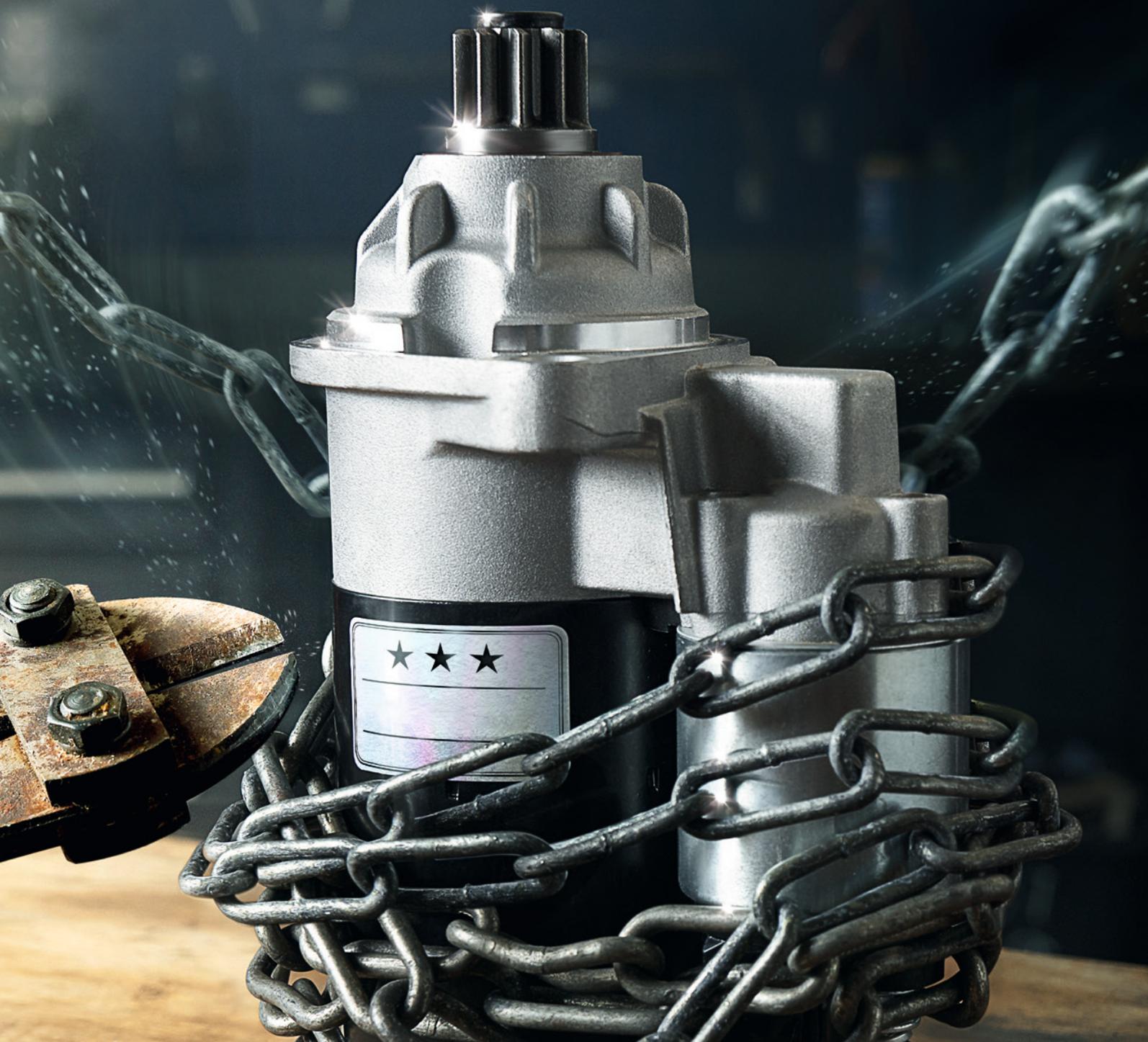




**STARTERS + ALTERNATORS**  
PRODUCT EXPERTISE



3 years guarantee | New part without deposit | High market coverage

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## 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".

There is a three year warranty on components as of October 2017 as the purchase date. The warranty is further extended by one year, over and above the statutory guarantee period. Besides reimbursement of the price for the part, the guarantee also covers installation and removal costs incurred up to a value of €250.

Wear and damage caused by improper handling as well as starters and alternators that have run in excess of 150,000 km since their installation are exempt from the guarantee.

If workshop customers hold statutory defects or product liability rights, they will however remain in force independently of the guarantee. Every starter/alternator packaging also includes a sticker. This can be affixed to the service booklet or the invoice as proof of replacement of the starter or alternator.

