Digital plus by Lenz

Information on ***compact***

art. no. 60500
1. edition, 07 00

Welcome!

We would like to congratulate you on your acquisition of the ***Digital plus by Lenz® compact*** and we hope you will enjoy working with this model-railway control.

The purpose of this operating manual is to explain the use of ***compact*** to you. In order to proceed as quickly as possible to the pleasure of operating your model railway for the first time, begin by reading the section "First steps". After you have done so you will be best able to follow the step by step description of ***compact*** 's entire range of functions.

If you do still have questions for which you cannot find the answers even after reading this operating manual, then please contact us. We shall be happy to help you. There are four different ways of contacting Lenz Elektronik GmbH:

Postal address:	Lenz Elektronik GmbH Huettenbergstrasse 29 D-35398 Giessen	
Telephone:	++49 (0) 6403 900 133	The recorded message will inform you of times when we are available for consultation.
Fax:	++49 (0) 6403 900 155	
e-mail:	info@digital-plus.de	

All present and correct?

Please check whether everything listed below is contained in the package:

compact device

Operating manual (this booklet)

If any component is missing, please ask your specialist supplier for a supplementary delivery.

Special thanks to Ken MacKay

MacKay Models
Studio 20 Sir James Clark Bldg.
Abbey Mill Centre Seedhill
GBPA1 1TJ Paisley/Scotland

for his great help with this manual.

1 Contents

2 Important advice, please read first!

Your ***compact*** is a component of the ***Digital plus by Lenz®*** system and was submitted to intensive testing before it was delivered. Lenz Elektronik GmbH guarantees fault-free operation if you follow the pieces of advice given below:

Compact is authorised for operation only with other components of the ***Digital plus by Lenz®*** system. Any use other than the one described in this operating manual is not permitted and all guarantees become invalid if ***compact*** is used in an inappropriate way.

Connect your ***compact*** only to devices which are designed for its connection. This operating manual will inform you which devices are suitable. Even if other devices (also those of other manufacturers) use the same connectors, you must not operate ***compact*** with those devices. The fact that the connectors are similar does not automatically mean that you may use them for operation, even if you are dealing with devices for the controlling of model railways.

Do not expose ***compact*** to wetness nor direct sunlight.

2.1 Important symbols:

(⇨P. 23) This arrow indicates particular pages of the operating manual which contain further information on the subject under discussion.

Texts marked with this symbol and a frame contain information and advice of special importance.

3 What is *compact* capable of? – Range of functions

Compact is a complete digital control. In one single device it unites

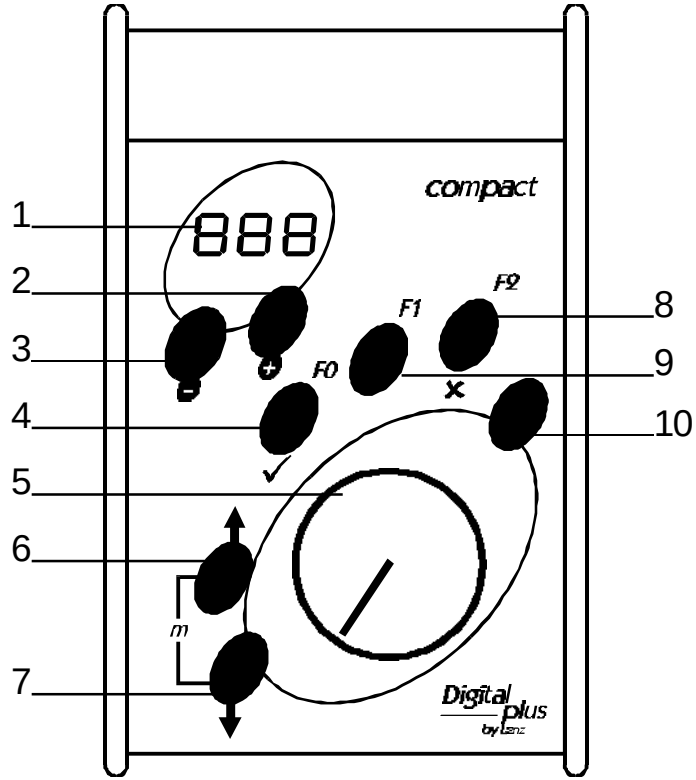
- a control panel which you use to control your locomotive,
- a command station which deals with the information for locomotives and points,
- an amplifier which supplies your model railway with power (the maximum current is 2.5A),
- a XpressNet interface for the connection of operating devices or the connection of ***compact*** to already existing *Digital plus by Lenz®* systems.

