SPEED TABLE CV67-CV94 FOR 28 SPEED STEPS

When CV29's bit 4 is set to “1” it will use the speed table formed by CV67-CV94 to control speed (motor voltage). It allows you to setup each speed for all 28 speed steps. First, program CV29 to 18 for short addresses (1-127) or program CV29 to 50 for long addresses (128-9999) to enable speed table control. Then select throttle to 28 speed steps and run your loco at speed step 1. Use program CV on the main to change CV67's value (1-255) to adjust step 1’s speed. The kick voltage, CV65 is only applied when the speed step changes from 0 to 1. You should switch between 0 to 1 many times to check step 1’s speed. When done with CV67, select speed step 2 and program CV68, CV69’s value will be greater then CV67’s. When done with CV67, use read back CV to make sure their values are in increasing order.

Note: When using MRC Prodigy DCC to program addresses it will automatically disable the speed table (set CV29's bit 4 to “0”). Programming CV125 to 1 will also disable the speed table and re-program CV67-CV94 to a default linear speed setting.

TROUBLESHOOTING

Loco running without sound chuff click F12. Whenever the decoder doesn’t work please use the program track to program CV #125 with value 1 to restore the decoder to factory settings. This should bring the decoder to life with address #3. This decoder should perform well with all DCC systems. The maximum DCC output should be less than 18 V. If the locomotive does not respond to commands, it may have lost its address. Please re-program the address and program CV19 to 0 (disable consist). If it responds slowly, you should check its momentry by reprogramming CV3 and CV4 to zero. If step 1’s speed is too high, you should program start voltage, CV2 to zero. If its top speed is too slow, program top voltage CV3 to 31. You should also clean the track to improve electrical pickup. Read your DCC system manual to learn how to program and operate the decoder. For more information about registers/CVs and their functions, please refer to the NMRA DCC Standard & Recommended Practices. RP-9.2.2. This is available directly from the NMRA or their website at www.nmra.org.

FCC COMPLIANCE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RETURN PROCEDURE

This decoder carries a 6 month warranty against factory defects. This warranty does not include abuse, misuse, neglect, improper installation, or any modifications made to this decoder, including but not limited to the removal of the NMRA plug if applicable. If it should become necessary to return the decoder for warranty repair/replacement, please include a copy of the original sales receipt. Please include a letter (printed clearly) with your name, address, daytime phone number, and a detailed description of the problem you are experiencing. Please also include a check or a money order for $11.00 to cover the cost of repair or replacement and return shipping and handling. Be certain to return the decoder only.

Any questions regarding Warranty Policy can be directed to our Customer Service Department by calling 732-225-6360 between the hours of 8:30am and 6:00pm EST, or by emailing: rtech@modelrectifier.com

Send the decoder to:

Model Rectifier Corporation
Attn: Parts & Service
80 Newfield Avenue
Edison, NJ 08837-3817 U.S.A

Printed in USA
INSTALLATION

It is quite a challenge to install the decoder in your loco. You should have some basic electrical knowledge. If you do not, please ask the dealer for help in the installation.

Figure 1 shows the electrical circuit of most standard locomotives. The terminals of the motor and lights are directly connected to the wheel pickup. Each type of loco has its own method of electrical pickup and distribution. There is no standard rule for installing decoders. It is always better to consult the loco manufacturer on how to install a decoder in your particular loco. First, figure out your loco's electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 1. Connection of standard locomotive. Note: The ‘X’ marks indicate where to disconnect (isolate).

This decoder is equipped with a wire harness that has an N.M.R.A. 8 pin medium plug on one end that simply plugs into a dcc ready loco, if you locomotive has a 9 pin JST decoder plug, simply unplug the wire harness of the decoder at the end of the board and plug the decoder into the 9 pin receptacle.

If your locomotive is not dcc ready and does not have a decoder plug, use the following directions: The decoder will be inserted between the wheel pickups and the motor. After disconnecting the motor terminals from the pickups, connect the right side pickup wires to the red decoder wire, and connect the left side pickup wires to the black decoder wire. Connect the right motor terminal to the orange decoder wire, then connect the left motor terminal to the grey decoder wire. Always use good soldering techniques, and use shrink wrap to isolate the connections. The white decoder wire is for the front headlight and the yellow decoder wire is for the rear light. The blue decoder wire is the light common. The pink and green decoder wires are for your accessory lights, use the blue decoder wire as the common for these extra lights. Use double-sided sticky tape to place the decoder in a safe place. The decoder can’t touch any metal part or bare wires. The 28 mm speaker should have an enclosure made for a better sound quality.

If you have a 1.5V bulb or LED’s, you should connect a 2k ohm resistor in series to these extra lights. Use double-sided sticky tape to place the decoder in a safe place. The decoder has been programmed to address #3, 28/128 speed steps. To test, place the loco on the test track. Select address #3 and 28 speed steps. Move up the throttle and the loco should move. Push the light button [F0] and headlight should come on. Change the direction of the loco and the loco should change direction. The loco cannot reach full speed, due to the resistor. If all the above occurs, you passed the test. Congratulations! Do not run the loco for an extended period of time on the test track or the resistor will overheat. If your installed decoder does not pass the test, find the problem, correct it and test it again. As long as you test the decoder on the test track there is little chance of damaging the decoder. This is why the test track is so important.

MAKING A TEST TRACK

We strongly recommend building a test track with a 27 ohm resistor to limit current. Only test your installed decoder on the test track. The test track will reduce the chance of damaging your decoder due to an incorrectly installed decoder. Note: The test track is not your program track.

TESTING

The decoder has been programmed to address #3, 28/128 speed steps. To test, place the loco on the test track. Select address #3 and 28 speed steps. Move up the throttle and the loco should move. Push the light button [F0] and headlight should come on. Change the direction of the loco and the loco should change direction. The loco cannot reach full speed, due to the resistor. If all the above occurs, you passed the test. Congratulations! Do not run the loco for an extended period of time on the test track or the resistor will overheat. If your installed decoder does not pass the test, find the problem, correct it and test it again. As long as you test the decoder on the test track, there is little chance of damaging the decoder. This is why the test track is so important.

OPERATION

The decoder has 20 types of chuff sounds (10 single and 10 double). You can use F24 to select them or F6 to turn the chuff off. With our unique double chuff enable, (CV122), you can also have 10 articulated chuff sounds. You can use F19 to select 17 different whistles. You can also use F18 to select 7 different bells. With MRC Prodigy Advance® DCC which has 28 functions, you can easily setup and access all the decoder’s functions. With all other DCC systems you have to use CV programming to setup the decoder.

BACK EMF LOAD CONTROL (PID CONTROLLER)

This decoder is equipped with adjustable back EMF load control feature. It is a closed loop speed control. With back EMF load control the locomotive will maintain its speed regardless of pulling up hill or driving down hill. You may program the back EMF load control intensity, CV124, to a lower value to get less back EMF load control. This will enable the locomotive to slow down during uphill travel (like real locomotive). The PID controller contains three components: proportional gain (CV113); the integral gain (CV114); and derivative gain (fixed). Fine tuning a PID controller is difficult and experimental on part of the end user, so we optimized these settings at the factory, but still give the customer the ability to make final adjustments. We recommend that you do not change these settings. Too much gain may cause the motor to oscillate (become unstable). Too little gain may cause slow response. Additional knowledge of PID feedback control is required before attempting to adjust CV113 and CV114. If CV113 and CV114 are programmed incorrectly, the locomotive will not run smoothly. Program CV125 to “1” will automatically restore the default PID controller settings.