STARTERS + ALTERNATORS
PRODUCT EXPERTISE

New part without deposit | High market coverage | Tested quality

CHEERS!

HERE IS SOMETHING YOU CAN TOAST TO:

STARTERS & ALTERNATORS ARE CORE-FREE NEW PARTS AND STAND FOR BEST QUALITY AND EASY HANDLING AT ATTRACTIVE PRICES.

More information under:
www.hella.com/startersalternators

THE WORKSHOP'S FRIEND

HELLA

NEW PARTS – FULL RANGE

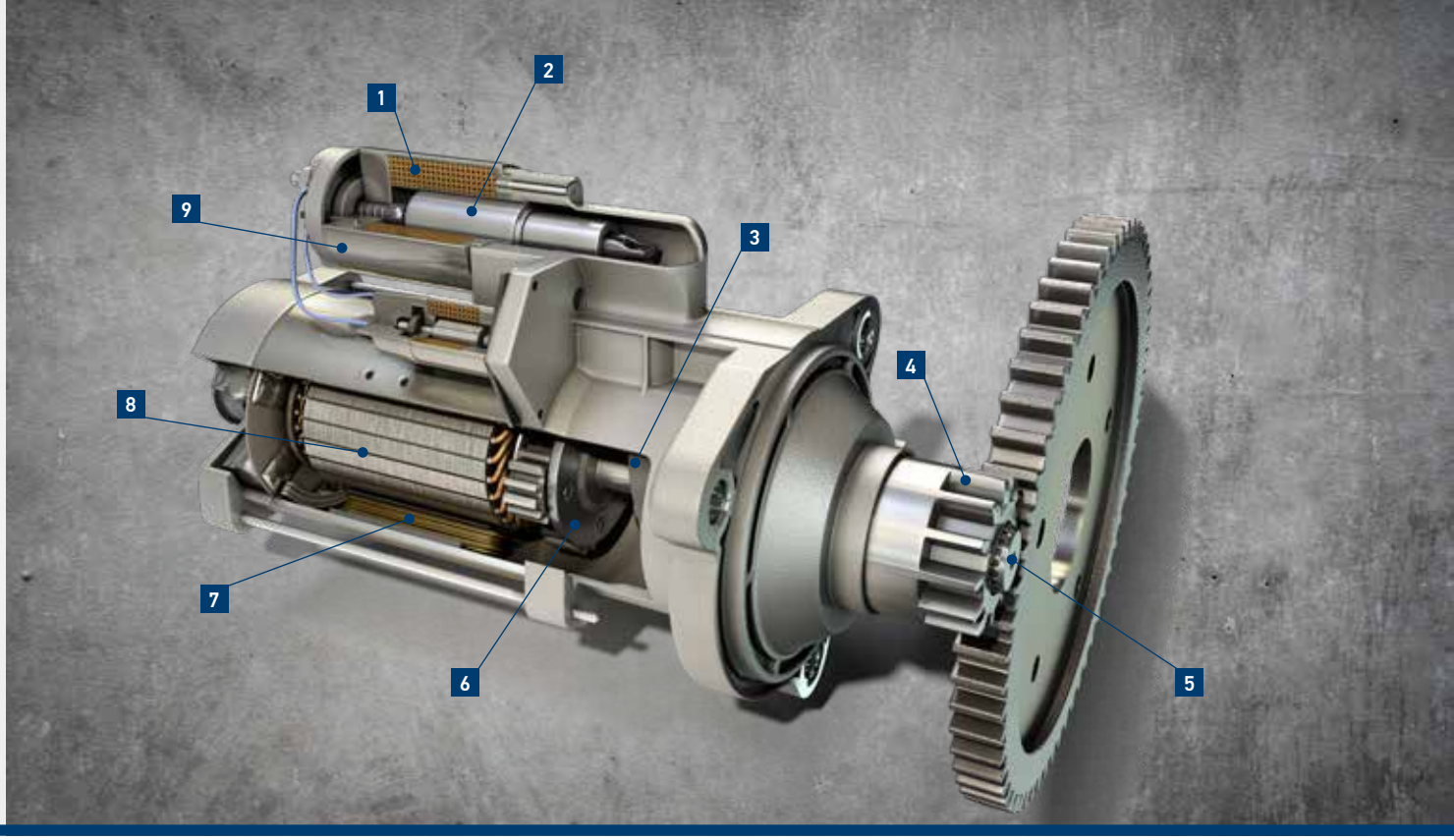
By removing the deposit, there is no necessity to return used parts as part of a risky and complex procedure. The guarantee process is conveniently handled by wholesalers. The relevant starters and alternators are sold in HELLA's yellow and blue packaging featuring "New parts without deposit".

STARTERS AND ALTERNATORS YOUR BENEFITS AT HELLA

- → Starters, alternators and spare parts in OE quality
- → Comprehensive range for cars, vans and commercial vehicles
- → High levels of reliability and long lifetime
- → Ample product range
- → High availability and market coverage
- → Innovative technologies/products, e.g. Start/stop starters
- → Fast and reliable delivery

Important

The following product illustrations are an extract from the HELLA starter and alternator range.
Please refer to TecDoc for the complete product range.



1. Solenoid winding | 2. Through-bolts | 3. Engaging lever | 4. Pinion | 5. Drive shaft
6. Planetary gear | 7. Field winding | 8. Armature | 9. Starter solenoid

Basics

Internal combustion engines cannot start themselves, they have to be started with external energy. This starting procedure can either be electrical, hydraulic or pneumatic.

Electric motors, usually referred to as starters, are used for this purpose in most vehicles. Since large amounts of resistance from friction and compression have to be overcome when starting the vehicle, a DC series-wound motor is particularly well suited because it provides high initial torque.

The starter converts electrical energy into kinetic energy. Diesel vehicles or vehicles with a start/stop system are equipped with a more powerful starter. A reduction gearbox frequently ensures the gear reduction required here to achieve the necessary torque to start the vehicle. A solenoid switch generally helps to 'engage' the starter pinion. In petrol engines, starting the vehicle will place a load of approximately 100A and up to 400A in diesel engines on the battery. The latter coming as a result of the higher compression in diesel engines. The minimum power of a starter not only depends on the type of engine (petrol, diesel), but also on the displacement, the minimum starting speed of the unit and the engine oil formulation specified (oil viscosity). For modern, turbocharged downsizing engines with a lower displacement, a smaller starter with less power is sufficient.

Design

A starter motor is usually composed of the following assemblies:
- → Electric starter motor
- → Engaging relay (solenoid switch)
- → Drive-end bearing with single-pinion gear

The electric starter motor consists in principle of a tubular pole housing accommodating the pole shoes, excitation winding and permanent magnets. The electrical armature with armature winding is situated in this pole housing. The engaging relay, also known as a solenoid switch, is a combination of a relay and solenoid magnet. It is mounted at the top in the drive-end bearing. The single-pinion gear with pinion, free-running roller, engaging lever, carrier and in-line spring are situated in the drive-end bearing.

How they work

The engaging relay is actuated when the motor is started via the ignition lock. The flow of current in the pull-in and hold-in winding attracts the relay armature. This actuates the engaging lever and pushes the carrier unit with pinion and freewheel against the ring gear of the engine flywheel. Once the pinion has meshed completely, the contact bridge in the starter solenoid closes the main circuit for the starter motor. The starter is switched on and turns.

STARTER

Starter	
Voltage	12 V
Power	1.8 kW
Pinions	10 / 11
Basic pinion position	52 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

Audi A2 (8Z0), A3 (8L1)
Ford Galaxy (WGR)
Seat Alhambra (7V8, 7V9), Arosa (6H), Cordoba (6K1, 6K2, 6L2), Cordoba Vario (6K5) Ibiza II (6K1), Ibiza III (6L1), Inca (6K9), Leon (1M1), Toledo I (1L), Toledo II (1M2)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I notchback (6Y3) Octavia I (1U2), Octavia I station wagon (1U5)
VW Bora (1J2), Bora station wagon (1J6) Caddy II box body (9K9A) Caddy II station wagon (9K9B) Golf III (1H1), Golf III convertible (1E7) Golf III station wagon (1H5) Golf IV (1J1), Golf IV convertible (1E7) Golf IV station wagon (1J5) Lupo (6X1, 6E1), New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Passat (3A2, 35I), Passat station wagon (3A5, 35I) Polo (6N2, 9N_), Polo Classic (6V2) Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5) Sharan (7M8, 7M9, 7M6), Vento (1H2)

8EA 011 610-561

Starter	
Voltage	12 V
Power	1 kW
Pinions	10
Basic pinion position	52.5 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

Audi A1 Sportback (8XA, 8XF) A3 (8P1), A3 Sportback (8PA)
Seat Altea (5P1) Altea XL (5P5, 5P8), Cordoba (6L2), Ibiza III (6L1), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Ibiza IV ST (6J8, 6P8), Leon (1P1)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I Praktik (6Y5), Fabia I notchback (6Y3) Fabia II (542), Fabia II station wagon (545) Octavia II (1Z3), Octavia II station wagon (1Z5) Rapid (NH3), Roomster (5J) , Roomster Praktik (5J)
VW Golf IV station wagon (1J5) Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) Golf VI (5K1), Golf VI station wagon (AJ5) Jetta III (1K2), Polo (6R1, 6C1), Polo (9N_), Polo notchback (602, 604, 612, 614)

8EA 012 527-531

Starter	
Voltage	12 V
Power	1.1 kW
Pinions	10
Basic pinion position	19 mm
Design	Clockwise direction of rotation
Flange diameter	68 mm
Number of fixing holes	2

Suitable for:

Chevrolet Aveo/Kalos hatchback (T200, T250, T255) Aveo/Kalos notchback (T250, T255) Cruze (J300), Lacetti (J200), Lacetti station wagon (J200) Lacetti hatchback (KLAN) Nubira station wagon, Nubira notchback, Rezzo MPV (U100)
Fiat Stilo (192_)
Opel Agila (A) (H00), Ascona C (J82), Ascona C CC (J82), Astra F (T92), Astra F convertible (T92) Astra F station wagon (T92) Astra F CC (T92), Astra F Classic station wagon (T92) Astra F Classic CC (T92) Astra F Classic notchback (T92) Astra F Van (T92), Astra G convertible (T98) Astra G CC (T98), Astra G coupe (T98) Astra G box body (F70) Astra G notchback (T98) Astra H (A04), Astra H station wagon (A04) Astra H GTC (A04), Astro H TwinTop (A04), Combo (71_), Combo box body/station wagon, Combo Tour, Corsa A CC (S83) Corsa A box body (S83) Corsa A TR (S83), Corsa B (S93), Corsa B box body (S93) Corsa C (X01), Corsa D (S07), Kadett E (T85), Kadett E convertible (T85) Kadett E station wagon (T85) Kadett E CC (T85), Kadett E Combo (T85), Kadett E box body (T85) Meriva A MPV (X03) Tigra (S93), Tigra TwinTop (X04), Vectra A (J89), Vectra A CC (J89), Vectra B (J96), Vectra B station wagon (J96) Vectra B CC (J96), Vectra C (Z02), Vectra C CC (Z02), Zafira / Zafira Family B (A05), Zafira A MPV (T98)

8EA 011 610-411

Starter	
Voltage	12 V
Power	1.4 kW
Pinions	9
Basic pinion position	22 mm
Design	Clockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	3

Suitable for:

BMW 3 (E36, E46), 3 Series convertible (E30, E36, E46) 3 Compact (E36, E46), 3 Series coupe (E36, E46) 3 Touring (E36, E46), 5 (E34, E39, E60), 5 Touring (E34, E39, E61), 7 (E38, E65, E66, E67), X3 (E83), X5 (E53), Z3 coupe (E36) Z3 Roadster (E36), Z4 Roadster (E85)

8EA 012 526-841

Starter	
Voltage	12 V
Power	2 kW
Pinions	10
Basic pinion position	42.5 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

Audi A3 (8P1), A3 convertible (8P7) A3 Sportback (8PA) TT (8J3, 8N3), TT Roadster (8J9, 8N9)
Seat Altea (5P1), Altea XL (5P5, 5P8), Leon (1P1), Toledo III (5P2)
Skoda Octavia II (1Z3), Octavia II station wagon (1Z5) Superb II (3T4), Superb II station wagon (3T5)
VW Caddy III box body (2KA, 2KH, 2CA, 2CH) Caddy III station wagon (2KB, 2KJ, 2CB, 2CJ) CC (358), Eos (1F7, 1F8), Golf IV (1J1), Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) Golf VI (5K1), Golf VI station wagon (AJ5) Jetta III (1K2), New Beetle (9C1, 1C1), Passat (362, 3C2), Passat CC (357), Passat station wagon (365, 3C5) Scirocco (137, 138), Touran (1T1, 1T2)

8EA 012 526-191

Starter	
Voltage	12 V
Power	1 kW
Pinions	10
Basic pinion position	14 mm
Design	Clockwise direction of rotation
Flange diameter	70 mm
Number of fixing holes	2

Suitable for:

Mercedes-Benz A-Class (W168, W169) B-Class (W245) Vaneo (414)

8EA 012 527-301

STARTER

How does start/stop technology affect the starter?

Start/stop technology has already been used for over 10 years. According to measurements on the basis of the new European driving cycle (NEDC) these technologies can save around 8% in terms of consumption and emissions. In actual city traffic these savings can be significantly higher.

