

FLAISCHMANN

BETRIEBSANLEITUNG

Operating Instructions • Instruções de service •
Handleiding • Vejledning • Istruzione per la manutenzione

Hinweis zur elektromagnetischen Verträglichkeit: Durch einen guten Rad-Schiene-Kontakt vermeiden Sie mögliche elektromagnetische Störungen! Advice about electromagnetic interferences: By having good contact between wheel and rail, any possible electromagnetic interferences can be avoided! Conseil pour éviter des interférences électromagnétiques: Par un bon contact électrique, vous éviterez d'éventuelles interférences électromagnétiques! • Tip voor elektromagnetische zekereheid: Door de zorken van het wiel-rail-kontak wordt het mogelijk elektromagnetische storingen te voorkomen! • En good electromagnetic compatibility tip: Getting a good wheel-rail contact avoids eventual electromagnetic interference! • Consiglio sulla compatibilità elettromagnetica: Per un buon contatto ruota-raila evitare possibili interferenze elettromagnetiche! • Recomendación para un mejor funcionamiento electromagnético: Con un buen contacto entre las vías y las ruedas evitara usted irregularidades electromagnéticas!

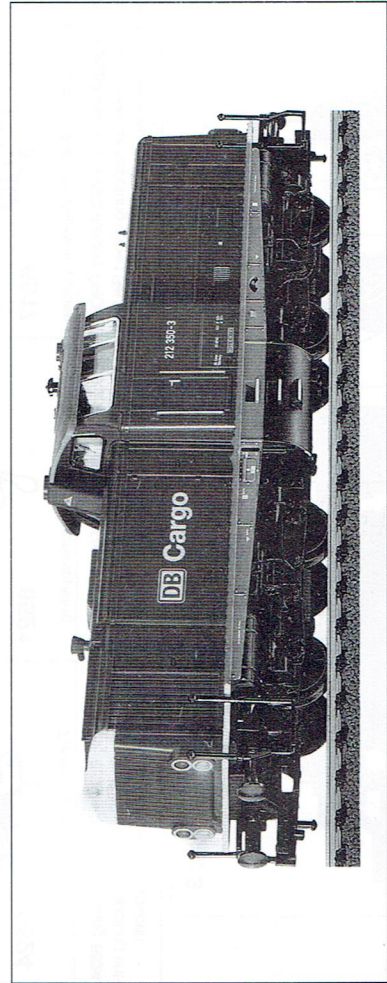
14 V ---
(bei Gleichstrombetrieb)



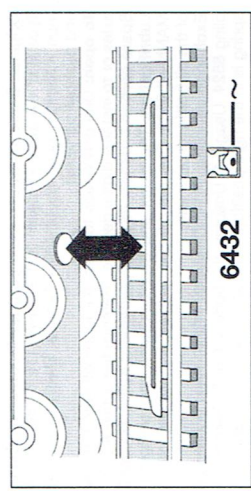
Alter/Age
14 +

CE GEBR. FLEISCHMANN GMBH & CO. KG
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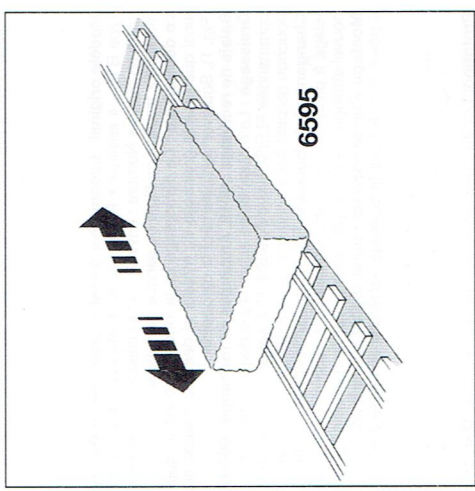
Baureihe 211/212 mit Varianten



Das Vorbild: Dieselhyaule Mchreweckloek, Baureihe 211/212 der DB.
Die 4-achsig Mchren der Baureihe B'B' (4-achsig) wurden als ursprüngliche Dieselhyaule Mchreweckloekmotoren V 100 gebaut. Sie leisten 810/994 kW (1100/1350 PS), wiegen 62/63 Tonnen, haben eine LUP von 12,3 m und fahren im Streckengang 100 km/h, im Rangiergang 65 km/h. Mehr als 700 Loks dieser Baureihe werden vorwiegend vor Reise- und Güterzügen eingesetzt. Im Streckendienst fahren sie auch im Wendezugbetrieb.



