

XL SYSTEMS INC

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N Diesel DCC Decoder for Atlas GP38 Item #0001812

- Six diesel prime movers with randomly associated locomotive sounds
- User selectable 22 different horns and 8 bells
- 28 accessory functions allowing more sound control than ever
- Programmable individual sound volumes
- 1.0 amp capacity with back EMF load control feature
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage
- Programmable acceleration rate
- Programmable deceleration rate
- Programmable top voltage
- Programmable 14, 28, 128 speed steps
- Selectable factory default speed curve
- Supports advanced consisting (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC
- Speaker included

INSTALLATION: Disassemble loco and tape the frame around the motor spring contact as Fig1 indicates. The motor spring contact should not touch the frame. The decoder replaces the original circuit board of the locomotive and should fit in the same location. Assemble one half of the frame first, installing the decoder, motor, driveshafts, bearings, trucks, and frame spacers. Gently place the other frame half on top of the completed half, checking clearances and if there is any binding of the drive mechanism. Correct any trouble spots at this point. Also check to make sure the motor brush tabs are not touching the frame halves and the clear tape is correctly positioned at the motor brush tab points to avoid shorting out the decoder. Now you can install the insulated bolts and nuts to secure both frame halves together. Apply tape on the chassis under the speaker to prevent the speaker from touching the chassis.

OPERATION: The decoder has been factory programmed with address #3. Release service brake (F5) and dynamic brake (F6). You will hear the brake release sound when you turn off F5. Move up the throttle and the loco should start to move. This decoder has start up and shut down feature. You must press any function key to start up the engine before operating the loco. To shut down the engine you must bring the loco to idle and then press F8 3 times. There are many more program features available with this decoder. Please refer to the CV Chart to explore other features of the decoder. You can use F19 to select 22 different horns and use F18 to select 8 different bells. F12 will toggle between max master volume and sound off. F13 will reduce the master volume reduce by 1. F14 will increase the master volume by 1. You can program CV122 to 3 for manual notch for realistic operation. And then use F9 to notch up and use F8 to notch down.

SERVICE BRAKING

To apply service brake set throttle to zero and press F5. The loco will slow down fast and you will hear the brake squeal. You can pump the brake by turning F5 on and off to stop the loco at desired location. The brake rate is proportional to deceleration rate that you program in CV4. If you forget to turn off F5 and move the throttle up. The loco will move. However, when you release the throttle the service brake will apply again. The service brake can only operate when throttle is at 0. If you don't hear the brake sound program CV115 with a value of 2.

DYNAMIC BRAKING

You can use dynamic brake F6 to reduce the speed. When you turn on F6 the prime mover will notch down to 1 and you will hear the dynamic brake sound and the loco will reduce its speed. When you release F6 the loco will speed up to the original speed. If you forget to turn off F6 and move throttle up it will automatically disable the dynamic brake and loco will start to move. To apply the dynamic brake again you have to cycle F6 off and on.

FUNCTION CHARTER

Function	Idle/Moving
F1	Bell on/off
F2	Horn
F3	Air release
F4	Coupling 1
F5	Brake release / brake squeal
F6	Dynamic brake on/off
F7	Air hose firing/uncoupling lever
F8	Click 3 times will shut down when in idle/Manual notch down
F9	Engine cooling fan / Manual notch up
F10	Rail wheel clack (only moving)
F11	Traction air compressor
F12	toggle between maximum master volume and sound off
F13	Master volume reduce by 1 / air release
F14	Master volume increase by 1 / air release
F15	Air compressor
F16	flange squeal
F17	Air release
F18	Change bell type (8 types plus off)
F19	Horn type select (total 22 different horns plus off)
F20	Associated loco sound
F21	Change bell volume and turn on the bell
F22	Change horn volume
F23	Change diesel rumble volume
F24	Safety valve pop
F25	Air release
F26	Flange noise
F27	Sand drop
F28	Air release

