



Image: Rob Dammer - Wikipedia

The E and E2 classes of the Swedish State Railways (SJ) were closely related 0-8-0 types of superheated steam locomotives. 130 were built between 1907 and 1920. Relatively strong, but with an axle load of only 12.5 tons (12.3 long tons; 13.8 short tons), they were intended for mixed traffic in Norrland and heavy freight trains in southern Sweden. The class had bar frames and inside cylinders, and all were delivered with fully enclosed cabs. They were given six-wheeled L class tenders, but some had larger A class tenders in the last years of use, increasing the operation radius. The E class was very successful, but the low maximum speed (only 65 kilometres per hour) was problematic, therefore 90 locomotives were rebuilt between 1935 and 1951 with two leading wheels, enabling an increase to 70 km/h. The rebuilt locomotives E2 became one metre longer and 7.5 tons heavier. The boiler was also moved a bit forward, making even more room in the large cab. Both E and E2 class locomotives remained in daily service until 31 March 1972, the last day of regular steam operations on SJ. The very last train was hauled by E2 1194. Most of the locomotives were preserved in the strategic reserve when no longer needed in regular traffic (most of the locomotives were placed in sealed plastic bags with dehumidifiers to reduce the need of maintenance). In the harsh winter of 1965–1966 B, E and E2 class locomotives were reactivated to haul trains on the electrified lines. All steam locomotives were removed from the strategic reserve in 1990. 11 E and 26 E2 have been preserved in Sweden.

Source: Wikipedia

### Project settings and information:

Project no.: B080

The project was realised in the new 16-bit technology for ZIMO MS decoders and is customized for the H0 model of Jeco / Liliput.

- The decoder must have at least software version 5.21.1
- The decoder can be controlled using address 3
- To ensure the functionality of the project, CV values should only be changed very carefully.
- After importing the sound project, an automatic measurement run (CV #302 = 75 - forward or 76 - backward) can be performed. This serves as a basis for motor current consumption and for setting CVs #277 to 280, but not for improving driving characteristics.
- A reset can be carried out using CV #8 = 8.



- The project provides for the use of a smoke generator. The heating element is connected to FO3 (controlled by the F24 key) for the use in the HO model. When used in „large scale decoders“, no further settings are necessary and connections are made via the outputs for the heating element and the ventilator. CV #353 determines the switch-off time of the heating element in 25-second increments. Here: value 24 = 10 minutes.

Function keys:

F-key	Function	Function output	Sound
F0	Light on/off	White lights (FO0fwd) on boiler in forward direction, White lights on tender (FO0bwd) in backward direction	Generator
F1	Solo drive		Light steam chuffs
F2			4x Whistles short (Script 3)
F3			4x Whistles long (Script 4)
F4			Conductor's whistle
F5			Coupling / uncoupling
F6	Half speed and shunting + head lights both ends	FO0fwd + FO0bwd	
F7			Curve squeal (2 different sounds when running; Script 1)
F8			Sund on / off
F9			Mute (when on)
F10			Cylinder drain
F11	Cab light	FO1	
F12	Upper front light	FO4fwd	
F13	High beam	FO0fwd / FO0bwd	
F14			Blower
F15			Injector 2
F16			Coal shoveling
F17			Slow air pump
F18			Rapid air pump
F19			Cab door open / close
F20			Clean dead ash
F21			Clean smoke box
F22			Water refill
F23			Sanding
F24			Railroad-crossing bells
F25	Smoker	FO3	
F26			Volume +
F27			Volume -
F28	Free to allocate		



Sound on/off on F8 corresponds to the ZIMO standard:

If you want to switch the sound with F1, you can swap the buttons as follows using CV programming:

- CV 401 = 8
- CV 408 = 1

### Random generators:

- Z1: Rapid air pump (after stopping)
- Z2: Slow air pump
- Z3: Coal shoveling
- Z4: Injector 1
- Z5: Security valves

