

# Denso PA90 Starter

## Parts & Unit Solenoid Repair Tools



Metro Auto Industrial Inc.

Toll Free: **1-800-263-8761**

**Denso PLGR (PA90) Starter Exploded View**



# Denso PA90 Solenoid Exploded View



Solenoid Assy  
with Lever Housing



Solenoid Cap Assembly

Solenoid Exploded View



***Denso PLGR Series Starter can replace to:***

- **Bosch EV PLGR Starters**
- **Delco 28MT Starters**
- **Denso OSGR Medium/Heavy Duty (90mm/100mm) Starters**
- **Leece Neville M93, M93R PLGR Staters**
- **Mitsubishi M8T Series Starters**

***Features:***

- **All Oil Seal/Water Proof Design**
- **Fits to most popular Industrial, Farming, Trucking, Bus and various vehicles**
- **Planetary Gear Reduction**
- **Service Parts available**

***Solenoid Repair Tools on the last page***

***Notice:***

***To the Solenoid Housing, we found there is OE and after market type design, here is the different,***



thinner Planetary Gear



thicker Planetary Gear

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# Starter Unit



**19029N**  
**Starter**  
**12V, 3.0kw, CW, 13T**  
**Battery Post M10**

**For:** Dodge Ram, Sterling  
**Replace:**  
**Application:** Dodge Ram 2500, 3500  
**Dim:**  
**Lester:** 19029, 19183  
**OE:** 428000-3330, 428000-3331, 428000-6110  
**Ref:** 190-799C, 190-799D, 190-799E  
**Note:** Can replace to 17548 (ND OSGR), 17892 (ND OSGR).



**19201N**  
**Starter**  
**12V, 3.0kw, CCW, 11T**  
**Battery Post M10**

**For:** Isuzu, Chevy-GMC Truck  
**Replace:**  
**Car:** 2008 Isuzu NPR, NQR & NRR Applications with 5.2L Engines  
**Dim:**  
**Lester:** 19201  
**OE:** 428000-586  
**Ref:** 190-9073  
**Note:** Can replace to 18500 (Denso OSGR, CCW).



**19336N**  
**Starter**  
**12V, 3.0kw, CW, 11T**  
**Battery Post M10**

**For:** Hino HD Truck  
**Replace:**  
**Car:** Hino HD Trucks 2009-2013  
**Dim:**  
**Lester:** 19336  
**OE:** 428000-6980, 428080-6981  
**Ref:** 190-6308  
**Note:**



**19120N**  
**Starter**  
**12V, 2.7kw, CW, 11T**  
**Battery Post M10**

**For:** Bluebird, Capacity, Ottawa  
**Replace:**  
**Application:** 2007 Bluebird, Capacity & Ottawa Applications with Cummins ISB Engines  
**Dim:**  
**Lester:** 19120  
**OE:** 428000-512  
**Ref:** 190-9060  
**Note:** Can replace to 16990 (Denso OSGR).



**19335N**  
**Starter**  
**12V, 2.7kw, CW, 11T**  
**Battery Post M10**

**For:** Thomas Built  
**Replace:**  
**Car:** Thomas Bus Applications with Cummins ISB Engines  
**Dim:**  
**Lester:** 19335  
**OE:** 428000-5230, 428000-5310  
**Ref:** 190-9062  
**Note:** 428000-5230 (19808) same unit.



**30483N**  
**Starter**  
**12V, 4.8kw, CW, 10T**  
**Battery Post M10**

**For:** Various w/Cummins Engine  
**Replace:**  
**Car:** Cummins ISB 6.7L  
**Dim:**  
**Lester:** 30483  
**OE:** 428000-711, 428000-994  
**Ref:** 190-6344, 190-9220  
**Note:**

# Starter Unit



**33334N**  
**Starter**  
 12V, 3.0kw, CW, 11T  
 Battery Post

**For:** D  
**Replace:**  
**Application:**  
**Dim:**  
**Lester:** 33334  
**OE:** 428000-4610, 428000-4611, 428000-4612  
**Ref:** 190-6435  
**Note:**



**19808N**  
**Starter**  
 12V, 3.0kw, CW, 11T  
 Battery Post M10

**For:** Denso PA90S  
**Replace:**  
**Car:** Freightliner Custom Chassis, Work-horse w/Cummins ISB 6.7L Engine  
**Dim:**  
**Lester:** 19808  
**OE:** 428000-523, 428000-5310  
**Ref:** 190-9061  
**Note:** DE Stud M  
 428000-5310 (19335) same unit.



**30691N**  
**Starter**  
 12V, 3.0kw, CCW, 11T  
 Battery Post M10

**For:** Denso PA90S  
**Replace:**  
**Car:** Isuzu, Chevrolet, GMC Truck 2008 up w/MT Isuzu 4HK1-TC 5.2L  
**GM:** 98092464  
**Isuzu:** 8980924640, 8980924641, 428980924642  
**Lester:** 30691  
**OE:** 428000-5930, 428000-5931, 428000-5932  
**Ref:** 190-9074  
**Note:** Can replace to Denso 18407 OSGR, but dependon the location.



**428000-4661N**  
**Starter**  
 12V, 3.0kw, CW, 11T  
 Battery Post

**For:** Denso PLGR PA90  
**Replace:**  
**Application:**  
**Dim:**  
**Lester:**  
**OE:** 428000-466  
**Ref:** 190-  
**Note:**



**30692N**  
**Starter**  
 12V, 4.8kw, CW, 10T  
 Battery Post M12

**For:** Denso PA90L  
**Replace:**  
**Car:** John Deere w/4045 4.5L, 6068 6.8L, 6090, 90L Engines.  
**Dim:**  
**John Deere:** RE539696, RE549229  
**Lester:** 30692  
**OE:** 428000-5740, 428000-5741  
**Ref:** 190-6387  
**Note:** DE Stud M12



**19856N**  
**Starter**  
 12V, 3.0kw, CW, 10T  
 Battery Post M10

**For:** Denso PA90S  
**Replace:**  
**Car:** Case/New Holland Loaders & Tractors 432T/M3, 445T/M3 Engines.  
**New Holland:** 87638510  
**Dim:**  
**Lester:** 19856  
**OE:** 428000-6030, 428000-9910  
**Ref:** 190-6318  
**Note:**

# Starter Unit



**10955N  
Starter  
12V, 2.7kw, CW, 11T  
Battery Post M10**

**For:** Denso PA90S  
**Replace:**  
**Application:** JLG Equipment w/Cummins QSB 3.3L  
**Cummins:** 5256155  
**Lester:** 10955  
**OE:** 428000-6800  
**Ref:** 190-6470  
**Note:** DE Stud M10



**16096N  
Starter  
12V, 2.7kw, CW, 10T  
Battery Post**

**For:** Denso PA90L  
**Replace:**  
**Car:** Various use w/Cummins ISF 2.8L, 3.8L, QSB 5.9L, 6.7L Engines.  
**Cummins:** 4996706  
**Lester:** 16096  
**OE:** 428000-709  
**Ref:** 190-6307  
**Note:** Also can replace to Delco 35MT 8200959  
 DE Stud M



**16020N  
Starter  
24V, 7.8kw, CW, 10T  
Battery Post M12**

**For:** Denso PA90L  
**Replace:**  
**Car:** Ingersoll Rand XP825-W w/Cummins 6CTA 8.3L Engines.  
**Cummins:** 4996709  
**Lester:** 16020  
**OE:** 428000-7120,438000-3730  
**Ref:** 190-6346  
**Note:** Unit same as 438000-3730.  
 DE Stud M



**16014N  
Starter  
24V, 7.8kw, CW, 10T  
Battery Post M12**

**For:** Denso PLGR PA90  
**Replace:**  
**Application:** John Deere w/4045 4.5L, 6068/6.8L, 6090 9.0L Engines  
**John Deere:** RE537519, RE538685, RE549230, SE502559, SE502823  
**Lester:** 16014  
**OE:** 428000-6900, 428000-9920  
**Ref:** 190-6313, 190-6313A, 190-6313B  
**Note:** DE Stud M  
 428000-9920 same unit.