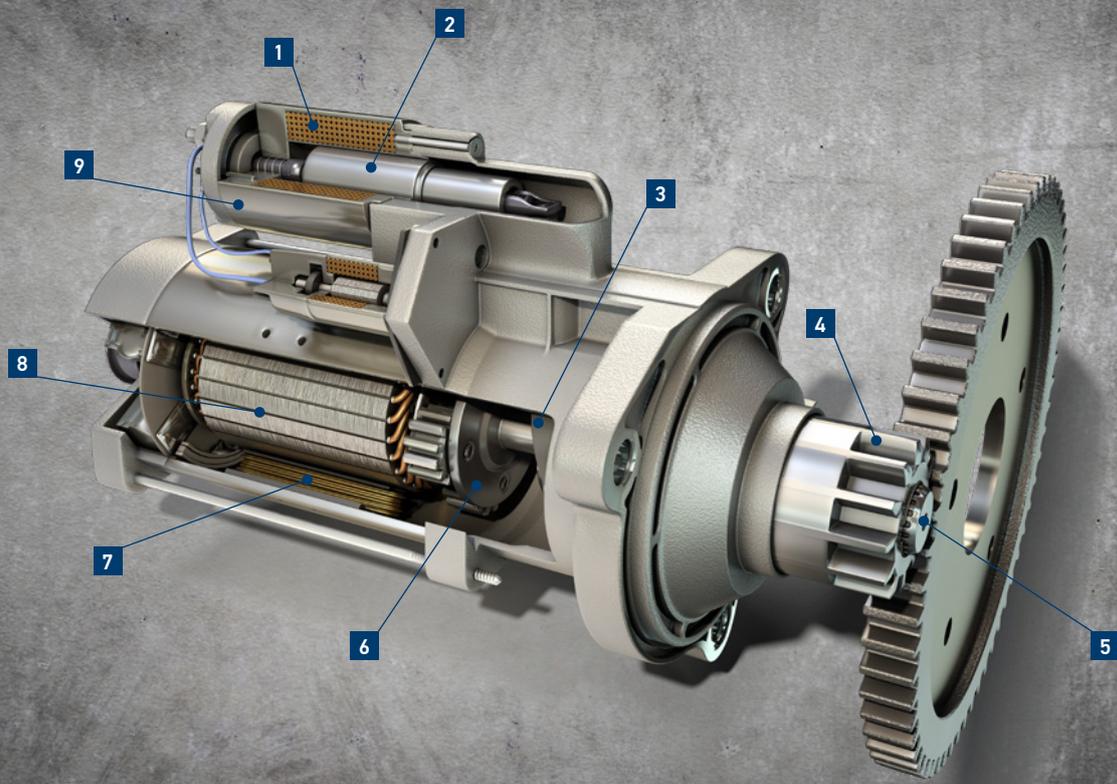
## STARTERS AND ALTERNATORS YOUR BENEFITS AT HELLA

- 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, 5Z1), 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, 5Z1), 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 Combispac (5-, 6-) Partner box body, Partner box body (5-, 6-) 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 (Y53F, E79, D79, D75), 9-3 Cabriolet (Y53F) 9-3 station wagon (Y53F) 9-5 (Y53E, Y53G), 9-5 station wagon (Y53E)

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 (5GB, 5GG, 5GJ, 5GC, 5HB)

**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, 70DB, 70DK, 70J, 70K, 70C, 70J) Transporter IV box body (70A, 70H, 70DA, 70DH) Transporter IV platform/chassis (70E, 70L, 70M, 70DE, 70DL)

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\_), CB (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