With ***compact*** you can

- control 99 digital locomotives individually: you determine speed, direction and function of each individual locomotive
- control speed and direction of 1 conventional locomotive (a locomotive without a digital decoder)
- read out and change the address (number) and other features of digital locomotives, such as starting and braking delay and many others, on a separate programming track
- switch 100 points (with the help of switch decoders)

You can use ***compact*** as an independent digital system or else as an additional input device for an existing *Digital plus by Lenz®* system. Operation remains the same. The first sections of this operating manual describe the use as independent digital system.
If you want to use your ***compact*** as an additional device for an existing system, please read the section "Connecting ***compact*** to an existing *Digital plus by Lenz®* system" (⇨P. 23) first and then the section "Controlling locomotives" (⇨P. 8).

4 Overview of the operational controls



1 Display
5 Rotary control-knob for speed

	Keys for:			
	Controlling the locomotive	**Switching points**		**Menu**
2	Scroll upwards in display			
3	Scroll downwards in display			
4	Switch function 0	one direction		confirm
6	Direction of travel "forward"		⎫ together:	
7	Direction of travel "backwards"		⎭ menu	
8	Switch function 2			abort
9	Switch function 1	the other direction		
10	Nothalt (Emergency stop)			

5 First steps

In this section you will learn about:

- How to connect your ***compact*** to your model railway and your transformer
- How to start your first test run

In the later sections below, the whole range of functions of the ***compact*** will be explained in detail.

5.1 Connection and initial operation

In addition to ***compact*** you require the following components in order to be able to enjoy the pleasure of operating a digital model railway:

- One or several locomotives equipped with *Digital plus by Lenz®* or, as the case may be, a conventional locomotive (a locomotive without decoder),
- A transformer 15V, 45VA, the best one to use is TR100 (art. no. 26000),
- The tracks of your model railway

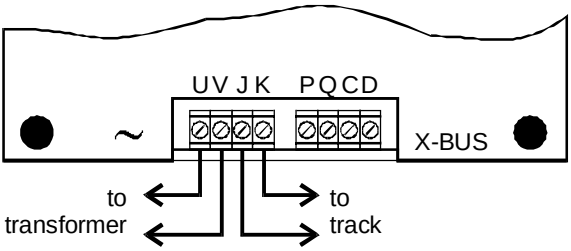
All connections for ***compact*** can be found on the rear or on the underside of the device. They are designed as screw terminals or plug-type connectors.

5.1.1 Connection to the tracks of your model railway

Connect the tracks of your model railway to the screw terminals J and K of ***compact***. Remove all radio interference suppression capacitors which are part of your track system. These capacitors interfere with the data transmission to your digital locomotives.

5.1.2 Connection to the TR100 transformer

Connect the terminals of the TR100 transformer to the screw terminals U and V of ***compact***.

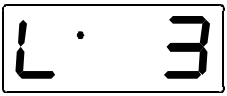


Compact 's connecting terminals

5.1.3 Switching on the device:

Plug the mains-plug of the TR100 transformer into the mains socket.

On the ***compact*** display you will see:



Now your ***compact*** is ready for work.

5.2 Controlling locomotives

Place a locomotive that is equipped with a ***Digital plus by Lenz®*** decoder on the tracks of your model railway layout (we assume here that you use a locomotive with the address "3").

5.2.1 Selecting the locomotive address:

The locomotive address is shown on the display. You can select addresses between 1 and 99.

You select the locomotive address by using the keys + and - (below the display):

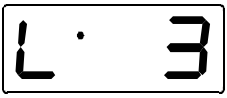
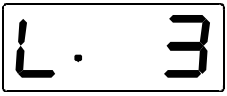
> You increase the number of the address by pressing the "+" key, and you decrease the number of the address by pressing the "-" key. By keeping the respective key pressed, you can scroll up and down through the addresses.

5.2.2 Controlling the speed of the locomotive:

You control the speed of the locomotive with the rotary control-knob. Turn it to the right to increase the speed, turn it to the left to decrease the speed. The stop-limit to the left marks still-stand, the stop-limit to the right marks maximum speed.

5.2.3 Changing the direction of the locomotive:

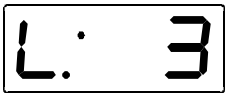
You determine the direction of motion with the keys and :

Key	Display	
		Locomotive moves forward (e.g. for steam locomotives "the smoke-stack leads")
		Locomotive moves backwards

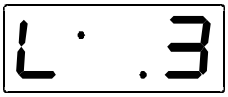
The direction of motion will change only when you release pressure on the key. The display shows the chosen direction.
If you change the direction while the locomotive is still in operation (rotary control-knob not at left-hand limit-stop), the locomotive will come to a halt in accordance with the amount of delay-in-braking which is set in the locomotive decoder. Afterwards it will speed up again, also in accordance with the amount of delay-in-starting set in the locomotive decoder, and move in the opposite direction.

5.2.4 Switching functions:

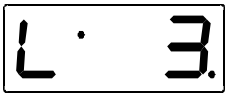
To switch between the functions of your digital locomotives use the keys F0, F1, and F2. The display informs you whether a function is switched on or not:

F0 

F0 switches the direction-dependent lighting in most digital locomotives on or off. If this function is activated, the dot at the bottom left of the display will shine.



