Model plus is the name for a new series of model railroad products from Lenz Electronics

A unique aspect of this model series is the possibility of using special features while operating on conventional DC layouts operation characteristics which to date have only been available to digital operations..

This was made possible by integrating the development of mechanics and electronics. We did not take a finished model and then try to "implant" an electronic module. Instead, we engineered the model and the electronics together from the ground up. In the process the mechanics and electronics are adapted optimally one to the other. The result is a model, which offers functionality so far a not attainable in either D.C. or digital operations at a favorable price.

The model of the V 36.4 is suitable for the operation on both conventional two-rail D.C. layouts and for the NMRA DCC digitally controlled layouts. In both operating modes you can use

- the back emf load-sensitive regulation
- the front and real remote controlled couplers
- the directional constant lighting

Prototype for the Model

The model represents a reproduction of a series of 18 locomotives, which MaK Kiel manufactured. This series differ from the previous by an extended axle base and a completely welded construction.

The model is delivered with a ladder, whose rungs are covered by a sheet metal cover. The cover was a safety precaution. Its purpose was to prevent personnel from climbing on the hood while being used under overhead catenary wire. A separate ladder is provided for use when not under catenary.

Our model locomotive, the **V36.413** was built in the period between 1957 and 1959 in Friedberg (Hessen).

Operating Range

The V 36,4 can be used on the following systems:

Digitally controlled systems that conform to the NMRA DCC specifications or any model railway controls with conventional D.C. direct current with a maximum track Voltage of 14V. The best handling D.C. characteristics are obtained using a classical transformer (Fleischmann, Trix). Such power packs have a amplitude-regulated solid shaft rectification.

The use of pulse power power packs is admissible up to a maximum pulse width frequency of 100Hz. The ROCO ASC1000 power pack is an example of a power pack that is not suitable; the ASC2000 should be used instead.

To be able to operate the remote controlled coupler with your DC power pack you need a separate AC output that has a voltage between 14 and 16 volts. This AC voltage must originate from a coil that is separate from that used for the DC output. If this is not possible with your DC power pack then you can use a separate AC transformer for this purpose.

If you are uncertain of the capabilities of your power pack please consult with its manufacturer for more information.

The remote controlled coupler

The remote controlled coupler works in a similar fashion with both DC and DCC control. The remote operation is designed for the use of the NEM loop and pin couplers. Other coupler styles can be exchanged for the supplied coupler by replacing the coupler with any other coupler that has the dove tail assembly. Detains for this exchange are included later in this manual. After this change the remote control operation will no longer be possible.

Conventional DC operation (analog operation)

The **V36.4** model locomotive can be operated on two-rail DC layouts and all the advanced features are still available! The locomotive motor is designed to not start until approx. **5V** is on the rails. The lighting and the coupler operation is available at a lower voltage. It is therefore possible to leave the locomotive stopped on the layout with the headlights on. When you increase the DC track voltage above 5 volts, the locomotive will start moving. The back emf load-sensitive regulation kicks in to allow very smooth slow speed operation without jerking.

Operating the coupler on conventional D.C. control systems:

To use the remote control coupler on a conventional DC control system you must install a simple circuit as shown in figure 1. A simple momentary switch is used to switch the track voltage from the normal DC track voltage to alternating AC voltage. Electronics in the locomotive react to the presence of the AC and activates the coupler. The switch need only be activated long enough to activate the coupler.

The uncoupling process works as follows. The rotary speed knob on the control unit is moved until the lamps light up. Select the direction so that the lights away from the car are lit. The locomotive will not move yet. Activate the coupler switch for the duration of the coupler operation. During this time AC voltage is fed to the track. The coupler arm lowers itself, the locomotive will also move slowly approximately 5mm away from the car being uncoupled. If you activate the coupler switch while the locomotive is moving the coupler is not activated and the locomotive continues moving at the same speed.

