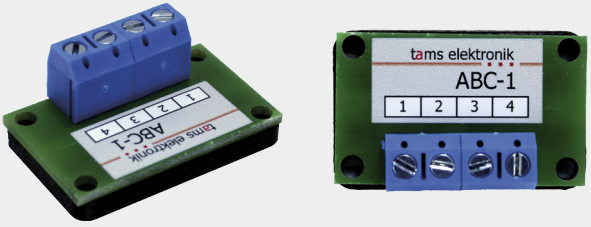
ABC-1

Brake module
for the ABC braking method

Manual



Item number 49-03106

tams elektronik

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Version: 1.0 | Status: 09/2023

Printing the manual

The formatting is optimised for double-sided printing. The standard page size is DIN A5. If you prefer a larger display, printing on DIN A4 is recommended.

1. Getting started

The instructions will help you step by step with the safe and proper installation and use of your brake module. Before you start to put the brake module into operation, read this manual completely, especially the safety instructions and the section on possible errors and their elimination. You will then know what you have to pay attention to and thus avoid errors that sometimes can only be rectified with a lot of effort.

Keep the instructions in a safe place so that you can restore functionality later in the event of any malfunctions. If you pass the brake module on to another person, also give the instructions with it.

1.1. Contents of the package

Turnout decoder WD-34:

- 1 brake module ABC-1 (item no. 49-03106-01)
- 1 plastic spacer

1.2. Accessories

Connection cables

The use of stranded wire is recommended for making the connections. Stranded wires consist of several thin individual wires and are therefore more flexible than rigid wires with the same copper cross-section. Recommended cross-sections:

- for all connections: $\geq$ 0.25 mm²

1.3. Intended use

The brake module is intended for use in model construction, especially in model railway layouts, according to the specifications in the manual. Any other use is not in accordance with the intended use and will result in the loss of the warranty claim. Intended use also includes reading, understanding and following all parts of the instructions. The brake module is not intended to be used by children under the age of 14.

1.4. Safety instructions

Improper use and non-observance of the instructions can lead to incalculable hazards. Prevent these dangers by carrying out the following measures:

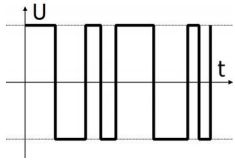
- Only use the brake module in closed, clean and dry rooms. Avoid moisture and splash water in the environment. After condensation has formed, wait two hours for acclimatisation before use.
- Disconnect the brake module from the power supply before carrying out wiring work.
- Supply the brake module only with extra-low voltage as specified in the technical data. Use only tested and approved transformers.
- Only plug the mains plugs of transformers into properly installed and fused earthed sockets.
- When making electrical connections, ensure that the cable cross-section is sufficient.
- Heating of the brake module during operation is normal and harmless.

- Do not expose the brake module to high ambient temperatures or direct sunlight. Observe the information on the maximum operating temperature in the technical data.
- Regularly check the operational safety of the brake module, e.g. for damage to the connection cables.
- If you notice damage or if malfunctions occur, disconnect the connection to the power supply immediately. Send the brake module in for inspection.

2. Operation overview

The ABC (Automatic Break Control) method is based on the fact that

- the ABC brake module reduces either the positive or the negative part of the digital voltage for the braking section and thus generates an asymmetrical track voltage and
- the locomotive decoders detect this asymmetrical track voltage when entering an ABC braking section and thereupon automatically reduce the driving speed with the set braking deceleration or the set braking distance. By setting a constant braking distance, an exact (signal) stop can be realised for all locomotives, regardless of the speed level with which the locomotives enter the braking section.

 Symmetrical track voltage at the normal section	 Asymmetrical track voltage at the ABC braking section	The normally symmetrical digital voltage is reduced on one side in the braking section by the ABC brake module, by default on the right rail as seen in the direction of travel.

In principle, the braking section is only effective for one direction of travel at a time. When travelling in the opposite direction, the locomotive does not react to the braking section.