If function F1 is activated, the dot right of centre at the bottom of the display will shine.

F2 

If function F2 is activated, the dot on the far right-hand side at the bottom of the display will shine.

To activate the function press the relevant key once, and to deactivate it press it again. All functions can be switched on and off independently from one another.

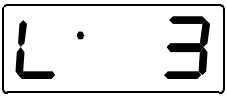
That was a quick introduction to how to control locomotives and how to switch functions on and off using your ***compact***.

6 Nothalt (Emergency stop)

To trigger an emergency stop you press the S key. The voltage on the track is switched off and all locomotives stop immediately. The following message flashes on the display:

S 

"OFF" flashes on the display. The voltage on the track is now switched off.

S 

By pressing the S key again, the voltage is reactivated. The locomotives called upon last will speed up again with the speed that was set before.

If you are within a menu when you press the key, the menu will be terminated.

7 Further functions of *compact*: the menus

In addition to controlling locomotives the ***compact*** device enables you to use further functions:

- Switching points and signals
- Setting the allocation of running-notches
- Reading out and programming the locomotive address and other features
- Executing system settings

These additional functions are available via the ***compact*** menu.

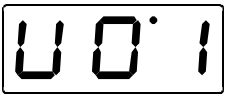
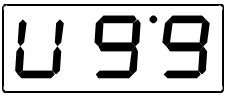
7.1 Reaching the menu:

Press the keys and ***simultaneously***. The display changes over to the menu. The menu displayed is always the one which was chosen last. When you switch on for the first time, the first menu displayed is for the setting of the running-notches.

You can scroll up and down the menu with the +/- keys, to enter the displayed menu use the key (F0) (one level deeper), and with the key (F2) you can go one level up.

8 Switching points and signals

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last. If it is not the desired menu, scroll up and down with the keys "+" and "-".

+ / -		Menu, Switching points.
ü* *(F0)		Scroll up and down until the desired address is displayed.
		The possible range is 0 to 99. Set the desired address and confirm with ***ü* *(F0)***. Afterwards you can immediately switch the point:
F0		Switches a point to one direction
F1		Switches the point to the opposite direction
û* *(F2)		To leave the menu when you are finished use the key (F2).

While you are in the menu "Switching points", you can use the rotary control-knob to control the locomotive whose number (address) was shown in the display immediately beforehand.

For digital control of points, switch decoders are used

In the ***Digital plus by Lenz®*** programme, the switch decoder LS110, for example, is suitable for use with ***compact***. It is possible to connect 4 points (signals, decouplers) to each of these switch decoders. The switch decoder receives its information from the terminals J and K of ***compact***. For detailed information on the connection of switch decoders please refer to the operating instructions for the switch decoder.

9 Allocation of running-notches

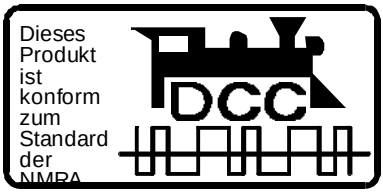
The range between standstill and the maximum speed of a locomotive is divided into running-notches. The more precise this division the more notches exist. We call this division "Running-notch mode". ***Compact*** supports 3 different running-notch modes: 14, 28 and 128 running-notches.

When you switch on for the first time, the 28 running-notch mode is set for all addresses in ***compact***. The setting of the running-notches is related to the locomotive address and stored for as long as ***compact*** is in operation.

> You must ensure that the running notch mode setting of the ***compact***. corresponds to the locomotive decoder setting. The following correlation is valid for Digital plus decoders:

Type of Digital plus locomotive decoder	**Supported running-notch mode**
NMRA compatible decoder XF series	14/27, 28, 128
NMRA compatible decoders	14/27, 28
All others	14/27

We recommend putting the locomotive decoder to 28 speed steps, if possible. If in doubt, please refer to the operating instructions of the relevant decoder. NMRA compatible Digital plus decoders can be recognised from the presence of the following symbols on the front page of the operating manuals:

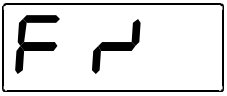


9.1 Changing the allocation of the running-notches

With the keys "+" and "-" select the locomotive address whose running- notch mode you wish to look at / change.

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

You can scroll up and down until you reach the desired menu by using the +/- keys. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2)



When you see the notches-symbol on the display, confirm your selection with .

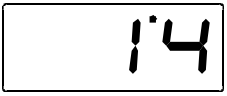
F0

Now the running-notch mode set for the locomotive address is displayed.

+ / -

By pressing the keys "+" and "-" you can scroll through the possible settings.

+ / -



ü
(F0)

To confirm the desired setting use the key (F0).

û
(F2)

To exit the menu when finished use the key (F2).