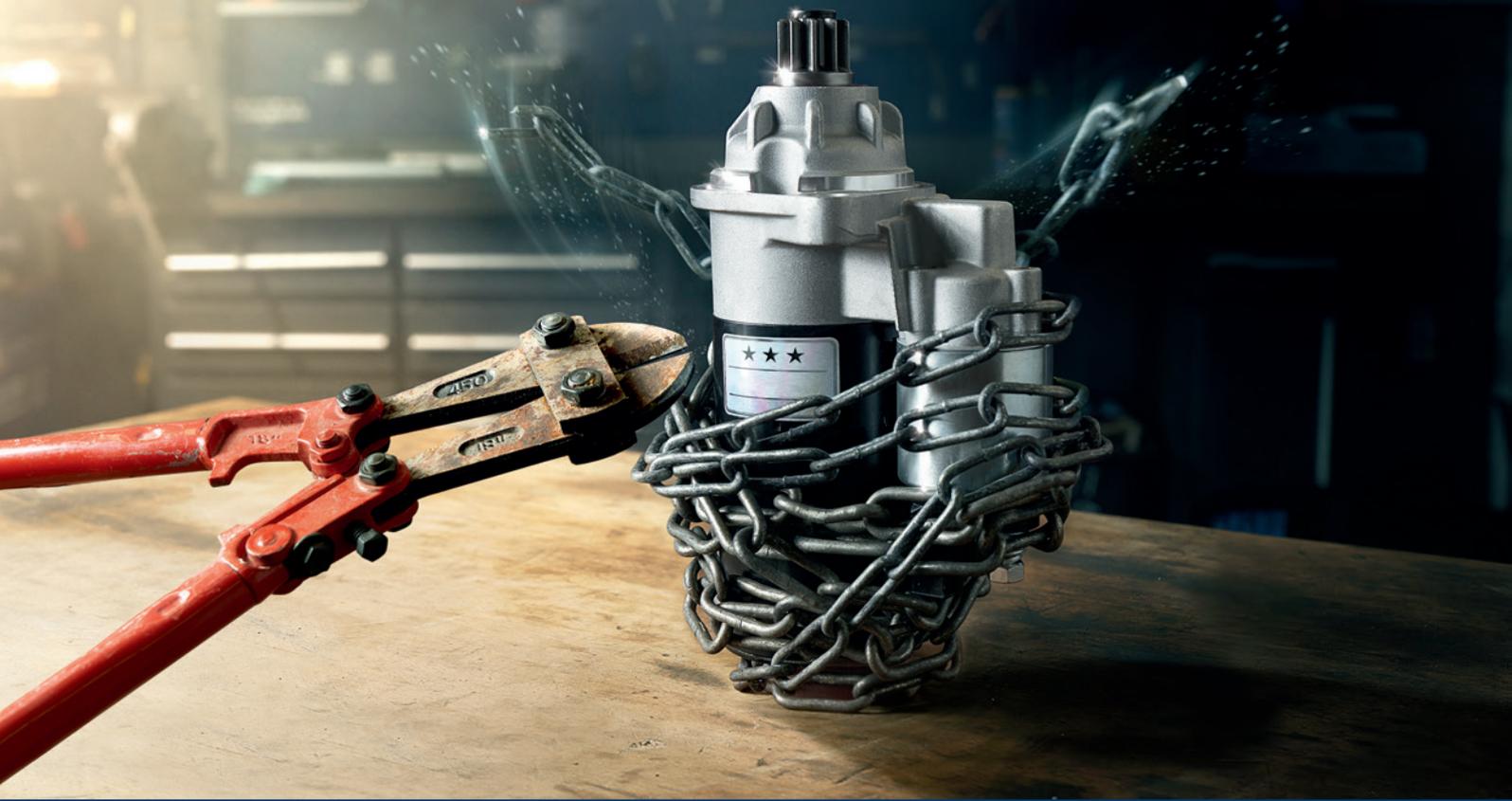
## Starter

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), Eonic, 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  $pi$  ( $n$ ) 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, SU, UL 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). <b>Lighting weak or not working =</b> → 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 <b>Starter running/engaging =</b> → Ignition switch faulty or → cable break	→ Replace ignition switch → Repair break
Solenoid switch energises: Bypass terminal 30 at the starter with the underlying terminal. <b>Starter starts up =</b> → 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.

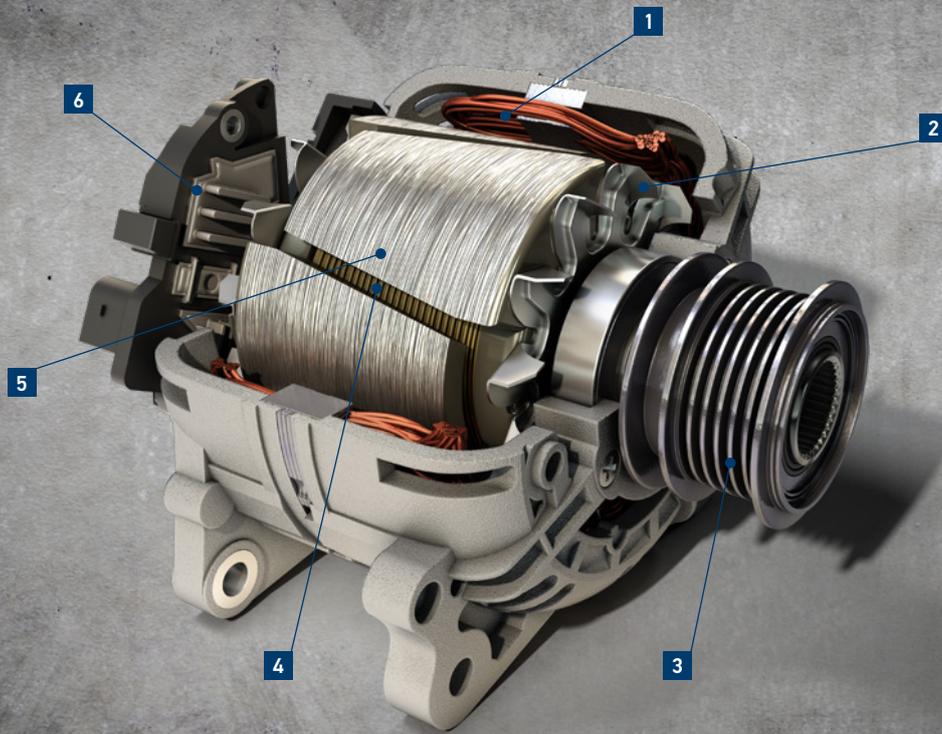
Causes	Remedy
Drive pinion faulty	Replace drive pinion
Ring gear on the flywheel faulty	Rework ring gear, replace if necessary

