Our customers' requirements for protection against overheating, modularity, operation and service-friendliness have motivated us to develop the type BCS-5400 (m) + multiple charging system. By charging your industrial tool batteries regularly using this station, you can increase their tool life between 2000 and 5000 charging cycles (NiMh and NiCd batteries)!



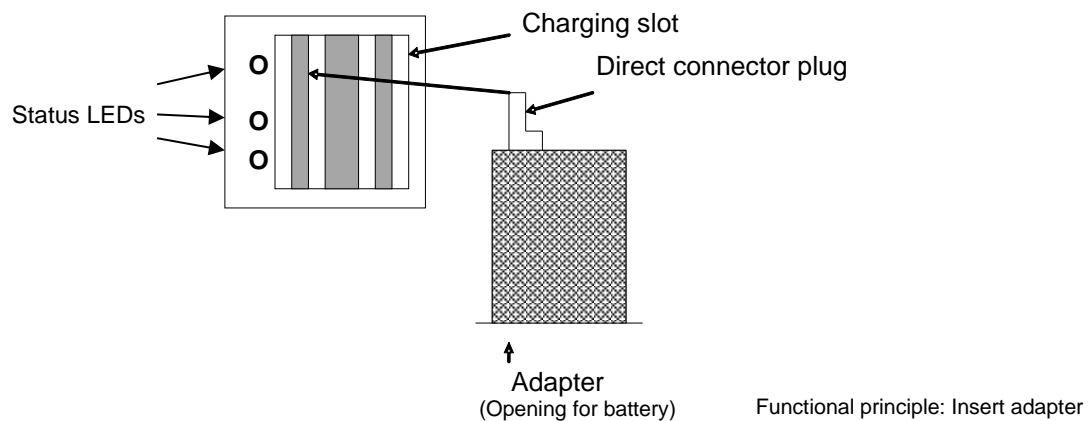
Special properties of the BCS-5400 (m) +:

- Independent of battery type (Li-Ion/lead acid/NiCd/NiMh, etc.)
- Precision: exact full charge possible.
- Long lifespan of battery combined with simultaneous fast charging
- Micro-computer controlled, automatic charging
- Independent of battery capacity and cell quantity
- No memory effect, no gases
- Micro-processor controlled charging
- Automatic battery and voltage detection
- Automatic transition to conservation mode (after full charging)
- Error analysis and indication via LED signal encoding.
- Charging possible for extremely low batteries
- Optional programming for individual charging parameters (e.g. for regions with other climatic conditions).
- Automatic configuration of charging rates via processor in the adapter.
- “Deep sleep” mode possible (Li-Ion).
- Update possible via external interface.
- Selectable as individual or cabinet system.



First steps:

- (1) Remove the device from the packaging and place it on a stable underlay.
- (2) Connect the device to a protective contact plug socket (a matching mains cable is provided in the packaging).
- (3) Slide the corresponding charging adapter and the required intermediate adapter as needed (accessory) into the charging slots (figure 1). Do not use force, since the adapter will snap into the insert with slight pressure. If used, ensure that the arrow on the intermediate adapter faces upwards and that the connector located on the adapter points to the left side of the charging slot. The system is not compatible with other similar charging adapters (with 8-pin contact connectors) from other manufacturers. (If you want to use these, please contact us.)



- (4) Switch on: After you have inserted all necessary adapters, switch on the device with the main switch (rear side). After switching on, all optical signal lamps glow in sequence to check the functionality (LEDs) for approx. 0.5 seconds, and then the red and blue signal maps (LEDs) go out, while the green signal lamps indicate that the charging slots are ready for operation.

- The charging station is now ready for operation! –

Notice:

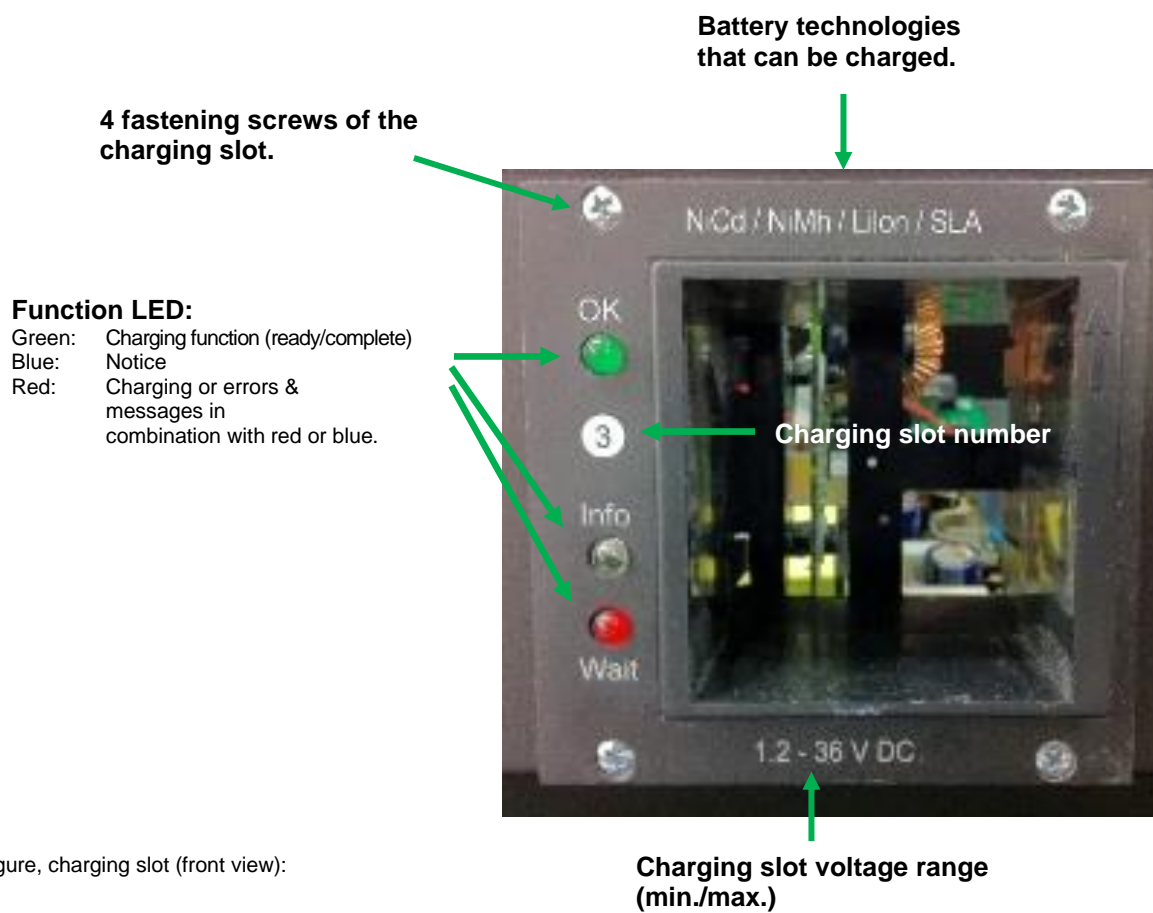
If a charging adapter is not inserted correctly or is not inserted at all, activation will issue a signal (optically and acoustically) via the red LED. The red LED flashes until an adapter has been inserted correctly or until the parameter sets of the adapter have been imported for the charging circuit board.

Do not use force to insert the charging adapter. If the adapter is inserted in the correct direction in the adapter mount, use soft pressure to slide the last 5 mm up to the end stop in the connector device. Never hammer the charging adapter into the mount!



Charging slot description:

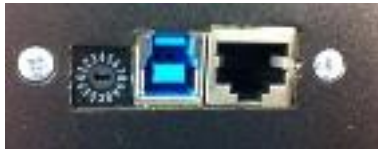
The charging slot is the receptacle for the charging adapter (types, see separate adapter list) and indicates all of the necessary information to the user for the respective device or the battery level in this slot.



Figure, charging slot (front view):

Interface/rear side of device:

The BCS 5400 (m) + has been future-proofed thanks to its freely programmable structure. Battery technologies that are not yet used and batteries that will be only be used years from now may be used by individually adjusting the parameter sets to suit future, unknown requirements. The properties on the chip of the adapter or on the main circuit board that are relevant are updated to the state of the art via the charging strip up to the adapter using a software update. An update is possible using a conventional USB cable and a PC including user software. The combination of rotary switch (left in the figure), USB (3.0) interface (centre of figure), and the network connection provide the system maximum flexibility. The network interface (right in the figure) is provided for the network connection of the AM 5400 battery management system and is not important for normal charging.



Notice:

Programming the device and parameter sets in the adapter may only be completed by trained technical personnel. In case of doubt, ask us directly.



