

Digital

plus
by Lenz

Information BM3

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1 **Important safety instructions**

The ABC modules BM1, BM2 and BM3 may only be used with *Digital plus by Lenz*® or other standard digital control systems with a NMRA-conformance seal. If in doubt, ask the system supplier.

The current-carrying capacities stated below may not be exceeded as this could damage the block section module!

2 **Technical Data:**

Maximum continuous current-carrying capacity	3.0 A
Dimensions	70 x 60 x 20 mm

3 **Requirements for using the ABC technology**

To use the ABC technology with BM1, BM2 and BM3 block section modules, you will need locomotive decoders of the GOLD series or other decoders that support the ABC technology.

4 How does the ABC technology work?

With little effort, ABC manages to accomplish just what model railway enthusiasts crave: precise on-the-spot stopping in front of signals, slow approach and passage in the opposite direction.

By means of simple modules, which supply the braking section in front of a signal, an asymmetry is created in the otherwise symmetrical digital track voltage. Naturally, this occurs only if the signal is at "Stop". This asymmetry informs the locomotive decoder about the signal status: A "Stop" signal indicates an asymmetry - the train will stop or slow down.

Additional advantages of the ABC technology:

- All locomotive functions (e.g. front lighting) can still be switched while the locomotive stops in front of the signal.
 - Programming in operational mode (POM) possible.
 - The locomotive can reverse away again from the signal!
 - A locomotive can pass in the opposite direction, even if the signal is at "Stop".
 - Shunting is possible, even if the signal is at "Stop". Simply activate the shunting mode!
 - No short-circuits when crossing section points between the driving and stopping sections.
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5 Using the BM3 block section module

The BM3 block section module uses the ABC technology to facilitate the simple construction of a block section. Each block is equipped with a BM3 module so that an infinite number of blocks can be added.

The BM3 block section module is used to control the block signals. You can connect light signals directly; signals with double-coil drive require a BMA adapter.

Control of block sections by means of BM3 modules is suitable for push and pull operation. If you want to use rear-powered (pushed) trains (push-pull trains, commuter trains, motor coaches), the first coach must be fitted with a power consumer. Simply use interior lighting or, if using a driving coach, a function decoder for controlling the direction-dependent front lighting.

5.1 Constructing the block section

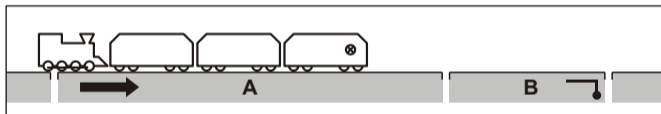
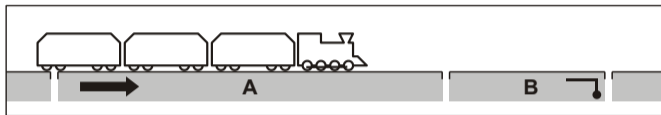
Each block is divided into a "driving section" **A** and a "braking section" **B**.

- The length of the driving section must be calculated so as to fully accommodate the longest trains passing this section.
 - The length of the braking section depends on the braking delay and/or distance set in the locomotive decoder.
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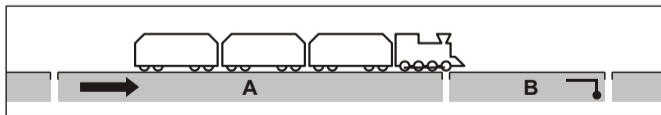
Procedure:

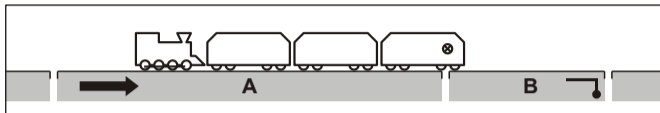
For the following procedure, we assume that the block that is next in the direction of travel is occupied. This means that the train that arrives next in the present block will have to stop.