**33321N  
Starter  
24V, 4.8kw, CW, 10T  
Battery Post M10**

**For:** Denso PA90S  
**Replace:**  
**Car:** Various w/Cummins ISB 6.7L Engines.  
**Cummins:** 4996707  
**Lester:** 33321, 33335  
**OE:** 428000-7100, 438000-0060  
**Ref:** 190-002, 190-9251  
**Note:** DE Stud



**428000-7140N  
Starter  
24V, 7.8kw, CW, 10T  
Battery Post M12**

**For:** Denso PA90L  
**Replace:**  
**Car:** Various w/Cummins ISC 8.3L Engines.  
**New Holland:** 87638510  
**Dim:**  
**Lester:** 30419  
**OE:** 428000-7140, 438000-3740 (Lester 30502)  
**Ref:** 190-6354, 190-9258  
**Note:** 438000-3740 same unit.  
 DE Stud M



# Starter Unit

Photo  
Coming Soon

**428000-7160N**  
Starter  
24V, 7.8kw, CW, 10T  
Battery Post M12

For: Denso PA90L  
**Replace:**  
**Application:**  
**Cummins:** 4995643  
**Lester:**  
**OE:** 428000-7160, 438000-3220  
**Ref:**  
**Note:** DE Stud M  
 438000-3220 (190-9254) same unit.

Photo  
Coming Soon

**19334N**  
Starter  
12V, 4.8kw, CW, 10T  
Battery Post M

For: Denso PA90  
**Replace:**  
**Car:** Various w/Cummins ISC 8.3L, 8.9L  
 Engines.  
**Lester:** 19334  
**OE:** 428000-715, 428000-7870  
**Ref:** 190-169, 190-6357  
**Note:** Dry Clutch, similar to 428000-  
 7150, but 428000-7150 is Wet Clutch.  
 DE Stud M

Photo  
Coming Soon

**438000-0560**  
Starter  
12V, 3.0kw, CW, 12T  
Battery Post M

For: Denso PA90S  
**Replace:**  
**Car:**  
**Lester:**  
**OE:** 438000-0560  
**Ref:**  
**Note:**

Photo  
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**428000-7340N**  
Starter  
12V, 2.7kw, CW, 10T  
Battery Post M12

For: Denso PLGR PA90S  
**Replace:**  
**Application:** John Deere 4.5L  
**Lester:**  
**OE:** 428000-7340  
**Ref:**  
**Note:** DE Stud M12



Photo  
Coming Soon

**19340N**  
Starter  
12V, 2.7kw, CW, 10T  
Battery Post M

For: Denso PA90S  
**Replace:**  
**Car:** Freightliner M2-106, -112, -108SD,  
 -114SD w/Cummins ISB 6.7L Engines.  
**Lester:** 19340  
**OE:** 428000-9340  
**Ref:**  
**Note:** with IMS (67-82101)  
 DE Stud M

**438000-2920N**  
Starter  
12V, 5.0kw, CW, 13T  
Battery Post M

For: UPS Truck  
**Replace:**  
**Car:** V  
**Dim:**  
**Lester:**  
**OE:** 438000-2920  
**Ref:**  
**Note:**

# Starter Unit



**428000-4620N**  
**Starter**  
**12V, 3.0kw, CW, 11T**  
**Battery Post M**

**For:** Denso PA90S  
**Replace:**  
**Application:** Hino 300/Toyota Coaster Mid Bus  
**Hino:**  
**Lester:**  
**OE:** 428000-4620  
**Ref:**  
**Note:**

**Photo**

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**428000-9120N**  
**Starter**  
**24V, 7.0kw, CW, 10T**  
**Battery Post M**

**For:** Denso PA90  
**Replace:**  
**Application:** Caterpillar  
**Hino:**  
**Lester:**  
**OE:** 428000-9120, 428000-9121  
**Ref:**  
**Note:** PIC 190-6519, 190-6519A  
 DE Stud M

**Photo**

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**428000-9950N**  
**Starter**  
**12V, 4.8kw, CW, 10T**  
**Battery Post M**

**For:** Denso PA9  
**Replace:**  
**Application:** Caterpillar  
**Hino:**  
**Lester:** 30832  
**OE:** 428000-7130, 428000-9950  
**Ref:** PIC 190-6347, 190-9221  
**Note:** 428000-7130 same unit, please use 428000-7130  
 DE Stud M



**428000-7150N**  
**Starter**  
**12V, 4.8kw, CW, 11T**  
**Battery Post M**

**For:** Denso PA90S  
**Replace:**  
**Application:**  
**Lester:**  
**OE:** 428000-7150  
**Ref:** PIC 190-6357  
**Note:** Wet Clutch.  
 Similar to 428000-7870 (19334), but 428000-7870 is Dry Clutch.  
 DE Stud M

**Photo**

**Coming Soon**

**30832N**  
**Starter**  
**12V, 4.8kw, CW, 10T**  
**Battery Post M**

**For:** Denso PA90  
**Replace:**  
**Application:** Caterpillar  
**Hino:**  
**Lester:** 30832  
**OE:** 428000-7130, 428000-9950  
**Ref:**  
**Note:** PIC 190-6347, 190-9221  
 428000-9950 same unit.  
 DE Stud M



**438000-3740**  
**Starter**  
**24V, 7.8kw, CW, 10T**  
**Battery Post M12**

**For:** Denso PA90  
**Replace:**  
**Application:**  
**Hino:**  
**Lester:**  
**OE:** 428000-7140, 438000-3740 (Lester 30502)  
**Ref:**  
**Note:** PIC 190-9258, 190-6354  
 428000-7140 same unit,  
 Please use 428000-7140N.

# Starter Unit

Photo

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**428000-7370**  
Starter  
12V, 3.0kw, CW, 10T  
Battery Post M

For: Denso PA90S  
Replace:  
Application: John Deere 4.5L  
Lester:  
OE: 428000-7370, 428080-7370  
Ref: 190-9245  
Note:

Photo

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**428000-9790**  
Starter  
24V, 4.8kw, CW, 10T  
Battery Post M

For: Denso PA90  
Replace:  
Application: John Deere  
Lester:  
OE: 428000-9790, 428080-9790  
Ref:  
Note:

Photo

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**428000-8730**  
Starter  
12V, 3.0kw, CW, 13T  
Battery Post M

For: Denso PA9  
Replace:  
Application: John Deere RE537513  
Lester:  
OE: 428000-8730, 428080-8730  
Ref: PIC 190-9247  
Note:

Photo

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**428000-8680**  
Starter  
24V, 4.8kw, CW, 10T  
Battery Post M

For: Denso PA90S  
Replace:  
Application:  
Lester:  
OE: 428000-8680, 438000-3480  
Ref: PIC 190-9255  
Note: DE Stud M

Photo

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**428000-8760**  
Starter  
12V, 3.0kw, CW, 13T  
Battery Post M

For: Denso PA90  
Replace:  
Application: John Deere# RE531501  
Lester:  
OE: 428000-8760, 428080-8760  
Ref: PIC 190-9248  
Note:

Photo

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**428000-7960N**  
Starter  
12V, 4.8kw, CW, 10T  
Battery Post M12

For: Denso PA90  
Replace:  
Application: John Deere 4.5L, 6.8L  
Lester:  
OE: 428000-7960, 428000-7961, 428080-7961  
Ref:  
Note: Similar to 428000-5740, but different DE Housing.