CV CHARTER

CV#	Description	Range	Default
CV1	Short address	1-127	3
CV2	Start voltage	0-63	10
CV3	Acceleration	0-63	0
CV4	Deceleration	0-63	0
CV5	Top voltage	0-63	63
CV29	Basic configuration		2
CV19	Advanced consist address	0-127	0
CV21	CV21=0, all accessory functions follow its own address. When CV21=1, all functions will follow the consist address		0
CV49	Master volume control 16=max volume, 0=sound off	0-16	16
CV50	Horn type (22 types plus off, 22=off)	0-22	13
CV51	Horn volume	0-15	15
CV52	Bell type (8 types plus off, 8=off)	0-7	5
CV53	Bell volume	0-15	15
CV54	Bell ring rate	0-50	3
CV55	Diesel rumble volume	0-15	12
CV56	Brake squeal volume	0-15	12
CV57	Dynamic brake volume	0-15	12
CV58	Air release volume	0-15	12
CV59	Air pump volume	0-15	12
CV60	Safety pop valve volume	0-15	12
CV61	Engine cooling fan volume	0-15	12
CV62	Coupling volume	0-15	12
CV64	Rail wheel clack	0-15	12
CV65	Kick start voltage	0-63	63
CV67-94	28 speed steps table while CV29.4=1	1-255	
CV112	Back EMF start speed adjustment	0-7	0
CV113	Back EMF load control proportional gain kp	0-31	20
CV114	Back EMF load control integral gain ki	0-31	10
CV115	Brake sound type: 2=breke sound off	0-2	0
CV120	Light brightness	0-255	255
CV121	Air compressor mode (1=change with engine rpm)	0-1	0
CV122	Diesel notch mode, 0=auto notch 3=manual notch	0-3	0
CV123	Diesel prime mover select	0-1	0
CV124	Back EMF load control intensity (0=off)	0-255	0
CV125	Program to "1" will restore some CV's to factory settings	0

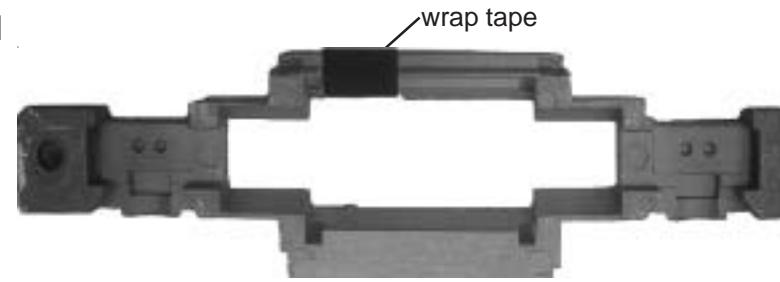
BACK EMF LOAD CONTROL (PID CONTROLLER)

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). Designing (tuning) a PID controller is a kind of "rocket science". So optimized these gains at the factory but still give the customer final adjustments. We recommend that you do not change these settings. Too much gain may cause the motor to oscilate (becomeunstable). Too little gain may cause slow response. Additional knowledge of PID

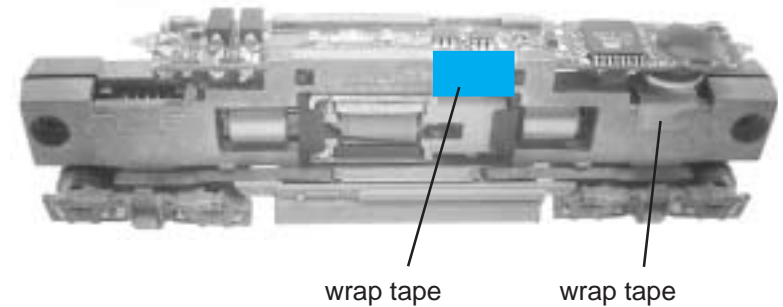
feedback control is required before attempting to adjust CV113 and CV114. If CV113 and CV114 are programmed incorrectly, the locomotive will not run smoothly. If this happens just program CV124 to 0.

Fig 1



wrap tape the whole notch with tape to prevent the motor's spring contact from touching the chassis. Otherwise the decoder will be destroyed if the motor contact touches unwrapped part of chassis

Fig 2



TROUBLE SHOOTING: 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.

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. If it should become necessary to return the decoder for warranty repair/replacement, please include a letter 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 \$10.00 to cover return shipping and handling. If the decoder is no longer considered under warranty, then please contact XL Systems for a price quote to cover the cost of repair or replacement of the decoder, and return shipping and handling. Customers outside the continental United States, including; Hawaii, Alaska, Canada and Mexico, have to contact us for exact return shipping rates for both warranty and non-warranty repairs.

Contact to us at linzping@gmail.com.

Send the decoder to: XL SYSTEM INC. 14 DORA Lane HOLMDEL, NJ 07733