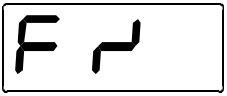
If the running-notch of the locomotive is not 0 (rotary control-knob is not at the left-hand limit-stop), you can display the set running- notch mode, but you cannot alter it.

9.2 Displaying the allocation of the running-notches

To select the locomotive address whose running-notch mode you want to look at and/or change, use the "+" and "-" keys.

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

Use the +/-keys, to scroll up and down until you reach the desired menu. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2).



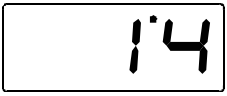
When you see the notches-symbol on the display, confirm your selection with .

F0 

Now the running-notch mode set for the locomotive address is displayed.

+ / - 

By pressing the keys "+" and "-" you can Scroll through the possible settings.

+ / - 

û To exit the menu without changing the running-notch mode,
(F2) use the key (F2)

10 Changing the locomotive address and other decoder features

10.1 General information on programming

Each locomotive with a digital decoder is addressed with its own individual number, the address. This address can be changed. We call this procedure *programming*.
In addition to the *feature* "address", you can also, among others, alter the following other characteristics:

- Starting voltage
- Starting delay
- Braking delay
- General settings

These features can be read out of the decoder and can be changed. The following features cannot be changed and can only be read out:

- Version number
- Manufacturer's identification

For detailed information please refer to the operating instructions for the decoders or the "Information on Digital plus locomotive decoders". Each feature has its own storage location inside the decoder, a so-called "register", in which a figure is stored. The content is kept unchanged until the next alteration takes place. Each register has its own individual number.

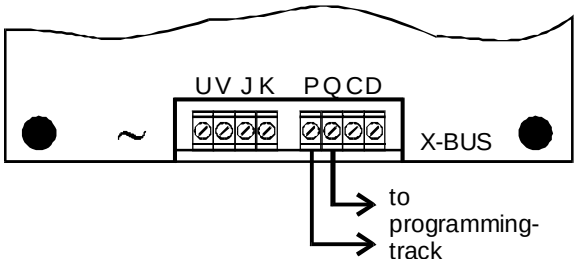
Register	Description	corresponding CV
R 1	Address	CV 1
R 2	Starting voltage	CV 2
R 3	Starting delay	CV 3

R 4	Braking delay	CV 4
R 5	General settings	CV 29
R 6	Not occupied	
R 7	Version number	CV 7
R 8	Manufacturer's identification	CV 8

10.2 The programming track

In order to change the features of a locomotive you need a separate track section, the programming track. It is only here on this track section, which is separated from the rest of your model railway system, that you can program with ***compact***.

The programming track is connected to the terminals P and Q of ***compact***



10.3 Programming the locomotive address

Place the locomotive whose decoder features you want to alter, on this programming track.

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

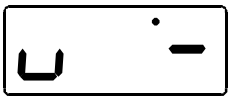
Use the +/-keys, to scroll up and down until you reach the desired menu. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2).

1 **+ / -**  Display of the menu "Setting and reading out of decoder features".

2 ***ü (F0)***  As in our example, R 1, the address of the locomotive, is displayed first. Confirm your selection with F0.

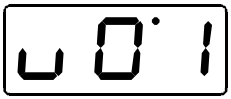
+ / - If register 1 is not displayed, scroll with **+ / -** until you reach the display of Register 1.

3 ***ü*** ***(F0)***



If you want to read out the register now, continue with step 4. If you wish to alter the register (write), proceed to Step 5.

4 ***ü*** ***(F0)***

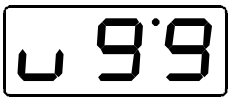


F0 starts the reading of the register which was previously displayed. If the reading procedure is completed successfully, the value which has been read out is displayed. If an error occurs during the reading procedure, you will receive an error message (see below).

5 **+ / -**

If you wish to write a certain value into the register which was previously displayed, use **+ / -** to choose the value which you wish to enter. Bear in mind the permitted range of values (For more detailed information please refer to the operating manual of the locomotive decoder).

6 ***ü*** ***(F0)***

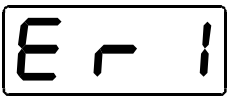


To enter the value (programming) use the ***ü*** key ***(F0)***. If the programming procedure is completed successfully, the entered value will be displayed at the end of the procedure. If an error occurs during the programming procedure, you will receive an error message (see below).

7 ***û*** ***(F2)***

To get back again to the display of the register, use the key (F2). Now you can select a different register (using **+ / -**) or you can return to the menu selection by pressing the key (F2) again.

The following error messages are displayed if an error occurs during the programming or reading out of a feature:



A short-circuit on the programming track has occurred and has been detected by the device. Check the track connection and the installation of the locomotive decoder.
Do not attempt to use the locomotive on the running track until you clear the short circuit

No value was found during the reading out of the register or no feedback took place during the writing. Check whether the locomotive is placed properly on the programming track and/or whether the decoder has been installed correctly in the locomotive.