Start/stop starters are geared towards associated, frequent starting procedures by having boosted their lifetime for these special applications. The optimised design makes it possible for the starter to cope with the more frequent starts across the vehicle's lifetime.

For this purpose, the following measures are required:

- → Highly stressed bearings are reinforced
- → Planetary gear additionally improved
- → Use of reinforced single-pinion mechanism
- → Optimised commutator for longer service life

Starter

Voltage	12 V
Power	0.9 kW
Pinions	9
Basic pinion position	-4 mm
Design	Clockwise direction of rotation
Flange diameter	58 mm
Number of fixing holes	3

Suitable for:

Citroën AX (ZA-_), Berlingo (B9), Berlingo/Berlingo First MPV (MF, GJK, GFK) Berlingo / Berlingo First box body (M_) Berlingo box body (B9) BX (XB-_), C2 (JM_), C3 I (FC_, FN_), C3 II (SC_), C3 Pluriel (HB_), C4 coupe (LA_) C4 I (LC_), C4 I notchback, Nemo box body (AA_) Nemo station wagon, Saxo (S0, S1) Xsara (N1), Xsara Break (N2), Xsara coupe (N0) Xsara Picasso (N68), ZX (N2), ZX Break (N2)
Fiat Fiorino box body/station wagon (225_) Qubo (225_)
Peugeot 1007 (KM_), 106 I (1A, 1C), 106 II (1A_, 1C_), 205 I convertible (741B, 20D) 205 II (20A/C), 205 box body, 206 CC (2D) 206 hatchback (2A/C) 206 notchback, 206 SW (2E/K) 207 (WA_, WC_), 207 SW (WK_), 306 (7B, N3, N5), 306 Break (7E, N3, N5), 306 convertible (7D, N3, N5) 306 hatchback (7A, 7C, N3, N5) 307 (3A/C), 307 Break (3E), 307 CC (3B), 307 SW (3H), 309 II (3C, 3A), 405 I Break (15E), Bipper (AA_), Bipper Tepee, Partner Combispace (5_, G_) Partner box body, Partner box body (5_, G_) Partner Tepee

8EA 011 610-441

Starter

Voltage	12 V
Power	1.7 kW
Pinions	9/10
Basic pinion position	8 mm
Design	Clockwise direction of rotation
Flange diameter	82 mm
Number of fixing holes	3

Suitable for:

Alfa Romeo 147 (937_), 156 Sportwagon (932_) 159 (939_), 159 Sportwagon (939_) GT (937_), Mito (955_)
Cadillac BLS
Fiat Brava (182_), Bravo I (182_), Bravo II (198_), Croma (194_), Doblo Cargo (223_), Doblo MPV (119_, 223_, 263_) Doblo box body/station wagon (263_) Doblo platform/chassis (263_) Grande Punto (199_), Idea (350_), Linea (323_, 110_), Multipla (186_), Punto (188_), Stilo (192_), Stilo Multi Wagon (192_), Strada Pick-up (178_)
Lancia Delta III (844_), Musa (350_)
Opel Astra H (A04), Astra H station wagon (A04) Astra H GTC (A04), Astra H box body (L70) Astra J (P10), Astra J station wagon (P10) Astra J GTC, Cascada (W13), Insignia A (G09), Insignia A Sports Tourer (G09) Insignia A notchback (G09) Vectra C (Z02), Vectra C station wagon (Z02) Vectra C CC (Z02), Zafira / Zafira Family B (A05), Zafira Tourer C (P12)
Saab 9-3 (YS3F, E79, D79, D75), 9-3 Cabriolet (YS3F) 9-3 station wagon (YS3F) 9-5 (YS3E, YS3G), 9-5 station wagon (YS3E)

8EA 012 527-771

Starter

Voltage	12 V
Power	1.1 kW
Pinions	9 / 10
Basic pinion position	32 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	3

Suitable for:

Agila (A) Vento (1H2)
Audi A3 (8L1), yyy, yyy
Ford Galaxy (WGR)
Seat Alhambra (7V8, 7V9), Cordoba (6K1, 6K2), Cordoba Vario (6K5) Ibiza II (6K1), Leon (1M1), Toledo II (1M2)
Skoda Fabia I (6Y2), Octavia I (1U2), Octavia I station wagon (1U5)
VW Bora (1J2), Bora station wagon (1J6) Caddy II box body (9K9A) Caddy II station wagon (9K9B) Golf III (1H1), Golf III convertible (1E7) Golf III station wagon (1H5) Golf IV (1J1), Golf IV convertible (1E7) Golf IV station wagon (1J5) New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Passat (3A2, 35I), Passat station wagon (3A5, 35I) Polo Classic (6V2) Sharan (7M8, 7M9, 7M6), Vento (1H2)

8EA 011 610-041

Starter

Voltage	12 V
Power	1.4 kW
Pinions	13
Basic pinion position	21 mm
Design	Clockwise direction of rotation
Flange diameter	78 mm
Number of fixing holes	2

Suitable for:

Opel Astra G station wagon (T98) Astra G CC (T98), Astra G notchback (T98) Astra H (A04), Astra H station wagon (A04) Astra H GTC (A04), Astra H notchback (A04) Astra J station wagon (P10) Opel box body/station wagon, Combo Tour, Corsa C (X01) Corsa C box body (X01) Corsa D (S07), Meriva A MPV (X03) Meriva B MPV (S10) Zafira / Zafira Family B (A05), Zafira Mk II (B) (A05)

8EA 011 610-661

STARTER

Starter	
Voltage	12 V
Power	1.1 kW
Pinions	10
Basic pinion position	53 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

Audi A2 (8Z0)
Seat Coridoba (6L2), Ibiza III (6L1)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I Praktik (6Y5), Fabia I notchback (6Y3)
VW Bora (1J2), Bora station wagon (1J6) Fox hatchback (5Z1, 5Z3, 5Z4) Golf IV (1J1), Golf IV station wagon (1J5) Lupo (6X1, 6E1), New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Polo (9N_), Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5)

8EA 012 527-401

Starter	
Voltage	12 V
Power	0.9 kW
Pinions	9
Basic pinion position	-2 mm
Design	Clockwise direction of rotation
Flange diameter	83 mm
Number of fixing holes	4

Suitable for:

Seat Arosa (6H), Cordoba (6K1, 6K2), Cordoba Vario (6K5) Ibiza II (6K1), Inca (6K9)
VW Caddy II box body (9K9A) Caddy II station wagon (9K9B) Golf III (1H1), Golf III station wagon (1H5) Lupo (6X1, 6E1), Polo (6N1, 6N2), Polo Classic (6V2) Polo van box body/hatchback (6N1) Polo station wagon (6V5) Vento (1H2)

8EA 011 611-041

Starter	
Voltage	12 V
Power	1.2 kW
Pinions	11
Basic pinion position	22 mm
Design	Counterclockwise direction of rotation
Flange diameter	79 mm
Number of fixing holes	2

Suitable for:

Audi A1 Sportback (8XA, 8XF) A3 (8V1, 8VK), A3 Sportback (8VA, 8VF) A3 Sportback (8VA, 8VF)
Seat Leon (5F1)
Skoda Octavia III (5E3, NL3, NR3), Octavia III station wagon (5E5) Superb III (3V3), Superb III Estate (3V5)
VW Beetle (5C1, 5C2), Golf VII (5G1, BQ1, BE1, BE2), Passat (362, 3G2, CB2), Passat CC (357), Passat Estate (365), Polo (6R1, 6C1)

8EA 011 611-581

Starter	
Voltage	12 V
Power	1.1 kW
Pinions	9
Basic pinion position	18 mm
Design	Clockwise direction of rotation
Flange diameter	68 mm
Number of fixing holes	2

Suitable for:

Opel Adam (M13), Astra J coupe, Astra J Sports Tourer (P10) Corsa D (S07), Corsa E (X15), Meriva B MPV (S10), Mokka / Mokka X (J13)

8EA 011 611-491

Starter	
Voltage	12 V
Power	1.7 kW
Pinions	12
Basic pinion position	52 mm
Design	CCW
Flange diameter	76 mm
Number of fixing holes	3

Suitable for:

Audi A1 Sportback (8XA, 8XF) A3 Sportback (8PA)
Seat Altea (5P1), Ibiza Mk IV (6J5, 6P1)
Skoda Octavia II station wagon (1Z5)
VW Caddy IV Estate (SAB, SAJ), Golf Plus Van (521), Golf Van VI station wagon (AJ5) Golf VI Van (5K1_), Passat (3C2), Polo Van (6R), Transporter/Caravelle Mk V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter/Caravelle Mk VI van (SGB, SGG, SGJ, SGC, SHB)

8EA 011 612-221

Starter	
Voltage	12 V
Power	1.4 kW
Pinions	11
Basic pinion position	14 mm
Design	Clockwise direction of rotation
Flange diameter	66 mm
Number of fixing holes	3

Suitable for:

Citroën Berlingo / Berlingo First MPV (MF, GJK, GFK), C4 coupe (LA_) C4 I (LC_), Xsara (N1)
Peugeot 307 (3A/C), 407 SW (6E_)

8EA 011 610-181

STARTER

Starter	
Voltage	12 V
Power	2 kW
Pinions	10
Basic pinion position	52 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	3

Suitable for:

VW Transporter IV van (70B, 70C, 7DB, 7DK, 70J, 70K, 7DC, 7DJ) Transporter IV box body (70A, 70H, 7DA, 7DH) Transporter IV platform/chassis (70E, 70L, 70M, 7DE, 7DL)

8EA 011 611-051

Starter	
Voltage	12 V
Power	2.2 kW
Pinions	10
Basic pinion position	61.5 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

VW Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EA 012 526-111

Starter	
Voltage	12 V
Power	2.5 kW
Pinions	9
Basic pinion position	1.5 mm
Design	Clockwise direction of rotation
Flange diameter	81.5 mm
Number of fixing holes	3

Suitable for:

Fiat Ducato van (250_, 290_) Ducato box body (250_, 290_) Ducato platform/chassis (250_, 290_)

8EA 012 527-651

Starter testing

Since an internal combustion engine cannot start by itself, a functioning starter is essential for a roadworthy vehicle. Starters are fundamentally maintenance-free and will do their job over the entire life of a vehicle. Should they however fail or malfunction, in many cases this is due to oxidised or faulty electrical connections, defective solenoid switches, to damaged electric motors or worn single-pinion gears, to the driving pinion (wear or "clogging-up") or the freewheel. Learn everything about possible problems and how you can remedy the individual cases here.

Symptoms

The following symptoms may indicate a fault in the starter if the engine fails to start:

- → No response when actuating the ignition switch
- → The starter "clacks", but does not engage
- → The starter audibly turns, but without driving the engine

Cause of failure

A starter malfunction can have different causes:

- → Electrical connections faulty
- → Solenoid switch (engaging relay) stiff or faulty
- → Electric motor damaged electrically
- → Single-pinion gear, starter pinion or freewheel damaged

Important

A fault-free supply of power to the starter is imperative for its successful function. The vehicle battery and the positive and ground contact of the starter should be included in the fault diagnostics.

Refer to page 13 for detailed information on troubleshooting.

STARTER

Starter	
Voltage	12 V
Power	1.9 kW
Pinions	11 / 12
Basic pinion position	-4 mm
Design	Clockwise direction of rotation
Number of fixing holes	3

Suitable for:

Citroën C4 coupe (LA_) C4 Grand Picasso I (UA_), C4 I (LC_), C4 II (B7), C4 Picasso I MPV (UD_) C5 II (RC_), C5 II Break (RE_), C5 III (RD_), C5 III Break (RW_), C8 (EA_, EB_), Jumpy (VF7), Jumpy box body
Fiat Scudo (270_, 272_), Scudo box body (270_, 272_) Scudo platform/chassis (270_, 272_)
Peugeot 307 (3A/C), 307 Break (3E), 307 CC (3B), 307 SW (3H), 406 (8B), 406 Break (8E/F), 406 coupe (8C) 407 (6D_), 407 coupe (6C_) 407 SW (6E_), 508 I (8D_), 508 SW I (8E_), 607 (9D, 9U), 807 (E), Expert box body (VF3A_, VF3U_, VF3X_) Expert platform/chassis, Expert Tepee (VF3X_) RCZ

8EA 011 610-281

Starter	
Voltage	12 V
Power	2 kW
Pinions	10 / 11
Basic pinion position	26 mm
Design	Clockwise direction of rotation
Flange diameter	83 mm
Number of fixing holes	2

Suitable for:

Mercedes-Benz C-Class (W202, W203) C-Class coupe (CL203) C-Class station wagon (S202, S203) CLK (C209), E-Class (W210, W211) E-Class station wagon (S210, S211, S124) G-Class (W463) M-Class (W163) S-Class (W220) Sprinter 2 t van (901, 902) Sprinter 2 t box body (901, 902) Sprinter 2 t platform/chassis (901, 902) Sprinter 3 t van (903, 906) Sprinter 3 t box body (903, 906) Sprinter 3 t platform/chassis (903, 906) Sprinter 3.5 t van (906) Sprinter 3.5 t box body (906) Sprinter 3.5 t platform/chassis (906) Sprinter 4 t van (904) Sprinter 4 t box body (904) Sprinter 4 t platform/chassis (904) Sprinter 4.6 t platform/chassis (906) Sprinter 5 t box body (906) Sprinter 5 t platform/chassis (905) Sprinter dump truck (905) V-Class (638/2) Viano (W639), Vito/Mixto box body (W639) Vito van (638, W639) Vito box body (638)