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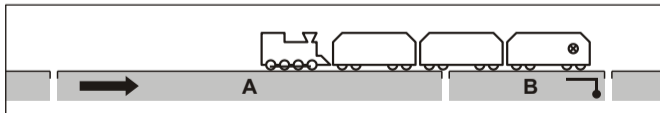
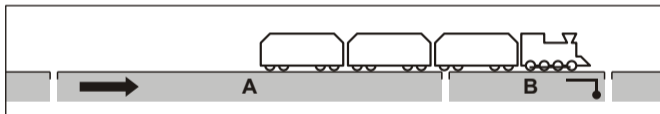


The next train arrives from the previous block.





When the rear-powered (pushed) train in the driving section reaches the braking section, the BM3 switches the driving and braking sections to asymmetrical digital voltage. As the pushing locomotive is already located in the driving section at that time, the GOLD decoder recognises this asymmetry and starts to brake.



If the constant braking distance has been set correctly in the decoder, the train will stop on the right spot in front of the block signal.

As soon as the next block is clear again, the signal will switch to "Clear" and the train will accelerate with the starting delay set in the decoder.

The above procedure requires that the first coach of the rear-powered (pushed) train is fitted with a power consumer, e.g. interior lighting.

6 Installing and connecting the BM3 module

6.1 The BM3 connections

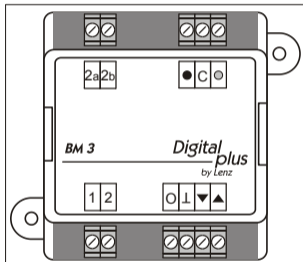


Figure 1

2a	Driving section connection
2b	Stopping section connection
●	Signal light GREEN (Clear)
C	Joint connection for signal lights
○	Signal light RED (Stop)
1 2	Track connections of the amplifier
○ ⊥	Outputs for connecting feedback modules LR101
▼ ▲	Signal output / Signal input

6.2 Length of driving and braking sections

First, define the length of the driving section (**A**). Keep in mind that the longest train on your layout must fit in this section!

Then, define the length of the braking section (**B**) in front of the signal. Keep in mind that the fastest train on your layout must be able to come to a standstill within this section. Use the feature "constant braking distance" of the GOLD / SILVER decoder - this will ensure that all trains will come to a complete standstill within the braking section you have defined.

6.3 " On the right means on the right..."

... was a slogan on an Autobahn sign at the end of the 1980s. It was meant to remind drivers to change back to the right lane after overtaking a lorry.

The same is true when using the BM3 module: "on the right means on the right". It is always *the right rail in the direction of travel where a rail-break is made* when a driving or braking section is defined.

Make breaks in the right rail at the beginning and at the end of the braking section. Alternatively, you can use an insulating track connector if there is a track joint at the point in question.

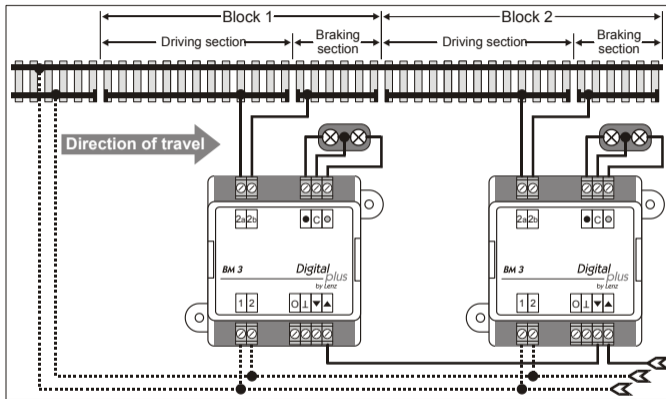


Figure 2

6.4 Connecting the driving and braking section

Connect terminal (1) to the left continuous rail.

Connect terminal (2) to the right rail before the braking section.

Connect the right isolated rail of the driving section to terminal (2a) of the BM3.