10.4 Programming of other registers

Place the locomotive whose decoder features you want to alter on the programming track.

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

Use the +/-keys to scroll up and down until you reach the desired menu. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2).

1 **+ / -**

Display of the menu "Setting and reading out of decoder features".

2 ***ü (F0)***

As in our example, register 1 (address of locomotive) is displayed first. Confirm your selection with F0.

+ / -

Use **+ / -** to scroll up or down until you reach the display of the register which you wish to look at or alter.

Proceed as described under Step 3 "Programming the locomotive address".

û ***(F2)***

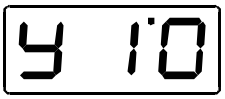
To get back again to the display of the register, use the key (F2). Now you can select a different register (using ***+ / -***) or you can return to the menu selection by pressing the key (F2) again.

11 System settings

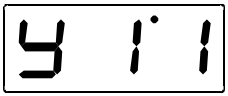
Here you can

- read out the version number and the service number of the device. You need this number in case you have problems with the device and you wish to contact Lenz Elektronik
- set whether your ***compact*** is to work as an independent digital system (command station) or as an additional input device (XpressNet input device).

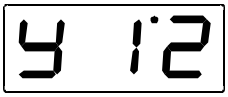
The following system settings exist:

1 

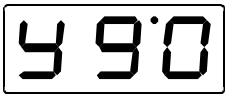
Display / change XpressNet address (appears only with "Operation as XpressNet (XBUS) input device").

2 

Display version number.

3 

Display service number.

4 

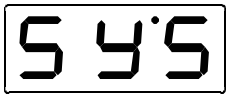
Setting "Operation as independent digital system" or "Operation as XpressNet (XBUS) input device".

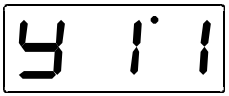
The following sections will inform you how the individual system settings are displayed or altered.

11.1 Displaying the version number

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

Use the +/-keys to scroll up and down until you reach the desired menu. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2).

+ / - 

ü (F0) 

The first system-setting is offered. Use the +/- keys to scroll up and down until you reach the desired system-setting "y11: version number". Confirm your selection with (F0).

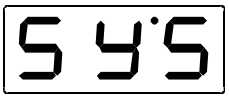
ü (F0) 

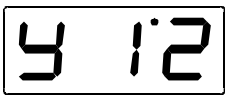
The version number of the device is displayed (here version 3.0). To exit the display use the key (F2).

11.2 Displaying the service number

Press the keys and *simultaneously*. The display changes over to the menu. The menu displayed is always the one which was chosen last.

Use the +/-keys to scroll up and down until you reach the desired menu. To enter the displayed menu use the key (F0) (one level deeper). To go up a level use the key (F2).

+ / - 

+ / - 

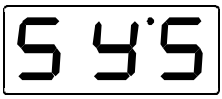
Scroll with + / - until the desired system setting "y12: service number" is displayed and confirm your selection with (F0).

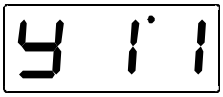
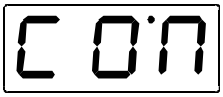
ü (F0) The service number of the device is displayed. To exit the display use the key (F2).

11.3 Setting *compact* on " Operation as XpressNet (XBUS) input device"

Connect your ***compact*** to the power supply (transformer) and plug the connector into the socket.

Press the keys and *simultaneously.* The display changes over to the menu. The menu displayed is always the one which was chosen last. Scroll with the keys +/- until you reach the menu SYS

+ / - 

ü (F0)		The system setting which was chosen last is offered.
+ / -		Scroll with + / - until the system setting 90 is displayed.
ü (F0)		On delivery, the setting " Operation as independent digital system" is displayed.
-		Use + / - to alter the setting to "Operation as XpressNet (XBUS) input device".
ü (F0)		Confirm your setting with ***ü (F0)***.

Switch the power supply of ***compact*** off again. Now, your ***compact*** is set to operation as an XpressNet (XBUS) input device.

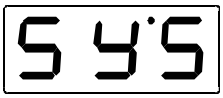
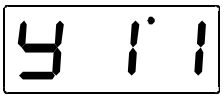
11.4 Setting *compact* to "Operation as independent digital system"

If you wish to alter the setting of your ***compact*** from operation as an XpressNet device back to operation as an independent digital system, then proceed as follows:

Connect your ***compact*** to the power supply (transformer) and plug the connector into the socket.

Press the keys and *simultaneously.* The display changes over to the menu. The menu displayed is always the one which was chosen last.

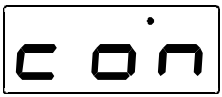
Scroll with the keys +/- until you reach the menu SYS

+ / -		
ü (F0)		The system setting which was chosen last is offered.

+ / -

Scroll with + / - until the system setting 90 is displayed.

