



1 SD40-2

2 GP40-2

The EMD 645 family of diesel engines was designed and manufactured by the Electro-Motive Division of General Motors. While the 645 series was intended primarily for locomotive, marine and stationary engine use, one 16-cylinder version powered the 33-19 "Titan" prototype haul truck designed by GM's Terex division.

The 645 series was an evolution of the earlier 567 series and a precursor to the later 710 series. First introduced in 1965, the EMD 645 series remained in production on a by-request basis long after it was replaced by the 710, and most 645 service parts are still in production. The EMD 645 engine series is currently supported by Electro-Motive Diesel, Inc., which purchased the assets of the Electro-Motive Division from General Motors in 2005.

The EMD 645E3 16cyl. is used in many prototypes:

GP40, GP40-2, GP40P, GP40P-2, GP40TC, SD40, SD40A, SD40-2, SD40T-2, SDP40, SDP40F, F40PH, Australian National BL class, GT26CW, DSB Class MZ (series I-II), etc.

Source Wikipedia

Project settings and information:

- The decoder software must be at least version 35.15.
- The ditch lights will be activated, if the bell or horn is played (CV 393 Bit0 = 1 activates ditch light if bell is played, CV 393 Bit1 = 1 activates ditch light if horn is played).
- **Attention:** Please note that this project use a special brake button on F6. Decrease the throttle to zero. While the loco is coasting, push F6 to actually engage the brakes. This simulates a far more realistic brake operation. If you don't want to use the brake button for braking, you have to modify the CV 4 to a lower value, for example 20.
- This project includes various horns: Nathan K3H long (29), Nathan K3H short (30), Nathan K5LLA (31), Nathan P3 (32), Nathan P5 (33), Leslie RS3K (34), Leslie RS3L (35), Leslie RS5T (36), Nathan M3 (37) and Nathan M5 (38). You can easily switch the horns in ZIMO Sound Programmer (ZSP) or modify CV 516 by changing its value to the above mentioned. You can also add other horns/sounds into this project in ZSP. You can switch the bells by modifying CV 513 from 28 to 27 or 39.



Function	Arrangement	Function output	Sound-function
F0	Lights on/off	Front light white right (function output 0 forward), front light white left (function output 1) and front headlight (function output 7) in forward direction; Back light white right (function output 0 reverse), back light white left (function output 3) and back headlight (function output 8) in reverse direction	
F1	Bell	Toggles ditch lights	Bell
F2	Horn	Toggles ditch lights	Horn K3H
F3	Coupling		Coupling
F4	Number board light	function output 4	
F5	Cab light	function output 5	
F6	Brake button		Dynamic brake
F7	Coasting (Notch 1)		
F8	Sound on/off		
F9	Toggles ditch lights	Front light white right (FOf), front light white left (FO1), back light white right (FOr) and back light white left (FO3) ditch lights	
F10	Volume +		
F11	Volume -		
F12	Mute		
F13	Notch 2		
F14	Notch 3		
F15	Notch 4		
F16	Notch 5		
F17	Notch 6		
F18	Notch 7		
F19	Notch 8		
F20 – F28	Reserved for user assignment		

Modified CVs:

CV# 1 = 3	CV# 40 = 0	CV# 124 = 3	CV# 283 = 200	CV# 340 = 97	CV# 385 = 1	CV# 432 = 7
CV# 4 = 230	CV# 41 = 0	CV# 125 = 33	CV# 286 = 200	CV# 349 = 20	CV# 386 = 8	CV# 434 = 8
CV# 9 = 77	CV# 42 = 0	CV# 126 = 34	CV# 287 = 50	CV# 351 = 0	CV# 389 = 255	
CV# 14 = 67	CV# 43 = 0	CV# 127 = 37	CV# 288 = 40	CV# 352 = 0	CV# 393 = 3	
CV# 29 = 14	CV# 44 = 0	CV# 129 = 38	CV# 309 = 6	CV# 374 = 7	CV# 394 = 64	
CV# 33 = 5	CV# 45 = 0	CV# 132 = 80	CV# 311 = 0	CV# 380 = 6	CV# 395 = 90	
CV# 34 = 18	CV# 46 = 0	CV# 158 = 76	CV# 312 = 0	CV# 381 = 80	CV# 396 = 11	
CV# 35 = 0	CV# 57 = 140	CV# 265 = 101	CV# 313 = 112	CV# 382 = 255	CV# 397 = 10	
CV# 36 = 0	CV# 63 = 51	CV# 275 = 200	CV# 314 = 0	CV# 383 = 30	CV# 430 = 29	
CV# 37 = 0	CV# 64 = 175	CV# 276 = 200	CV# 339 = 13	CV# 384 = 255	CV# 431 = 253	