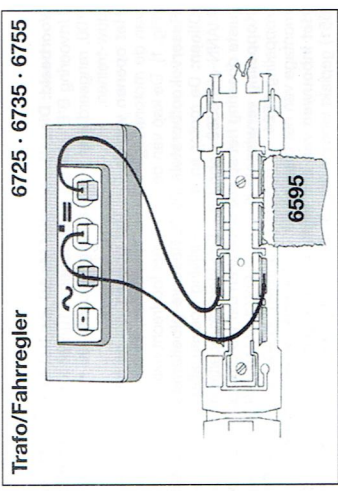
Kontaktgeber in Verbindung mit **Schaltstange 6432** zur Auslösung elektrischer Schaltfunktionen.
Contacter and contact unit 6432 perform electrical switching functions.
Frotteur fonctionnant e combinaison avec le **contact universel 6432** pour effectuer des commandes d'appareils électromagnétiques.
Het kontakt wordt gemaakt tesamen met **schakelkontakt 6432** om de elektrische schakelfunctie buiten werking te stellen.
Kontakt til udløsning af elektriske funktioner – il forbindelse med kontaktskinnene 6432.
Trasmettitore d'impulsi (in unione lamina di condatto 6432) per il comando di dispositivi elettrici.



Schienenreinigung: Bei ungleichmäßigem Lauf von Loks die Schienen mit **Schienenreinigungsgummi 6595** säubern. Abrieb und Staub auf geeignete Weise entfernen (z. B. Tischsaugsauger). Schienen werden leicht öligem Lappen nachreiben. Dazu FLEISCHMANN-Öl 6599 verwenden.
Track Cleaning: For smooth running of locos, the tracks must be kept clean using a **track rubber block 6595**. Dirt and dust can be removed in any suitable way (i.e. by vacuuming). Lightly oil the tracks with the FLEISCHMANN oil 6599.
Nettoyage des voies: En cas de fonctionnement des locomotives par "à coups", nettoyez la voie au moyen de la **gomme 6595** prévue à cet effet. Éliminez au maximum les poussières et autres corps étrangers (utilisez p. ex. un petit aspirateur ménager). Huilez très parcimonieusement la voie au moyen d'un chiffon légèrement imbibé d'huile spéciale FLEISCHMANN 6599.
Rail-reinishing: Bij een ongelijkmatige loop van de locs moeten de rails met het **railreiningsrubber 6595** worden schoongemaakt. Vuil en stof daarvan op de bekende wijze wegwerken (bijv. met een stofzuiger). De rails daarna lichtjes met een geolied lapje nabewerken. Daarvoor FLEISCHMANN-olie 6599 gebruiken.
Skinnerenging: Hvis toget kører ujævnt p.g.a. snavsede skinner, bruges **gummiblokken 6595**. Støv m.v. fjernes, - evt. med en let støvsugning. Skinnene gndes let over med en blød olieret klud. Brug FLEISCHMANN olie 6599.
Pulizia delle rotaie: Nel caso di un'andatura irregolare delle locomotive, pulire i binari con la **gomma pulisc rotaie 6595**. Eliminare ogni traccia di polvere e sporcizia (es. con un aspirapolvere da tavolo). Stronfare le rotaie con un straccio leggermente unto. Allo scopo utilizzare olio FLEISCHMANN 6599.

Renngang av lok-hjul: Hvis korelladerne på hjulene er snavsede, rengøres de rene med en klud eller **rumblokken 6595**. Forsøg ikke at dreje drivhjulene med håndkraft. Vnd lok-et på hovedet og hold to ledninger fra traleten på hjulene. Drej op for strømmen på transformatoren.
Dette tog nu kun anvendes med en jævnstrømstransformator vi anbefaler FLEISCHMANNs regulerbare transformatorer (max. 14 V...).

Pulizia delle ruote delle locomotive: In caso di sporcizia le superfici di attrito delle ruote vanno pulite con uno straccio di lino o con la **gomma pulisci rotaie 6595**. Non girare mai le ruote motrici a mano, ma collegare a una corrente d'esercizio cavi di collegamento e mettere in movimento. Le ruote libere possono essere girate manualmente.
I treni in miniatura FLEISCHMANN devono essere azionati soltanto alla tensione di alimentazione prevista (max. 14 V...). Raccomandiamo l'impiego di trasformatori di regolazione FLEISCHMANN, i quali sono forniti di marchi di qualità GS.



Trafo/Fahregler 6725 • 6735 • 6755
Schoonmaken van de loc-wielen: Als de wielen van de loc vuil zijn geworden moeten de loopvlakken met een schone doek of met **railreiningsrubber 6595** worden schoongemaakt. Nooit de aangedreven assen met de hand doordraaien, maar eventjes aan de trafo aansluiten met de juiste aansluiting. De locassen kunnen natuurlijk gewoon met de hand worden gereinigd.
Nettoyage des roues des locomotives : Des roues propres sont le garant d'un fonctionnement impeccable, éliminez donc les impuretés sur celles-ci avec un chiffon propre ou la **gomme 6595**. Ne jamais faire tourner l'ensemble moteur avec les roues, y appliquez une tension de service afin de les faire tourner et d'attendre la conférence entière de la roue. Les roues non motrices peuvent être tournées à la main.
Les réseaux FLEISCHMANN ne peuvent être alimentés qu'avec la tension de service prévue (max. 14 V...). Nous recommandons les transformateurs FLEISCHMANN lesquels portent la marque d'agréation GS.
Schoonmaken van de loc-wielen: Als de wielen van de loc vuil zijn geworden moeten de loopvlakken met een schone doek of met **railreiningsrubber 6595** worden schoongemaakt. Nooit de aangedreven assen met de hand doordraaien, maar eventjes aan de trafo aansluiten met de juiste aansluiting. De locassen kunnen natuurlijk gewoon met de hand worden gereinigd.
FLEISCHMANN-locassen worden alleen gevoed met de voorgescreven veiligheidsvoeding (max. 14 V...). Wil bevelen gebruik van FLEISCHMANN-transformatoren aan, want deze zijn voorzien van GS-keuringen.