ü (F0)

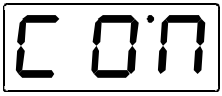


The last setting "Operation as XpressNet (XBUS) input device" is displayed.

-

Use + / - to alter the setting to "Operation as independent digital system".

ü (F0)



Confirm your setting with ***ü (F0)***.

Switch the power supply of ***compact*** off again. Now, your ***compact*** is set to operation as an independent digital system.

11.5 Setting the XpressNet address

> While setting the XpressNet address, please bear in mind to which device you wish to connect your ***compact***. The following addresses / ranges of addresses can be set:
> Connection to command station LZ100: 1 - 31
> Connection SET02, SET03 and ***compact*** : 1, 2, 3, 29 and 31.
> You must not on any account use an address to which a different device has already been set!
>
> You can alter the XpressNet (XBUS) address only if your ***compact*** is set to "Operation as XpressNet input device".

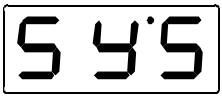
On delivery, ***compact*** is set to the XpressNet address "3". If a different Digital plus device is already set to this address, you will have to alter the address of ***compact*** to a different, free address.

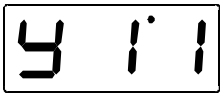
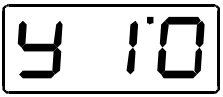
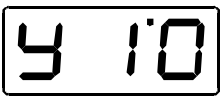
In order to set the XpressNet address proceed as follows:

Press the keys and *simultaneously.* The display changes over to the menu. The menu displayed is always the one which was chosen last.

Scroll with the keys +/- until you reach the menu SYS

+ / -



ü (F0)		The system setting which was chosen last is offered.
+ / -		Scroll with + / - until the system setting 10 (displaying and altering the XpressNet address) is displayed.
ü (F0)		The set XpressNet (XBUS) address is displayed.
+ / -		Use the +/- keys to alter the address. In this example the address 5 has been chosen.
ü (F0)		Confirm the setting with F0. Exit the menu afterwards by using F2.

12 Combined operation with a second *compact*

It is possible to connect further control devices to your ***compact***. Thus several people can operate the model railway together at the same time.

The easiest way to achieve this is to connect another ***compact***. To do this, proceed as follows:

1. For the time being, connect the second ***compact*** only to the transformer.
2. Enter the menu "System settings" and alter the device setting to "Operation as XpressNet (XBUS) input device". (⇨P. 19)
3. Separate the connection of the second ***compact*** from the transformer. For operation as an XpressNet input device a power supply is unnecessary.
4. Connect the second ***compact*** to the first one by means of a LY160 cable (you will find the XpressNet connection at the rear of the ***compact*** devices. It is marked with the letters XBUS).
5. No tracks are to be connected to the terminals J and K of the second ***compact*** !
6. Put the first device into operation.

13 Connecting other XpressNet devices to *compact*

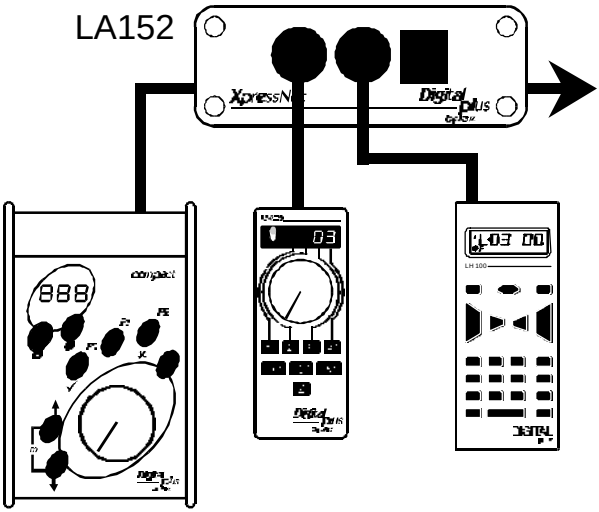
A maximum of 5 further XpressNet (XBUS) devices can be connected to a ***compact***. You can use further ***compact*** devices as well as any other device from the ***Digital plus by Lenz®*** range.

You could, for example, use a manual control LH200 as a mobile device in addition to the stationary ***compact***.

These additional devices can be disconnected and reconnected during operation.

An LA152 terminal-board is required for the connection of any further XpressNet devices. Connect this terminal-board to the ***compact*** XpressNet connection. (You will find the XpressNet connection on the rear of the ***compact*** devices. It is marked with the letters XBUS).

You can now connect further devices to the sockets of the LA152 terminal-board. If you wish, you can install further terminal-boards at various locations on your railway layout.



14 Connecting *compact* to an existing *Digital plus by Lenz®* system

compact can be connected as an additional controller to already existing Digital plus systems.

On delivery, ***compact*** is set to operation as an independent digital system. **Before** you connect it to a Digital plus system as an additional controller, you must alter the system settings to this operating mode.