While the locomotive is in the braking section,

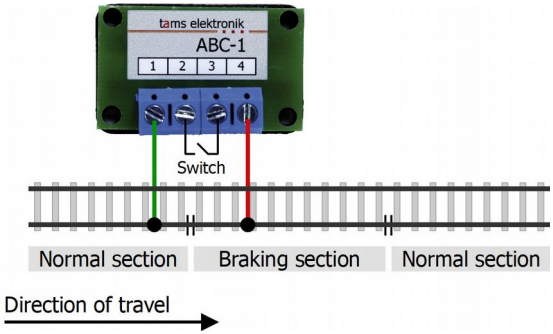
- the functions can be switched,
- the CVs of the decoder can be changed by means of main track programming (PoM),
- the direction of travel of the locomotive can be changed and thus the locomotive can be shunted or driven out of the braking section in the opposite direction.

As soon as the braking distance is released or the locomotive leaves the braking section, it accelerates with the set starting deceleration up to the set speed level. No short-circuits occur when driving over the separation point between the normal section and the ABC braking section.

In order to be able to use the ABC braking method, the booster must provide an output voltage at the track output that is as symmetrical as possible. When using boosters that do not provide a symmetrical voltage at the output due to their design, the locomotive decoders may not brake reliably when entering the braking section.

3. Connections

The brake module is equipped with modular terminal blocks into which you plug and screw the cables for connection to the rails and the switch (or a comparable circuit).



1	Normal track in front of the braking section (track output of the booster
2	Switch
3	Switch
4	Braking section

Setting up the brake section

When determining the length of the braking section, take into account that the longest train must come to a stop within the section. Cut the right rail as seen in the direction of travel at both ends of the brake section.

Connections to the rails

Connect connections 1 and 4 of the brake module according to the illustration to the right rail of the normal track in front of the braking section and to the right rail in the braking section as seen in the direction of travel.

Connecting a switch

The brake module is bridged with a switch

- to trigger the continuation of a train after it has stopped, or
- to let a train pass without stopping.

As a switch you can use

- a separate switch, if you want to (de-)activate the brake module manually
- the switching output of a separate circuit (e.g. to control a signal with double coil drive).

If you want to switch the brake module together with a light signal, you must connect a relay parallel to the green lamp / LED. With the make contact of the relay, you bridge (deactivate) the brake module when the signal is in the "green" position.

Note:

The entire current for the train in the braking section must be transmitted via the connecting cables to the rails and to the switch. Therefore, make sure that the cable cross-section is sufficient and that the connecting cables to the rails and to the switch are as short as possible in order to avoid a high voltage drop.
If you need long connection cables for the switch, the use of a remote switch (e.g. a switch decoder) is recommended.

Fixing the brake modul

A spacer is included in the scope of delivery, which is mounted between the underside of the brake module and the base. It prevents the diodes on the underside of the circuit board from being accidentally damaged when the module is screwed on.

4. Checklist for troubleshooting and error correction

Warning:
If you notice a strong heat development, immediately switch off the power supply for the layout. **Fire hazard!**

Possible causes:

- One or more connections are faulty. → Check the connections.
- The module is defective. → Send the module in for inspection.

No reaction of the locomotive when entering the braking section

Possible causes:

- The seperation points for the braking section are on the left rail instead of the right rail (seen in direction of travel) or are not continuous. → Check the seperation points.
- The CV-settings of the locomotive decoder are not correct. → Check the CV-settings if the ABC-braking method is active and if the ABC-detection is inverted.
- The output voltage of the booster is not symmetrical. → If possible, change the ABC sensitivity of the decoder in the CV settings. Boosters that do not produce a symmetrical output voltage due to their design may not be suitable for the use of the ABC braking method.

4.1. Technical Hotline

If you have any questions about the use of the module, our technical hotline will help you (telephone number and e-mail address on the last page).

4.2. Repairs

You can send us a defective module for inspection / repair (address on the last page). Please do not send us your return freight collect. In the event of a warranty or guarantee claim, we will reimburse you for the regular shipping costs.

Please enclose the following with your shipment

- proof of purchase as evidence of any warranty or guarantee claim
- a brief description of the defect
- the address to which we should return the product(s)
- your email address and/or a telephone number where we can reach you in case of queries.