Fig. 1

0006530

00544007

6519

Ersetzschaltfreifen

Ersetzschaltfreifen


An der schraffierten Stelle kann der Schaltmagnet 942701 eingebaut werden.

Ersatzschleifkohlens: 6519. Ersatzglühlampen: 0006530. Ersatzhaftreifen: 00544007

Ölen: Geölt werden die Achsen und das Getriebe nur an den gekennzeichneten Schmierstellen (Fig. 1).

Nur FLEISCHMANN-Öl 6599 verwenden. Nur ein kleiner Tropfen pro Schmierstelle (→), sonst Überölung.

Zur Dichtung die in der Verschlusskappe der Ölfäße angebrachte Nadel verwenden.




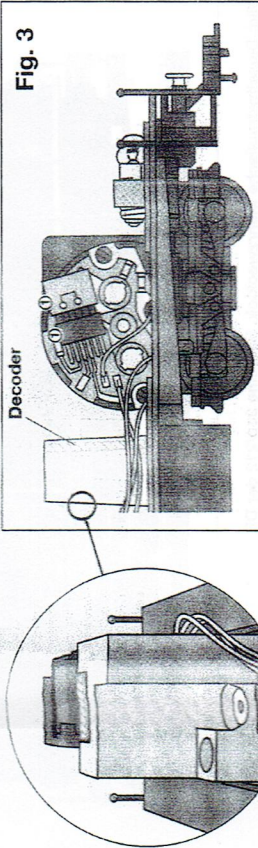


Fig. 3



Original: Diesel hydraulic multi purpose locomotive, Class 211/212 of the DB.
Type B'B' - 4 axes • Power: 810/994 kW (1100/1350 hp) • Weight: 62/63 tons • Top speed: road gear 60 mph, yard gear 42 mph • Number built: about 700 • Service: Medium-heavy passenger and freight (Multiple-unit equipped for double-heading and pushpull services)

Spare carbon brushes: 65519. Replacement bulbs: 00065630. Spare traction tyres: 00544007.

Lubrication: The motor and gear-box need only be lightly oiled at the bearing points marked (Fig. 1). Only use FLEISCHMANN-oil 6599. Only put a tiny drop in each place (+), otherwise it will be overiled. An applicator needle is located in the cap of the oil bottle for your use.

Exchange coupling: FLEISCHMANN PROFIL-Rivet coupling **6517** • FLEISCHMANN-Rivet coupling **6521** • Exchange rivet coupling **6524**. Usage: 1. Unscrew the buffers (Fig. 2). Remove the railings and coupling. 2. Insert the new coupling. Make sure the spring is in the right position. 3. Replace the railings. Screw the buffers back in place.

Installing a digital decoder: A 6-pole **DECODER 687403 (NEM 651)** can be glued onto the cross-hatched surface (Fig. 3). Please consult the instructions included with the DECODER for fitting advice.

Modèle original : Locomotive diesel hydraulique mixte - type 211/212 - de la DB.

Type B/B' - 4 essieux • Puissance 810/994 kW (1 100/1 350 CV) • Poids: 62/63 t • Vitesse max.: 100 km/h en pleine voie, 65 km/h en ligne simple • Capacité de chargement par fraction multiple ou service de navette: 100 tonnes

Le démontage : Le démontage de la locomotive est uniquement nécessaire pour le remplacement des ampoules, des balais ainsi que pour le graissage du moteur et des engrenages et pour le montage d'un module récepteur digital. Enlever les vis **A** (Fig. 1). Soulever verticalement la carrosserie.

Balais de rechange : 6519. Ampoules de rechange : 00006530. Bandages de rechange: 00544007.

Graissage : Le moteur et les engrenages doivent être huilés uniquement aux endroits indiqués (Fig. 1). N'utilisez que l'huile recommandée FLEISCHMANN 6599. Une seule goutte par point à lubrifier (->) afin d'éviter tout excès. L'aiguille montée dans le bouchon du petit flacon convient parfaitement à cet usage.

Changement d'attaches (Fig. 2): FLEISCHMANN PROFIL-Attelage à pivot **6517** • FLEISCHMANN-Attelage à pivot **6521** • Attelage à pivot d'autres marques **6524**. La séquence : 1. Dévissez les boulons. Enlevez la plateforme et l'attelage. 2. Montez le nouvel attelage, vérifiez au positionnement du ressort de rappel. 3. Remontez la plateforme et revérifiez les boulons.

Montage d'un module récepteur digital (décodeur): La zone hachurée permet de coller un **DECODER 687403 (NEM 651)** à 6 pôles (Fig. 3). Pour le montage, se référer au mode d'emploi du DECODER.