8EA 011 610-001

Starter	
Voltage	12 V
Power	2 kW
Pinions	12
Basic pinion position	19 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	2

Suitable for:

Citroën Jumper van, Jumper box body, Jumper platform/chassis
Fiat Ducato van (250_, 290_) Ducato box body (250_, 290_) Ducato platform/chassis (250_, 290_)
Ford Transit van (FD_ _, FB_ _, FS_ _, FZ_ _, FC_ _) Transit box body (FA_ _) Transit platform/chassis (FM_ _, FN_ _) Tourneo Custom V362 van (F3) Transit Custom V362 van (F3) Transit Custom V362 box body (FY, FZ) Transit Tourneo
Land Rover Defender convertible (L316) Defender Pick-up (L316), Defender platform/chassis (L316) Defender Station Wagon (L316)
Peugeot Boxer van, Boxer box body, Boxer platform/chassis

8EA 012 527-611

Starter	
Voltage	12 V
Power	1.7 kW
Pinions	10 / 11
Basic pinion position	55 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	3

Suitable for:

Audi A3 (8P1), A3 convertible (8P7) A3 Sportback (8PA) TT (8N3), TT Roadster (8N9)
Seat Altea (5P1), Altea XL (5P5, 5P8), Ibiza III (6L1), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Cordoba (6L2), Leon (1P1), Toledo III (5P2)
Skoda Fabia I (6Y2), Fabia II (542), Fabia I station wagon (6Y5) Fabia II station wagon (545) Fabia I notchback (6Y3) Octavia II (1Z3), Octavia II station wagon (1Z5) Roomster (5J), Roomster Praktik (5J), Superb II (3T4)
VW Caddy III box body (2KA, 2KH, 2CA, 2CH) Caddy III station wagon (2KB, 2KJ, 2CB, 2CJ) Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) Jetta III (1K2), Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), Passat (362, 3C2), Passat station wagon (365, 3C5) Polo (9N_), Polo notchback (9A4, 9A2, 9N2, 9A6) Touran (1T1, 1T2), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EA 011 610-221

Starter	
Voltage	12 V
Power	1.7 kW
Pinions	10
Basic pinion position	62 mm
Design	Counterclockwise direction of rotation
Flange diameter	76 mm
Number of fixing holes	2

Suitable for:

Audi A3 (8P1), A3 convertible (8P7) A3 Sportback (8PA) TT (8J3), TT Roadster (8J9)
Seat Altea (5P1), Altea XL (5P5, 5P8), Ibiza III (6L1), Ibiza IV (6J5, 6P1), Ibiza IV SPORTCOUPE (6J1, 6P5) Leon (1P1), Toledo III (5P2)
Skoda Octavia II (1Z3), Octavia II station wagon (1Z5) Superb II (3T4), Superb II station wagon (3T5) Yeti (5L)
VW Caddy III box body (2KA, 2KH, 2CA, 2CH) Caddy III station wagon (2KB, 2KJ, 2CB, 2CJ) EOS (1F7, 1F8), Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) Golf VI (5K1), Golf VI station wagon (AJ5) Jetta III (1K2), Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), Passat (362, 3C2), Passat CC (357), Passat station wagon (3C5) Scirocco (137, 138), Tiguan (5N_), Touran (1T1, 1T2), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EA 011 610-231

Starter	
Voltage	12 V
Power	1.2 kW
Pinions	9
Basic pinion position	26 mm
Design	Clockwise direction of rotation
Flange diameter	82.5 mm
Number of fixing holes	2

Suitable for:

Daewoo Korando (KJ), Korando convertible (KJ) Musso (FJ)
Mercedes-Benz C-Class (W202, W203) C-Class coupe (CL203) C-Class station wagon (S202, S203) CLK (C208), CLK convertible (A208) E-CLASS (W124, W210) E-Class convertible (A124) E-Class coupe (C124) E-Class station wagon (S124, S210) M-Class (W163) MB100 box body (KPA) MB140 box body (KPA) SLK (R170), Sprinter 2 t van (901, 902) Sprinter 2 t box body (901, 902) Sprinter 2 t platform/chassis (901, 902) Sprinter 3 t van (903) Sprinter 3 t box body (903) Sprinter 3 t platform/chassis (903) Sprinter 4 t van (904) Sprinter 4 t box body (904) Sprinter 4 t platform/chassis (904) T1/TN box body/station wagon, T1/TN platform/chassis, V-Class (638/2) Vito van (638) Vito box body (638)
SsangYong Korando (KJ), Korando convertible (KJ) Musso (FJ)
VW LT 28-35 II van (2DB, 2DE, 2DK) LT 28-46 II box body (2DA, 2DD, 2DH) LT 28-46 II platform/chassis (2DC, 2DF, 2DG, 2DL, 2DM)

8EA 012 527-271

STARTER

Starter	
Voltage	24 V
Power	4 kW
Pinions	9
Basic pinion position	48 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	3

Suitable for:

Mercedes-Benz Atego, Atego 2, Axor, Axor 2, Citaro (O 530), Cito (O 520), Conecto (O 345), Econic, LK/LN2, Tourino (O 510), Unimog, Zetros

8EA 012 586-011

Starter	
Voltage	24 V
Power	5.5 kW
Pinions	12
Basic pinion position	48 mm
Design	Clockwise direction of rotation
Flange diameter	92 mm
Number of fixing holes	3

Suitable for:

MAN TGA, TGS, TGX

8EA 012 586-381

Starter	
Voltage	24 V
Power	4 kW
Pinions	9
Basic pinion position	48 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	3

Suitable for:

Mercedes-Benz LK/LN2, LP, MK, NG, O 301, O 309, Unimog

8EA 012 586-121

Starters with different numbers of teeth

As part of product revisions it may be possible that starters with a different number of teeth are installed in a vehicle.

The decisive factor in the equation here is not the actual number of teeth but the shifting of the centre of the armature in order to balance out the difference on the ring gear.

The offset armature shaft corresponds to half a module per tooth, whereby the module is always the ratio of the split p to the number pi (π) thus meaning that the diameter of the ring section or working diameter results from the product of module and number of teeth. Wheel and counter wheel must always have the same module.

For instance, if the objective is to replace a starter with 11 teeth with one featuring 12, the armature shaft with a module of 2.05 is removed further away from the ring gear by 1.025 mm. The ring circumference's point of contact at the pinion and the ring gear thus remains identical despite a different number of teeth. If a starter with a different number of teeth is thus supplied, it can be installed without any issues – provided the vehicle has been correctly assigned.

STARTER

Starter	
Voltage	24 V
Power	4.5 kW
Pinions	10
Basic pinion position	50 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	3

Suitable for:

Iveco EuroTech MH, EuroTrakker, LK/LN2, Stralis, Trakker

8EA 012 586-001

Starter	
Voltage	24 V
Power	4 kW
Pinions	9
Basic pinion position	46 mm
Design	Clockwise direction of rotation
Flange diameter	88 mm
Number of fixing holes	3

Suitable for:

Mercedes-Benz Atego, Atego 2, Citario (O 530), Cito (O 520), Conecto (O 345), Econic, LK/LN2, T2/LN1 platform/chassis, Unimog, Vario van, Vario box body/combination body, Vario dump truck, Vario platform/chassis, Vario cab with engine

8EA 012 586-201

Starter	
Voltage	24 V
Power	7 kW
Pinions	12
Basic pinion position	49 mm
Design	Clockwise direction of rotation
Flange diameter	91.5 mm
Number of fixing holes	3

Suitable for:

Mercedes-Benz Actros, Actros MP2 / MP3, Actros MP4 / MP5, Antos, Axor, Axor 2, Integro (O 550), Touro (O 500), Travego (O 580)

8EA 012 586-231

STARTER

Electrical faults in the starter are mainly caused by overloads.

This can manifest itself in ground and winding short circuits in the field and armature winding, but sometimes also in the coils of the control elements (solenoid switches).

Carbon brushes and collectors are subjected to high loads and are more susceptible to faults than the alternator. While, for example, clamping carbon brushes in the alternator do not cause voltage to arise and thus relieve the alternator, clamping carbon brushes in the starter lead to the formation of significant arcs due to the high currents. These arcs often destroy the collector. A multimeter and a clip-on ammeter are required for troubleshooting. Fault sources (such as the pinion) can, however, also be located through audible perception.

Please also refer to the technical information about "Ground (31)" on page 21.

Starter

Voltage	24 V
Power	5.5 kW
Pinions	10
Basic pinion position	47 mm
Design	Clockwise direction of rotation
Flange diameter	92 mm
Number of fixing holes	3

Suitable for:

Iveco EuroStar, EuroTech MP, EuroTrakker, Stralis, Trakker

8EA 012 586-251

Starter

Voltage	24 V
Power	4 kW
Pinions	11
Basic pinion position	29 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	3

Suitable for:

MAN TGA, TGL, TGM

8EA 012 586-311

Starter

Voltage	24 V
Power	5 kW
Pinions	10
Basic pinion position	26.5 mm
Design	Clockwise direction of rotation
Flange diameter	89 mm
Number of fixing holes	3

Suitable for:

Volvo FL II

8EA 012 586-281

Starter

Voltage	24 V
Power	6.6 kW
Pinions	9
Basic pinion position	84 mm
Design	Clockwise direction of rotation
Flange diameter	92 mm
Number of fixing holes	3

Suitable for:

MAN TGA, E2000, F2000, F90, M90, LION S, NL, NÜ, R, SD, SD, SR, SÜ, ÜL
Mercedes SK, MK, NG, O
NEOPLAN Tourliner N

8EA 012 586-041

STARTER TROUBLESHOOTING – INDIVIDUAL FAULTS

Malfunction: Starter not rotating upon actuation of the ignition switch.

Causes	Remedy
Switch on lighting (low beam). **Lighting weak or not working =** → Cable or ground connection break → Insufficient current flow due to loose or oxidised connections → Battery is discharged → Alternator faulty	→ Check battery cables and connections → Clean battery poles and terminals → Establish electrically secure connection between starter, battery and ground → Measure battery voltage → Check battery, if necessary charge or replace → Check alternator
Solenoid switch not energising: Bypass terminal 30 and 50 at the starter **Starter running/engaging =** → Ignition switch faulty or → cable break	→ Replace ignition switch → Repair break
Solenoid switch energises: Bypass terminal 30 at the starter with the underlying terminal. **Starter starts up =** → Solenoid switch contact dirty or worn	→ Clean/replace solenoid switch or contacts

Malfunction: Starter not rotating if the battery cable is positioned directly on the contact screw below terminal 30 or the starter is not rotating fast enough or does not energise the engine.

Causes	Remedy
Carbon brushes worn	Replace carbon brushes
Clamp carbon brushes	Clean carbon brushes and guides of the brush brackets
Springs tensioned enough, carbon brushes have not established contact	Replace springs
Collector contaminated	Clean collector
Collector grooved or burned	Refurbish or replace starter
Armature or field winding faulty	Refurbish or replace starter

Malfunction: Starter does not engage and energise. The engine rotates only with jolts or not at all.

Causes	Remedy
Battery is discharged	Charge, check battery
Poor conductance of electricity due to loose or oxidised connections	Clean and tighten battery poles and terminals
Clamp carbon brushes	Clean carbon brushes and guides of the brush brackets
Carbon brushes worn	Replace carbon brushes
Collector contaminated	Clean collector
Collector grooved or burned	Refurbish or replace starter
Armature or field winding faulty	Refurbish or replace starter

Fault: Drive pinion does not disengage. Starter engages and energises. The engine only turns with jolts or not at all.

Causes	Remedy
Drive pinion faulty	Replace drive pinion
Ring gear on the flywheel faulty	Rework ring gear, replace if necessary

Fault: Drive pinion does not disengage.

Causes	Remedy
Pinion or steep thread dirty or damaged	Refurbish or replace starter
Solenoid switch faulty	Replace solenoid switch
Return spring worn or broken	Replace return spring

Malfunction: Starter continues to run after having released the ignition switch.

Causes	Remedy
Ignition switch or relay faulty	Switch off the engine immediately! Check switch and relay, and replace if necessary

1. Stator winding | 2. Fan | 3. Pulley
4. Excitation winding | 5. Claw pole rotor | 6. Regulator

Basics

The task of the alternator is to supply all electrical consumers within the vehicle with energy while charging the battery at the same time.

Alternators convert kinetic energy to electrical energy and ensure that a vehicle battery is charged, the vehicle electrical system remains stable and that all consumers in the vehicle are supplied with electricity. Alternators are driven via engine-side V- or V-ribbed belts, which are regularly checked for wear and may have to be replaced. An alternator freewheel decouples the belt drive from the crankshaft, with vibrations being dampened. Due to the coupling function of the alternator freewheel clutch, the torque only acts in the running direction.

The energy itself is generated between the armature and coil according to the principle of electromagnetic induction. The alternating voltage generated here is converted by a rectifier to the direct-current voltage required for the vehicle electrical system.