Additional battery information:

The design of a battery is different according to the manufacturer. Make sure that the battery you use

- a) matches the adapter mechanically
- b) matches the internal contact arrangement in the adapter

It is possible that the battery in fact matches the shape of the adapter you wish to use, but the connection contacts inside the adapter still do not match those of the battery. Or, the arrangement of the contacts matches, but the configuration of the contacts is different. (figure 2).

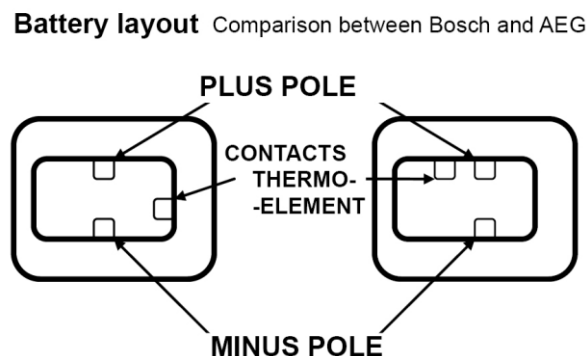


Figure: Contacting principle (front view):

For this reason, always ensure that the battery type is pressed on to the adapter properly. If you observe the previously indicated points and the adapter type matches the battery, then you can slide the battery into the corresponding charging slot.

Nevertheless, if an acoustic signal sounds, please compare the contact configuration of the battery with that of the adapter again. The BCS-5400/5401 (m) + is fully compatible with the adapters of the previous series of our charging stations, i.e. all adapters with the older design (8-pin connector) match the new charging station, and in case older adapters are used, the BCS-5400/5401 (m) + works in compatibility mode. For safety reasons, batteries after the year 2011 may only still be charged with the new one-wire chip adapter, which may be recognised by its 10-pin connector plug. We can convert older adapters for you after checking them.

In case of doubt, please read the troubleshooting chapter, contact the technical service department, or talk with us directly.

Charging:

After you have slid the battery into the charging slot, the system checks the battery briefly, the green signal lamp goes out, and the red signal lamps start to glow. The automatic charging process has now started.

During the charging process, the internal temperature of the battery is monitored continuously. If the temperature exceeds its threshold value during the charging process, this will stop immediately. If an overheated battery is inserted into the charging slot, the charging process only begins after the battery has cooled off. This may extend the charging time accordingly.

In order to start the charging process directly, do not insert overheated batteries into the charging device (e.g. batteries that were previously discharged under extreme conditions).

During charging, voltage & current are regularly monitored. Upon reaching its maximum capacity, the battery is immediately disconnected from the charging current. The measurement applied in the device for internal impedance detection therefore rules out overcharging. Therefore, a charged battery does not need to be removed from the charging slot, but instead remains full thanks to the automatically activated conservation mode (this compensates the self-discharge caused by the battery's interior resistance). The battery is therefore always available in an optimal state. Li-Ion batteries are charged directly in dialogue with the battery, and the final shut-off and charge conservation is completed in dialogue with the battery or the adapter chip.

The flashing green LED indicates the availability of the battery.

This signals that:

- the battery in the battery is fully charged
- conservation mode is active

If you possess a battery management system (AM 5400), the blue LED indicates instructions for use of the battery in the device. Additional detailed information is provided in the separate use instructions.



Notice:

If you insert older batteries in this device (basically NiCd or NiMh) that were charged previously in a conventional charging device, these could nevertheless possess less capacity in spite of complete charging.

This so-called “memory effect” results from the different charging processes. After charging this battery multiple times with the BCS-5400 (m), this effect should be completely corrected again (provided the battery is not yet damaged).



LED signal description:

GREEN	glowing	-	the charging slot is ready
GREEN	flashing	-	fully charged & conservation charge
RED	glowing	-	BATTERY charging
RED	flashing	-	ERROR MESSAGE (for details, see the error codes chapter)
BLUE	glowing	-	NOTICE - battery cooling off Automatic charging only continues after cooling.

The description of the signal encoding is also provided on an included sticker. This may be attached to the device as required.

Messages/error codes

The BCS 5400/5401 (m) + is equipped with numerous extensive self-monitoring and analysis functions. The goal is to examine the individual charging requirements of the battery manufacturer to achieve the max. life cycle of the battery. If a battery or system function deviates from the specified criteria during the charging cycle, an optical and acoustic signal message will be provided to the user. The optical signal message takes place during registration via the attached LED together with an acoustic signal. The LED flashes again during the signal tone after the process has been completed. If the battery is removed from the charging adapter, the signal tone repeats and provides information about the situation. The meaning of the signal tones differs according to the frequency of the repetitions. The colours of the diodes differ according to:

RED & GREEN

Status message (uncritical situation - battery should be evaluated or tested manually. E.g. overloading, over-temperature, etc.)