Prototipo: Locomotiva diesel-idraulica per l'esercizio misto - BR 211/212 - delle DB.

Tipo B'E': 4 assi • potenza: 810/994 kW (1100/1350 PS) • peso: 62/63 t • velocità massima nel traffico: 100 km/h, operazioni di manovra 65 km/h • esemplari acquistati: 700 • impiego: percorsi di media importanza, treni passeggeri e merci (comando multiplo per doppia trazione ed esercizio a navetta).

Apertura: L'apertura della locomotiva si richiede solo per il cambio delle lampade, per la sostituzione delle spazzole di carboni di contatto, per oliare i cuscinetti del motore e dell'ingranaggio, e per montaggio di un modulo di ricezione digitale. Rimuovere le viti **A** (Fig. 1). Sfilare la carcassa della locomotiva verticalmente in alto.

Carboncini di ricambio: 6519. Lampadina di ricambio: 00006530. Anelli di attrito: 00544007.

Lubrificazione: Il motore e l'ingranaggio vengono lubrificati solo nei punti contrassegnati dei supporti. Utilizzare solo olio FLEISCHMANN 6599. Usare soltanto una piccola goccia per ogni punto di oliatura (->), altrimenti si rischia di oliare troppo. Per desolcatizzare l'uso di cui è provvisto il tappo di chiusura del flacone dell'olio.

Sostituzione gancio (Fig. 2): FLEISCHMANN PROFIL-Gancio a perno **6517** • FLEISCHMANN Gancio a perno **6521** • Gancio a perno di ricambio per altre marche **6524**, 1. Levare i respingenti; Togliere la ringhiera ed il gancio. 2. Inserire il nuovo gancio. 3. Assicurare la posizione e la posizione correttamente la molla 3. Rimettere la ringhiera. Riavvitare i respingenti.

Montaggio di un decoder: Sul piano tratteggiato può essere incollare un **DECODER 687403 (NEM 651)** a 6 poli (Fig. 3). Prima di procedere al montaggio, consultare il manuale di funzionamento del DECODER.

Voorbeeld: Diesellocomotief Model van het type 211/212 van de DB.

Uitvoering B/B - 4-assig • Vermogen: 810/994 kW (1100/1350 PS) • Gewicht Ton: 62/63 • Maximum snelheid km/u: traindienst 100, rangerdienst 65 • Aantal gebouwd: 700 • Voor dienst in middelzware personen- en goederentreinen en tevens voor trek- en w-treinen.

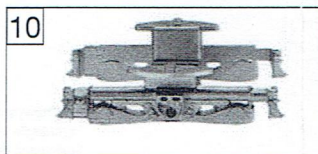
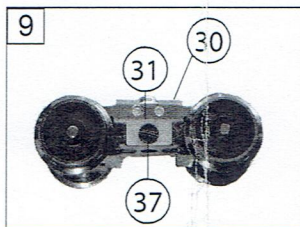
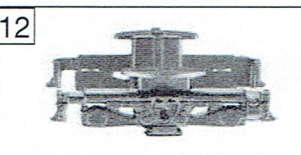
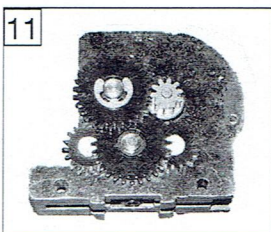
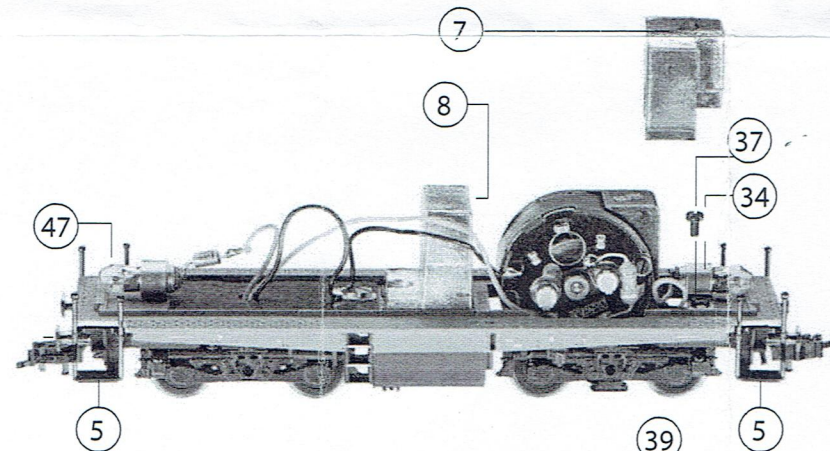
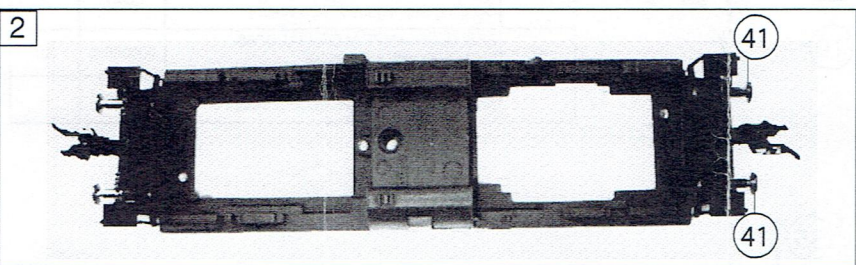
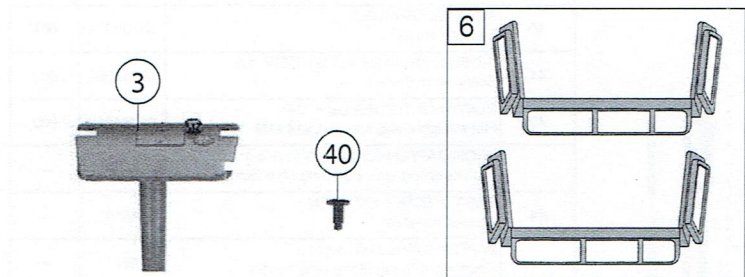
Het openen van de loc: Het openen van de lok is alleen nodig bij het wisselen van de lampen en de koolborstels, het oliën van de motorenlagers en de tandwielen, en het inbouwen van een digitale ontvangerbouwsteen. De schroeven **A** verwijderen (Fig. 1). De kap van de locomotief loodrecht naar boven trekken.