Three-phase alternators are generally installed in contemporary vehicles. The alternator power, battery capacity and the total power requirements of the vehicle's electrical system are matched to each other.

Design

The alternator is usually composed of the following components:
- → Housing
- → Anchor
- → Alternator rotor
- → Alternator regulator

The stator with three-phase winding is mounted in the alternator housing. Claw poles, excitation winding, fan and slip rings are mounted on the shaft of the alternator rotor. The pulley is mounted on the front of the external part of the shaft. The electronic control unit with carbon brush brackets is attached in the rear area of the alternator.

How they work

Induction is used to generate electricity in the three-phase alternator. An electrical voltage is generated in the stator winding when the magnetic field within this winding changes. This change in the magnetic field is generated by the rotating alternating rotor. Alternating the north and south poles of the magnetic field generates a sinusoidal AC voltage. This alternating voltage, which is unsuitable for the electrical system in the vehicle, is converted to direct-current voltage by the rectifier. The control unit adjusts the alternator voltage to the respective operating state of the motor and to the voltage requirements of all consumers in the system.

ALTERNATORS

Alternator

Charging voltage	14 V
Charging current	90 A
Design	With V-ribbed belt pulley
Pulley diameter	56 mm
Number of ribs	6

Suitable for:

Audi A3 (8L1), Ypsilon (843_), TT (8N3), TT Roadster (8N9)
Seat Altea XL (5P5, 5P8), Cordoba (6K1, 6K2, 6L2) , Ibiza II (6K1), Ibiza III (6L1), Leon (1M1, 1P1) , Toledo II (1M2), Toledo III (5P2)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I notchback (6Y3) Octavia I (1U2), Octavia I station wagon (1U5) Octavia II (1Z3), Octavia II station wagon (1Z5)
VW Bora (1J2), Bora station wagon (1J6) Caddy III box body (2KA, 2KH, 2CA, 2CH) Caddy III station wagon (2KB, 2KJ, 2CB, 2CJ) Golf IV (1J1), Golf IV station wagon (1J5) Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Polo (9N_), Polo Classic (6V2) Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5)

8EL 011 710-311

Alternator

Charging voltage	14 V
Charging current	140 A
Design	With overrunning alternator pulley
Pulley diameter	61.4 mm
Number of ribs	6

Suitable for:

Alfa Romeo 159 (939_), 159 Sportwagon (939_)
Fiat Bravo II (198_), Croma (194_), Grande Punto (199_), Linea (323_, 110_), Sedici I (FY_)
Lancia Delta III (844_)
Suzuki SX4 (EY, GY)

8EL 012 430-801

Alternator

Charging voltage	14 V
Charging current	100 A
Design	With multi-pulley
Pulley diameter	53.5 mm
Number of ribs	5

Suitable for:

Chevrolet Corsa Pick-up
Holden Astra convertible (TS)
Opel Astra F convertible (T92) Astra F station wagon (T92) Astra G convertible (T98) Astra G station wagon (T98) Astra G CC (T98), Astra G coupe (T98) Astra G box body (F70) Astra G notchback (T98) Astra H station wagon (A04) Astra H GTC (A04), Astra H TwinTop (A04), Combo box body/station wagon, Combo Tour, Corsa C (X01) Meriva A MPV (X03) Omega B (V94), Omega B station wagon (V94) Speedster (E01) , Tigra TwinTop (X04), Vectra C (Z02), Vectra C station wagon (Z02) Vectra C CC (Z02), Zafira / Zafira Family B (A05), Zafira A MPV (T98)
Vauxhall Astra Mk IV (G) convertible (T98) Astra Mk IV (G) CC (T98), Astra Mk IV (G) coupe (T98) Astra Mk IV (G) station wagon (T98) Astra Mk IV (G) notchback (T98) Astra Mk V (H) station wagon (A04) Astra Mk V (H) Sport Hatch (A04) Astravan Mk IV (G) (T98), Combo Mk II (C) box body/station wagon (F25) Combo Tour Mk II (C) (F25), Corsa Mk II (C) (X01), Meriva Mk I (A) (X03), Signum (Z03), Tigra TwinTop (X04), Vectra Mk II (C) (Z02), Vectra Mk II (C) CC (Z02), Vectra Mk II (C) station wagon (Z02) VX220 convertible (E01) Zafira Mk I (A) (T98)

8EL 012 427-451

Alternator

Charging voltage	14 V
Charging current	120 A
Design	With V-ribbed belt pulley
Pulley diameter	50 mm
Number of ribs	6

Suitable for:

BMW 3 (E46), 3 Series convertible (E46) 3 Compact (E46), 3 Series coupe (E46) 3 Touring (E46), 5 (E39), 5 Touring (E39), 7 (E38), X5 (E53), Z3 coupe (E36) Z3 Roadster (E36)

8EL 012 428-141

Alternator

Charging voltage	14 V
Charging current	105 A
Design	With multi-pulley
Pulley diameter	54 mm
Number of ribs	4

Suitable for:

Fiat 500 (312_), 500L (351_, 352_), Bravo II (198_), Grande Punto (199_), Punto Van (199_), Stilo Van (192_)
Ford KA (RU8)

8EL 011 713-501

Alternator

Charging voltage	14 V
Charging current	120 A
Design	With multi-pulley
Pulley diameter	50 mm
Number of ribs	7

Suitable for:

Dacia Logan MCV II, Sandero II
Renault Captur I (J5_, H5_), Clio IV (BH_)
Smart Fortwo coupe (453)

8EL 011 713-111

ALTERNATORS

Alternator sizes

The rated voltage (voltage) is the standardised battery voltage (6 V,12 V, 24 V). The charging voltage is the voltage adjusted by the alternator regulator installed in the alternator, which used to charge the battery and supply the vehicle electrical system with energy. As a rule, these are: 7 V, 14 V and 28 V.

Alternator	
Charging voltage	14 V
Charging current	120 A
Design	With V-ribbed belt pulley
Pulley diameter	68 mm
Number of ribs	6

Suitable for:

Volvo S60 I (384), S70 (874), S80 I (184), V70 I (875, 876), V70 II (285), XC70 Cross Country (295), XC90 I (275)
VW LT 28-35 II van (2DB, 2DE, 2DK) LT 28-46 II box body (2DA, 2DD, 2DH) LT 28-46 II platform/chassis (2DC, 2DF, 2DG, 2DL, 2DM) Transporter IV van (70B, 70C, 7DB, 7DK, 70J, 70K, 7DC, 7DJ) Transporter IV box body (70A, 70H, 7DA, 7DH) Transporter IV platform/chassis (70E, 70L, 70M, 7DE, 7DL)

8EL 012 427-541

Alternator	
Charging voltage	14 V
Charging current	85 A
Design	With overrunning alternator pulley
Pulley diameter	58 mm
Number of ribs	7

Suitable for:

Toyota Hiace IV van (_H1_, _H2_) Hiace IV box body (LXH1_, RZH1_, LH1_) Hilux VI Pick-up (_N1_), Hilux VII Pick-up (_N1_, _N2_, _N3_), Land Cruiser 90 (_J9_), Land Cruiser Prado (_J12_)

8EL 011 711-331

Overrunning alternator pulleys in alternators

Features

- → Variant that has been sealed on both sides against any ingress of dust and water
- → Specifically developed for application in three-phase alternators
- → Decoupling of the alternator from rotational irregularities of the crankshaft using the freewheel unit

Alternator	
Charging voltage	14 V
Charging current	180 A
Design	With overrunning alternator pulley
Pulley diameter	50 mm
Number of ribs	6

Suitable for:

Mercedes-Benz Sprinter 3 t van (906) Sprinter 3 t box body (906) Sprinter 3 t platform/chassis (906) Sprinter 3.5 t van (906) Sprinter 3.5 t box body (906) Sprinter 3.5 t platform/chassis (906) Sprinter 4.6 t box body (906) Sprinter 4.6 t platform/chassis (906) Sprinter 5 t box body (906) Sprinter 5 t platform/chassis (906) Viano (W639), Vito/Mixto box body (W639) Vito van (W639)

8EL 012 430-201

Alternator	
Charging voltage	14 V
Charging current	90 A
Design	With overrunning alternator pulley
Pulley diameter	50 mm
Number of ribs	6

Suitable for:

Mercedes-Benz C-Class (W202) C-Class station wagon (S202) Sprinter 2 t van (901, 902) Sprinter 2 t box body (901, 902) Sprinter 2 t platform/chassis (901, 902) Sprinter 3 t van (903) Sprinter 3 t box body (903) Sprinter 3 t platform/chassis (903) Sprinter 4 t van (904) Sprinter 4 t box body (904) Sprinter 4 t platform/chassis (904) Sprinter 5 t platform/chassis (905) Sprinter dump truck (905) V-Class (638/2) Vito van (638) Vito box body (638)

8EL 011 711-511

ALTERNATORS

Alternator

Charging voltage	14 V
Charging current	140 A
Design	With overrunning alternator pulley
Pulley diameter	56 mm
Number of ribs	6

Suitable for:

Audi A3 (8P1), A3 convertible (8P7) A3 Sportback (8PA) A4 (8E2, B6, 8EC, B7), A4 Avant (8E5, B6), A4 convertible (8H7, B6, 8HE, B7) TT (8J3), TT Roadster (8J9)
Seat Alhambra (7V8, 7V9), Altea (5P1), Altea XL (5P5, 5P8), Exeo (3R2), Exeo ST (3R5), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Ibiza IV ST (6J8, 6P8), Leon (1P1), Toledo III (5P2)
Skoda Fabia II (542), Fabia II station wagon (545) Octavia II (1Z3), Octavia II station wagon (1Z5) Roomster (5J), Superb II (3T4), Superb II station wagon (3T5) Yeti (5L)
VW Caddy III box body (2KA, 2KH, 2CA, 2CH) Caddy III station wagon (2KB, 2KJ, 2CB, 2CJ) Crafter 30-35 van (2E_) Crafter 30-50 box bodies (2E_) Crafter 30-50 platform/chassis (2F_) Eos (1F7, 1F8), Golf Plus (5M1, 521), Golf V (1K1), Golf V station wagon (1K5) Golf VI (5K1), Golf VI station wagon (AJ5) Jetta III (1K2), Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), Passat (362, 3C2), Passat CC (357), Passat station wagon (3C5) Polo (6R1, 6C1), Scirocco (137, 138), Sharan (7M8, 7M9, 7M6), Tiguan (5N_), Touran (1T1, 1T2), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EL 011 710-791

Generator

Charging voltage	14 V
Charging current	120 A
Design	With overrunning alternator pulley
Pulley diameter	56 mm
Number of ribs	6

Suitable for:

Audi A3 (8L1), A4 (8D2, B5), TT (8N3), TT Roadster (8N9)
Ford Galaxy (WGR)
Seat Alhambra (7V8, 7V9), Cordoba (6K1, 6K2, 6L2), Cordoba Vario (6K5) Ibiza II (6K1), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Inca (6K9), Leon (1M1), Toledo II (1M2)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I Praktik (6Y5), Fabia I notchback (6Y3) Fabia II (542), Fabia II station wagon (545) Octavia I (1U2), Octavia I station wagon (1U5)
VW Bora (1J2), Bora station wagon (1J6) Caddy II box body (9K9A) Caddy II station wagon (9K9B) Golf IV (1J1), Golf IV station wagon (1J5) Golf V (1K1), LT 28-46 II box body (2DA, 2DD, 2DH) LT 28-46 II platform/chassis (2DC, 2DF, 2DG, 2DL, 2DM) Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Polo (9N_), Polo Classic (6V2) Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5) Roomster (5J), Sharan (7M8, 7M9, 7M6), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EL 011 710-321

Alternator

Charging voltage	14 V
Charging current	90 A
Design	With overrunning alternator pulley
Pulley diameter	56 mm
Number of ribs	6

Suitable for:

Audi A3 (8L1), Allroad (4BH, C5)
Ford Galaxy (WGR)
Seat Alhambra (7V8, 7V9), Cordoba (6K1, 6K2, 6L2), Cordoba Vario (6K5) Ibiza II (6K1), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Inca (6K9), Leon (1M1), Toledo II (1M2)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I Praktik (6Y5), Fabia I notchback (6Y3) Fabia II station wagon (545) Octavia I (1U2), Octavia I station wagon (1U5), Roomster (5J)
VW Bora (1J2), Bora station wagon (1J6) Caddy II box body (9K9A) Caddy II station wagon (9K9B) Fox hatchback (5Z1, 5Z3, 5Z4) Golf IV (1J1), Golf IV station wagon (1J5) Golf V (1K1), Multivan V (7HM, 7HN, 7HF, 7EF, 7EM, 7EN), New Beetle (9C1, 1C1), New Beetle convertible (1Y7) Polo (9N_), Polo Classic (6V2) Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5) Sharan (7M8, 7M9, 7M6), Transporter V van (7HB, 7HJ, 7EB, 7EJ, 7EF, 7EG, 7HF, 7EC) Transporter V box body (7HA, 7HH, 7EA, 7EH) Transporter V platform/chassis (7JD, 7JE, 7JL, 7JY, 7JZ)

8EL 011 710-381

Alternator

Charging voltage	14 V
Charging current	90 A
Design	With V-ribbed belt pulley
Pulley diameter	50 mm
Number of ribs	6

Suitable for:

Seat Arosa (6H), Cordoba (6K1, 6K2, 6L2), Cordoba Vario (6K5) Ibiza II (6K1), Ibiza III (6L1), Ibiza IV (6J5, 6P1), Ibiza IV Sportcoupe (6J1, 6P5) Ibiza IV ST (6J8, 6P8), Inca (6K9)
Skoda Fabia I (6Y2), Fabia I station wagon (6Y5) Fabia I Praktik (6Y5), Fabia I notchback (6Y3) Fabia II (542), Fabia II station wagon (545) Roomster (5J), Roomster Praktik (5J)
VW Bora station wagon (1J6) Caddy II box body (9K9A) Caddy II station wagon (9K9B) Fox hatchback (5Z1, 5Z3, 5Z4) Lupo (6X1, 6E1), New Beetle (9C1, 1C1), Polo (6N2, 6R1, 6C1, 9N_), Polo Classic (6V2) Polo notchback (9A4, 9A2, 9N2, 9A6) Polo station wagon (6V5) Transporter IV box body (70A, 70H, 7DA, 7DH) Transporter IV platform/chassis (70E, 70L, 70M, 7DE, 7DL)

8EL 011 710-481

Alternator

Charging voltage	14 V
Charging current	150 A
Design	With overrunning alternator pulley
Pulley diameter	48.5 mm
Number of ribs	7

Suitable for:

Nissan Primastar van (X83) Primastar box body (X83)
Opel Vivaro A station wagon (X83) Vivaro A box body (X83) Vivaro A platform/chassis (X83)
Renault Espace IV (JK0/1_), Laguna II (BG0/1_), Laguna II Grandtour (KG0/1_), Trafic II box body (FL) Trafic II platform/chassis (EL) Vel Satis (BJ0_)
Vauxhall Vivaro A station wagon (X83) Vivaro A box body (X83) Vivaro A platform/chassis (X83)

8EL 012 426-051

Alternator

Charging voltage	14 V
Charging current	65 A
Design	With pulley
Pulley diameter	65 mm
Number of ribs	1

Suitable for:

Audi 100 (44, 44Q, C3, 4A2, C4), 100 Avant (44, 44Q, C3), 80 (81, 85, B2, 89, 89Q, 8A, B3, 8C2, B4), Coupe (81, 85, 89, 8B)
Seat Toledo I (1L)
VW Caddy I (14), Golf I convertible (155) Golf II (19E, 1G1), Jetta II (19E, 1G2, 165), LT 28-35 I van (281-363) LT 28-35 I box body (281-363) LT 28-35 I platform/chassis (281-363) LT 40-55 I box body (291-512) LT 40-55 I platform/chassis (293-909) Passat (32B, 3A2, 35I), Passat notchback (32B) Passat station wagon (33B, 3A5, 35I) Santana (32B), Scirocco (53B), Transporter III van, Transporter III platform/chassis, Transporter IV van (70B, 70C, 7DB, 7DK, 70J, 70K, 7DC, 7DJ) Transporter IV box body (70A, 70H, 7DA, 7DH) Transporter IV platform/chassis (70E, 70L, 70M, 7DE, 7DL)

8EL 012 427-381

ALTERNATORS

Alternator

Charging voltage	28 V
Charging current	100 A
Design	Without pulley

Suitable for:

Bova Futura, Magiq, Synergy
DAF 75 CF, 85 CF, CF 75, CF 85, XF 95
Solaris Vacanza

8EL 012 584-481

Alternator

Charging voltage	28 V
Charging current	80 A
Design	Without pulley

Suitable for:

Mercedes-Benz Actros, Actros MP2 / MP3, Atego, Atego 2, Axor, Axor 2, Citaro (O 530), Econic, LK / LN2, Tourino (O 510), Unimog, Zetros

8EL 012 584-011

Alternator

Charging voltage	28 V
Charging current	90 A
Design	With V-ribbed belt pulley
Pulley diameter	69 mm
Number of ribs	12

Suitable for:

Iveco EuroStar, EuroTech MP, EuroTrakker, Stralis, Trakker

8EL 012 584-001

Alternator

Charging voltage	28 V
Charging current	100 A
Design	Without pulley

Suitable for:

Mercedes-Benz Actros, Actros MP2 / MP3, Atego, Atego 2, Axor, Axor 2, Citaro (O 530), Cito (O 520), Conecto (O 345), Econic, Tourino (O 510), Unimog, Zetros

8EL 012 584-191

Alternator

Charging voltage	28 V
Charging current	120 A
Design	Without pulley

Suitable for:

MAN HOCL, TGA, TGS, TGX
Neoplan Tourliner
Temsa Diamond

8EL 012 584-461

Alternator

Charging voltage	28 V
Charging current	100 A
Design	Without pulley

Suitable for:

Mercedes-Benz Actros, Actros MP2 / MP3, Atego, Atego 2, Axor, Axor 2, Citaro (O 530), Econic, Unimog, Zetros

8EL 012 584-151

Alternator

Charging voltage	28 V
Charging current	55 A
Design	Without pulley

Suitable for:

MAN E 2000, F 2000, L 2000, M 2000 L, M 2000 M, SÜ, TGA

8EL 012 584-091

Alternator

Charging voltage	28 V
Charging current	80 A
Design	Without pulley

Suitable for:

MAN TGA, TGL, TGM, TGS, TGX

8EL 012 584-251

Alternator

Charging voltage	28 V
Charging current	110 A
Design	Without pulley

Suitable for:

Renault Trucks Kerax, Magnum
Volvo 8700, 9700, B 12, FH, FH 12, FM, FM 12

8EL 012 584-271

ALTERNATORS

Alternator	
Charging voltage	28 V
Charging current	140 A
Design	Without pulley

Suitable for:

Mercedes-Benz Citaro (O 530), Conecto (O 345), Integro (O 550), LK / LN2, LP, MK, O 303, O 402, O 403, O 404, O 405, O 407, O 408, SK, Tourino (O 510), Tourismo (O 350), Travego (O 580)

8EL 012 584-361

Alternator	
Charging voltage	28 V
Charging current	80 A
Design	With V-ribbed belt pulley
Pulley diameter	55 mm
Number of ribs	8

Suitable for:

DAF C65, LF45, LF55

8EL 012 584-721

Alternator testing

The alternator supplies all electrical components in the vehicle with electricity. Alternators can become damaged by the effects of humidity, contamination with oil (e.g. in the case of alternators with flange-mounted vacuum pump) and by corrosion. Short circuiting may occur (for example, with polarity reversal when jump-starting) or bearing damage. Should the alternator lose its full functionality, the electronics will fail after a certain period – the battery will no longer be charged, and the vehicle will no longer be roadworthy. Any faults must be identified in good time in order for this not to happen. We therefore provide you with various problem descriptions and detailed solutions in the following.

Symptoms

The following symptoms may indicate a fault in the alternator:

- → Charging indicator lamp lights up
- → Starting difficulties due to insufficiently charged vehicle battery
- → Vehicle battery heats up due to overload
- → The illuminance of the headlamp fluctuates depending on the engine RPM
- → Bulbs burn out more quickly than normal

Cause of failure

An alternator malfunction can have different causes. The cause is not always due to an internal alternator fault, such as a faulty winding, rotor, rectifier or regulator. Before replacing the alternator, additional components must be considered and checked as a cause of failure.

- → Prematurely aged or faulty vehicle battery
- → Electrical connections on the alternator loose or faulty
- → V-belt or V-ribbed belt loose or faulty
- → Belt tensioner or free-running roller damaged

Important

As a rule, when performing welding work on the vehicle and when removing or installing the alternator, the battery must be disconnected.

Refer to page 20 for detailed information about troubleshooting.

ALTERNATOR TROUBLESHOOTING – INDIVIDUAL FAULTS

Malfunction: Charging indicator lamp flickering.

Causes	Remedy
V-belt too loose	Retighten V-belt

Malfunction: Charging indicator lamp lights up equally brightly at higher engine RPM.

Causes	Remedy
Short circuit to frame at cable D+/61	→ Rectify short circuit to frame → Replace cable
Regulator faulty	Replace regulator
→ Rectifier damaged → Short circuit in DF cable or in the rotor winding	Check alternator and repair or replace if necessary

Fault: Charging indicator lamp lights up brightly with the ignition switched on, but dims or flickers when the engine is running..

Causes	Remedy
Contact resistance in the charging current circuit or in the cable for the indicator lamp	Check cable and connections, and replace if necessary
Regulator faulty	Replace regulator
Alternator faulty	Check alternator, repair, or replace if necessary

Malfunction: Charging indicator lamp lights up when the ignition is switched on.

Causes	Remedy
Battery discharged or faulty	Charge battery, check, replace if necessary
Cables or connections damaged, loose or oxidised	Check cables and connections, attach, replace if necessary
→ Carbon brushes worn → Regulator faulty	→ Replace carbon brushes → Replace regulator
Short circuit of a positive diode	Immediately disconnect battery or B+ (otherwise discharge in situ) and repair/ replace alternator
Oxide coating on the slip rings, break in the rotor winding	Repair/replace alternator
Indicator lamp faulty	Replace indicator lamp

Troubleshooting information

Observe the following fundamental rules when performing troubleshooting on the alternator:

- → Do not disconnect, short circuit or mount battery or connection terminals when the engine is running or the alternator is in operation (voltage peaks can lead to damage)
- → Do not measure voltage or current via short circuit (voltage peaks) - use a voltmeter or ammeter

Please also refer to the technical information about "Ground (31)" on page 21.

Fault: Battery not charging or merely insufficiently charging.

Causes	Remedy
V-belt too loose	Tighten V-belt
Cables or connections loose, damaged, oxidised	Check cables and connections between battery and alternator and the respective ground connection, replace if necessary
Battery faulty	Charge battery, check, replace if necessary
Regulator faulty	Replace regulator
→ Rectifier faulty	Check alternator, repair, or replace if necessary

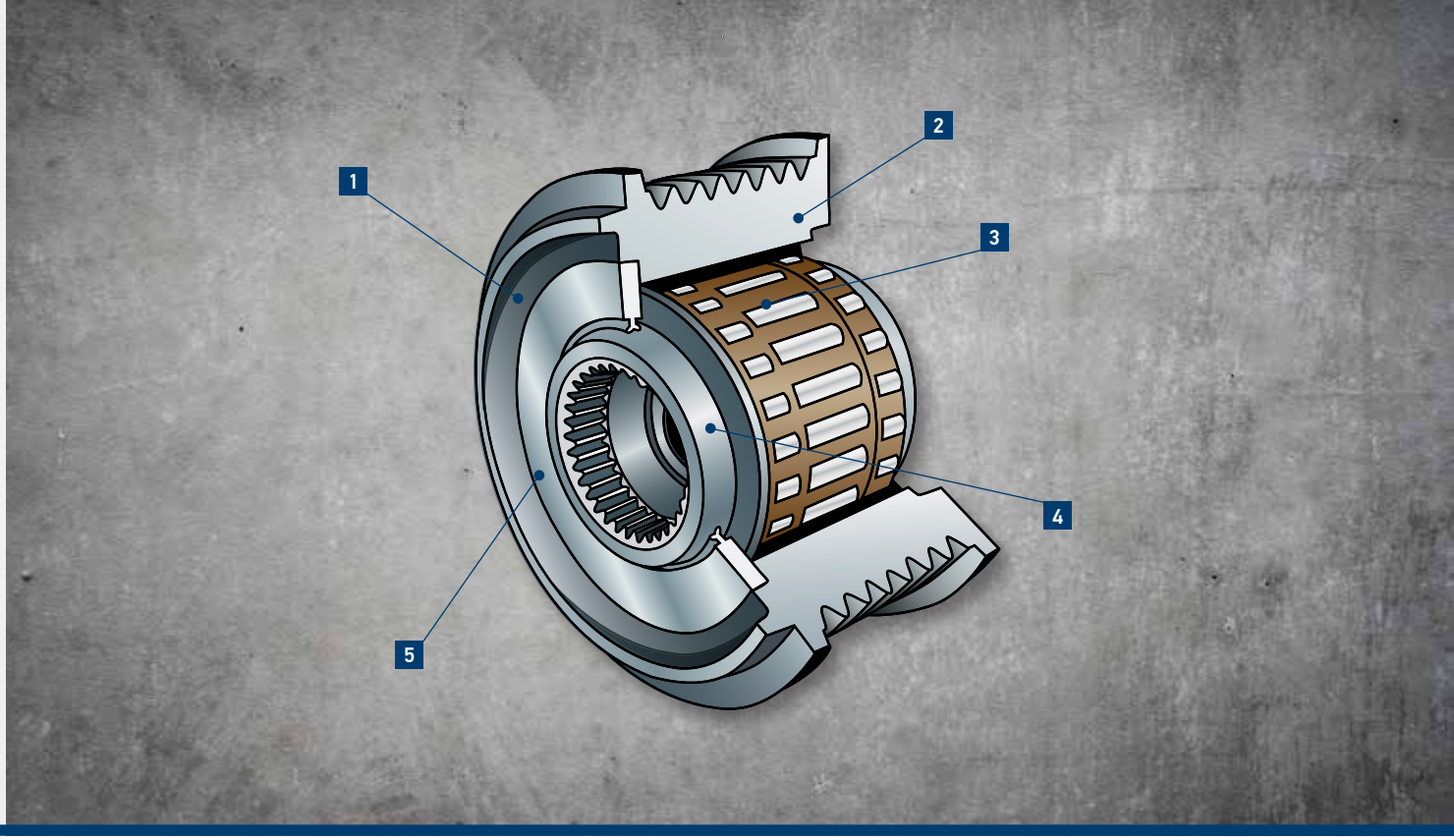
TROUBLESHOOTING AT GROUND (31) – FREQUENTLY NEGLECTED

Loose or oxidised ground connections frequently lead to malfunctions at electrical or electronic components. Areas outside the vehicle interior are particularly affected, for instance alternator, starter, battery, ABS, ignition and injection system (engine electronics). However, the lighting system may also be affected. Diagnostics usually starts by checking the voltage supply. In this process, the opposite connection (ground) to the body, engine or battery is not paid enough attention. However, this connection is just as significant. Small amounts of dirt on terminals or connections can already have significant consequences.