To do this, proceed as follows:

1. For the time being, connect the second ***compact*** only to the transformer.
2. Enter the menu "System settings" and alter the device setting to "Operation as XpressNet (XBUS) input device". (⇨P. 19)
3. Separate the connection of the second ***compact*** from the transformer. For the operation as an XpressNet input device, a power supply is unnecessary.
4. By means of a no. 80006 cable, connect the ***compact*** to the LA150 or LA152 terminal-board of your ***Digital plus by Lenz®*** system.
5. If necessary, alter the default XpressNet address.

No tracks are connected to the terminals J and K if ***compact*** is connected as an XpressNet device!

14.1 Using *compact* as separate programming device

If you operate your ***compact*** as an XpressNet device with a ***Digital plus by Lenz®*** system, you can still use the connection for the programming track. In this case, however, ***compact*** has to be supplied by its own individual transformer.

1. Prepare your ***compact*** for the operation as an XpressNet (XBUS) input device (⇨P. 23).
2. Connect a programming track to the terminals P and Q of ***compact***.
3. Put ***compact*** into operation in a ***Digital plus by Lenz®*** system.
4. Connect ***compact*** with the terminals U and V to a separate transformer.

You can now use the connected programming track. The operation is the same as in the section "Changing the locomotive address and other decoder features" (⇨P. 14).

15 More power for your model railway

Railways running on the system consume power, as do illuminated coaches.

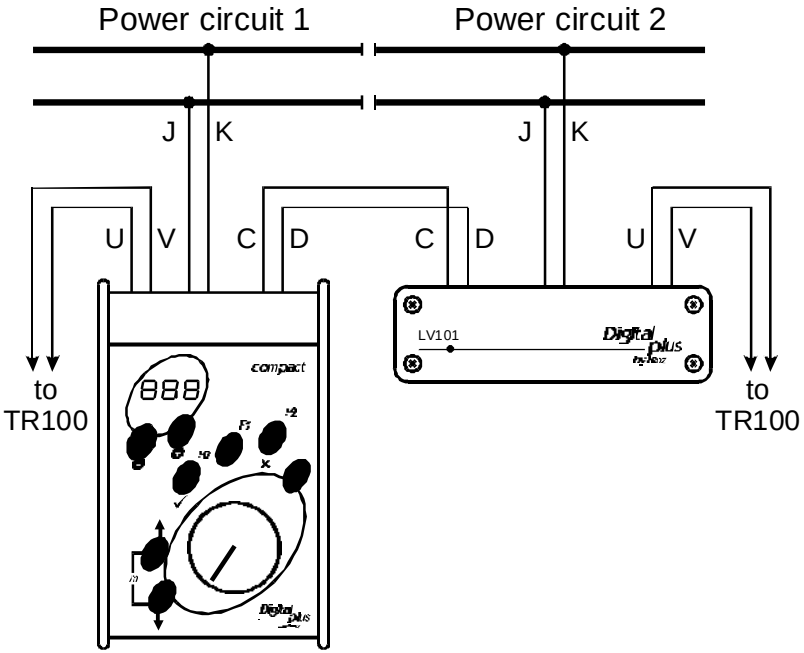
Your ***compact*** is able to supply a maximum of 2.5 A to the model railway. If the trains and illuminated coaches which you have in operation consume more than 2.5 A, you will have to divide your system among various power circuits and supply each circuit with an LV101 amplifier.

Each amplifier requires its own separate transformer. We recommend the use of a TR100.

15.1 Connecting the LV101 to *compact*

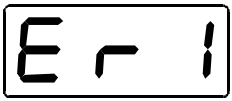
Divide your model railway between two power circuits. You need a LV101 and a TR100v transformer for the second power circuit.

1. Connect the terminals C and D of ***compact*** to the terminals C and D of the amplifier LV101.
2. Connect the tracks of the first power circuit to the terminals J and K of ***compact***.
3. Connect the tracks of the second power circuit to the terminals J and K of the LV101.
4. Connect ***compact*** and the LV101 to a TR100 transformer each.


Power circuit 1
Power circuit 2
J
K
J
K
U
V
C
D
C
D
U
V
LV101
to
TR100
to
TR100
compact

16 Technical appendix

16.1 Messages on the display



compact always shows a message if you have done something which is not permissible at the time or if a certain function cannot be executed.

The following is a list of possible messages:

Er 1 An overload (short-circuit) was detected during the programming or reading out procedure of a decoder. It is possible that the decoder is not properly connected or that it is defective.

Er 2 No information was found during the programming or reading out of a decoder. This means that it is possible that the decoder was not connected correctly to the programming output of the command station LZ100 (e.g. the digital locomotive is not placed properly on the programming track).

Er 8 The command sent from ***compact*** to the command station is not part of the station's range of commands. Normally this happens if the software version of the command station does not support this command. Please read out the software version of your command station and contact your specialist dealer or Lenz GmbH.