Reservekoolborsteis: 6519. Reserve-gloeilampen: 0006530. Anti-slip-bandjes: 00544007.

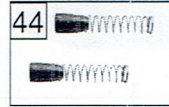
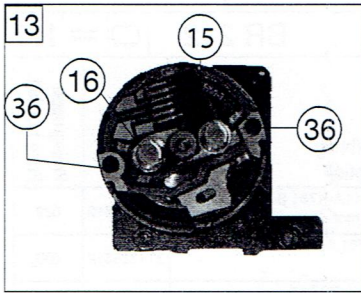
OLIE: De motor en de aandrijving hoeven alleen op de aangegeven plaatsen geolied te worden (Fig. 1). Alleen FLEISCHMANN-olie 6599 gebruiken. Een klein druppeltje per smeerpunt (→) is heus voldoende, anders wordt de zaak te vet. Voor een juiste dosering het spuitje gebruiken dat wordt bijgeleverd in het flesjespak.

Koppeling verwisseln (Fig. 2): FLEISCHMANN PROFI-Penkoppeling **6517** • FLEISCHMANN Penkoppeling **6521** • Pen-wisselkoppeling **6524**. 1. Buffers losdraaien. Hekwerk en koppeling verwijderen. 2. Nieuwe koppeling monteren. Let op de juiste montage van het bladventiel. 3. Hekwerk bevestigen. Buffers vastdraaien.

Het inbouwen van een digitale ontvangerbouwsteen: Op de gemarkeerde plaats kan een 6-polige Decoder 687403 (NEM 651) geplakt worden (Fig. 3). Bij het inbouwen a.u.b. de handleiding van de DECODER raadplegen.



631781		DB	BR 212		=	HO
Pos. Nr. Pos.no.	Beschreibung Description	Art.-Nr. Art.no.	Preisgruppe Price bracket			
1	LOKGEHÄU.O.DACH f.631781 BR212 Body assembly w/o roof	104228812	029			
2	LOKRAHMEN f.631781 BR 212 Loco framework	114228812	030			
3	DACH LACK. f.631781 BR 212 Roof painted	124228812	014			
4	LICHTLEITER Light conductor	00134230	007			
5	BUEHNENGELAENDER Platform hand rail	00144230	007			
6	FENSTER/SATZ f.631781 BR 212 Set of windows	154228812	014			
7	BESCHWERUNG Ballast	00164230	012			
8	BESCHWERUNG Ballast	00164231	014			
9	LAUFDREHGESTELLB.O.RAHMEN Bogie w/o frame	304228812	024			
10	DREHGEST.RAHMEN F.4215/28/30 Bogie framework	00310230	016			
11	MOTORDREHGESTELLBLOCK M.MOTOR Motorized bogie block w.motor	404228812	036			
12	DREHGEST.RAHMEN F.MOTORDREHG. Bogie framework	00410230	016			
13	MOTOR M.SCHWUNGMASSE U. M.SCHN Motor with flywheel,	00504228	034			
14	ANKER KPL.M.SCHWUNGMASSE Rotor complete with integr. flywheel	00504607	025			
15	LAGERSCHILD ISOL.M.SCHNITTST. Motor PCB, insulated, with interface	00504736	019			
16	KOHLNROHRKAPPE Brush pipe cap	00504801	002			
17	L.RAD M.Z.M.N. Loco wheel with gear wheel,with trac. tyre	00514209	007			
18	L.RAD M.Z.O.N. Loco wheel with gear wheel, w/o trac. tyre	00514232	007			
19	L.RAD O.Z.O.N.ISO Loco wheel w/o gear, w/c traction tyre insul.	00514182	006			
20	L.RAD O.Z.M.N.ISO. Loco wheel w/o gear, with traction tyre insul.	00514183	006			
21	ACHSE gerändelt Milled axle	52401600	002			
22	HAFTREIFEN HO Traction tyre	00544007	001			
23	UNTERSETZUNGRAD Z:28/13 SCHWA Reduction gear wheel Z:28/13	00564102	002			
24	ZWISCHENRAD Z:18 SCHWARZ Gear wheel Z:18	00564105	002			
25	RITZEL Z:10 Gear wheel Z:10	00564602	004			
26	SICHERUNGSRING KLEIN Securing ring,small	00564701	001			
27	SICHERUNGSRING GROSS Securing ring,big	00564702	001			
	UNTERLEGSCH. 2,3 X 5 X 0,1(o.Abb.) Washer 2,3 X 5 X 0,1 (w/o illustr.)	00564747	001			
	UNTERLEGSCH.ROT 2,2X5X0,3 (o.Abb.) Washer red 2,2X5X0,3 (w/o illustr.)	00564751	001			
30	STROMABNEHMER ISOL. Pantograph insulated	00614005	007			
31	STROMABNEHMER Pantograph	00614012	007			
32	MASSEFEDER Ground contact spring	00614934	001			
33	MOTORSTROMABN.F.4215/28/29/30 Motor contact clip	00614935	001			
34	LAMPENHALTER Lamp support	624228812	011			
35	ENTSTOERDROSSEL Suppressor choke	00644101	007			
36	SCHRAUBE Screw	00700313	001			