**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\_), Cromia (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, 70D, 70K, 70J, 70K, 70C, 70J) Transporter IV box body (70A, 70H, 70A, 70H) Transporter IV platform/chassis (70E, 70L, 70M, 70E, 70L)

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, 5Z1), 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, 70D, 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, 35), Passat notchback (32B) Passat station wagon (33B, 3A5, 35) 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  
Temsu 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), Turismo (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.

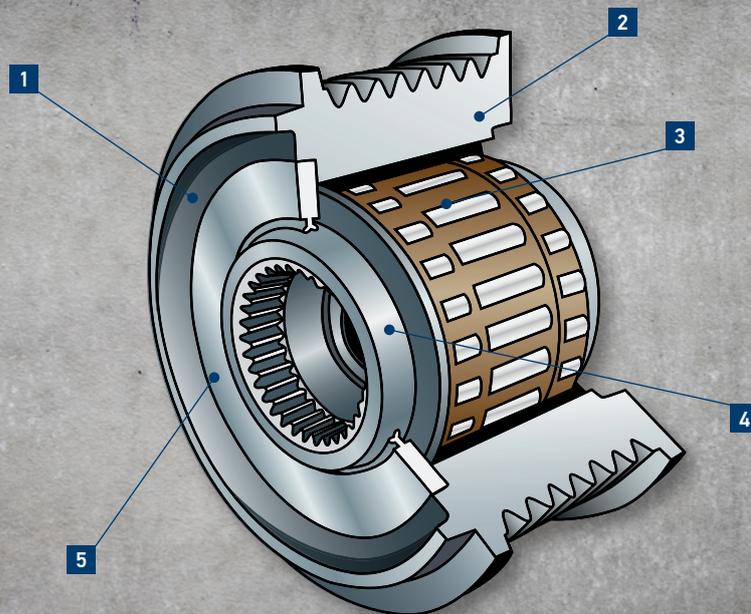
A formation of contact resistance can lead to voltage drops or leakage currents. These may lead to malfunctions or incorrect diagnoses. For this reason, check ground connections have been securely fastened and check they are clean. The metal must be clean and free from dirt, paint and oxidation.

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 mm <sup>2</sup>	Max. Resistance/m (20 °C) mΩ/m	Permissible continuous current A
1	18,5	10
1,5	12,7	20
2,5	7,6	25
46	4,71	35
10	3,14	50
16	1,82	65
25	1,16	85
35	0,743	120
50	0,527	160
70	0,368	200
95	0,259	250
120	0,196	300
	0,153	350

Maximum permissible Starter	Voltage drop in Alternator	12 Volt vehicle electrical system (example) Lighting
<ul style="list-style-type: none"> <li>→ Starter housing to body and/or to engine block: 0.1 V</li> <li>→ Negative battery terminal to body and/or to engine block: 0.2 V</li> <li>→ Negative battery terminal to starter housing: 0.3 V</li> <li>→ Positive battery terminal to starter's main power connection: 0.5 V</li> <li>→ Starter's main power connection under load (when starting): 3.5 V</li> <li>→ Ignition switch to starter's control current connection: 1.5 V</li> </ul>	<ul style="list-style-type: none"> <li>→ Alternator housing to body and/or to engine block: 0.1 V</li> <li>→ Negative battery terminal to body and/or to engine block: 0.2 V</li> <li>→ Negative battery terminal to alternator housing: 0.3 V</li> <li>→ Positive battery housing to alternator's main power connection: 0.4 V</li> </ul>	<p>Voltage drop at positive cable and (in overall circuit):</p> <ul style="list-style-type: none"> <li>→ From light switch at terminal 30 to bulb &lt; 15 W: 0.1 V (0.6 V)</li> <li>→ From light switch at terminal 30 to bulb &gt; 15 W: 0.5 V (0.9 V)</li> <li>→ From light switch at terminal 30 to headlamps: 0.3 V (0.6 V)</li> </ul>



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

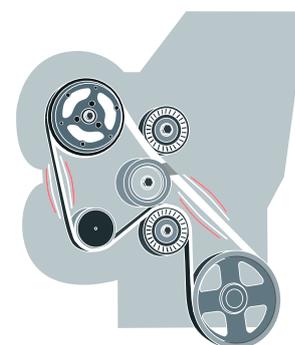
Advantages:

- 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

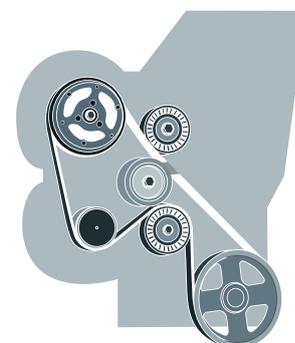
A unit drive with rigid pulleys leads to rotational irregularities and causes a high degree of tension on the belt drive.