# Starter Unit

Photo

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**428000-8400**

**Starter**  
**12V, 3.0kw, CW, 13T**  
**Battery Post M**

For: Denso PA90S

Replace:

Application: Cummins ISB 5.9L

Lester:

OE: 428000-8400

Ref: 190-9215

Note:

Photo

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**428000-2170**

**Starter**  
**12V, 3.0kw, CW, 13T**  
**Battery Post M**

For: Denso PA90

Replace:

Application: Cummins ISV

Lester:

OE: 428000-2170, 428080-2170

Ref:

Note:

Photo

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**428000-9780**

**Starter**  
**24V, 4.8kw, CW, 10T**  
**Battery Post M**

For: Denso PA9

Replace:

Application: John Deere

Lester:

OE: 428000-9780, 428080-9780

Ref:

Note: DE Stud M

Photo

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**428000-8470**

**Starter**  
**12V, 3.0kw, CW, 11T**  
**Battery Post M**

For: Denso PA90S

Replace:

Application:

Lester:

OE: 428000-8470

Ref: PIC 190-9216

Note:

Photo

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**428000-8670**

**Starter**  
**12V, 2.7kw, CW, 10T**  
**Battery Post M**

For: Denso PA90

Replace:

Application: Cummins ISB

Lester:

OE: 428000-8670, 438000-3550

Ref: PIC 190-9256

Note:

Photo

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**428000-1150**

**Starter**  
**24V, 7.8kw, CW, 10T**  
**Battery Post M12**

For: Denso PA90

Replace:

Application:

Lester:

OE: 428000-1150, 438000-1150

Ref:

Note: DE Stud M12

# Starter Unit

**Photo**

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**428000-9930N**  
**Starter**  
**24V, 7.8kw, CW, 10T**  
**Battery Post M12**

**For:** Denso PA90S

**Replace:**

**Application:**

**Lester:**

**OE:** 428000-7970, 428080-7971, 428000-9930

**Ref:** PIC 190-9219

**Note:** 428000-7970, 428000-7971 same unit.

DE Stud M12

# DE Housing



**51-826001**  
**DE Housing**  
**12V, 2.7kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 428400-3331  
**Dim:**  
**OE:** 428000-333, 428000-611  
**Lester:** 19029, 19183  
**Note:** Ref SZ-03116, 190-799C, 190-799D  
(with or without Seal & Bushing)



**51-826004**  
**DE Housing**  
**12V, 4.8kw, 7.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 428400-6900  
**Dim:**  
**OE:** 428000-574, 428000-690, 428000-992  
**Lester:** 16014, 30692  
**Note:** 16014, 30692  
Ref 190-6313, 190-6387, 190-9244  
wo/Ground Stud Hole.



**51-826007**  
**DE Housing**  
**12V, 3.0kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-603, 428000-991  
**Lester:** 19856  
**Note:** Ref 190-6318, 190-6318A



**51-826002**  
**DE Housing**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 428400-5121  
**Dim:**  
**OE:** 428000-512, 428000-523, 428000-531  
**Lester:** 19120, 19335, 19808  
**Note:** Ref 190-9060, 190-9061, 190-9062  
DE w/Ground Hole M12 x 1.75



**51-826005**  
**DE Housing**  
**12V, 3.0kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-586, 428000-593  
**Lester:** 19201  
**Note:** Ref 190-9073, 190-9074  
Used on CCW unit.



**51-826008**  
**DE Housing**  
**12V, 3.0kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-698  
**Lester:** 19336  
**Note:** Ref 190-6308



**51-826003**  
**DE Housing**  
**12V, 4.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 428400-7870  
**Dim:**  
**OE:** 428000-714, 428000-715, 428000-787  
**Lester:** 19334  
**Note:** Ref 190-169, 190-6354, 190-6357



**51-826006**  
**DE Housing**  
**V, kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-462  
**Lester:**  
**Note:**



**51-826009**  
**DE Housing**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-4661  
**Lester:**  
**Note:** Ref

# DE Housing



**51-826011  
DE Housing  
12V, 2.7kw**

**For:** Denso PLGR PA90 Starters  
**Used:** JLG Equipment  
**Replace:**  
**Dim:**  
**OE:** 428000-680  
**Lester:** 10955  
**Note:** 190-6470  
DE w/Ground Stud Hole M12 x 1.75



**51-826015  
DE Housing  
V, kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-461  
**Lester:** 33334  
**Note:** 190-6335



**51-826013  
DE Housing  
12V, 2.7kw**

**For:** Denso PLGR PA90 Starters  
**Used:** Cummins Engine  
**Replace:**  
**Dim:**  
**OE:** 428000-7090, -7091, -7092,  
428000-712  
**Lester:** 16020, 16096, 30483, 33321  
**Note:** 190-6307, 190-6307A  
DE w/Ground Stud Hole M12 x 1.75

**Photo  
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**51-826014  
DE Housing  
24V, 4.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-710, 438000-006  
**Lester:** 33321, 33335  
**Note:** 190-002, 190-9251

# CE Housing



**52-82503  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1350, 128501-1840  
**Dim:**  
**OE:** 428000-603, 428000-680, 428000-709, 428000-710, 428000-934, 428000-991; 438000-006, 438000-311; 512800-0980  
**Lester:** 10955, 16096, 19856, 33321  
**Note:** Ref



**52-82505  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-0470  
**Dim:** 89.5mm OD, 65mm Height  
 Drain hole 5.6mm ID, 2.7mm Wall Thickness  
**OE:** 428000-333, 428000-523, 428000-531, 428000-611  
**Lester:** 19029, 19183, 19335, 19808  
**Note:** Ref SZ-04116



**52-82506  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1080  
**Dim:**  
**OE:** 428000-512  
**Lester:** 19120  
**Note:** Ref

**Photo  
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**52-82507  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1820  
**Dim:**  
**OE:** 428000-787  
**Lester:** 19334  
**Note:** Ref



**52-82508  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1600  
**Dim:**  
**OE:** 428000-698  
**Lester:** 19336  
**Note:** Ref

**Photo  
Coming Soon**

**52-82509  
CE Plate  
4.8kw, 7.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1670  
**Dim:**  
**OE:** 428000-574, 428080-574, 428000-690, 428000-714, 428000-734, 438000-374, 428000-992  
**Lester:**  
**Note:** Ref



**52-82510  
CE Plate  
24V, 7.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128501-1780  
**Dim:**  
**OE:** 428000-711, 428000-712, 428000-994; 438000-373  
**Lester:** 16020, 30483, 30693  
**Note:** Ref 190-6344, 190-6346, 190-9220, 190-9257



**52-82511  
CE Plate**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** with Ground Stud Hole



# Lever Housing

**Photo  
Coming Soon**

**53-82512  
Lever Housing  
(Center Housing)**

**For:** Denso PLGR PA90 Starters

**Used:**

**Replace:**

**Dim:**

**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611

**Lester:** 19029, 19120, 19183, 19201, 19335

**Note:** Ref SZ-23116

# Drive Assy



**54-8533  
Drive Assy  
11T, CCW**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-586, 428000-593, 428080-586  
**Lester:** 19201  
**Note:** CCW Drive  
Gear use 54-82558

**Photo  
Coming Soon**

**54-8535  
Drive Assy  
10T, CW**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-7110, 428000-9940  
**Lester:** 30483  
**Note:** Gear use 54-82555



**54-82030  
Clutch Assy  
CCW**

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-586, 428000-593, 428080-586  
**Lester:** 19201  
**Note:** Clutch assemble with Sleeve & Bearing.