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631781		DB	BR 212	 = H0
Pos. Nr. Pos.no.	Beschreibung Description	Art.-Nr. Art.no.	Preisgruppe Price bracket	
37	ZYLINDERKOPFSCHRAUBE Cylinder head screw	00700403	001	
38	SCHRAUBE M2 X 5 Screw M2 X 5	70900041	001	
39	SCHRAUBE Screw	00713516	001	
40	ANSATZSCHRAUBE Flanged screw	00730014	004	
41	SCHRAUBPUFFER MITTEL GEW. 4,5 Screw-in buffer	00754002	002	
42	BLATTRICHTFEDER L=14 MM Flat straightening spring L=14 MM	00764012	002	
	PROFI-ZAPFENKUPPLUNG (o.Abb.) Profi coupling with lug fitting (w/o Illustr.)	6517	---	
44	ERSATZ SCHLEIFKOHLEN Carbon brushes	6519	---	
	ZAPFENKUPPLUNG (o.Abb.) Coupling with lug fitting (w/o Illustr.)	6521	---	
	ZAPFEN-TAUSCHKUPPLUNG (o.Abb.) Coupling with lug fitting (w/o Illustr.)	6524	---	
47	ERS. GLÜHLAMPE M.SCHRAUBFAS. Spare bulb with screw base	00006530	007	
	DCC Decoder MIT RAILCOM m. 6po (o.Abb.) DCC-decoder with railCom (w/o Illustr.)	687403	---	

**PROPERTIES OF THE INBUILT
DCC-DECODER**

Locomotives with an inbuilt DCC-decoder can be run using the FLEISCHMANN control equipment LOK-BOSS, PROFI-BOSS, multiMAUS, multiMAUS^{PRO}, TWIN-CENTER and Z21 as well as with other DCC-controllers conforming to the NMRA standard, without the need to alter the DCC-decoder of the vehicle when changing from one system to another (with the exception of loco addresses higher than "4").

In this multi-protocol decoder the following operation modes are possible: Motorola Digital, Analog AC, Digital DCC, Analog DC. Automatically controlled, flying change of all 4 modes is guaranteed as well as support of brake lines.

With a DCC-decoder installed, the speed of the loco remains constant, irrespective of the load, i. e. whether up- or downhill, the loco will run at the same speed (allowing for sufficient motive power).

Max. size HO: 20 x 11 x 3.5 mm
Load capacity: Motor 1000 mA, Function outputs 200 mA each.

Address: Electronically codeable · **Special function Light:** Switchable On/Off, coordinated with direction of travel · **Power Control:** Speed unaffected by load · **Acceleration and Braking Inertia:** Settable at several levels · **Control Characteristics:** 2, settable · **Motor and Light Output:** Protected against short circuit · **Overheating:** Switches off when overheated · **Sender function:** Already integrated for RailCom¹⁾.

In the event of a malfunction, the DCC-decoder switches itself off, and in addition, by blinking the loco lights will indicate the type problem:

Continual Blinking: **Short Circuit**

Double Blinking: **Overheating**

Triple Blinking: **Current overload**

Once the cause of the problem has been sorted out, the loco will run once more.

ADVICE:

The digital DCC-DECODERS are high value products of the most modern electronics, and therefore must be handled with the greatest of care: Liquids (i. e. oil, water, cleaning fluid ...) will damage the DCC-DECODER. · The DCC-DECODER can be damaged both electrically or mechanically by unnecessary contact with tools (tweezers, screwdrivers, etc.) · Rough handling (i. e. pulling on the wires, bending the components) can cause mechanical or electrical damage · Soldering onto the DCC-DECODER can lead to failure.