A formation of contact resistance can lead to voltage drops or leakage currents. These may lead to malfunctions or incorrect diagnoses. For this reason, check ground connections have been securely fastened and check they are clean. The metal must be clean and free from dirt, paint and oxidation.

Special contact sprays are available for protection. Also check the cable ends secured to the connectors and cable ends. These may have come loose as a result of temperature fluctuations and vibrations. Water that has penetrated the cables may cause internal corrosion and thus associated malfunctions. Measuring the resistance using a multimeter also forms part of the test scope as does measuring the voltage drop (if possible under load). The following overview provides some starting points for cable resistance, cross sections, maximum continuous current and voltage drops:

Cable cross section in mm²	**Max. Resistance/m (20 °C) mΩ/m**	**Permissible continuous current A**
1 1.5 2.5 46 10 16 25 35 50 70 95 120	18.5 12.7 7.6 4.71 3.14 1.82 1.16 0.743 0.527 0.368 0.259 0.196 0.153	10 20 25 35 50 65 85 120 160 200 250 300 350
Maximum permissible Starter	Voltage drop in Alternator	12 Volt vehicle electrical system (example) Lighting
→ Starter housing to body and/or to engine block: 0.1 V → Negative battery terminal to body and/or to engine block: 0.2 V → Negative battery terminal to starter housing: 0.3 V → Positive battery terminal to starter's main power connection: 0.5 V → Starter's main power connection under load (when starting): 3.5 V → Ignition switch to starter's control current connection: 1.5 V	→ Alternator housing to body and/or to engine block: 0.1 V → Negative battery terminal to body and/or to engine block: 0.2 V → Negative battery terminal to alternator housing: 0.3 V → Positive battery housing to alternator's main power connection: 0.4 V	Voltage drop at positive cable and (in overall circuit): → From light switch at terminal 30 to bulb < 15 W: 0.1 V (0.6 V) → From light switch at terminal 30 to bulb > 15 W: 0.5 V (0.9 V) → From light switch at terminal 30 to headlamps: 0.3 V (0.6 V)



1. Serrated inner ring | 2. Freewheel unit | 3. Radial support bearings
4. Outer ring with profiled track | 5. Overrunning alternator pulley

Basics

During an engine's combustion cycle, the rotary movement of the crankshaft is sped up and slowed down This rotational irregularity is transferred to the unit drive as a result of the alternator's moment of inertia Consequences: Extreme forces and large fluctuations which impact on the belt drive.

Resulting strong vibrations and thrashing noise of the belt. Decoupling the alternator with the freewheel unit compensated for the crankshaft's rotational irregularity.

How they work

Decoupling of the alternator from rotational irregularities of the crankshaft using the freewheel unit

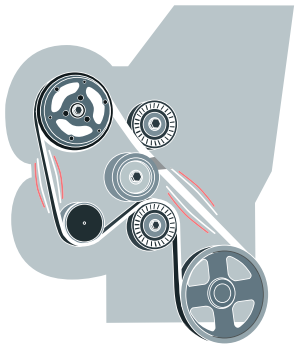
Advantages:

- → Reduces the influence of the alternator's moment of inertia torque on the unit drive
- → Reduces belt load
- → Longer lifetime for all components
- → Reduced fuel consumption
- → Greater driving comfort and improved noise levels

Comparing the pulley and the overrunning alternator pulley

Without alternator freewheel clutch

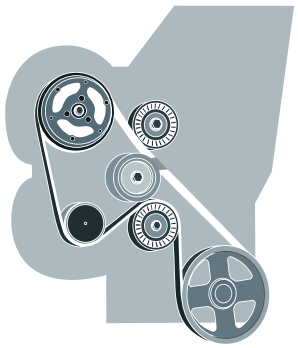
A unit drive with rigid pulleys leads to rotational irregularities and causes a high degree of tension on the belt drive.



Normal pulley

With alternator freewheel clutch

Unit drive with overrunning alternator pulley guarantees a significant reduction of strain on the belt.



Alternator freewheel clutch

ALTERNATOR FREEWHEEL CLUTCHES

Alternator freewheel clutch

Number of grooves	6
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	56.2 mm
Thread dimension	M16 x 1.5

Suitable for:

Bosch, Hitachi, Valeo

9XU 358 038-041

Alternator freewheel clutch

Number of grooves	–
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	62 mm
Thread dimension	M16 x 1.5

Suitable for:

Bosch, Delphi, Denso, Hitachi

9XU 358 038-721

Alternator freewheel clutch

Number of grooves	7
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	64.7 mm
Thread dimension	M16 x 1.5

Suitable for:

Mitsubishi Electric

9XU 358 039-021

Alternator freewheel clutch

Number of grooves	7
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	49 mm
Thread dimension	M17 x 1.5

Suitable for:

Mitsubishi Electric

9XU 358 038-871

Alternator freewheel clutch

Number of grooves	5
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	54 mm
Thread dimension	M16 x 1.5

Suitable for:

Bosch

9XU 358 039-201

Alternator freewheel clutch

Number of grooves	6
Internal diameter	17 mm
Design	Clockwise direction of rotation
Pulley diameter	54 mm
Thread dimension	M16 x 1.5

Suitable for:

Valeo

9XU 358 039-161

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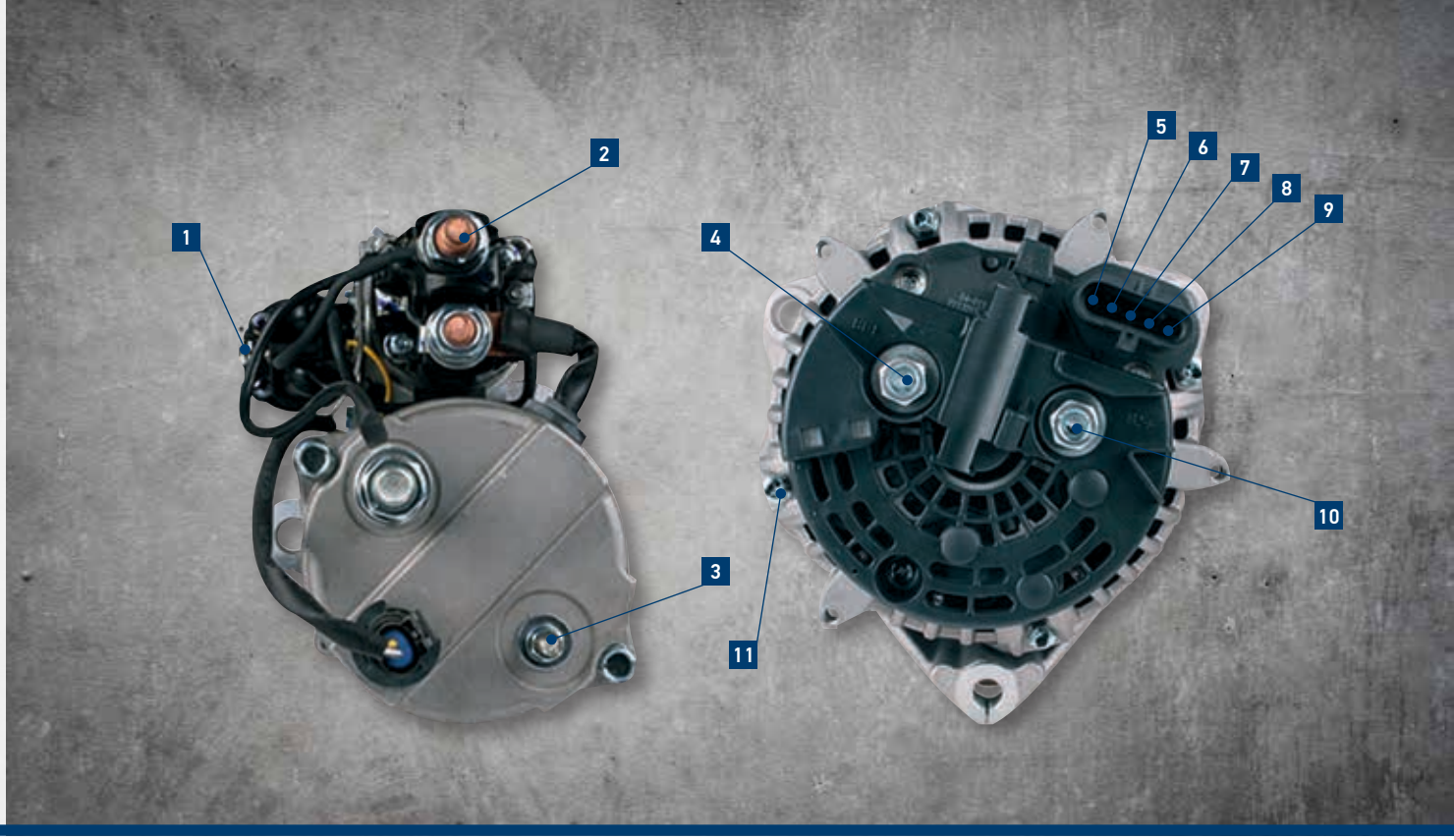

1. Terminal 50c (15/15a) | 2. Terminal 30 (B+) | 3. Terminal 31(B-) | 4. Terminal B+ (B1+) | 5. Connection W
6. Connection/terminal L | 7. Connection/terminal 15 | 8. Connection/terminal S (Sense) | 9. Connection/terminal DFM
10. Terminal B2+ (auxiliary connection) | 11. Terminal 31 (B-) (directly via the housing/vehicle chassis)

DIN 72552 terminal designations

The objective of the standard for electrical systems in motor vehicles is to eradicate connection errors of cables to devices as much as possible, most of all during repair work and when installing spare parts. The terminal and cable designations may deviate from each other because devices with different terminal designations may have been connected to both ends of a cable. For this reason, the designations must not be attached to the cables. Multiple plug connectors for which designations as part of DIN 72552 are no longer sufficient are assigned serial numbers or designations with letters for which the standard has not specified specific functions.

Battery

15	Positive battery terminal via switch, ignition lock, fuse
30	Direct input from positive battery terminal
30a	12/24 V battery changeover relay, input from battery 2 positive
31	Vehicle ground, negative battery terminal
31a	Return cable to second battery negative, 12/24 V changeover relay
31b	Return cable to negative battery terminal or to ground via switch
31c	Return cable to first battery negative, 12/24 V changeover relay

Alternator, alternator regulator

61	Charge controller from alternator
B+	Positive battery terminal
B-	Negative battery terminal
D+	Positive dynamo terminal
D-	Negative dynamo terminal
DF	Dynamo field
DF1	Dynamo field 1
DF2	Dynamo field 2
U, V, W	Three-phase current terminals

Starter

45	Separate starting relay, output, starter: input (principal current)
45a	2-starter parallel operation, starting relay for engagement current, output starter 1
45b	2-starter parallel operation, starting relay for engagement current, output starter 2
48	Terminal on starter and on starting repeat relay
50	Starter, start control direct
50a	Batter changeover relay, output for starter control
50b	Starter control, parallel operation of 2 starters with downstream control
50c	Input in starting relay for starter 1
50d	Input in starting relay for starter 2
50e	Start lock relay input
50f	Start lock relay output
50g	Starting repeat relay input