**54-82031  
Clutch Assy  
CW**

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
  
**Lester:**  
**Note:**

# Drive Parts



**54-82553  
Pinion Gear  
11T, CW, 16-SPL**

**For:** Denso PA90  
**Used:**  
**Replace:** 028371-9050  
**Dim:** 39.8mm Gear OD, 16.4mm ID  
 18mm Gear OD, 19.8mm OAL  
**OE:** 428000-512, 428000-523, 428000-531, 428000-698  
**Lester:** 19120, 19335, 19336, 19808  
**Note:**



**54-82554  
Pinion Gear  
13T, CW, 16-SPL**

**For:** Denso PA90  
**Used:**  
**Replace:** 028371-8810  
**Dim:** 39.8mm Gear OD, 16.65mm ID  
 19.8mm OAL  
**OE:** 428000-3330, 428000-3331, 428000-6110, 428000-8400, 428000-8760  
**Lester:** 19029, 19183  
**Note:** SZ-07116A



**54-82555  
Pinion Gear  
10T, CW, 16-SPL**

**For:** Denso PA90  
**Used:**  
**Replace:** 028371-9210  
**Dim:** 40mm Gear OD  
**OE:** 428000-603, 428000-690, 428000-710, 428000-711, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 16020, 19334, 19856, 30483,  
**Note:** 33321



**54-82556  
Pinion Gear  
11T, CCW, -16SPL**

**For:** Denso PA90  
**Used:**  
**Replace:**  
**Dim:** 39.8mm Gear OD  
**OE:**  
**Lester:** 19201  
**Note:** Clutch Assemble use 54-82030



**54-82557  
Pinion Gear  
12T, CW, 16-SPL**

**For:** Denso PA90  
**Used:**  
**Replace:**  
**Dim:** 44.9mm Gear OD, 16mm Gear  
**OE:** Length, 19.8mm W  
**Lester:**  
**Note:**



**54-82558  
Pinion Gear  
11T, CCW, 16-SPL**

**For:** Denso PA90  
**Used:** Isuzu Truck  
**Replace:**  
**Dim:** 40.3mm Gear OD, 17mm Gear  
 Length, 21.35mm W  
**OE:** 428000-5930, -5931, -5932  
**Lester:** 30691  
**Note:**



**54-82857  
Shaft-Drive  
CW, 12-SPL**

**For:** Denso PA90  
**Used:**  
**Replace:**  
**Dim:** 20mm OD, 120mm OAL  
**OE:** 428000-333, 428000-512, 428000-531, 428000-603, 428000-611, 428000-680, 428000-690, 428000-709, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 16020, 16096, 19029, 19120, 19183, 19856, 19334, 19335, 33321  
**Note:** use with Sleeve 54-82858

# Drive Parts



## 54-82859 Spacer-Shift Lever

**For:** Denso PLGR PA90 Starters  
**Used:** Shift Lever  
**Replace:**  
**Dim:** 35.8mmODx20.4mmIDx1.5mmT  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:**



## 54-82860 Spacer-Shift Lever

**For:** Denso PLGR PA90 Starters  
**Used:** Shift Lever  
**Replace:**  
**Dim:** 28mmODx20.45mmIDx1mmT  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:**



## 54-82861 Spring-Drive

**For:** Denso PLGR PA90 Starters  
**Used:** Drive  
**Replace:**  
**Dim:** 17mm ID, x 20mm OD, x 1.5mm T  
**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-07116AS



## 54-82862 Roller Pin-Clutch

**For:** Denso PLGR PA90 Starters  
**Used:** Drive  
**Replace:**  
**Dim:** 8mm OD x 18mm L  
**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-07116L



## 54-82863 Spring-Clutch

**For:** Denso PLGR PA90 Starters  
**Used:** Drive  
**Replace:**  
**Dim:** 6.2mm x 17.65mm x 11.8mm L  
**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-07116L



## 54-82864 Cover-Drive

**For:** Denso PLGR PA90 Starters  
**Used:** Drive  
**Replace:**  
**Dim:** 20mm ID, 36mm OD, 6.75mm Thickness  
**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-07116C

## Photo Coming Soon

## 54-82865 Spring-Drive

**For:** Denso PLGR PA90 Starters  
**Used:** Drive  
**Replace:** 028303-5040  
**Dim:**  
**OE:** 428000-690, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 16020, 19334, 33321  
**Note:**

# Shift Lever



**55-82009K  
Shift Lever Kit**

**For:** Denso PLGR PA90 Starters  
**Used:** 12V / 24V  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** Ref SZ-13116K  
 Parts Includes:  
 55-82009A Shift Lever  
 55-82009B Front Sheave  
 55-82009C Back Sheave  
 54-82859 Spacer  
 (35.8mmODx20.4mmIDx1.5mmT)  
 54-82860 Spacer  
 (28mmODx20.45mmIDx1mmT)



**55-82009A  
Shift Lever**

**For:** Denso PLGR PA90 Starters  
**Used:** 12V / 24V  
**Replace:**  
**Dim:**  
**OE:** 428000-3330, 428000-3331,  
 428000-512, 428000-586, 428000-  
 603, 428000-611, 428000-680,  
 428000-690, 428000-698, 428000-  
 709, 428000-710, 428000-712,  
 428000-714, 428000-787, 428000-  
 992  
**Lester:** 10955, 16020, 19029, 19120,  
 19183, 19201, 19029, 19334,  
 19336, 19856, 16096, 33321  
**Note:** Please use 55-82009, we don't sell  
 Shift Lver only.



**55-82009C  
Back Sheaver-Shift Lever**

**For:** Denso PLGR PA90 Starters  
**Used:** 12V / 24V  
**Replace:**  
**Dim:**  
**OE:** 428000-3330, 428000-3331,  
 428000-512, 428000-586, 428000-  
 603, 428000-611, 428000-680,  
 428000-690, 428000-698, 428000-  
 709, 428000-710, 428000-712,  
 428000-714, 428000-787, 428000-  
 992  
**Lester:** 10955, 16020, 19029, 19120,  
 19183, 19201, 19029, 19334,  
 19336, 19856, 16096, 33321  
**Note:** Please use 55-82009, we don't sell  
 Shift Lver only.



**55-82009  
Shift Lever**

**For:** Denso PLGR PA90 Starters  
**Used:** 12V / 24V  
**Replace:** 028740-5350  
**Dim:**  
**OE:** 428000-3330, 428000-3331,  
 428000-512, 428000-586, 428000-  
 603, 428000-611, 428000-680,  
 428000-690, 428000-698, 428000-  
 709, 428000-710, 428000-712,  
 428000-714, 428000-787, 428000-  
 992  
**Lester:** 10955, 16020, 19029, 19120,  
 19183, 19201, 19029, 19334,  
 19336, 19856, 16096, 33321  
**Note:** Parts includes:  
 55-82009A Shift Lever  
 55-82009B Front Sheave  
 55-82009C Bach Sheave



**55-82009B  
Front Sheave-Shift Lever**

**For:** Denso PLGR PA90 Starters  
**Used:** 12V / 24V  
**Replace:**  
**Dim:**  
**OE:** 428000-3330, 428000-3331,  
 428000-512, 428000-586, 428000-  
 603, 428000-611, 428000-680,  
 428000-690, 428000-698, 428000-  
 709, 428000-710, 428000-712,  
 428000-714, 428000-787, 428000-  
 992  
**Lester:** 10955, 16020, 19029, 19120,  
 19183, 19201, 19029, 19334,  
 19336, 19856, 16096, 33321  
**Note:** Please use 55-82009, we don't sell  
 Shift Lver only.