### Modified CVs:

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|--|--|
| CV# 1 = 3 Loco address                           | CV# 440 = 15 ZIMO Mapping 2 A1 rev.    |
| CV# 3 = 30 Acceleration rate                     | CV# 442 = 25 ZIMO Mapping 3 F-key      |
| CV# 4 = 18 Deceleration rate                     | CV# 444 = 3 ZIMO Mapping 3 A1 forw.    |
| CV# 9 = 58 Motor control frequency               | CV# 446 = 3 ZIMO Mapping 3 A1 rev.     |
| CV# 12 = 53 operating modes                      | CV# 450 = 5 ZIMO Mapping 4 A1 forw.    |
| CV# 13 = 128 Analog functions F1-F8              | CV# 452 = 6 ZIMO Mapping 4 A1 rev.     |
| CV# 57 = 120 Motor regulation: voltage reference | CV# 454 = 12 ZIMO Mapping 5 F-key      |
| CV# 60 = 80 Dimming general                      | CV# 456 = 4 ZIMO Mapping 5 A1 forw.    |
| CV# 61 = 97 ZIMO ext. mapping                    | CV# 460 = 6 ZIMO Mapping 6 F-key       |
| CV# 105 = 145 User Data 1                        | CV# 462 = 14 ZIMO Mapping 6 A1 forw.   |
| CV# 114 = 248 Dim Mask FOfront-FO6               | CV# 463 = 15 ZIMO Mapping 6 A2 forw.   |
| CV# 124 = 3 Shunting keys configuration (binary) | CV# 464 = 14 ZIMO Mapping 6 A1 rev.    |
| CV# 125 = 88 Effects FOfront                     | CV# 465 = 15 ZIMO Mapping 6 A2 rev.    |
| CV# 126 = 88 Effects FOrear                      | CV# 512 = 192 ZIMO Mapp. dimming value |
| CV# 128 = 8 Effects FO2                          | CV# 522 = 109 F4 soundnumber           |
| CV# 129 = 72 Effects FO3                         | CV# 523 = 91 F4 volume                 |
| CV# 130 = 88 Effects FO4                         | CV# 525 = 98 F5 soundnumber            |
| CV# 137 = 30 Smoke generator at standstill       | CV# 526 = 91 F5 volume                 |
| CV# 138 = 120 Smoke generator at cruising speed  | CV# 527 = 8 F5 information on loop     |
| CV# 139 = 220 Smoke generator at acceleration    | CV# 552 = 107 F14 soundnumber          |
| CV# 147 = 160 Motor regulation: I value          | CV# 553 = 64 F14 volume                |
| CV# 148 = 100 Motor regulation: D value          | CV# 554 = 72 F14 information on loop   |
| CV# 149 = 150 Motor regulation: P value          | CV# 555 = 81 F15 soundnumber           |
| CV# 154 = 16 ZIMO configuration bits 2 (binary)  | CV# 556 = 128 F15 volume               |
| CV# 155 = 6 Half-speed key                       | CV# 557 = 72 F15 information on loop   |
| CV# 156 = 6 Shunting key accel./decel.           | CV# 558 = 97 F16 soundnumber           |
| CV# 158 = 8 Several sound bits                   | CV# 559 = 91 F16 volume                |
| CV# 190 = 80 Up-dimming time for FO              | CV# 560 = 8 F16 information on loop    |
| CV# 191 = 40 Down-dimming time for FO            | CV# 561 = 92 F17 soundnumber           |
| CV# 254 = 80 Project-ID                          | CV# 562 = 0 F17 volume                 |
| CV# 255 = 1 Project-ID                           | CV# 563 = 8 F17 information on loop    |