Normal pulley

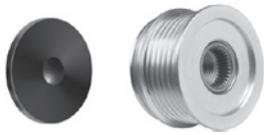
#### With alternator freewheel clutch

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

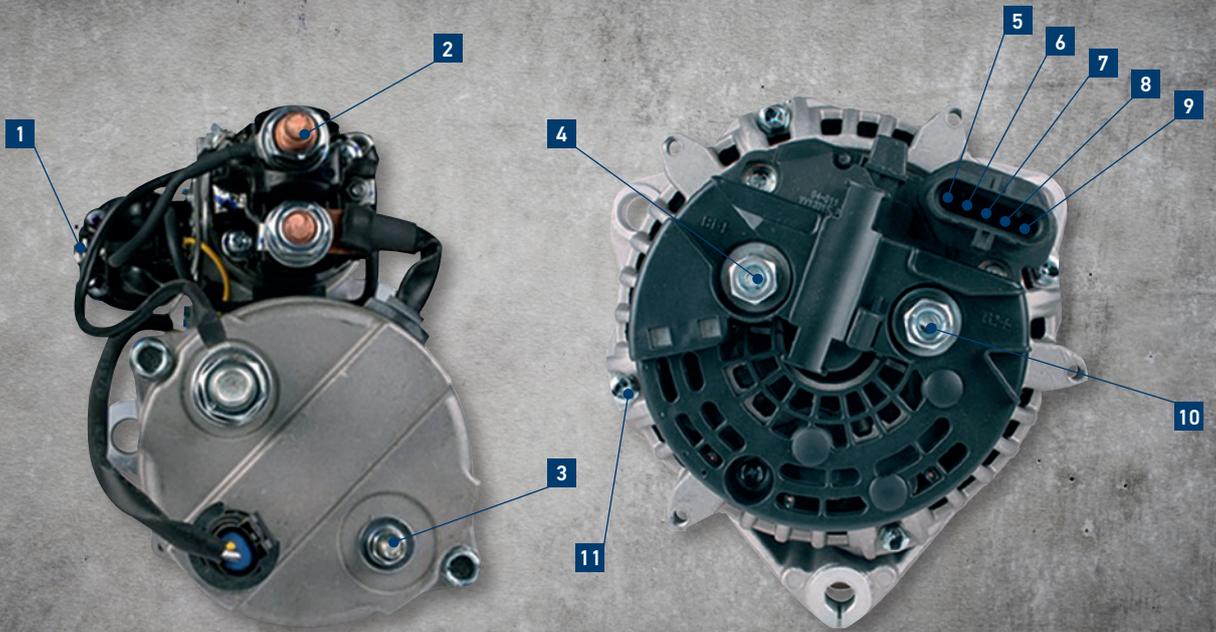
9XU 358 039-161



## HELLA TECH WORLD

Online platform for workshops | [www.hella.com/techworld](http://www.hella.com/techworld)

- Vehicle-specific repair information
- Technical Information
- Technical Videos
- Responsive design