# Field Case Assy



**57-8255**  
**Field Case Assy**  
**24V, CW, 4.8kw**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 128100-0211  
**Dim:**  
**OE:** 428000-710, 438000-006  
**Lester:** 33321  
**Note:** Lip for O-Ring 85mm OD



**57-8258**  
**Field Case Assy**  
**24V, CW, 4.8kw, 7.8kw**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 128100-0240  
**Dim:**  
**OE:** 428000-690, 428000-712, 428000-714, 428000-992; 438000-374  
**Lester:** 16014, 16020  
**Note:** Lip for O-Ring 85mm OD

**Photo**  
**Coming Soon**

**57-8260**  
**Field Case Assy**  
**12V, 3.0kw, CCW**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-586, 428080-586, 428000-593  
**Lester:** 19201  
**Note:** This is CCW Field Case Assy



**57-8257**  
**Field Case Assy**  
**12V, CW**

**For:** Denso PLGR PA90S Starters  
**Used:** 2.7kw, 3.0kw  
**Replace:** 128100-7681, 128100-0160  
**Dim:** 90mm OD, 73mm L  
**OE:** 428000-333, 428000-512, 428000-523, 428000-531, 428000-603, 428000-611, 428000-680, 428000-709, 428000-934, 428000-991, 438000-311, 512800-0980  
**Lester:** 10955, 16096, 19029, 19120, 19183, 19335, 19808, 19856  
**Note:** w/Case, Fields, Pole Shoes, Insulated Brushes, & Field Lead w/ Grommet.  
 Ref SZ-02116

**Photo**  
**Coming Soon**

**57-8259**  
**Field Case Assy**  
**12V, CW, 3.0kw, 4.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128100-0190  
**Dim:**  
**OE:** 428000-698, 428000-715, 428000-787, 428000-996  
**Lester:** 19334, 19336  
**Note:** Lip for O-Ring 85mm OD



**57-8261**  
**Field Case Assy**  
**12V, 4.8kw, CW**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-574, 428080-574, 428000-711, 428000-994  
**Lester:** 30483  
**Note:**

# Bearing & Bushing

Photo  
Coming Soon

**6-**  
**Bearing-Planetary Gear**

**For:** Denso PLGR PA90 Starters  
**Used:** Planetary  
**Replace:**  
**Dim:** 8mm ID, x 12.6mm OD, x 10mm L  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:** SZ-30116B



**6-9034-1**  
**Bearing- Armature Front**

**For:** Denso PLGR PA90 Starters  
**Used:** Armature Front  
**Replace:**  
**Dim:** 17mm ID x 30mm OD x 7mm W  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:** 69032RS, 6-903-4



**6-2004**  
**Bearing- Armature Rear**

**For:** Denso PLGR PA90 Starters  
**Used:** Armature rear  
**Replace:** 949100-2590  
**Dim:** 10mm ID x 30mm OD x 9mm W  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:** #6200, 62002RS, 6-200-4



**62-82005**  
**Bushing-DE Housing**

**For:** Denso PLGR PA90 Starters  
**Used:** DE Housing  
**Replace:**  
**Dim:** 21mm ID x 23mm OD x 15.5mm W  
**OE:** 428000-333, 428000-611  
**Lester:** 19029, 19183  
**Note:** Used on Metro DE# 51-826001

# Armature & Commutator



**61-82506  
Armature  
12V, 4.8kw, CW**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:**  
**Dim:** 19 Bars, 9T Straight Spline  
 34.40mm Commutator OD  
 38.5mm Commutator Length  
 10mm DE Shaft, 10mm CE Shaft  
 59mm OD  
 178mm OAL  
**OE:** 428000-5740, 428080-5740,  
 428000-711, 428000-734, 428000-  
 994  
**Lester:** 30483  
**Note:** with both side Bearing



**61-82508  
Armature  
24V, 7.8kw, CW**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 028200-9100  
**Dim:** 9T Straight Spline  
 19 Bars, 34.50mm Commutator  
 OD  
 38.5mm Commutator Length  
 10mm DE Shaft, 10mm CE Shaft  
 59mm OD  
 178.25mm OAL  
**OE:** 428000-6900, 428000-7120,  
 428000-7140, 428000-9920,  
 438000-374  
**Lester:** 16014, 16020  
**Note:** with both side Bearing

**Photo  
Coming Soon**

**61-82510  
Armature  
12V, 3.0kw, 4.8kw**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 028200-9070  
**Dim:**  
**OE:** 428000-698, 428000-787  
**Lester:** 19334, 19336  
**Note:**



**61-82507  
Armature  
12V, 3.0kw, CW**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 028200-8650  
**Dim:** 23 Bars, 9T Straight Spline  
 60.2mm OD, 156.5mm OAL  
 DE OD 10mm, CE OD 10mm  
**OE:** 428000-3330, 428000-  
 3331, 428000-5120, 428000-  
 5230, 428000-5310, 428000-  
 5311, 428000-5312, 428000-  
 5860, 428000-5861, 428000-  
 5862, 428000-5863, 428000-  
 603, 428000-6110, 428000-680,  
 428000-698, 428000-709, 428080-  
 586, 428000-934, 428000-991,  
 438000-311  
**Lester:** 10955, 16096, 19029, 19120,  
 19183, 19201, 19335, 19336,  
 19808, 19856  
**Note:** SZ 01116  
 with both side Bearing



**61-82509  
Armature  
24V, CW, 4.8kw**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 028200-9190  
**Dim:** 9T Straight Gear  
 23 Bars, 36.30mm Commutator  
 OD  
 33.9mm Commutator Length  
 10mm DE Shaft, 10mm CE Shaft  
 60mm OD  
 156.5mm OAL  
**OE:** 428000-7100, 438000-006  
**Lester:** 33321  
**Note:** with both side Bearing



# Solenoid Assy



**66-82668**  
**Solenoid Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 153400-9931  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term M5 x 0.8  
**OE:** 428000-512  
**Lester:** 19120  
**Note:** Cap Assy use 66-82668C  
 Use w/Lower Stationary Gear



**66-82670**  
**Solenoid Assy**  
**24V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 253400-0870  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term M5 x 0.8  
**OE:**  
**Lester:**  
**Note:** Stationary Gear used with 76-82524 only, cannot used with OE designed

**Photo**  
**Coming Soon**

**66-82672**  
**Solenoid Assy**  
**24V, 4.8kw, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 253400-1170  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-461, 428000-710, 438000-006  
**Lester:** 33321, 33334  
**Note:** Use w/Lower Stationary Gear



**66-82669**  
**Solenoid Assy**  
**12V, 2.7kw, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 153400-9262  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term Spade  
**OE:** 428000-3330, 428000-3331, 428000-611  
**Lester:** 19029, 19183  
**Note:** Use w/Lower Stationary Gear



**66-82671**  
**Solenoid Assy**  
**12V, 3.0kw, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term Spade  
**OE:** 428000-523  
**Lester:** 19808  
**Note:** Use w/Lower Stationary Gear



**66-82673**  
**Solenoid Assy**  
**12V, 3.0kw, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 253400-0820  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-603, 428000-698, 428000-991  
**Lester:** 19336, 19856  
**Note:** Use w/Lower Stationary Gear.  
 For Higher Stationary Gear, please use 66-82673A.

# Solenoid Assy

Photo  
Coming Soon

## 66-82673A Solenoid Assy 12V, 3.0kw, 3-Terminals

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 253400-0820  
**Dim:** Batt. Term M10 x 1.50  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-603, 428000-698, 428000-991  
**Lester:** 19336, 19856  
**Note:** Use w/Higher Stationary Gear.  
 For Lower Stationary Gear, please use 66-82673.



## 66-82674A Solenoid Assy 24V, 7.8kw, 3-Terminals

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 253400-2030  
**Dim:** Batt. Term M12 x 1.75  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-690, 428000-712, 428000-992  
**Lester:** 16014, 16020  
**Note:** Use w/Higher Stationary Gear.



## 66-82678 Solenoid Assy 12V, 2.7kw, 3-Terminals

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M12 x 1.75  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-680, 428000-709, 428000-711, 428000-934, 428000-994, 512800-0980  
**Lester:** 10955, 16096, 30483  
**Note:** Use w/Lower Stationary Gear.



## 66-82674 Solenoid Assy 24V, 7.8kw, 3-Terminals

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 253400-2030  
**Dim:** Batt. Term M12 x 1.75  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-690, 428000-712, 428000-992  
**Lester:** 16014, 16020  
**Note:** Use w/Lower Stationary Gear.

Photo  
Coming Soon

## 66-82675 Solenoid Assy 12V, 4.8kw, 3-Terminals

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 253400-1340  
**Dim:** Batt. Term  
 Motor Term M10  
**OE:** 428000-715, 428000-787, 428000-992  
**Lester:** 19334  
**Note:** Use w/Lower Stationary Gear.

