Item 36-553

Bachmann Branchline
EZ COMMAND 3 Function Decoder with 8-wire harness and plug

Please read this sheet before installing the decoder in your locomotive

Introduction
Thank you for your choice of the Bachmann EZ Command 36-553 decoder. This item is a high quality DCC decoder incorporating back EMF monitoring for fine control of the motor at low speed.

The decoder is supplied fitted with a harness and 8-pin NEM/NMRA plug intended to be used in conjunction with a compatible socket on a locomotive.

Features
► High frequency 31.25Khz pulse power for quiet operation
► User configurable Back EMF control
► 3 function outputs to control functions on the locomotive (eg lighting)
► Function button controlled reduced shunting speed
► Function button selectable inertia
► NMRA DCC with 14, 28, 128 speed steps
► short or long addresses
► Overload protection on outputs
► Accepts all programming methods
► Operable on DC controlled layouts
► Supports Lenz® brake sections
► Dimensions: 25.5 x 15.5 x 4.5 mm
► Motor Output: 700mA
► Function outputs: 180mA each – total 350mA

Important default values
Address 03, 28 speed steps

Important:
•The decoder is designed for use in model railways only
•Avoid mechanical force and impact on the decoder
•Do not expose to wet and humid conditions
•Do not remove the heat shrink sleeve around the decoder
•Never solder on the circuit board, extend cables if necessary
•Never wrap the decoder in insulation tape, since this may cause overheating
•Always remove the locomotive from the track when installing the decoder
•Make sure that no wires are squeezed or cut when reassembling the locomotive.

Aligning decoder
Plug the decoder into the socket aligning pin 1 (orange) to the mark on the loco PCB. The plug is arranged so that there will be no damage if plugged in reversed, although the loco will run backwards and the lights will not work.

Harness colour coding

Pin	Purpose	Wire colour
1	motor right	orange
2	rear light	yellow
3	function F1	green
4	left rail pickup	black
5	motor left	grey
6	front light	white
7	function common positive	blue
8	right rail pickup	red

Functions

F0	Locomotive directional lighting
F1	180mA auxiliary output
F3	Shunting speed reduction selection
F4	Inertia on/off

Prior to installation
The locomotive must be in perfect technical condition prior to installation. Only a locomotive with a trouble free mechanism and smooth running properties in analogue mode should be converted for digital mode. Inspect the model and clean and lubricate if necessary. All work should be carried out with the locomotive placed on a suitable base (not the track) without power. Make sure there can never be any electrical power applied to the loco during the conversion – even inadvertently.

Long addresses
Refer to the instructions with your DCC equipments regarding the procedure for entering long addresses

IMPORTANT – Back EMF motor control
The default CV values are suitable for many motors. However, there may be instability in motor performance when the back EMF control is not matched to the requirements of the motor. If this is found to be the case CVs 54 and 55 should be adjusted to alter the back EMF to suit the motor.
For smaller, lighter motors use a lower value for CV54 and a higher value for CV 55.

In the event of difficulty please contact your retailer or Bachmann Europe Plc for more advice.

Guarantee
This product is guaranteed for 12 months from the date of purchase against faulty materials or workmanship. During this period it will be repaired or have parts replaced free of charge provided that:-
1 the product is returned to Bachmann Europe plc with evidence of purchase date in accordance with the claims procedure outlined below;
2 this product has not been misused or handled carelessly or used on a voltage supply other than that stamped on the product; and
3 repairs have not been attempted other than by our service staff
Claims procedure:-
Any claim made under this guarantee should be made directly to the manufacturer. The claim itself should be made in a letter setting out the date and place of purchase, and giving a brief explanation of the problem which has led to the claim. This letter should then be sent, together with the product itself and proof of the purchase date (preferably a receipt) to the address below:
PLEASE NOTE that it is essential that the letter of claim reaches the above address on the last day of this Guarantee at the latest. Late claims will not be considered.

This Guarantee applies to all goods purchased from an authorised retailer of Bachmann Europe plc within the United Kingdom of Great Britain and Northern Ireland. This Guarantee does not confer any rights other than those expressly set out above and does not cover any claims for consequential loss or damage. This Guarantee is offered as an extra benefit and does not affect your statutory rights as a consumer

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CV Programming
The *Configuration Variables* - CVs - hold values within the processor of the decoder which control its performance characteristics. They can be changed as many times as required using an appropriate DCC command unit or standalone programmer. The table below shows the purpose of and the default value for each CV that is available on this decoder and the range of values each may hold. Some CVs can contain a value from a range (eg start voltage) whilst others use the individual 'bits' of the CV to act as on/off switches for features (eg direction of operation). **Inappropriate CV values may cause the decoder to operate incorrectly: if in doubt please take advice from your retailer or Bachmann Europe plc.**

Table of CV Values

CV	Description		Range	Default		
1	Primary Address		1-127	3		
2	Start voltage		1-63	3		
3	Acceleration rate		0-63	8		
4	Deceleration rate		0-63	6		
5	Max voltage		0-63	42		
7	Version number		0	0		
8	Manufacturer ID	ESU		151		
17 18	Extended address	(Select either CV 1 or CV 17/18 as address using CV29 bit 5 – add 32 to existing value in CV29)	128 - 9999	192		
			Decimal value when set		Effect when Bit value 0	Effect when Bit value 1
29	Decoder configuration data			6		
	Bit 0	Direction of operation	1	0	**Normal**	Reversed
	Bit 1	Speed steps	2	1	14	**28/128**
	Bit 2	Operation on DC	4	1	Disabled	**Enabled**
	Bits 3 and 4	Not used				
	Bit 5	Selection of short or long address	32	0	**Short Uses CV1**	Long Uses CV17/18
	Bits 6 and 7	Not used				
49	Back EMF			1		
	Bit 0	Back EMF Selector		1	Disabled	**Enabled**
	Bits 1 to 7	Not used				
51	DC Brake Control			1		
	Bit 0	Lenz DC brake mode		1	Disabled	**Enabled**
	Bits 1 to 7	Not used				
54	Feedback Parameter K	Determines the load control effect. Use a lower value for a small. light motor.	0-63	32		
55	Feedback parameter I	Determines the momentum of the motor. Motors with large flywheels of large diameter require a smaller value.	0-63	24		
63	Function brightness	Applies to both F0 and F1	0-7	7		

Decoder reset
The values can be reset to the defaults as above by writing value 08 to CV 8

Your DCC equipment instructions will tell you how to turn the lights on and off – usually F0 (or F10 on EZ Command). If this does not turn them on check the alignment of the decoder and reverse if necessary

Locomotive lights

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