Costs

The inspection of returned products is free of charge for you. In the event of a warranty or guarantee claim, the repair and return are also free of charge for you.

If there is no warranty or guarantee case, we will charge you the costs of the repair and the costs of the return. We charge a maximum of 50% of the new price for the repair according to our valid price list.

Carrying out the repair(s)

By sending in the product(s), you give us the order to inspect and repair it. We reserve the right to refuse the repair if it is technically impossible or uneconomical. In the event of a warranty or guarantee claim, you will then receive a replacement free of charge.

Cost estimates

Repairs for which we charge less than € 25.00 per item plus shipping costs will be carried out without further consultation with you. If the repair costs are higher, we will contact you and carry out the repair only after you have confirmed the repair order.

5. Technical data

Electrical properties

Maximum current	3 A duration 6 A peak (maximum 10 seconds)

Protection

Protection class	IP 00 Meaning: No protection against foreign bodies, contact and water.

Environment

	For use in closed rooms
Ambient temperature during operation	0 ~ + 30 °C
Permissible relative humidity during operation	10 ~ 85% (non-condensing)
Ambient temperature during storage	- 10 ~ + 40 °C
Permissible relative humidity during storage	10 ~ 85% (non-condensing)

Other features

Dimensions (approx.)	Circuit board: 35 x 21 mm incl. spacer: 36 x 22 x 15
Weight (approx.)	7 g (withouat spacer)

6. Warranty, EU conformity & WEEE

6.1. Guarantee bond

For this product we issue voluntarily a guarantee of 2 years from the date of purchase by the first customer, but in maximum 3 years after the end of series production. The first customer is the consumer first purchasing the product from us, a dealer or another natural or juristic person reselling or mounting the product on the basis of self-employment. The guarantee exists supplementary to the legal warranty of merchantability due to the consumer by the seller.

The warranty includes the free correction of faults which can be proved to be due to material failure or factory flaw. With kits we guarantee the completeness and quality of the components as well as the function of the parts according to the parameters in not mounted state. We guarantee the adherence to the technical specifications when the kit has been assembled and the ready-built circuit connected according to the manual and when start and mode of operation follow the instructions.

We retain the right to repair, make improvements, to deliver spares or to return the purchase price. Other claims are excluded. Claims for secondary damages or product liability consist only according to legal requirements.

Condition for this guarantee to be valid, is the adherence to the manual. In addition, the guarantee claim is excluded in the following cases:

- if arbitrary changes in the circuit are made,
- if repair attempts have failed with a ready-made module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

6.2. EU Declaration of Conformity

CE This product fulfils the requirements of the following EU directives and therefore bears the CE marking.

2001/95/EU Product Safety Directive

2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

2014/30/EU on electromagnetic compatibility (EMC Directive). Underlying standards:

DIN-EN 55014-1 and 55014-2: Electromagnetic compatibility - Requirements for household appliances, electric tools and similar electrical appliances. Part 1: Emitted interference, Part 2: Immunity to interference

To maintain electromagnetic compatibility during operation, observe the following measures:

Only connect the supply transformer to a professionally installed and fused earthed socket.

Do not make any changes to the original components and follow the instructions, connection and assembly diagrams in this manual exactly.

Only use original spare parts for repair work.

6.3. Declarations on the WEEE Directive

This product is subject to the requirements of the EU Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE), i.e. the manufacturer, distributor or seller of the product must contribute to the proper disposal and treatment of waste equipment in accordance with EU and national law. This obligation includes

- registration with the registering authorities ("registers") in the country where WEEE is distributed or sold
- the regular reporting of the amount of EEE sold
- the organisation or financing of collection, treatment, recycling and recovery of the products
- for distributors, the establishment of a take-back service where customers can return WEEE free of charge
- for producers, compliance with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive.

The "crossed-out wheeled bin" symbol means that you are legally obliged to recycle the marked equipment at the end of its life. The appliances must not be disposed of with (unsorted) household waste or packaging waste. Dispose of the appliances at special collection and return points, e.g. at recycling centres or at dealers who offer a corresponding take-back service.

Further Information and Tips:

http://www.tams-online.de

Warranty and Service:

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