OE references

OE manufacturer	OE number			Part number
Starter				
ALFA ROMEO	468 2354 3 517 8232 1 551 9248 2	551 9521 1 608 1700 2 717 9259 7	717 9453 0	**8EA 012 527-771**
BMW	12 41 1 712 937 12 41 1 740 373 12 41 1 740 374 12 41 1 740 375	12 41 1 740 379 12 41 2 354 693 12 41 7 501 668 12 41 7 501 738	12 41 7 515 390 12 41 7 515 391 12 41 7 515 392 2 354 693	**8EA 012 526-841**
CHEVROLET	96843578	96952006	96469963	**8EA 011 610-411**
	25192447	25196021	55578921	**8EA 011 611-491**
DAIMLER	004 151 89 01 004 151 92 01 004 151 97 01 005 151 13 01 005 151 66 01	007 151 89 01 007 151 92 01 A 004 151 89 01 A 004 151 92 01 A 004 151 97 01	A 005 151 13 01 A 005 151 66 01 A 007 151 89 01 A 007 151 92 01	**8EA 011 610-001**
	001 151 69 01 004 151 69 01 005 151 06 01 005 151 34 01 005 151 36 01 005 151 46 01	005 151 53 01 005 151 73 01 A 001 151 69 01 A 004 151 69 01 A 005 151 06 01 A 005 151 34 01	A 005 151 36 01 A 005 151 46 01 A 005 151 53 01 A 005 151 73 01	**8EA 012 527-271**
	004 151 85 01 005 151 11 01 005 151 21 01 005 151 47 01	006 151 03 01 A 004 151 85 01 A 005 151 11 01 A 005 151 21 01	A 005 151 47 01 A 006 151 03 01	**8EA 012 527-301**
	004 151 84 01 005 151 20 01 005 151 97 01	006 151 22 01 A 004 151 84 01 A 005 151 20 01	A 005 151 97 01 A 006 151 22 01	**8EA 012 586-011**
	000 151 28 01 001 151 97 01 002 151 02 01 003 151 46 01 004 151 61 01 80	005 151 28 01 A 000 151 28 01 A 001 151 97 01 A 002 151 02 01 A 003 151 46 01	A 004 151 61 01 80 A 005 151 28 01	**8EA 012 586-041**
	001 151 73 01 001 151 96 01 002 151 07 01 003 151 04 01 003 151 08 01 003 151 18 01 80 003 151 74 01 003 151 86 01 003 151 88 01	004 151 59 01 80 004 151 73 01 151 010 03 18 80 A 001 151 73 01 A 001 151 96 01 A 002 151 07 01 A 003 151 04 01 A 003 151 08 01 A 003 151 18 01 80	A 003 151 74 01 A 003 151 86 01 A 003 151 88 01 A 004 151 59 01 80 A 004 151 73 01 A 151 010 03 18 80	**8EA 012 586-121**
	004 151 62 01 005 151 22 01	006 151 21 01 A 004 151 62 01	A 005 151 22 01 A 006 151 21 01	**8EA 012 586-201**
	005 151 64 01 006 151 15 01 006 151 69 01 007 151 02 01	007 151 02 01 007 151 04 01 A 005 151 64 01 A 006 151 15 01	A 006 151 69 01 A 007 151 04 01	**8EA 012 586-231**
FERRARI	963 7813 680			**8EA 011 610-181**
	956 8144 7	965 8144 780		**8EA 012 527-611**
	551 9596 7			**8EA 012 527-651**
	468 2354 3 517 8232 1 518 3295 4	551 9248 2 551 9521 1 608 1700 2	717 9259 7 717 9453 0	**8EA 012 527-771**
FIAT	9637813680			**8EA 011 610-181**
	71739718			**8EA 011 610-411**
	9609313280			**8EA 011 610-441**
	95681447	9658144780		**8EA 012 527-611**
	55195967			**8EA 012 527-651**
	46823543 51782321 55192482	55195211 60817002 71792597	71794530	**8EA 012 527-771**
	99432760			**8EA 012 586-001**
FORD	1 072 156	95VW11000BC		**8EA 011 610-041**
	1 007 765 1 059 564 1003308	1012221 1012395 1072559	95VW 11000 CB 95VW 11000 GA 97VW 11000 AA	**8EA 011 610-561**
	1 372 739 1 385 378 1 574 338 1 669 558	1 709 189 6C1T 11000 AF 6C1T 11000 AB 6C1T 11000 AC	6C1T 11000 AD 6C1T 11000 AE 7H12 11002 AB	**8EA 012 527-611**
HONDA	31200-PLZ-D00			**8EA 011 610-661**
ISUZU	8971891180 8971891181	8973860620	8980147430	**8EA 011 610-661**
IVECO	2995138	99432760		**8EA 012 586-001**
	2995 988	99486046		**8EA 012 586-251**
LANCIA	46823543 51782321 55192482	55195211 60817002 71792597	71794530	**8EA 012 527-771**
MAN	51.26201.7057 51.26201.7061 51.26201.7087	51.26201.7110 51.26201.7123 51.26201.9057	51.26201.9061	**8EA 012 586-041**
	51.26201-7222 51.26201-7237	51.26201-9236	51.26201-9237	**8EA 012 586-311**
MAN	51.26101-7228 51.26201-7199 51.26201-7211	51.26201-7220 51.26201-7228 51.26201-7239	51.26201-9199 51.26201-9211 51.26201-9239	**8EA 012 586-381**

OE manufacturer	OE number			Part number
OPEL (Vauxhall)	1202137 1202142 1202172 1202174 6202075	90421876 90421877 90543871 9115191 9115192	9117031 9130838 93604828	**8EA 011 610-411**
	06202103 1202591 6202000 6202043	6202087 93169014 93174028 97189118	97386062 98014743 R1540010 R1540027	**8EA 011 610-661**
	1202217 1202404 1202419	25192447 25196021 55578921	95520113	**8EA 011 611-491**
	55353857	55358857	6202074	**8EA 012 527-771**
PSA	5802AZ 5802Y4 5802Y5	5802Y6 9637813680 9640825280	9646679980 9664016980 9688268480	**8EA 011 610-181**
	5802EF 5802Z5 5802Z6	5802Z7 9555507680 9646972280	9647157980 9648 242180	**8EA 011 610-281**
	5802EP 5802N3 5802R4 5802Y3 5802C9	5802CG 5802E8 5802P8 5802J1 9633292480	9609313280 9618725080 9648644680 9658308780 97530824	**8EA 011 610-441**
	5802AS	5802FC		**8EA 012 527-611**
RENAULT	50 00 049 122	50 00 241 777		**8EA 012 586-041**
TOYOTA	28100-YV010			**8EA 011 610-181**
VOLKSWAGEN AG	020 911 023 F 020 911 023 FV	020 911 023 FX	02A 911 023 J	**8EA 011 610-041**
	02Z 911 023 F 02Z 911 023 H 02Z 911 023 FX 02Z 911 023 HX	02Z 911 023 M 02Z 911 023 MX 02Z 911 023 N 02Z 911 023 NX	02Z 911 023 P 02Z 911 023 PX 02Z 911 024 K 02Z 911 024 KX	**8EA 011 610-221**
	02M 911 023 N 02M 911 023 P	02M 911 024	02M 911 024 A	**8EA 011 610-231**
	02A 911 023 J 02A 911 023 JX 02A 911 023 R 02A 911 024	02A 911 024 B 02A 911 024 D 02A 911 024 G 02A 911 024 X	02A 911 023 RX 02A 911 023 TV 02A 911 024 BX	**8EA 011 610-561**
	036 911 023 Q 036 911 023 QX 085 911 023 B	085 911 023 BX 085 911 023 E 085 911 023 EX	085 911 023 J 085 911 023 JX	**8EA 011 611-041**
	02B 911 023 D 02B 911 023 DX	02B 911 023 J 02B 911 023 L	02B 911 023 N	**8EA 011 611-051**
	0AM 911 021 0AM 911 023 K	0AM 911 023 KX 0AM 911 023 T	0AM 911 023 TX	**8EA 011 611-581**
	02Z 911 023 M 02Z 911 023 MX 02Z 911 023 N	02Z 911 023 NX 02Z 911 023 P 02Z 911 023 PX	02Z 911 024 K 02Z 911 024 KX	**8EA 011 612-221**
	02M 911 023 Q	02M 911 023 QX		**8EA 012 526-111**
	02E 911 023 H 02E 911 023 L	02E 911 023 LX	02E 911 023 HX	**8EA 012 526-191**
	02T 911 023 D 02T 911 023 E	02T 911 023 G	02T 911 023 GX	**8EA 012 527-401**
	02T 911 023 R 02T 911 023 RX 02T 911 023 S 02T 911 023 SX	02T 911 024 A 02T 911 024 AX 02T 911 024 BX 02T 911 024 C	02T 911 024 CX 02T 911 024 N 02Z 911 023 C	**8EA 012 527-531**
Alternators				
ALFA ROMEO	51727333	51859044	52003538	**8EL 011 713-501**
	71746673	71789538	73501591	**8EL 012 430-801**
BMW	1 432 980 1 432 986 1 432 987 12 31 1 432 980 12 31 1 432 986 12 31 1 432 987	12 31 7 501 593 12 31 7 501 595 12 31 7 501 597 12 31 7 501 599 12 31 7 501 690 7 501 593	7 501 595 7 501 597 7 501 599 7 501 690	**8EL 012 428-141**
DACIA	231000643R	231006677R	231007842R	**8EL 011 713-111**
DAF	1377860 1697023	1697024	1697322	**8EL 012 584-481**
	1387388 1387388R	1400520	1400520R	**8EL 012 584-721**
DAIMLER	010 154 95 02 011 154 06 02 012 154 20 02 012 154 22 02	013 154 17 02 A 010 154 95 02 A 011 154 06 02 A 012 154 20 02	A 012 154 22 02 A 013 154 17 02	**8EL 011 711-511**
	453 906 41 00	A 453 906 41 00		**8EL 011 713-111**
	646 154 01 02 646 154 11 02 80	A 646 154 01 02 80	A 646 154 11 02 80	**8EL 012 430-201**
	011 154 86 02 012 154 04 02 012 154 10 02 012 154 68 02 013 154 28 02	013 154 78 02 80 014 154 53 02 A 011 154 86 02 A 012 154 04 02 A 012 154 10 02	A 012 154 68 02 A 013 154 28 02 A 013 154 78 02 80 A 014 154 53 02	**8EL 012 584-011**
	011 154 87 02 012 154 05 02 012 154 11 02 012 154 67 02 013 154 42 02	013 154 43 02 013 154 79 02 A 011 154 87 02 A 012 154 05 02 A 012 154 11 02	A 012 154 67 02 A 013 154 42 02 A 013 154 43 02 A 013 154 79 02	**8EL 012 584-151**
	009 154 99 02 010 154 00 02 010 154 89 02 010 154 92 02	011 154 89 02 013 154 71 02 A 009 154 99 02 A 010 154 00 02	A 010 154 89 02 A 010 154 92 02 A 011 154 89 02 A 013 154 71 02	**8EL 012 584-191**
	008 154 78 02 011 154 50 02	013 154 73 02 A 008 154 78 02	A 011 154 50 02 A 013 154 73 02	**8EL 012 584-361**

OE references

OE manufacturer	OE number			Part number
FIAT	51727333	51859044	52003538	8EL 011 713-501
	71746673	71789538	73501591	8EL 012 430-801
FORD	1 100 712 1 253 624	3M21 10300 BA	98VW 10300 EA	8EL 011 710-321
	1 100 711 1 253 623	1 580 264 3M21 10300 AA	98VW 10300 CA	8EL 011 710-381
	1 705 484 1 719 535	9S51 10346 HA	BS51 10346 AA	8EL 011 713-501
IVECO	2995980 5003159433 5003317366 5003373944 5040280955 5040657766	504109413 3 504114396 6 504114397 7 500315943 500331736 500337394	504028095 504114396 504114397 504349338 9947 7271	8EL 012 584-001
LANCIA	51727333	51859044	52003538	8EL 011 713-501
	71746673	71789538	73501591	8EL 012 430-801
LEYLAND	AELD074			8EL 012 584-721
MAN	51 26101 7241 51 26101 7231	51 26101 7233 51 26101 7266	51 26101 9266	8EL 012 584-091
	51 26101 7249	51 26101 7271	51 26101 9271	8EL 012 584-251
	51 26101 7278 51 26101 7283	51 26101 7287	51 26101 7296	8EL 012 584-461
OPEL (Vauxhall)	93161735			8EL 012 426-051
	10480459 1204123 13156051 24463063 4431340 55556070 55556071 6204073 6204076 6204098	6204109 6204155 6204192 6204204 6204209 90561970 90561971 9117851 9117931 9129823	9133600 9192823 9195753 9201489 93175795 93180415 93183436 93184064	8EL 012 427-451
RENAULT	77 01 473 735			8EL 011 710-381
	23 10 006 43R	23 10 066 77R	23 10 078 42R	8EL 011 713-111
	82 00 404 459			8EL 012 426-051
	50 01 868 213 50 10 589 551	74 20 466 317	74 20 862 899	8EL 012 584-271
SMART	453 906 41 00	A 453 906 41 00		8EL 011 713-111
SUZUKI	31400-79J00			8EL 012 430-801
TOYOTA	27060-0L020 27060-0L021 27060-30010	27060-30020 27060-30040 27060-30050	27060-30150 27060-30152	8EL 011 711-331
VOLVO	2 040 924 0 2 073 977 8 2 084 935	2 084 935 2 2 142 978 9 8 500 062 8	8 500 062 9 8 500 064 4 8 500 335 7	8EL 012 584-271
	8 111 119 8 111 122	9 442 130	9 459 093	8EL 012 427-541
VOLVO TRUCKS	2 040 924 0 2 073 977 8 2 084 935 2	2 142 978 9 8 500 062 8 8 500 062 9	8 500 064 4 8 500 335 7	8EL 012 584-271
VOLKSWAGEN AG	028 903 028 D 028 903 028 DX 030 903 023 J 030 903 023 JX	038 903 018 X 038 903 023 A 06A 903 023 06A 903 026	06A 903 026 A 06A 903 026 AX	8EL 011 710-311
	021 903 025 K 028 903 026 H 028 903 028 E 028 903 029 G	028 903 030 028 903 030 A 038 903 018 Q 038 903 023 S	038 903 024 F 038 903 024 G 038 903 024 GX 074 903 025 T	8EL 011 710-321
	037 903 025 M 037 903 025 T 038 903 018 A	038 903 018 R 038 903 018 RX 038 903 018 AX	047 903 015 H 047 903 018 A	8EL 011 710-481
	06F 903 023 A 06F 903 023 C 06F 903 023 F	06F 903 023 H 06F 903 023 J 06F 903 023 FX	07K 903 025 A	8EL 011 710-791
	038 903 018 P 038 903 018 PX 038 903 023 L	038 903 023 R 038 903 024 A 038 903 024 D	038 903 024 E 074 903 026	8EL 011 710-381
	026 903 015 A 026 903 015 E 026 903 015 EX	026 903 017 A 026 903 017 AX 026 903 023 A	026 903 023 B 037 903 023 P 076 903 023 J	8EL 012 427-381
	074 903 025 J	074 903 025 Q	074 903 025 R	8EL 012 427-541
Alternator freewheel clutches				
FIAT	77363468			9XU 358 039-161
FORD	1 469 755	6M21 10344 BA		9XU 358 038-041
LANCIA	77363468			9XU 358 039-161
MITSUBISHI	A2 52C5 64FE			9XU 358 039-021
NISSAN	23151-EB301	23151-EB30A		9XU 358 039-021
	23151-JG71B			9XU 358 038-871
VOLVO	31285818			9XU 358 039-161
	30667682			9XU 358 039-201
VOLKSWAGEN AG	021 903 119 G 022 903 119 A 022 903 119 C	028 903 119 AM 038 903 119 A 038 903 119 S	038 903 119 T L03 890 311 9S	9XU 358 038-041
	070 903 201 C	070 903 201 E		9XU 358 038-721

