Ural (Урал) - Dnepr (Днепр) Russian Motorcycle Generators and Alternators

Part III-3: Г-424 (G-424) Alternator

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## Types of Generators/Alternators for Ural (Урал) and Dнепр (Днепр)

<table>
<thead>
<tr>
<th>Generator/Alternator</th>
<th>Type</th>
<th>Vintage</th>
<th>Nominal Voltage</th>
<th>Current</th>
<th>Nominal Power</th>
<th>Motorcycles</th>
<th>Motorcycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Г-11 (G-11) (P/N: 72181)</td>
<td>DC Generator</td>
<td>1941-1951</td>
<td>6-Volt (7-Volt)</td>
<td>7-Amp</td>
<td>45-Watts</td>
<td>M-72</td>
<td>Not Used</td>
</tr>
<tr>
<td>Г-11A (G-11A) (P/N: 72181-A)</td>
<td>DC Generator</td>
<td>1952-1957</td>
<td>6-Volt (7-Volt)</td>
<td>7-Amp</td>
<td>45-Watts</td>
<td>M-72, M-72M, M-61</td>
<td>M-72, M-72N, early K-750</td>
</tr>
</tbody>
</table>

### Notes:
1. **Nomenclature:** The Cyrillic letter “Г” transliterates (Russian-to-Latin) to “G” or “L” or “T.” Thus we see Г-414 or G-414 or L-414 or T-414, all the same part.
2. **Cannot use Г-424 Alternator with discharged battery or without battery.**
3. **MB-750 = MW-750, MB-750M = MB-750M**
4. **The frame (case) of the Г-11/Г-11A generator is positive (positive-ground).**
5. **Г-414 Generator:** P/N: 750181 6-Volt (negative ground), whereas P/N: 750181-A (positive-ground) for fitting Г-11A’s into early K-750’s.
Alternators have progressed in output voltage and power. From the Г-11 (G-11) generator of 6-Volts/45-Watts in 1941, the Г-11A in 1952, the Г-414 6V/65 W in 1957, the Г-424 of 12V/150W in 1974, the 14.3771 of 12V/500W in 1998.5, to the present-day Nippon-Denso alternator of 12-V/770W.

- **12-Volt / 11-Ampere avg. 14-Ampere max. / 150-Watt Alternator**
- **First Used on Ural M-67 and Dnepr MT-10**
- **Total Capacity Doubled Improved Lighting**
- **Maximum Short-Term Overload: 200 W**
- **Rotor Speed:**
  - Begins to Produce Voltage (no load) at Speed of 1000-1100 rpm, corresponding to 750-850 rpm Engine Crankshaft Speed
  - 1,300 rpm (14-V, 0-A), 2,400 rpm (11-A), 5,000 rpm (Max)
- **Used on:**
  - Ural: M-67, M-67.36, IMZ 8.103 Series
  - Dnepr: MB-650, MB-650M, MT-10, MT-10.36, MT-11, MT-16
- **Used in Conjunction with Mechanical PP-330 & Solid-State 33.3702 Regulators**
- **3-Ø (three-phase) Generation, 12-Pole Construction**
- **Built-in Rectifier: MSF-2A (ВБГ-2А)**

The higher-output capability of the Г-424 alternator was needed to provide a migratory path for electric-start.
This diagram is handy because the terminals are unlabelled.
The 14-Amp Γ-424 alternator has a thin pressed sheet-metal shroud covering the rear half, while the later 35-Amp 14.3771 alternator has a thicker cast aluminum housing.
Γ-424 Alternator on 650cc Engine (1989)
Г-424 Alternator on Dnepr MT-16 650cc (1985)
Г-424 Alternator on Dnepr MB-650M

(www.oldtimergarage.eu)
The Г-424 alternator has an in-built rectifier unit, ВБГ12А.
Construction of Г-424 Alternator (uraldnepr.ru/publ/5-1-0-150)

- PP-330 Regulator
- Dash “Fault” Indicator
- 12-Volt Battery
- Full-Wave 3Ø Rectifier
- Slip-Rings
- Stator (field output winding)
- Rotor (exciter magnetic field)
Alternator Parts

• Alternator Consists of Three Main Parts; Stator, Rotor and Covers
  – Stator Pack (8):
    • Sheet Electrical Steel, Thickness 1 mm, with 18 Teeth
    • Three-Phase Winding, Wye-Connected
    • Each of 18 Coils: Wound Wire TCPI-2, Diameter 1.08 mm
  – 12-Pole Rotor
    • Maximum Excitation Current at 14-Volts: 1.2-Amperes
    • Rotor Shaft (6) and Slip Rings (10)
  – Cast Aluminum Alloy Covers (4 and 11) Enclose;
    • Rectifier Unit: MSF-2A
    • Non-Conductive Holder and Clamps with Three Labels
    • Cover (4) and Gasket Set (5) Protect Cavity from Crankcase Oil
Г-424 Alternator