Er 9 No communication with the command station via the XpressNet exists. The F0 key will lead you directly to the system setting.

1. Check whether ***compact*** is configured for the operation as an XpressNet input device (⇨P. 19).
2. Check whether the set XpressNet address is free and/or whether it is really supported by the command station (⇨P. 23)

16.2 Glossary

The most important terms in the ***Digital plus by Lenz***® system:

Address	Number of a locomotive, comparable to a telephone number
Starting - and braking-delay	Features of a locomotive decoder. The starting-delay determines how long it takes a locomotive to reach its allocated higher speed setting. The braking-delay determines how long it takes a locomotive to reach its allocated lower speed setting.
DCC	Abbreviation for "**D**igital **C**ommand **C**ontrol". This term has meanwhile become the name of the digital command control that was developed by Lenz in keeping with NMRA standards.
Features of the locomotive decoders	Address, starting- and braking-delay , for example, are features which can be altered in the locomotive decoder. You will find detailed information on the features of Digital plus locomotive decoders in "Information on Digital plus Locomotive decoders", available from your specialist dealer or direct from Lenz Elektronik GmbH (send a stamped addressed C5 envelope).
Running-notch	The range between the minimum and maximum speed is divided into individual sections. These sections are called running-notches.
Running-notch mode	Determines whether a locomotive is controlled with 14, 28 or 128 running-notches.
Track format	The way in which the information is stored in the voltage for the tracks.
Locomotive address	See Address
NMRA	**N**orth **A**merican **R**ailroad **A**ssociation, (American model railway organisation)
NMRA normalisation, standardisation	A standard developed by the NMRA on the basis of the Digital plus control, which determines the transfer of information to locomotive decoders and points decoders. This standard defines the preconditions which ensure the inter-changeability of decoder components produced by different producers in accordance with the standard.
XpressNet	Fast network via which the devices of the ***Digital plus by Lenz***® system exchange data.
XBUS-input devices	Devices by which the Digital plus model railway is controlled: manual controls, signal boxes, interface etc.

17 Help in cases of malfunction

Malfunction	**Possible cause**	**Correction**
Locomotive does not work.	Wrong locomotive address on display.	Scroll through the deck until you find the correct address or enter the correct address into the deck.
Running-notch mode cannot be altered.	Speed of the locomotive is not 0.	**Before** setting the running-notch mode turn the rotary control-knob as far to the left as possible.
Locomotive does not react when running-notch mode 128 has been selected.	Locomotive decoder can not master this mode.	Set ***compact*** to running-notch mode 14 or 28 depending on locomotive decoder notch setting
Locomotive lighting (F0) switches on and off when the rotary control-knob is turned.	Locomotive decoder is set at running-notch mode 14. The relevant address is set in the ***compact*** to running-notch mode 28.	Alter the running-notch mode of the ***compact*** to 14 notches for relevant address
Locomotive lighting (F0) cannot be switched.	Locomotive decoder is set at running-notch mode 28. The relevant address is set in the ***compact*** to running-notch mode 14.	Alter the running-notch mode of the ***compact*** to 28 notches for relevant address
	Locomotive decoder is set at running-notch mode 14. The relevant address is set in the ***compact*** to running-notch mode 128.	Alter the running-notch mode of the ***compact*** to 14 notches for relevant address
Locomotive address on the display flashes.	Selected address is already being used on a different manual control.	Select a different locomotive or take over the locomotive by turning the rotary knob.
"OFF" flashes on the display.	The Stop-key has been pressed.	Terminate the NOTHALT by pressing the Stop-key again.
	Compact has triggered the NOTAUS (Emergency stop) due to a short-circuit or overload.	Deal with the short circuit. If there is overloading, divide the layout into several coverage areas. Please refer to the section "More power for your model railway" for more detailed information.

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List of locomotive addresses

In this list you can enter which locomotive decoder you have fitted into which locomotive and to which address this locomotive is programmed.

Series	**Designation**	**Locomotive decoder**	**Address**

Series	Designation	Locomotive decoder	Address

Not suitable for children under three because of the danger of their swallowing the small constituent pieces. Improper use can result in injury by functionally necessary sharp protuberances and edges. For use only in dry areas. We reserve the right to make changes in line with technical progress, product maintenance or changes in production methods. We accept no responsibility for errors which may occur for similar reasons. We accept no responsibility for direct or indirect damage resulting from improper use, non- observance of instructions, use of transformers or other electrical equipment which is not authorised for use with model railways, or use of transformers or other electrical equipment which has been altered or adapted or which is faulty. Nor can we accept responsibility when damage results from unsupervised adjustments to equipment or from acts of violence or from overheating or from the effects of moisture etc.. Furthermore, in all such cases guarantees become invalid.

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CE Keep this operation manual for future reference!