Photo  
Coming Soon

## 66-82678A Solenoid Assy 12V, 2.7kw, 3-Terminals

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M12 x 1.75  
 Motor Term M10 x 1.50  
 Switch Term  
**OE:** 428000-680, 428000-709, 428000-711, 428000-934, 428000-994, 512800-0980  
**Lester:** 10955, 16096, 30483  
**Note:** Use w/High Stationary Gear.

# Solenoid Assy

B+ M10



**66-82680**  
**Solenoid Assy**  
**12V, 3.0kw, CCW**  
**3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M10 x 1.50  
Motor Term M10 x 1.50  
Switch Term  
**OE:** 428000-593  
**Lester:** 19201, 30691  
**Note:** This is used on CCW unit.  
Use w/Lower Stationary Gear.

# Solenoid Cap Assy & Parts



**66-82668C**  
**Solenoid Cap Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M10  
 Motor Term M10  
**OE:** 428000-512  
**Lester:** 19120  
**Note:** PIC  
 Includes Cap, B+ & Motor Studs w/  
 Hardware, Gasket, & Contact



**66-82673C**  
**Solenoid Cap Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M12  
 Motor Term M10  
**OE:** 428000-6030, 428000-6980,  
 428080-6980, 428080-6981  
**Lester:** 19336, 19856  
**Note:** PIC  
 Includes Cap, B+ & Motor Studs w/  
 Hardware, Gasket, & Contact



**66-82669G**  
**Gasket-Solenoid**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-3330, 428000-3331,  
 428000-611  
**Lester:** 19029, 19183  
**Note:** used with 66-82669C.  
 SZ-09116G



**66-82669C**  
**Solenoid Cap Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M10  
 Motor Term M10  
**OE:** 428000-3330, 428000-3331,  
 428000-593, 428000-611  
**Lester:** 19029, 19183, 19201, 30691  
**Note:** PIC  
 Includes Cap, B+ & Motor Studs w/  
 Hardware, Gasket, & Contact



**66-82678C**  
**Solenoid Cap Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M12  
 Motor Term M10  
**OE:** 428000-6800, 428000-7090,  
 428000-7091, 428000-7092  
**Lester:** 10955, 16096  
**Note:** PIC  
 Includes Cap, B+ & Motor Studs w/  
 Hardware, Gasket, & Contact

**Photo  
 Coming Soon**

**66-82549**  
**Field Coil Assy-Solenoid**  
**24V, 4.8kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-710  
**Lester:** 33321  
**Note:**



**66-82671C**  
**Solenoid Cap Assy**  
**12V, 3-Terminals**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** Batt. Term M10  
 Motor Term M10  
**OE:** 428000-5230  
**Lester:** 19808  
**Note:** PIC  
 Includes Cap, B+ & Motor Studs w/  
 Hardware, Gasket, & Contact



**7966-82007K**  
**Plunger Kit**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** Parts Includes:  
 66-82563 Plunger  
 66-82566 Clip-Plunger  
 66-82211 Insulator-Plunger  
 85-82517 Washer-Plunger

# Solenoid Parts



**66-82563  
Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 109.2mm OAL  
**OE:**  
**Lester:**  
**Note:**



**66-82566  
Clip - Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 10.4mm OD x 1.5mm Thickness  
**OE:**  
**Lester:**  
**Note:**



**66-82211  
Insulator - Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 6.5mm ID x 15.5mm OD x 1mm T  
**OE:**  
**Lester:**  
**Note:**



**85-82517  
Washer - Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 6.4mm ID x 12mm OD x 1.5mm Thickness  
**OE:**  
**Lester:**  
**Note:**



**66-82209  
Coil-Solenoid  
12V, kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:**



**66-82210  
Coil - Solenoid  
24V, kw**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:**



**66-82562  
Contact - Solenoid**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 14.7/23.9mm W x 45.8mm L x 3mm T  
**OE:** 428000-3330, 428000-3331, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-08116C used on Solenoid Cap for Motor Terminal.



**66-82564  
Bracket-Solenoid Coil**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:**



**66-82565  
Plate - Solenoid Bracket**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 65mm Length, 48.6mm Width  
6.5mm Total Thickness  
28.5mm ID Hole  
**OE:**  
**Lester:**  
**Note:** Zinc plated

# Solenoid Parts



## 67-82101 Relay Control - Solenoid 12V

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-9340  
**Lester:** 19340  
**Note:**

Photo  
Coming Soon

## 67-8210 Relay Control - Solenoid 24V

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:**



## 69-82518 Spring-Plunger Rod

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 29.1mm ID x 32.8mm OD x 65mm L  
1.9mm Wire Dia.  
**OE:**  
**Lester:**  
**Note:**



## 69-82519 Spring-Plunger Stick

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 6.4mm ID x 9.5mm OD x 26.5mm L  
1.5mm Wire Dia.  
**OE:**  
**Lester:**  
**Note:**



## 72-82515 Insulator-Plunger Contact

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 6.2mm ID x 23.3mm OD x 5.8mm  
Thickness  
**OE:**  
**Lester:**  
**Note:**

# Brush



## 68-82039 Brush-Positive 12 Volt, (Field)

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 8mm T x 25mm W x 21mm L x 39mm LL  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-05116A

Photo  
Coming Soon

## 68-82042 Brush-Positive 24Volt, (Field)

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 9mm T x 30mm W x 21mm L x 45mm LL  
**OE:**  
**Lester:**  
**Note:** Ref



## 68-82040 Brush-Negative 12 Volt, (Ground)

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 8mm T x 25mm W x 21mm L x 36mm LL  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-05116B

Photo  
Coming Soon

## 68-82043 Brush-Negative 24Volt, (Ground)

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 9mm T x 30mm W x 21mm L x 41mm LL  
**OE:**  
**Lester:**  
**Note:** Ref

# Brush Holder Assy



**69-82509**  
**Brush Holder Assy**  
**CW, 12V, 2.7kw/3.0kw**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 028510-6840  
**Dim:** 79.1mm OD  
**OE:** 428000-3330, 428000-3331, 428000-512, 428000-531, 428000-586, 428000-603, 428000-611, 428000-680, 428000-698, 428000-709  
**Lester:** 10955, 16096, 19029, 19120, 19183, 19201, 19335, 19336, 19856,  
**Note:** SZ-06116

**Photo**  
**Coming Soon**

**69-82511**  
**Brush Holder Assy**  
**24V, CW, 4.8kw**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 028510-6830  
**Dim:**  
**OE:** 428000-690, 428000-7140, 428000-9920  
**Lester:** 16014, 30419  
**Note:** May interchange with 69-82510



**69-82516**  
**Brush Holder Assy**  
**12V, CCW, 3.0kw**

**For:** Denso PLGR PA90S Starters  
**Used:**  
**Replace:** 028510-6770  
**Dim:**  
**OE:** 428000-5861, -5862, -5863  
**Lester:** 19201  
**Note:** May interchange with 69-82510



**69-82510**  
**Brush Holder Assy**  
**24V, 7.8kw, CW**

**For:** Denso PLGR PA90L Starters  
**Used:**  
**Replace:** 028510-6810  
**Dim:**  
**OE:** 428000-710, 428000-7120  
**Lester:** 16020, 33321  
**Note:** May interchange with 69-82509.

**Photo**  
**Coming Soon**

**69-82512**  
**Brush Holder Assy**  
**12V, CW, 4.8kw**

**For:** Denso PLGR PA90LStarters  
**Used:**  
**Replace:** 028510-6800  
**Dim:**  
**OE:** 428000-7870  
**Lester:** 19334  
**Note:** May interchange with 69-82509.