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

OE manufacturer	OE number			Part number	
OPEL (Vauxhall)	1202137	90421876	9117031	8EA 011 610-411	
	1202142	90421877	9130838		
	1202172	90543871	93604828		
	1202174	9115191			
	6202075	9115192			
	06202103	6202087	97386062		8EA 011 610-661
	1202591	93169014	98014743		
	6202000	93174028	R1540010		
	6202043	97189118	R1540027		
	PSA	1202217	25192447		95520113
1202404		25196021		8EA 012 527-771	
1202419		55578921			
55353857		55358857	6202074	8EA 011 610-181	
5802AZ		5802Y6	9646679980		
5802Y4		9637813680	9664016980		
5802Y5		9640825280	9688268480		
5802EF		5802Z7	9647157980		8EA 011 610-281
5802Z5		9555507680	9648 242180		
5802Z6		9646972280			
5802EP	5802CG	9609313280			
5802N3	5802E8	9618725080			
5802R4	5802P8	9648644680			
5802Y3	5802J1	9658308780	8EA 011 610-441		
5802C9	9633292480	97530824			
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	
	020 911 023 F	020 911 023 FX	02A 911 023 J	8EA 011 610-041	
	020 911 023 FV			8EA 011 610-221	
	022 911 023 F	022 911 023 M	022 911 023 P		
	022 911 023 H	022 911 023 MX	022 911 023 PX		
	022 911 023 FX	022 911 023 N	022 911 024 K		
	022 911 023 HX	022 911 023 NX	022 911 024 KX		
	02M 911 023 N	02M 911 024	02M 911 024 A		8EA 011 610-231
	02M 911 023 P				
	02A 911 023 J	02A 911 024 B	02A 911 023 RX		8EA 011 610-561
	02A 911 023 JX	02A 911 024 D	02A 911 023 TV		
02A 911 023 R	02A 911 024 G	02A 911 024 BX			
02A 911 024	02A 911 024 X				
036 911 023 Q	085 911 023 BX	085 911 023 J	8EA 011 611-041		
036 911 023 QX	085 911 023 E	085 911 023 JX			
085 911 023 B	085 911 023 EX				
VOLKSWAGEN AG	02B 911 023 D	02B 911 023 J	02B 911 023 N	8EA 011 611-051	
	02B 911 023 DX	02B 911 023 L		8EA 011 611-581	
	0AM 911 021	0AM 911 023 KX	0AM 911 023 TX		
	0AM 911 023 K	0AM 911 023 T			
	022 911 023 M	022 911 023 NX	022 911 024 K		8EA 011 612-221
	022 911 023 MX	022 911 023 P	022 911 024 KX		
	022 911 023 N	022 911 023 PX			
	02M 911 023 Q	02M 911 023 QX			
	02E 911 023 H	02E 911 023 LX	02E 911 023 HX		8EA 012 526-191
	02E 911 023 L				8EA 012 527-401
02T 911 023 D	02T 911 023 G	02T 911 023 GX			
02T 911 023 E					
02T 911 023 R	02T 911 024 A	02T 911 024 CX	8EA 012 527-531		
02T 911 023 RX	02T 911 024 AX	02T 911 024 N			
02T 911 023 S	02T 911 024 BX	022 911 023 C			
02T 911 023 SX	02T 911 024 C				
<b>Alternators</b>					
ALFA ROMEO	51727333	51859044	52003538	8EL 011 713-501	
	71746673	71789538	73501591	8EL 012 430-801	
BMW	1 432 980	12 31 7 501 593	7 501 595	8EL 012 428-141	
	1 432 986	12 31 7 501 595	7 501 597		
	1 432 987	12 31 7 501 597	7 501 599		
	12 31 1 432 980	12 31 7 501 599	7 501 690		
	12 31 1 432 986	12 31 7 501 690			
	12 31 1 432 987	7 501 593			
DACIA	231000643R	231006677R	231007842R	8EL 011 713-111	
DAF	1377860	1697024	1697322	8EL 012 584-481	
	1697023			8EL 012 584-721	
1387388	1400520	1400520R			
	010 154 95 02	013 154 17 02	A 012 154 22 02	8EL 011 711-511	
	011 154 06 02	A 010 154 95 02	A 013 154 17 02		
	012 154 20 02	A 011 154 06 02			
	012 154 22 02	A 012 154 20 02			
	453 906 41 00	A 453 906 41 00			
	646 154 01 02	A 646 154 01 02 80	A 646 154 11 02 80		
	646 154 11 02 80				
	011 154 86 02	013 154 78 02 80	A 012 154 68 02		8EL 012 584-011
	012 154 04 02	014 154 53 02	A 013 154 28 02		
	012 154 10 02	A 011 154 86 02	A 013 154 78 02 80		
012 154 68 02	A 012 154 04 02	A 014 154 53 02			
013 154 28 02	A 012 154 10 02		8EL 012 584-151		
011 154 87 02	013 154 43 02	A 012 154 67 02			