Connect the right isolated rail of the braking section to terminal (2b) of the BM3.

6.5 Connection to the previous / next BM3: Connecting the signal output / input

Connect the signal *input* of the BM3 module that controls section 1 to the signal *output* of the BM3 module that controls section 2. Via this connection, each BM3 module will receive information on the occupancy status of the block that is next in the direction of travel.

Connect the signal *input* of the BM3 module that controls section 2 to the signal *output* of the BM3 module that controls the *next* block.

Continue like this to link the signal inputs and outputs of all BM3 modules that make up your block section.

6.6 Connecting the signal

It is not necessary to connect signals in order for the block section to function properly, but, of course, this is helpful.

6.6.1 Connecting light signals

Simply connect the BM3 signal outputs to the bulbs of the light signal. The voltage at these outputs is 15V DC. The maximum continuous current-carrying capacity of these outputs is 100mA. You can connect bulbs as well as luminous diodes to these outputs. In the case of luminous diodes, please note that terminal (C) is the plus pole.

6.6.2 *Connecting signals with double-coil drives (form signals)*

Form signals cannot be connected directly to the BM3 signal output. The BMA adapter (art. no. 22630) is available for this purpose. For more detailed information, please refer to the BMA adapter operating manual.

7 Tips for use

7.1 Using the BM2 at the end of a block section

You can use the BM2 module to complete a block section of BM3 modules. In a typical case, the entry signal to a station would be at the end of a block section. By setting the entry signal, you, as the conductor, determine whether an arriving train may or may not enter the station.

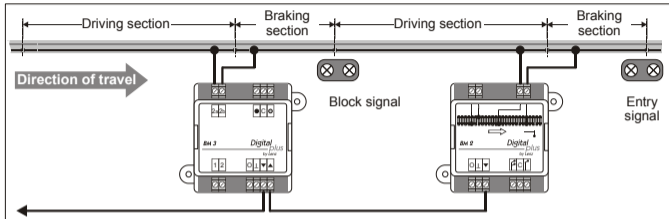


Figure 3

The BM2 has a control output designed for this purpose. Connect this output to the BM3 control input that controls the previous block (All other wirings necessary for this function are not shown in Figure 3).

7.2 Controlling the entry into a block section / exit signal

Normally, the signal connected to a BM3 module automatically switches to "Clear" if the block that is next in the direction of travel is clear. It is possible that you do not want this to happen automatically because you want to define yourself when the train should accelerate again after a stop. Typical applications are the exit from a train station or a stop within a block section.

If you want to prevent the block signal from switching automatically to "Clear", all you have to do is use a switch (K1 in Figure4) to interrupt the connection between the signal input and the signal output of the block that is next in the direction of travel.

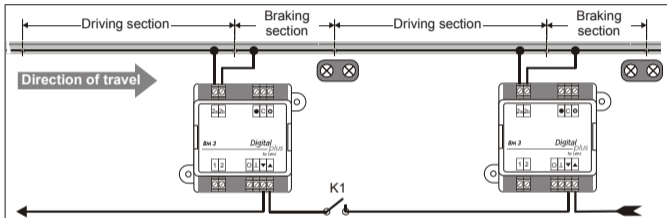


Figure 4

As long as the switch is open, the block signal remains in the "Stop" position. The signal will only change to "Clear" again when you reclose the switch and the block that is next in the direction of travel is clear. The block signal will remain in the "Stop" position as long as the next block is occupied.

7.3 Connecting the BM3 to a feedback module LR101

If you want to verify the occupancy status of braking and driving sections by means of the feedback function of the Digital plus system, simply connect the BM3 to a LR101 feedback module:

- Connect output (O) to one of the eight inputs of the LR101,
- and output (\perp) to the terminal (\perp) of the LR101.

As soon as a power consumer enters the driving or braking sections, the occupancy status will be transmitted to the command station via the R-S bus.