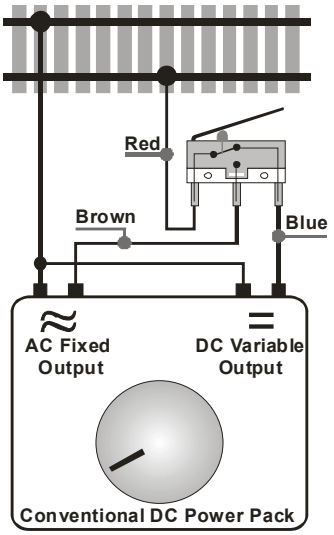


Figure 1

Digital Operation

The back emf load-sensitive regulation is also active in digital operation. Four further functions can be used:

- F0: headlight control - switches the direction-controlled lighting on and of.
- F1 uncoupling - F1 must be turned off before F1 will activate a second uncoupling operation.
- F2 coupling - F2 must be turned off before F2 will activate a second coupling operation.
- F3 switching lights - when you turn on the lights using F0, both the front and rear lights go on.

Uncoupling Operation:

The locomotive is driven up to the place, where it is to be uncoupled. Now the locomotive is brought to a stop and the direction set so that when moved it will move away from the car being uncoupled. With **F1** the uncoupling process is activated: The hook lowers itself, and the locomotive creeps approx. **5mm** away from the car being uncoupled and then the hook is raised.

Coupling Operation:

The locomotive is driven to a point directly in front of the car, which is to be coupled. With **F2** the coupling process is activated: The **coupler hook lowers**, and the locomotive **creeps** approx. **5mm** toward cars. When the coupling process is complete the lowered hook is lifted under the coupler loop of the car to engage the coupler. In this way a car can be coupled, without any movement of the car.

Important Consideration:

Do not forget to switch off the coupling functions (F1/F2) after use so that they will be available for use the next time you need them. The coupling/uncoupling function must be off for a short period before they can be reactivated. If you are using an LZ100 or LZV100 this can best be done by making these functions momentary functions so that they automatically turn off after use.

CVs supported by the V36.4

The following NMRA DCC Configuration Variables (CVs) are supported by the V36.4:

CV	Purpose		Range	Default
1	**Basic Address**		1 - 99	36
2	**Starting Voltage**		0 - 31	0
3	**Acceleration Rate**		1 - 255	4
4	**Deceleration Rate**		1 - 255	4
7	**Version Number**		-	1
8	**Lenz Manufacturer ID**		-	99
17	**Extended Address High Byte**		192 - 255	0
18	**Extended Address Low Byte** The two byte address if used is contained in CV17+18		0 - 255	0
19	**Advanced Consist Address**		1 - 99	0
29	**Decoder Configuration**		0-63	6
	bit 0 (1)	**Locomotive direction:** Locomotive's relative direction: This bit sets the direction the locomotive will move when told to move forward in digital mode. 0 = locomotive's direction is normal 1 = locomotive's direction is reversed	0,1	0 [1]
	bit 1 (2)	**Headlight mode:** 0 = Operation with 14 or 27 speed step systems. This setting is selected when the locomotive decoder is used with any Digital system that does not support 28 speed step mode. If the headlights turn on and off as the speed is increased, the command station is configured for 28 speed step mode, and the decoder is in 14 speed step mode. 1 = Operation with 28, 55 or 128 speed steps. If you use this setting, the Command Station must also be configured to use 28 speed step mode or 128 speed step mode for the decoder's address, otherwise the headlights can not be controlled.	0,1	1 [2]
	bit 2 (3)	**Usage on conventional DC layouts:** 0 = locomotive operates in digital mode only 1 = locomotive can operate on either conventional DC and on DCC	0,1	1 [4]
	bit 5 (6)	**Extended Addressing** 0= Normal addressing 1= Four digit extended addressing	0-1	0 [32]
50	**Analog Break Control**		0-4	0
	bit 2 (3)	Used to achieve prototypical braking at red signal indications if conventional DC control CV29.2 is disabled. (CV 29 bit 2 = 0) 0 = locomotive proceeds with track voltage dependent speed inside the conventional DC section. 1 = locomotive brakes in the conventional DC section with pre set brake momentum.	0,1	0 [4]
54	**Function assignment for Breaking lighting mode**		0-255	4
	bit 0 (1)	1 = Break lighting is controlled By F1	0,1	1 [1]
	bit 1 (2)	1 = Break lighting is controlled By F2	0,1	0 [2]
	bit 2 (3)	1 = Break lighting is controlled By F3 (default)	0,1	0 [4]
	bit 3 (4)	1 = Break lighting is controlled By F4	0,1	0 [8]
	bit 4 (5)	1 = Break lighting is controlled By F5	0,1	0 [16]
	bit 5 (6)	1 = Break lighting is controlled By F6	0,1	0 [32]
	bit 6 (7)	1 = Break lighting is controlled By F7	0,1	0 [64]
	bit 7 (8)	1 = Break lighting is controlled By F8	0,1	0 [128]

Numbers in () are the bit numbers if using an LH100 or LH90 Numbers in [] are the decimal equivalent for the bit. If multiple bits are set these numbers can be added together.