012 154 05 02	013 154 79 02	A 013 154 42 02			
012 154 11 02	A 011 154 87 02	A 013 154 43 02			
012 154 67 02	A 012 154 05 02	A 013 154 79 02			
013 154 42 02	A 012 154 11 02				
009 154 99 02	011 154 89 02	A 010 154 89 02		8EL 012 584-191	
010 154 00 02	013 154 71 02	A 010 154 92 02			
010 154 89 02	A 009 154 99 02	A 011 154 89 02			
010 154 92 02	A 010 154 00 02	A 013 154 71 02			
008 154 78 02	013 154 73 02	A 011 154 50 02			
011 154 50 02	A 008 154 78 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	3M21 10300 BA	98VW 10300 EA	8EL 011 710-321
	1 253 624			
	1 100 711	1 580 264	98VW 10300 CA	8EL 011 710-381
FORD	1 253 623	3M21 10300 AA		8EL 011 710-381
	1 705 484	9551 10346 HA	BS51 10346 AA	8EL 011 713-501
IVECO	2995980	504109413 3	504028095	8EL 012 584-001
	5003159433	504114396 6	504114396	
	5003317366	504114397 7	504114397	
	5003373944	500315943	504349338	
	5040280955	500331736	9947 7271	
5040657766	500337394			
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 7233	51 26101 9266	8EL 012 584-091
	51 26101 7231	51 26101 7266		
	51 26101 7249	51 26101 7271	51 26101 9271	8EL 012 584-251
MAN	51 26101 7278	51 26101 7287	51 26101 7296	8EL 012 584-461
	51 26101 7283			8EL 012 426-051
	93161735			
OPEL (Vauxhall)	10480459	6204109	9133600	8EL 012 427-451
	1204123	6204155	9192823	
	13156051	6204192	9195753	
	24463063	6204204	9201489	
	4431340	6204209	93175795	
	55556070	90561970	93180415	
	55556071	90561971	93183436	
	6204073	9117851	93184064	
	6204076	9117931		
	6204098	9129823		
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	74 20 466 317	74 20 862 899	8EL 012 584-271
50 10 589 551				
SMART	453 906 41 00	A 453 906 41 00		8EL 011 713-111
SUZUKI	31400-79J00			8EL 012 430-801
TOYOTA	27060-0L020	27060-30020	27060-30150	8EL 011 711-331
	27060-0L021	27060-30040	27060-30152	
	27060-30010	27060-30050		
VOLVO	2 040 924 0	2 084 935 2	8 500 062 9	8EL 012 584-271
	2 073 977 8	2 142 978 9	8 500 064 4	
	2 084 935	8 500 062 8	8 500 335 7	
VOLVO	8 111 119	9 442 130	9 459 093	8EL 012 427-541
	8 111 122			
VOLVO TRUCKS	2 040 924 0	2 142 978 9	8 500 064 4	8EL 012 584-271
	2 073 977 8	8 500 062 8	8 500 335 7	
	2 084 935 2	8 500 062 9		
VOLKSWAGEN AG	028 903 028 D	038 903 018 X	06A 903 026 A	8EL 011 710-311
	028 903 028 DX	038 903 023 A	06A 903 026 AX	
	030 903 023 J	06A 903 023		
	030 903 023 JX	06A 903 026		
	021 903 025 K	028 903 030	038 903 024 F	
	028 903 026 H	028 903 030 A	038 903 024 G	
	028 903 028 E	038 903 018 Q	038 903 024 GX	
	028 903 029 G	038 903 023 S	074 903 025 T	
	037 903 025 M	038 903 018 R	047 903 015 H	
	037 903 025 T	038 903 018 RX	047 903 018 A	
038 903 018 A	038 903 018 AX			
VOLKSWAGEN AG	06F 903 023 A	06F 903 023 H	07K 903 025 A	8EL 011 710-791
	06F 903 023 C	06F 903 023 J		
	06F 903 023 F	06F 903 023 FX		
	038 903 018 P	038 903 023 R	038 903 024 E	
038 903 018 PX	038 903 024 A	074 903 026	8EL 011 710-381	
038 903 023 L	038 903 024 D			
VOLKSWAGEN AG	026 903 015 A	026 903 017 A	026 903 023 B	8EL 012 427-381
	026 903 015 E	026 903 017 AX	037 903 023 P	
	026 903 015 EX	026 903 023 A	076 903 023 J	
	074 903 025 J	074 903 025 Q	074 903 025 R	
074 903 025 J	074 903 025 Q	074 903 025 R	8EL 012 427-541	
<b>Alternator freewheel clutches</b>				
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	028 903 119 AM	038 903 119 T	9XU 358 038-041
	022 903 119 A	038 903 119 A	L03 890 311 9S	
	022 903 119 C	038 903 119 S		
VOLVO	070 903 201 C	070 903 201 E		9XU 358 038-721