BLUE

Information: The charging process has been interrupted temporarily by the cooling phase, will start after cooling automatically.



After removing the battery, the type of error is indicated to the user by an acoustic signal. The error codes indicated below describe the errors that occurred:

(please also see: “Technical service information for software version XX”)

The exact importance of the notice/warning message and the error codes are included with the respective testing documents for the device and correspond with the newest version. If you receive a software update, then ask for an updated version of the documents in case of doubt.

Security system:

The device is equipped with a regular security query.

After the supply voltage switches on, the charging device electronics are checked for any possible errors by a self-test. If the detected parameters do not match the saved ones, this is indicated to the user by a message.

These system checks take place as described above and during battery charging. If errors occur in this case that could endanger the battery, then the message indicated above will be displayed and the affected charging slot will be switched off.



Safety instructions/disposal:

- Note the voltage supply!
The device may only be connected to the following alternating current mains:
 - a) 230 V/50 Hz (EU version) or
 - b) 110 V/50-60 Hz (US version)
- Only batteries marked NiCd (nickel cadmium), NiMH (nickel metal hydride), and Li or Li-Ion (lithium ions are charged with the adapters provided for this. Other battery types permitted only if authorised by the manufacturer.
- In commercial institutions, the accident prevention regulations of the Association of Commercial Trade Associations for electrical systems (BGV-A3) must be observed.
- Adapters are subject to wear. The BCS-5400/5401 (m)+ itself is maintenance-free. Nevertheless,
if faults occur that require an alteration in the device required, then this may only be completed by trained technical personnel.
- Defective safeguards on the device may only be replaced with equivalent designs.
- The BCS-5400/5401 (m) + may only be operated in dry rooms.
- Ensure sufficient ventilation! The ventilation slits on the respective device may never be covered during operation to prevent possible heat accumulation. In spite of the innovative, sophisticated cooling concept, the worst case could result in damage to individual electronic components!
- In case of transport from a cold into a warm environment, wait until the BCS-5400/5401 (m)+ has reached room temperature before switching it on.
- Damaged batteries and charging systems are able to be recycled or must be disposed of correctly as special waste. Provide these to your dealer accordingly. Your dealer is obligated to accept them free of charge.



Troubleshooting:

Error	Cause	Remedy
After switching on, not all prepared displays glow	The device is defective	Contact our customer service
After inserting the battery, an acoustic warning signal sounds	The adapter used is not compatible with the battery type	Use an adapter that matches the corresponding battery
	The inserted battery is defective	Replace the defective battery
After inserting the battery, the red Signal lamp flashes	The adapter used is not compatible with the battery type No adapter inserted.	Use an adapter that matches the corresponding battery and insert it correctly.
	The thermo-element in the battery is defective	Replace the defective battery
After approx. 100 min, The signal lamps flash	The maximum charging time has been exceeded	Replace the defective battery
The battery does not provide power in spite of a full charge	One or more cells in the battery are defective	Replace the defective battery

Charging adapter for 1.2 V-36 V:

NiCd and NiMh batteries:

- Bosch
- Atlas Copco
- Dewalt
- Cooper (Cleco)
- Fein
- Uruy
- Makita
- Gesipa
- Panasonic
- Hitachi

Li-Ion batteries:

- Bosch
- Atlas Copco
- Makita
- Panasonic
- Cooper (Cleco)
- Desoutter
- HST, AMT
- POP
- Milwaukee

Additional adapters and testing devices upon request.





Declaration of conformity with ES standards

The signing party,
Nordisch GmbH, Carsten-Dressler-Str. 10, Germany,
hereby declares that the following industrial charging devices:

Model: BCS-5400 (m) + and BCS 5401 (m) +
(serial no.: serial production)

According to the guidelines 2004/108/EC (ex 89/336/ECC), guideline 2006/95/EC (ex 73/23/ECC) and guideline 2006/42/EC for safe & fault-free operation matching the following standards or standard documents:

EN 60065, EN 55014, EN 55011, EN 61000-3-2, EN 61000-6-2

Bremen, 01.05.2014

Dipl. -Wirtsch.- Ing. (FH)



Marcus Runge

-Geschäftsführung / Chief Executive Officer-

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