Problems when coupling/uncoupling?

For problems with coupling or uncoupling you should first check to see whether the coupler on the car has the correct height prescribed by NEM. A coupler height gauge is included with the model. The use of the coupler height gauge is very simple.

Put an NEM coupler handle into the accommodation of the supplied coupler gauge

Place the coupler gauge on the track so that its coupler is exactly opposite the locomotive coupler. Adjust the coupler handle height so that it slides over the impact plate of the locomotive.

Next place the car, whose coupler you want to adjust, on the track that the car's coupler is on the same height as the coupler in the coupler gauge. Adjust the coupler of the car so that it matches after the coupler in the coupler gauge which was previously adjusted to the locomotive

Maintenance

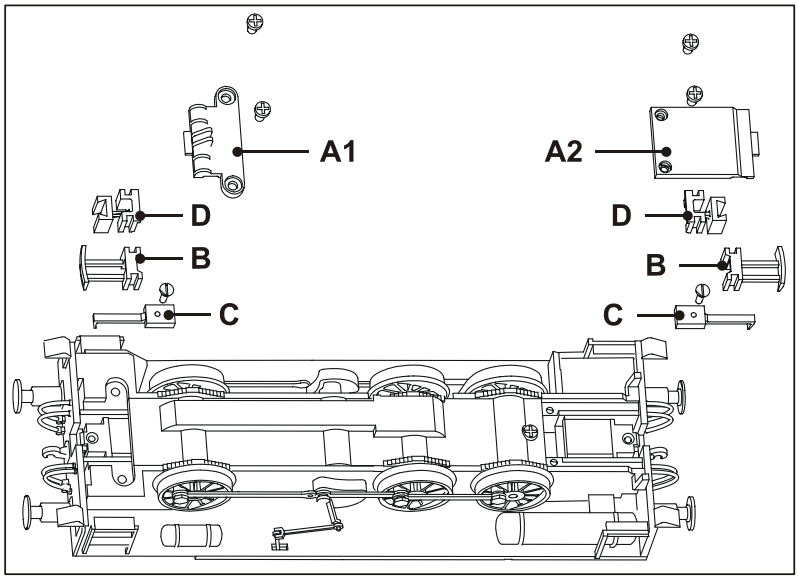
The housing of the locomotive does not have to be removed for maintenance. Light replacement is not necessary; the model is equipped with maintenance-free light emitting diodes.

The gear assembly of the locomotive is provided with a permanent lubrication and requires no maintenance. Axle bearings on the locomotive must be oiled occasionally. Use only model railroad suitable oil, available in most model railroad hobby shops.

Replacing the Coupler

The automatic uncoupling approach can work with a variety of coupler styles such as ROCO 40287, 40353 or Fleischmann 6570. Any coupler with the standard dove tail fitting can be used. Following are the steps to be taken to replace the factory installed coupler.

1. remove the coupler cover A1 (in the front, viz. fig. 2) or A2 (in the rear).
2. remove the impact plate B and carefully unscrew the coupler hook C. Keep these parts save in a suitable workstation, such as in the recess in the packing of the V 36.
3. Insert the coupler attachment D. You can now add a suitable coupler of your choice.
4. Re-fasten the coupler cover A1 or A2



Hüttenbergstraße 29
35398 Gießen, Germany
Hotline: 06403 900 133
Fax: 06403 900155
info@digital-plus.de

Lenz ELEKTRONIK GMBH
http://www.lenz.com

Lenz Agency of North America
PO Box 143
Chelmsford, MA 01824
ph: 978 250 1494
fax: 978 455 LENZ
support@lenz.com