## OEM REFERENCES

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

# OEM REFERENCES

OEM MANUFACTURER	OEM number			Part number	
<b>Alternators</b>					
<b>BOSCH</b>	0 001 109 014	0 001 109 250	0 001 109 290	8EA 011 610-001	
	0 001 109 036				
	0 001 121 006	0 001 121 028	0 001 121 029	8EA 011 610-041	
	0 001 121 007				
	0 001 123 012	0 001 123 013		8EA 011 610-221	
	0 001 123 014	0 001 123 038	0 001 123 039	8EA 011 610-231	
	0 001 123 015				
	0 001 106 011	0 001 107 401	0 001 112 035	8EA 011 610-411	
	0 001 106 015				
	0 001 112 019	0 001 112 041	F 000 AL0 327	8EA 011 610-441	
	0 001 112 029				
	0 001 124 001	0 001 125 008	0 001 125 042	8EA 011 610-561	
	0 001 124 002	0 001 125 012	0 001 125 043		
	0 001 125 007	0 001 125 013			
	0 001 112 027	0 001 112 044	0 001 113 013	8EA 011 611-041	
	0 001 112 028	0 001 112 045	0 001 113 014		
	0 001 124 005	0 001 125 002	0 001 125 032	8EA 011 611-051	
	0 001 124 006	0 001 125 011			
	0 001 125 001	0 001 125 031			
	0 001 107 521	0 001 192 009	0 001 192 080	8EA 011 611-491	
	0 001 107 522	0 001 192 069	0 001 192 086		
	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	0 001 123 036	0 001 123 037	8EA 012 526-191	
	0 001 123 017				
	0 001 107 442	0 001 108 157	0 001 108 230	8EA 012 526-841	
	0 001 107 443	0 001 108 190			
	0 001 108 054	0 001 108 401			
	0 001 107 037	0 001 107 072	0 001 107 403	8EA 012 527-271	
	0 001 107 048	0 001 107 096	0 001 107 416		
F 000 AL0 101	F 000 AL0 127	F 009 AL0 101	8EA 012 527-301		
0 001 120 400	0 001 121 016	0 001 121 017	8EA 012 527-401		
0 001 120 401					
0 001 120 406	0 001 120 407		8EA 012 527-531		
0 001 109 205	0 001 109 324	0 001 109 329	8EA 012 527-611		
0 001 109 304	0 001 109 325	0 001 109 391			
0 001 109 305	0 001 109 328				
0 001 108 202	0 001 108 235	0 001 108 239	8EA 012 527-771		
0 001 108 234	0 001 108 224	0 001 108 240			
0 001 231 002	0 001 231 133	0 001 263 049	8EA 012 586-011		
0 001 231 032	0 001 263 015				
0 001 231 033	0 001 263 016				
0 001 330 065	0 001 411 024	0 001 417 038	8EA 012 586-041		
0 001 410 088	0 001 411 324	0 001 417 051			
0 001 411 009	0 001 417 001	0 001 410 024			
0 001 360 022	0 001 368 035	0 001 816 326	8EA 012 586-121		
0 001 360 037	0 001 368 055	0 001 816 570			
0 001 360 052	0 001 368 062	9 000 083 065			
0 001 360 065	0 001 368 300	9 000 143 601			
0 001 368 022	0 001 368 307	9 120 600 027			
0 001 368 024	0 001 368 309				
0 001 330 050					
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		
<b>DELCO REMY</b>	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	8200138	8200297	8EA 012 586-201	
	10479626				
	19081009	8200519		8EA 012 586-231	
	19085003			8EA 012 586-251	
19084007			8EA 012 586-311		
19081019			8EA 012 586-381		
<b>DENSO</b>	428000-1640			8EA 011 610-181	
	428000-1620			8EA 011 610-281	
	428000-6700	428000-6702	428080-6702	8EA 011 612-221	
	428000-6701				
	428000-0670			8EA 012 526-841	
	228000-5640	228000-5641		8EA 012 586-001	
	228000-7550	228000-7551		8EA 012 586-251	
<b>HITACHI</b>	S114-829	S114-829B	S114-925	8EA 011 610-661	
	S114-829A	S114-869			
<b>MAGNETI MARELLI</b>	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	063293039010	063521120440	8EA 011 611-041		
0632 93039					
<b>MAGNETON</b>	443115141313	443115141394		8EA 011 610-041	
	9141319	9141414		8EA 011 611-051	
	915101A	9999984		8EA 012 527-531	
	M0T22472			8EA 011 610-181	
	M1T30071	M001T30071	M001T30072	8EA 012 527-771	
	M1T30072				
	M008T61671	M8T61671		8EA 012 586-001	
	M009T20171	M9T80472	M9T83671	8EA 012 586-231	
	M9T20171	M9T80473			
	M8T62471	M8T62471AM		8EA 012 586-281	
	M8T62771			8EA 012 586-311	
	M009T61971	M9T61971	M9T62071	8EA 012 586-381	
	<b>NIKKO</b>	0-23000-2350	0-23000-2358	0-23000-2590	8EA 012 586-201
		D7R19	D7R43	ND162	8EA 011 610-001
		D7R28	D7R46		
	D7R281	D7R123			
	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	
<b>VALEO</b>	D6RA132	D6RA293	D7EP12	8EA 011 610-411	
	D6RA162	D6RA32	ND134		
	D6RA163	D6RA62			
	D6RA249	D6RA93			
	D6G3	D6RA572	D7E5	8EA 011 610-441	
	D6RA100	D7E16	ND131		
	D6RA37	D7E2	ND212		
	D6RA57	D7E23	TS8E2		
	D6RA571	D7E25	VS272		
	D7RS130	D7RS30	D7RS301	8EA 011 610-561	
	D7RS131	D7RS31		8EA 011 610-051	
	TS12ER22	TS12ER22M		8EA 011 611-581	
	TS18ER121	TS18ER121A	TS18ER121B	8EA 011 612-221	
	D6G5	D7E38	ND209	8EA 012 527-301	
	D6RA83	D7E4			
D7E18	D7E8				
D6GS12			8EA 012 527-531		