OEM REFERENCES

OEM MANUFACTURER	OEM number			Part number
Starter				
BOSCH	0 124 325 003	0 124 325 135	0 124 325 137	8EL 011 710-311
	0 124 515 010 0 124 515 011 0 124 515 012 0 124 515 110	0 124 515 117 0 124 515 119 0 124 515 121 0 124 515 123	0 124 515 124 0 124 515 125 0 124 515 127	8EL 011 710-321
	0 124 325 001 0 124 325 088	0 124 325 101 0 124 325 131	0 124 325 149	8EL 011 710-381
	0 124 325 013	0 124 325 032	0 124 325 150	8EL 011 710-481
	0 124 525 039 0 124 525 050 0 124 525 066	0 124 525 067 0 124 525 091 0 124 525 092	0 124 525 102 0 124 525 525 0 124 525 539	8EL 011 710-791
	0 124 315 033			8EL 011 711-331
	0 123 320 051 0 123 320 065	0 124 325 039 0 124 325 046	0 124 325 093 0 124 325 105	8EL 011 711-511
	0 120 489 185 0 120 489 364 0 120 489 365	0 120 489 370 0 120 489 499 9 127 041 200	9 127 041 201	8EL 012 427-381
	0 124 225 002 0 124 225 024 0 124 225 046	0 124 225 050 0 124 415 002 0 124 425 022	0 124 425 025	8EL 012 427-451
	0 124 515 013 0 124 515 020	0 124 515 021 0 124 515 038	0 124 515 068	8EL 012 427-541
	0 123 515 022	0 124 515 050	0 124 515 052	8EL 012 428-141
	0 123 525 502			8EL 012 584-001
	0 124 555 004 0 124 555 022	0 124 555 032 0 124 555 001	0 124 555 002 0 124 555 065	8EL 012 584-011
	0 123 325 500	0 123 325 507		8EL 012 584-091
	0 124 655 001 0 124 655 002	0 124 655 004 0 124 655 016	0 124 655 023	8EL 012 584-151
	0 120 468 143 0 120 468 145	6 033 GB3 010 6 033 GB3 023	0 120 469 119 6 033 GB3 083	8EL 012 584-191
	0 124 555 013			8EL 012 584-251
	0 124 655 008 0 124 655 012	0 124 655 019	0 124 655 499	8EL 012 584-271
	0 120 689 535	0 120 689 571	0 120 689 587	8EL 012 584-361
	0 124 655 025			8EL 012 584-461
	0 124 655 003 0 124 655 036	0 124 655 037	0 124 655 039	8EL 012 584-481
	0 124 555 006			8EL 012 584-721
DELCO REMY	19092036			8EL 012 584-011
	19070013			8EL 012 584-151
	19025112			8EL 012 584-191
	19092046			8EL 012 584-251
	19092000			8EL 012 584-271
	10480225	3493225	3493459	8EL 012 427-451
	8600788			8EL 012 584-481
	19092045			8EL 012 584-721
DENSO	102211-2310 102211-2810 102211-5600	104210-8020 104210-8021 104210-8240	104210-9010 104210-9011	8EL 011 711-331
	102211-8690	102211-8691		8EL 011 713-501
	102211-8270	101210-0990		8EL 012 430-801
	8600498			8EL 012 584-001
HITACHI	LR1120-701			8EL 011 710-321
MAGNETI MARELLI	063533250010			8EL 011 710-381
	063533250130			8EL 011 710-481
	63377031			8EL 011 713-501
	63321940	63377005	063377005010	8EL 012 430-801
MAGNETON	9517413			8EL 011 710-381
	9517212			8EL 011 710-481
MITSUBISHI	A004TA0592 A4T A0592	A004TA8292 A004TA8492	A4TA8292 A4TA8492	8EL 012 584-001
	A4TR5592	A4TR5592ZT		8EL 012 584-271
VALEO	2542241 2542767	2543320 SG9B013	SG9B059 SG9B087	8EL 011 710-311
	2542237 2542949	SG12B015	SG12B090	8EL 011 710-321
	2542245 2542948	SG9B015	SG9B078	8EL 011 710-381
	2541998 2542282	A13VI223	SG9B024	8EL 011 710-481
	2542695 2542898	TG14C011 TG14C015	TG16C016	8EL 011 710-791
	TG12C125 TG12C164	TG12C166	TG12S272	8EL 011 713-111
	2542966	TG15C058		8EL 012 426-051
	2541434 2541434A	2940305 2940375	VA256	8EL 012 427-381
	2542543	SG7S021		8EL 012 427-451
	2541963 2542377	A14VI22	SG12B029	8EL 012 428-141
	TG17C061			8EL 012 430-201

OEM REFERENCES

OEM MANUFACTURER	OEM number			Part number
Alternators				
BOSCH	0 001 109 014 0 001 109 036	0 001 109 250	0 001 109 290	**8EA 011 610-001**
	0 001 121 006 0 001 121 007	0 001 121 028	0 001 121 029	**8EA 011 610-041**
	0 001 123 012	0 001 123 013		**8EA 011 610-221**
	0 001 123 014 0 001 123 015	0 001 123 038	0 001 123 039	**8EA 011 610-231**
	0 001 106 011 0 001 106 015	0 001 107 401	0 001 112 035	**8EA 011 610-411**
	0 001 112 019 0 001 112 029	0 001 112 041	F 000 AL0 327	**8EA 011 610-441**
	0 001 124 001 0 001 124 002 0 001 125 007	0 001 125 008 0 001 125 012 0 001 125 013	0 001 125 042 0 001 125 043	**8EA 011 610-561**
	0 001 112 027 0 001 112 028	0 001 112 044 0 001 112 045	0 001 113 013 0 001 113 014	**8EA 011 611-041**
	0 001 124 005 0 001 124 006 0 001 125 001	0 001 125 002 0 001 125 011 0 001 125 031	0 001 125 032	**8EA 011 611-051**
	0 001 107 521 0 001 107 522	0 001 192 009 0 001 192 069	0 001 192 080 0 001 192 086	**8EA 011 611-491**
	0 001 123 028	0 001 123 029		**8EA 011 612-221**
	0 001 125 605	0 001 125 606		**8EA 012 526-111**
	0 001 123 016 0 001 123 017	0 001 123 036	0 001 123 037	**8EA 012 526-191**
	0 001 107 442 0 001 107 443 0 001 108 054	0 001 108 157 0 001 108 190 0 001 108 401	0 001 108 230	**8EA 012 526-841**
	0 001 107 037 0 001 107 048	0 001 107 072 0 001 107 096	0 001 107 403 0 001 107 416	**8EA 012 527-271**
	F 000 AL0 101	F 000 AL0 127	F 009 AL0 101	**8EA 012 527-301**
	0 001 120 400 0 001 120 401	0 001 121 016	0 001 121 017	**8EA 012 527-401**
	0 001 120 406	0 001 120 407		**8EA 012 527-531**
	0 001 109 205 0 001 109 304 0 001 109 305	0 001 109 324 0 001 109 325 0 001 109 328	0 001 109 329 0 001 109 391	**8EA 012 527-611**
	0 001 108 202 0 001 108 234	0 001 108 235 0 001 108 224	0 001 108 239 0 001 108 240	**8EA 012 527-771**
	0 001 231 002 0 001 231 032 0 001 231 033	0 001 231 133 0 001 263 015 0 001 263 016	0 001 263 049	**8EA 012 586-011**
	0 001 330 065 0 001 410 088 0 001 411 009	0 001 411 024 0 001 411 324 0 001 417 001	0 001 417 038 0 001 417 051 0 001 410 024	**8EA 012 586-041**
	0 001 360 022 0 001 360 037 0 001 360 052 0 001 360 065 0 001 368 022 0 001 368 024	0 001 368 035 0 001 368 055 0 001 368 062 0 001 368 300 0 001 368 307 0 001 368 309	0 001 816 326 0 001 816 570 9 000 083 065 9 000 143 601 9 120 600 027	**8EA 012 586-121**
	0 001 330 050			**8EA 012 586-231**
	0 001 231 023	0 001 231 034		**8EA 012 586-311**
	0 001 241 005	0 001 241 009	0 001 241 021	**8EA 012 586-381**
DELCO REMY	96550792			**8EA 011 610-411**
	8000032			**8EA 012 527-651**
	8200242			**8EA 012 586-001**
	19084014			**8EA 012 586-011**
	19024051			**8EA 012 586-041**
	19024204			**8EA 012 586-121**
	10461470 10479626	8200138	8200297	**8EA 012 586-201**
	19081009	8200519		**8EA 012 586-231**
	19085003			**8EA 012 586-251**
	19084007			**8EA 012 586-311**
	19081019			**8EA 012 586-381**
DENSO	428000-1640			**8EA 011 610-181**
	428000-1620			**8EA 011 610-281**
	428000-6700 428000-6701	428000-6702	428080-6702	**8EA 011 612-221**
	428000-0670			**8EA 012 526-841**
	228000-5640	228000-5641		**8EA 012 586-001**
	228000-7550	228000-7551		**8EA 012 586-251**
HITACHI	S114-829 S114-829A	S114-829B S114-869	S114-925	**8EA 011 610-661**
MAGNETI MARELLI	063521092500			**8EA 011 610-001**
	063521210280			**8EA 011 610-041**
	063521230120			**8EA 011 610-221**
	063521230140			**8EA 011 610-231**
	0632 80090			**8EA 011 610-281**
	063521120410			**8EA 011 610-441**
	063521250420			**8EA 011 610-561**
	63223039 0632 93039	063293039010	063521120440	**8EA 011 611-041**

OEM MANUFACTURER	OEM number			Part number
MAGNETON	443115141313	443115141394		**8EA 011 610-041**
	9141319	9141414		**8EA 011 611-051**
	915101A	9999984		**8EA 012 527-531**
MITSUBISHI	M0T22472			**8EA 011 610-181**
	M1T30071 M1T30072	M001T30071	M001T30072	**8EA 012 527-771**
	M008T61671	M8T61671		**8EA 012 586-001**
	M009T20171 M9T20171	M9T80472 M9T80473	M9T83671	**8EA 012 586-231**
	M8T62471	M8T62471AM		**8EA 012 586-281**
	M8T62771			**8EA 012 586-311**
	M009T61971	M9T61971	M9T62071	**8EA 012 586-381**
NIKKO	0-23000-2350	0-23000-2358	0-23000-2590	**8EA 012 586-201**
VALEO	D7R19 D7R28 D7R281	D7R43 D7R46 D7RP123	ND162	**8EA 011 610-001**
	D6RA110	TS14E110		**8EA 011 610-181**
	191335	D7GS8	TS18E1	**8EA 011 610-221**
	D7GS10	TS18E3	TS18ER123	**8EA 011 610-231**
	D8R27	D8R29		**8EA 011 610-281**
	D6RA132 D6RA162 D6RA163 D6RA249	D6RA293 D6RA32 D6RA62 D6RA93	D7EP12 ND134	**8EA 011 610-411**
	D6G3 D6RA100 D6RA37 D6RA57 D6RA571	D6RA572 D7E16 D7E2 D7E23 D7E25	D7E5 ND131 ND212 TS8E2 VS272	**8EA 011 610-441**
	D7RS130	D7RS30	D7RS301	**8EA 011 610-561**
	D7RS131	D7RS31		**8EA 011 611-051**
	TS12ER22	TS12ER22M		**8EA 011 611-581**
	TS18ER121	TS18ER121A	TS18ER121B	**8EA 011 612-221**
	D6G5 D6RA83 D7E18	D7E38 D7E4 D7E8	ND209	**8EA 012 527-301**
	D6GS12			**8EA 012 527-531**

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J01694/10.22