# Brush Holder Parts

**Photo  
Coming Soon**

**69-82513  
Return Spring-Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:** Plunger  
**Replace:**  
**Dim:** 9.6mm OD, X 25mm L  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** SZ-08116SR

**Photo  
Coming Soon**

**69-82514  
Spring-Plunger**

**For:** Denso PLGR PA90 Starters  
**Used:** Plunger  
**Replace:**  
**Dim:**  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** SZ-08116S

# O-Ring, Seal, Drain Tube



## 71-82117 Drain Tube-CE Plate

**For:** Denso PLGR PA90 Starters  
**Used:** CE Plate  
**Replace:** 028065-0290  
**Dim:** 2.2mm Gap x 6mm OD x 28.5mm OAL  
 For 6mm Hole w/2mm Thick Wall  
**OE:** 428000-333, 428000-611  
**Lester:** 19029  
**Note:** Ref ST-29107, 71-82312, W485-96  
 We have the same style but different design.



## 71-82513 O Ring-Field Case

**For:** Denso PLGR PA90 Starters  
**Used:** Field Case  
**Replace:** 028901-5821  
**Dim:** 61mm OD x 59.2mm ID x 1.8mm T  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-603, 428000-611, 428000-680, 428000-690, 428000-698, 428000-709, 428000-710, 428000-714, 428000-787, 428000-992  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Also can use 71-82171 (62mmIDx64mmODx1.6mmT)



## 71-82171 O Ring-Field Case

**For:** Denso PLGR PA90 Starters  
**Used:** Field Case  
**Replace:**  
**Dim:** 62mm OD x 64mm ID x 1.6mm T  
**OE:**  
**Lester:**  
**Note:** Similar type use to the PA90 Field Case.  
 Can be use instead of 71-82513.



## 71-82514 Seal-DE Housing

**For:** Denso PLGR PA90 Starters  
**Used:** DE Housing  
**Replace:**  
**Dim:** 19.5mmID x 32.2mmOD x 4.1mmTH  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Rubber with plastic.  
 Oil seal for DE Housing.



## 71-82515 Drain Plug-CE & DE

**For:** Denso PLGR PA90 Starters  
**Used:** CE Plate  
**Replace:** 028062-6010  
**Dim:** 11mm OD  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** SZ-29116



## 71-82501 O Ring-Terminal

**For:** Denso PLGR PA90 Starters  
**Used:** Battery & Motor Terminal  
**Replace:**  
**Dim:** 9.8mmID x 13.8mmOD x 1.9mmW  
**OE:**  
**Lester:**  
**Note:** Also can use 71-82141 (7.6mm ID x 11.2mm OD x 1.8mm W).



## 71-82194 Insulator - Switch Terminal Pin, Solenoid Cap

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 9.1mm W x 6mm L x 4.5mm Thickness  
**OE:**  
**Lester:**  
**Note:** Rubber material.

## O-Ring, Seal, Drain Tube



### **71-82195 Insulator-Field Case**

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** Rubber material.



### **71-82196 Insulator - Switch Terminal Pin, Solenoid Cap**

**For:** Denso PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 11mm W x 5.8mm L x 4.5mm  
Thickness  
**OE:**  
**Lester:**  
**Note:** Rubber material.

# Misc. Parts



**76-82243**  
**Connector-Field Case**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** Long type



**76-82244**  
**Connector-Field Case**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:**  
**Lester:**  
**Note:** Short type



**76-82522**  
**Stop Collar-Drive**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128952-0590  
**Dim:** 16.5mm ID, x 22mm OD, x 4.5mm Thickness  
**OE:** 428000-333, 428000-512, 428000-586, 428000-603, 428000-611, 428000-680, 428000-690, 428000-698, 428000-709, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 10955, 16020, 16096, 19029, 19120, 19183, 19201, 19334, 19335, 19856, 33321  
**Note:** Ref SZ-2001



**76-82523**  
**Planetary Gear**  
**15T, Straight Gear**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 028630-5180  
**Dim:** 8mm ID, 25.5mm OD, 12.5mm Thickness  
**OE:** 428000,333, 428000-512, 428000-586, 428000-603, 428000-611, 428000-680, 428000-690, 428000-698, 428000-709, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 10955, 16096, 19029, 19120, 19201, 19334, 19336, 19856, 33321  
**Note:** SZ-30116G  
 This is for Lower Stationary Gear use.



**76-82524**  
**Planetary Gear Track**  
**39T**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 028635-5220  
**Dim:** 73.4mm OD, 57.5mm ID, 12.75mm Thickness  
**OE:** 428000-333, 428000-512, 428000-586, 428000-603, 428000-611, 428000-680, 428000-709  
**Lester:** 19849  
**Note:** Deep drawing steel. This is after market design, used with 66-82674 Solenoid.  
 Ref SZ-30116  
 This is for Lower Stationary Gear use.

**Photo**  
**Coming Soon**

**76-82524A**  
**Planetary Gear Track**  
**39T**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 22.8mm OD x 18.7mm ID x 1.2mm Thickness  
**OE:**  
**Lester:**  
**Note:** Similar to 76-82524.  
 Steel material;



**76-82525**  
**Retainer Ring-Armature**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 90557-20000  
**Dim:** 22.8mm OD, 18.7mm ID, 1.2mm Thickness  
**OE:** 428000,333, 428000-586, 428000-603, 428000-611, 428000-680, 428000-690, 428000-698, 428000-709, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 10955, 16020, 16096, 19029, 19201, 19336, 19856, 33321  
**Note:**



**76-82526**  
**Planetary Drive**

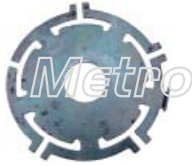
**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 65.3mm OD, 10.4mm ID, 32.2mm Thickness, 8mm OD each Pin  
**OE:** 428000,333, 428000-611  
**Lester:** 19029  
**Note:** w/6 Clutch Roller Pin & 6 Clutch Spring

# Misc. Parts



## 76-82527 Support-Armature Bearing

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 85.9mm OD, 30mm Inner ID, 26.65mm Outer OD, 2.35mm Plate Thickness, 9.2mm Total Thickness  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** SZ-23116C



## 76-82528 Cover-Gear Track

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 028452-5130  
**Dim:** 77.3mm OD, 20mm ID, 1mm Thickness  
**OE:** 428000-333, 428000-512, 428000-531, 428000-586, 428000-603, 428000-611, 428000-680, 428000-690, 428000-709, 428000-710, 428000-712, 428000-714, 428000-787, 428000-992  
**Lester:** 10955, 16020, 16096, 19029, 19120, 19183, 19201, 19334, 19335, 19856, 33321  
**Note:** Ref SZ-30116C



## 76-82529 Retainer Ring-Pinion

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:** 14.5mm ID, x 17.7mm OD, x 1.6mm T  
**OE:** 428000-333, 42800-512, 428000-531, 428000-586, 428000-611  
**Lester:** 19029, 19120, 19183, 19201, 19335  
**Note:** Ref SZ-1501

**Photo  
Coming Soon**

## 76-82530 Relay

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:**  
**Dim:**  
**OE:** 428000-9340  
**Lester:**  
**Note:** Ref PIC 190-6530



## 76-82531 Connector-Motor Terminal

**For:** Denso PLGR PA90 Starters  
**Used:** Motor Terminal  
**Replace:**  
**Dim:** 10mm ID  
**OE:**  
**Lester:**  
**Note:** used on Solenoid Cap for Motor Terminal.



## 76-82532 Connector-Motor Terminal

**For:** Denso PLGR PA90 Starters  
**Used:** Motor Terminal  
**Replace:**  
**Dim:** mm ID  
**OE:**  
**Lester:**  
**Note:** used on Solenoid Cap for Motor Terminal.