**OPERATION WITH THE FLEISCHMANN
DCC-DIGITAL SYSTEM**

Locos with inbuilt DCC-DECODER can be used with the FLEISCHMANN-controllers LOK-BOSS, PROFI-BOSS, multiMAUS, multiMAUS^{PRO}, TWIN-CENTER and Z21 conforming to the NMRA standard. Which DCC-decoder functions can be used within which parameters are fully described in the respective operating instructions of the respective controller. The prescribed functions shown in the instruction leaflets included with our controllers are fully useable with the DCC-decoder. The simultaneous, compatible running possibilities with D.C. vehicles on the same electrical circuit is not possible with DCC controllers conforming to NMRA standards (see also manual of the respective controller).

CODING THE ADDRESS

Using the controllers TWIN-CENTER, multiMAUS, multiMAUS^{PRO}, PROFI-BOSS and Z21 the address can be altered at any time from address 1 to 9999. Using the LOK-BOSS the address can be altered at any time to address 1 through 4. Please make yourself familiar with the instructions which are included with each piece of equipment.

PROGRAMMING WITH DCC

The DCC-decoder enables a range of further settable possibilities and information according to its characteristics. This information is stored in so-called CVs (CV = Configuration Variable). There are CVs which store only a

CVS OF FLEISCHMANN DCC-DECODER

CV	Name	Basic value	Meaning
1	Loco address	3	For DCC effective with CV29 bit 5=0.
2	v min	5	Minimum speed (range of values: 0-255)
3	Acceleration inertia	3	Inertia value when accelerating
4	Braking inertia	3	Inertia value when braking
5	v max	220	Maximum speed (range of values: 2-255).
6	v mid	1	Medium speed (not in use when 0) for non-linear characteristic curve.
8	Manufacturer ID	145	NMRA identification no. of manufacturer.
17	Extended address (Upper section)	192	Upper section of additional addresses. Effective for DCC with CV29 Bit 5=1.
18	Extended address (Lower section)	0	Lower section of additional addresses. Effective for DCC with CV29 Bit 5=1.
28	RailCom ¹⁾ Configuration	3	Bit 0=1: RailCom ¹⁾ channel 1 (Broadcast) is switched on. Bit 0=0: switched off. Bit 1=1: RailCom ¹⁾ channel 2 (Data) is switched on. Bit 1=0: switched off.
29	Configuration values	14	Bit 0: With Bit 0=1 the direction of travel is reversed. Bit 1: With Bit 1=1 valid for controllers with 28/128 speed levels. For controllers with 14 speed levels use Bit 1=0. Feed current detection: Bit 2=1: DC travel (analog) possible. Bit 2=0: DC travel off. Switching between 3-point-curve (Bit 4=0) and speed table (Bit 4=1) in CV67-94. Bit 3: With Bit 3=1 RailCom ¹⁾ is switched on. With Bit 3=0 it is switched off. Bit 5: For use of the additional addresses 128 – 9999 set Bit 5=1.
60	Function-Dimming	0	Determines the dim factor of the function outputs
66	Speed correction	0	Speed correction forward, correction factor=value in CV64/128 Value valid for running forward.
67 to 94	Adjustment of control characteristic curve of controller		A speed between 0 and 255 can be given in each of the 28 CVs from 67 to 94. CV67 holds the minimum speed, and CV94 holds the top speed. The control characteristic curve is then determined by intermediate values. They decide how the speed of the vehicle alters with the controller setting.
95	Speed correction	0	As CV64, but for running backwards.

by register-programming is also possible. Furthermore, all CVs can be programmed byte-wise on the main track, independently from the programming-track. However, this is possible only if your appliance is capable of this programming-mode (POM - program on main).

Further information concerning that issue is given in the respective manuals and operating instructions of the digital controllers.

The pre-adjusted basic values of the CVs can be altered by use of the above described DCC controllers that accord to NMRA standards. The vehicles will then behave according to the values that you have set within the CVs.

**RUNNING ON CONVENTIONAL
DC LAYOUTS**

You want to run your FLEISCHMANN DCC-loco once in while on a DC layout? No problem at all, because as delivered, we have adjusted the respective CV29 in our decoders so that they can run on "analog" layouts as well! However, you may not be able to enjoy the full range of digital technique highlights.

If a locomotive with this decoder runs from the digital layout into an analog layout and the transformer is set for this area that the locomotive will continue in the same direction, so the locomotive will do so. The speed is dependent on the setting of the transformer. You can then shunt the train in the digital layout and then go to run in an analog circuit of your model railway layout.

BRAKING SECTIONS

In the digital systems you have also automatic braking sections. In this vehicle, the support of braking sections already is turned on.

If a locomotive with this decoder runs from the digital layout into an analog layout and the transformer is set for this area that the locomotive will run in the opposite direction, the locomotive slows down with the deceleration stored in the decoder and stops. The decoder knows that this is the analog braking distance with opposite DC voltage. If the transformer is now turned to zero, then the locomotive can be operated afterwards with the same transformer in analog mode. If the brake section is switched from analog to digital again, the locomotive continues running with its digital commands.