CV# 256 = 1 Project-ID	CV# 564 = 93 F18 soundnumber
CV# 265 = 1 Selection of the locomotive type	CV# 565 = 0 F18 volume
CV# 266 = 60 Total volume	CV# 566 = 8 F18 information on loop
CV# 267 = 190 Chuff sound rate	CV# 567 = 82 F19 soundnumber
CV# 272 = 75 Drainage time [0.1s]	CV# 568 = 128 F19 volume
CV# 273 = 13 Starting delay	CV# 569 = 8 F19 information on loop
CV# 274 = 65 minimal drainage downtime [0.1s]	CV# 570 = 91 F0 soundnumber
CV# 275 = 180 Volume with no load slow travel	CV# 571 = 64 F0 volume
CV# 276 = 180 Volume with no load speed run	CV# 572 = 72 F0 information on loop
CV# 282 = 75 Duration of the acceleration noise [0.1s]	CV# 573 = 106 soundnumber boiling
CV# 284 = 10 Threshold for noise reduction in delay	CV# 574 = 91 volume boiling
CV# 286 = 180 Vol. reduced driving sound during decel.	CV# 577 = 95 soundnumber squeal
CV# 287 = 65 Threshold for brake squeal	CV# 578 = 91 volume squeal
CV# 288 = 85 Brake squeal time spent driving [0.1s]	CV# 581 = 89 sound no. starting whistle
CV# 310 = 8 Sound on/off for road- and random noise	CV# 582 = 0 volume starting whistle
CV# 312 = 10 Drainage button	CV# 583 = 96 Soundnumber drainage
CV# 313 = 109 Mute button	CV# 584 = 0 Volume dewatering
CV# 314 = 45 Mute fade time [0.1s]	CV# 673 = 99 F20 soundnumber
CV# 315 = 25 Random Z1 min interval	CV# 674 = 128 F20 volume
CV# 316 = 25 Random Z1 max interval	CV# 676 = 101 F21 soundnumber
CV# 317 = 10 Random generator Z1 playback time	CV# 677 = 91 F21 volume
CV# 318 = 60 Random Z2 min interval	CV# 679 = 103 F22 soundnumber
CV# 319 = 90 Random Z2 max interval	CV# 680 = 128 F22 volume
CV# 320 = 18 Random generator Z2 playback time	CV# 681 = 72 F22 information on loop
CV# 321 = 120 Random Z3 min interval	CV# 682 = 110 F23 soundnumber
CV# 322 = 160 Random Z3 max interval	CV# 683 = 91 F23 volume
CV# 323 = 12 Random generator Z3 playback time	CV# 685 = 119 F24 soundnumber
CV# 324 = 85 Random Z4 min interval	CV# 686 = 128 F24 volume
CV# 325 = 120 Random Z4 max interval	CV# 687 = 72 F24 information on loop
CV# 326 = 14 Random generator Z4 playback time	CV# 744 = 93 Soundnumber Z1
CV# 327 = 235 Random Z5 min interval	CV# 745 = 0 Volume Z1
CV# 328 = 250 Random Z5 max interval	CV# 746 = 8 Information on loop Z1
CV# 329 = 1 Random generator Z5 playback time	CV# 747 = 92 Soundnumber Z2
CV# 345 = 1 Sound-switch-key	CV# 748 = 0 Volume Z2
CV# 346 = 1 Sound-switch-conditions	CV# 749 = 8 Information on loop Z2
CV# 347 = 1 Solo driving	CV# 750 = 97 Soundnumber Z3
CV# 348 = 18 Solo driving parameters (binary)	CV# 751 = 91 Volume Z3
CV# 353 = 24 Smoke heater max. operating time	CV# 752 = 8 Information on loop Z3
CV# 355 = 30 Smoke fan speed at standstill	CV# 753 = 90 Soundnumber Z4
CV# 390 = 150 Solo drive reduction of CV3/CV4	CV# 754 = 128 Volume Z4
CV# 395 = 85 Maximum volume for increase key	CV# 755 = 8 Information on loop Z4
CV# 396 = 27 Volume decrease key	CV# 756 = 94 Soundnumber Z5
CV# 397 = 26 Volume increase key	CV# 757 = 0 Volume Z5
CV# 430 = 11 ZIMO Mapping 1 F-key	CV# 758 = 72 Information on loop Z5
CV# 432 = 161 ZIMO Mapping 1 A1 forw.	CV# 980 = 91 Script 1 volume sound 1
CV# 434 = 161 ZIMO Mapping 1 A1 rev.	CV# 981 = 181 Script 1 volume sound 2



CV# 436 = 13 ZIMO Mapping 2 F-key  
 CV# 437 = 255 ZIMO Mapping 2 M-key  
 CV# 438 = 14 ZIMO Mapping 2 A1 forw.

CV# 982 = 181 Script 3 volume sound  
 CV# 983 = 181 Script 4 volume sound  
 CV# 990 = 45 Script 2 timer


### Sound Samples:

82 Tür_auf-zu.wav	104 Pfiff-doppelt_1122_0.82.wav
89 Ausgleichsventil_2.wav	105 Pfiff-doppelt_1122_1.16.wav
90 Injektor.wav	107 Hilfsbläser_02.wav
91 LiMa.wav	108 Bremsventil_SJ-E2.wav
92 Luftpumpe langsam.wav	109 Schaffnerpfiff.wav
93 Luftpumpe schnell.wav	110 Sanden_kurz.wav
94 SJ E2 Sicherheitsventile_echo.wav	111 Pfiff-doppelt_1122_1.60.wav
95 Bremse_kurz.wav	112 Pfiff_1122_0.18.wav
96 Entw loop.wav	113 Pfiff_1122_0.50.wav
97 Kohleschaukeln.wav	114 Pfiff_1122_0.70.wav
98 An-Abkuppeln_E2.wav	115 Pfiff_1122_1.20.wav
99 Ausschlacken.wav	116 Pfiff_1122_0.97.wav
100 Kurvenquietschen.wav	117 Abkuppeln_E2.wav
101 Lösche ziehen.wav	118 Ankuppeln_E2.wav
102 Schienenknarren.wav	119 Kreuzung-Glocken.wav
103 Wassernehmen_kurz.wav	

### Scripts:

Script 1: 2-sounds curve squeal speed dependent. Volume sound 1: CV 980; volume sound 2: CV 981.  
 Script 2: Cab light timer. Timer: CV 990.  
 Script 3: 4x short whistles (each whistle press F-key once). Sound volume: CV 982.  
 Script 4: 4x long whistles (each whistle press F-key once). Sound volume: CV 983.

### Operation with mfx:

 The project is equipped with mfx function symbols and prepared for the use of locomotive pictures: the mfx product number 20481 applies to the SJ E2.  
 In order to ensure automatic registration with key symbols on an mfx-capable command station, the (DCC) CV# 12 must be programmed to the value 117.

ZIMO Elektronik GmbH  
 Schoenbrunner Strasse 188  
 1120 Vienna  
 Austria

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