# Hardware



**84-82532**  
**Thru Bolt**  
**Hex Head (Short)**

**For:** Denso PLGR PA90 Starters  
**Used:** DE Housing to CE Plate  
**Replace:** 128950-0980  
**Dim:** M7x1.0, 194mm L, 201mm OAL,  
 35mm Thread Length  
 Drive: 10mm  
**OE:** 428000-333, 428000-512, 428000-586, 428000-603, 428000-611, 428000-680, 428000-709, 428000-710  
**Lester:** 10955, 16096, 19029, 19120, 19201, 19856, 33321  
**Note:** SZ-12116



**84-82533**  
**Thru Bolt**  
**Hex Head (Long)**

**For:** Denso PLGR PA90 Starters  
**Used:** DE Housing to CE Plate  
**Replace:**  
**Dim:** M7x1.0, 213.5mm L, 220.6mm OAL,  
 26.5mm Thread Length  
 Drive: 10mm  
**OE:**  
**Lester:**  
**Note:**



**84-82013**  
**Screw-Brush Holder**  
**Phillips Round Washer Head**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128960-0040  
**Dim:** M5x0.8, 16mm L  
**OE:**  
**Lester:** 19029 etc  
**Note:**



**84-82194**  
**Screw-DE to Solenoid**  
**Hex Head**

**For:** Denso PLGR PA90 Starters  
**Used:**  
**Replace:** 128950-0970  
**Dim:** M5 x 0.8 x 30mm L, 35mm OAL  
 Drive: 8mm  
**OE:**  
**Lester:** 19029 etc  
**Note:**



**84-82523**  
**Ground Stud-DE Housing**

**For:** Denso OSGR, PA90 Starters  
**Used:** DE Housing  
**Replace:** 128950-0550  
**Dim:** **M12x1.75x22mmL**  
**M10x1.50x22mmL**  
**OE:** 428000-523, 428000-934, 428000-680, 428000-709, 428000-710, 428000-994; 438000-311, 10955, 16020, 16096, 19029,  
**Lester:** 19120, 19808, 30483, 33321  
**Note:** Copper



**84-82518**  
**Ground Stud-DE Housing**

**For:** Denso OSGR, PA90 Starters  
**Used:** DE Housing  
**Replace:** 128950-0140  
**Dim:** **M12x1.75x22mmL**  
**M12x1.75x22.8mmL**  
**OE:** 428000-714, 428000-787, 428000-992  
**Lester:** 16020, 19029, 19120, 19334, 19808  
**Note:** Copper

# Hardware



## 84-82530 Terminal Post

**For:** Denso OSGR, PA90 Starters  
**Used:** Battery, Motor  
**Replace:**  
**Dim:** M10 x 1.50 x 34mm L  
 41mm OAL  
**OE:**  
**Lester:**  
**Note:** Copper



## 84-82529 Terminal Post

**For:** Denso OSGR, PA90 Starters  
**Used:** Battery, Motor  
**Replace:**  
**Dim:** M10 x 1.50 x 48mm L  
 55mm OAL  
**OE:**  
**Lester:**  
**Note:** Copper



## 84-82531 Terminal Post

**For:** Denso OSGR, PA90 Starters  
**Used:** Battery, Motor  
**Replace:**  
**Dim:** M12 x 1.75 x 48mm L  
 55.1mm OAL  
**OE:**  
**Lester:**  
**Note:** Copper



## 85-82503 Split Lock Washer

**For:** Denso PLGR PA90 Starters  
**Used:** M10 Solenoid Batter & Motor Terminal  
**Replace:** 902581-0001  
**Dim:** 10mm ID x 17.5mm OD, 2.2mm Thickness  
**OE:** 428000-333, 428000-611  
**Lester:** 19029 etc  
**Note:** Used on all PA90 Solenoid with M10 Battery & Motor Terminal Post



## 85-82112 Split Lock Washer

**For:** Denso PLGR PA90 Starters  
**Used:** Solenoid Cap to Solenoid Housing  
**Replace:**  
**Dim:** 5.3mm ID x 8.8mm OD, 1.3mm Thickness  
**OE:** 428000-333, 428000-611  
**Lester:** 19029 etc  
**Note:**



## 85-82519 Flat Washer

**For:** Denso PLGR PA90 Starters  
**Used:** M10 Battery & Motor Terminal  
**Replace:**  
**Dim:** 10.5mm ID x 20mm OD, 1.4mm Thickness  
**OE:** 428000-333, 428000-611  
**Lester:** 19029 etc  
**Note:**



## 85-82501 Hex Nut

**For:** Denso PLGR PA90 Starters  
**Used:** M10 Batter & Motor Stud  
**Replace:** 901701-0061  
**Dim:** M10x1.50, 6mm Thickness  
**OE:** 428000-333, 428000-611  
**Lester:** 19029 etc  
**Note:** MN-1017, 85-2503



## 85-82520 Flat Washer

**For:** Denso PLGR PA90 Starters  
**Used:** M12 Batter & Motor Stud  
**Replace:**  
**Dim:** 12.5mm ID x 20mm OD x 2.10mm Thickness  
**OE:**  
**Lester:**  
**Note:**



## 85-82521 Split Lock Washer

**For:** Denso PLGR PA90 Starters  
**Used:** M12 Batter & Motor Stud  
**Replace:**  
**Dim:** 12.4mm ID x 18.5mm OD x 3.2mm Thickness  
**OE:**  
**Lester:**  
**Note:**



## 85-82522 Hex Nut

**For:** Denso PLGR PA90 Starters  
**Used:** M12 Batter & Motor Stud  
**Replace:**  
**Dim:** M12 x 1.75 x 7.8mm Thickness  
**OE:**  
**Lester:**  
**Note:**

# Solenoid Repair Tools

## DENSO PA90 SOLENOID SWITCH REMOVE & INSTALL FIXTURE USE WITH HYDRAULIC MACHINE

need help, please call 800-263-8761 or info@metroautoinc.com

### Remove Fixture TL66-002

The diagram illustrates the removal of the solenoid cap and the placement of the TL66-002 fixture. It shows the solenoid cap being removed from the base, the base being placed on the fixture, and the fixture being aligned with the base.

**Adjusting Bolt**

remove Solenoid cap → place on the base → align top fixture, one pin to each bracket hole

### Install Fixture TL66-003

The diagram illustrates the installation of the solenoid housing and the TL66-003 fixture. It shows the bracket and coil being placed on the base, the solenoid housing being covered over the base, and the fixture being pressed in with a hydraulic machine.

**Adjusting Bolt**

66-82564 Bracket

place bracket & Coil on base → cover with Solenoid Housing → press in with fixture



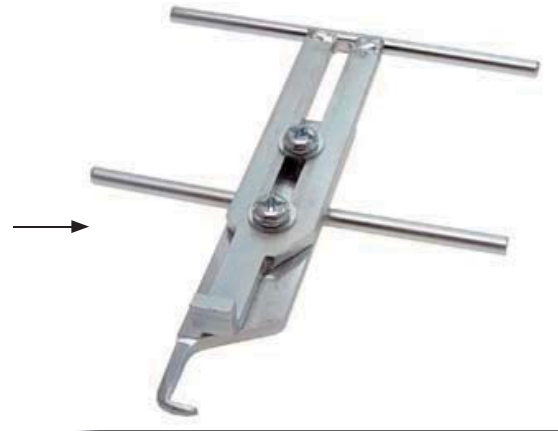
# BRUSH HOLDER TOOL

## FOR MOST HEAVY DUTY STARTERS USE

**TL69-001**  
**Brush Holder Spring Puller**  
**CW Brush Holder use**

*Can used on Bosch, Delco, Denso, Ford, Hitachi, Mitsubishi, Nikko, Sawafuli .... all type heavy duty Brush Holder.*

**\$25.00/ea**



**TL69-002**  
**Brush Holder Spring Puller**  
**CCW Brush Holder use**

*Can used on Bosch, Delco, Denso, Ford, Hitachi, Mitsubishi, Nikko, Sawafuli .... all type heavy duty Brush Holder.*

**\$25.00/ea**

### **Features:**

- **Safety use**
- **Easy use**
- **Steel material, limited lifetime warranty**
- **See our web video for demenstration, [press here](#)**

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