SIMULATION OF TRAIN WEIGHT

In our decoders we have integrated acceleration and braking inertia values, that repre-

RAILCOM¹⁾

The decoder in this car has "RailCom¹⁾", i.e. it does not only receive data from the control center, but can also return data to a RailCom¹⁾ capable control center. For more information please refer to the manual of your RailCom¹⁾ capable control center. By default RailCom¹⁾ is switched off (CV29, Bit 3=0). For operation at a control center that does not have RailCom¹⁾ capability, we recommend to leave RailCom¹⁾ switched off.

**ADVICE ON SWITCHING THE DIGITAL
LAYOUT ON AND OFF**

To switch off your model railway controller, first of all activate the emergency stop function of the controller (see instructions with the controller). Then finally, pull out the mains plug of the controller power supply; otherwise you might damage the appliance. If you ignore this critical advice, damage could be caused to the equipment.

4 modes is guaranteed as well as support of brake lines.
With a DCC-decoder installed, the speed of the loco remains constant, irrespective of the load, i. e. whether up- or downhill, the loco will run at the same speed (allowing for sufficient motive power).

Max. size HO: 20 x 11 x 3.5 mm
Load capacity: Motor 1000 mA, Function outputs 200 mA each.
Address: Electronically codeable · **Special function Light:** Switchable On/Off, co-ordinated with direction of travel · **Power Control:** Speed unaffected by load · **Acceleration and Braking Inertia:** Settable at several levels · **Control Characteristics:** 2, settable · **Motor and Light Output:** Protected against short circuit · **Overheating:** Switches off when overheated. · **Sender function:** Already integrated for RailCom¹⁾.

In the event of a malfunction, the DCC-decoder switches itself off, and in addition, by blinking the loco lights will indicate the type problem:
Continual Blinking: **Short Circuit**
Double Blinking: **Overheating**
Triple Blinking: **Current overload**
Once the cause of the problem has been sorted out, the loco will run once more.

ADVICE:
The digital DCC-DECODERS are high value products of the most modern electronics, and therefore must be handled with the greatest of care: Liquids (i. e. oil, water, cleaning fluid ...) will damage the DCC-DECODER. · The DCC-DECODER can be damaged both electrically or mechanically by unnecessary contact with tools (tweezers, screwdrivers, etc.) · Rough handling (i. e. pulling on the wires, bending the components) can cause mechanical or electrical damage · Soldering onto the DCC-DECODER can lead to failure.

OPERATION WITH THE FLEISCHMANN DCC-DIGITAL SYSTEM
Locos with inbuilt DCC-DECODER can be used with the FLEISCHMANN-controllers LOK-BOSS, PROFI-BOSS, multiMAUS, multiMAUS^{PRO}, TWIN-CENTER and Z21 conforming to the NMRA standard. Which DCC-decoder functions can be used within which parameters are fully described in the respective operating instructions of the respective controller. The prescribed functions shown in the instruction leaflets included with our controllers are fully useable with the DCC-decoder. The simultaneous, compatible running possibilities with D.C. vehicles on the same electrical circuit is not possible with DCC controllers conforming to NMRA standards (see also manual of the respective controller).

CODING THE ADDRESS
Using the controllers TWIN-CENTER, multiMAUS, multiMAUS^{PRO}, PROFI-BOSS and Z21 the address can be altered at any time from address 1 to 9999. Using the LOK-BOSS the address can be altered at any time to address 1 through 4. Please make yourself familiar with the instructions which are included with each piece of equipment.

PROGRAMMING WITH DCC
The DCC-decoder enables a range of further settable possibilities and information according to its characteristics. This information is stored in so-called CVs (CV = Configuration Variable). There are CVs which store only a single information, the so-called Byte, and others that contain 8 pieces of information (Bits). For FLEISCHMANN, the Bits are numbered from 0 to 7. When programming, you will need that knowledge. The CVs required we have listed for you (see CV table).

The pre-adjusted basic values of the CVs can be altered by use of TWIN-CENTER, multiMAUS, multiMAUS^{PRO}, PROFI-BOSS, Z21 and other DCC controllers that accord to NMRA standards and that are capable of the programming by bits and bytes in mode "CV direct". The programming of some CVs

			For controllers with 14 speed levels use Bit 1=0. Feed current detection: Bit 2=1: DC travel (analog) possible. Bit 2=0: DC travel off. Switching between 3-point-curve (Bit 4=0) and speed table (Bit 4=1) in CV67-94. Bit 3: With Bit 3=1 RailCom ¹⁾ is switched on. With Bit 3=0 it is switched off. Bit 5: For use of the additional addresses 128 - 9999 set Bit 5=1.
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SIMULATION OF TRAIN WEIGHT
In our decoders we have integrated acceleration and braking inertia values, that represent the weight of a "real" locomotive (see CV-table). Often, however it is of advantage to be able to switch off this simulation, e.g. when coupling. The inertia can then be switched on and off using the function key F4.

SHUNTING GEAR
Some operational situations require delicate speed adaption, often called 'shunting gear'. By using the F3 function key, you can set your DCC-loco to "half speed" with increased speed levels in order to make the shunting far more finely controllable.

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Detailed information is also available at www.zimo.at

¹⁾ RailCom is a registered trademark of Lenz GmbH, Giessen