- Rectifier Unit
- Rotor (Anchor)
- Stator
- Terminal Block
- Brush Holder
- Carbon Brush Set
Г-424 Alternator Parts Breakdown (Ural 650)

- Pinion Gear
- Rotor
- Brushes
- Stator
- Terminal Block
- Rectifier
- Plastic End-Cap
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<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Г424-3701006</td>
<td>Casing</td>
<td>1</td>
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<tr>
<td>Г424-3701007</td>
<td>Clamp</td>
<td>2</td>
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<tr>
<td>Г424-3701008</td>
<td>Fan</td>
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<tr>
<td>Г424-3701011</td>
<td>Bushing</td>
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<td>Г424-3701015</td>
<td>Brush Holder</td>
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<tr>
<td>Г424-3701020</td>
<td>Brush</td>
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<tr>
<td>Г424-3701030</td>
<td>Brush</td>
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<tr>
<td>Г424-3701090</td>
<td>Terminal block</td>
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<td>Г424-3701100</td>
<td>Stator with Windings</td>
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<tr>
<td>Г424-3701200</td>
<td>Rotor</td>
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</tr>
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<td>Г424-3701300</td>
<td>Cover</td>
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<td>Г424-3701400</td>
<td>Cover</td>
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<tr>
<td>ВБГ-2A</td>
<td>Unit</td>
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<td>1-22x40-1</td>
<td>Gland</td>
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<tr>
<td>180503K1</td>
<td>Bearing</td>
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<td>201419</td>
<td>Bolt M6x18</td>
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<td>Screw M4x8</td>
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<td>Screw M6x50</td>
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<td>250959</td>
<td>Nut M12</td>
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<td>252003</td>
<td>Washer 5</td>
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<td>252004</td>
<td>Washer 6</td>
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<tr>
<td>252136</td>
<td>Washer 4H</td>
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<tr>
<td>252133</td>
<td>Washer 5л</td>
<td>3</td>
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<tr>
<td>252134</td>
<td>Washer 6л</td>
<td>4</td>
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The concentrically-located rotor shaft is made for the newly-designed engine case.
Г-424 (G-424) Alternator (cont.)

Rubber Cover for 3-Terminal Connection
Г-424 (G-424) Alternator (cont.)
Model 424, 12-Volt, 150-Watt
List Price: $75.00 New
(www.ebay.com)

Generator 12V DNEPR
Fits: Dnepr MT-11/16, MB-650
List Price: $105.00 New
(www.ebay.com)
The 3-Ø (three-phase) winding produces three waves, 120° apart, for a more continuous supply of current.
MT-11 and MT-16 Alternator/Regulator Circuitry

Diagram is useful when unmarked wires are removed from unmarked terminals!

'+' (output) goes to the battery
'W' (field) goes to the regulator
'~' is not used. Used only with the old electromechanical regulators (PP-330).

Master Switch (deleted for electric-start)

Alternator Fault Indicator (Dash)
Alternator Rotor for G-424

Alternator Rotor for G424-3701200
Fits: Dnepr MT-11/16, MT-10.36, Ural
List Price: $65.95
(www.ebay.ie)
Alternator Γ-424 Rotor

Exciter Slip-Rings
Alternator Г-424 Rotor and Stator
Γ-424 Diode Pack Mounted on Diode Bridge
(If battery wires have been connected the wrong way, even for a second, you’ll need new diodes in the back of the alternator.)

Pair of Brushes and Rotor for Γ-424 Alternator

When validating a generator (as in its operation), it must be remembered that a no-load may destroy the rectifier.
Pinion Gears for Alternator Γ-424

Γ-424 Alternator Gear
List Price: EUR 14.00
(www.ebay.com)

Alternator Gear IMZ for Ural
List Price: $40.00 New
(www.ebay.com)
Checking the Alternator Performance

• Checking the Performance of the Alternator on a Stand
  – Check Performance at No-Load and Under a Load
  – In All Tests, Strictly Observe Polarity
  – When Testing the Alternator Excitation, Connect the Battery Terminal “+” to the \( \mathbf{W} \) Terminal of the Alternator

• Checking the Performance of the Alternator with Motorcycle on a Stand
  – Check Performance with Engine Running
  – Add Voltmeter (30-volt range) and Ammeter (15-amp range)
  – Add Loading Rheostat (2-ohms with current up to 15-amps)
  – In Fourth Gear, Speedometer Should Read 18 kph at 1,300 rpm; 35 kph at 2,400 rpm
Structure and Features of the Γ-424 Alternator

- Front Cover (1), from Drive Side, Has Adjustable Eccentric Cylindrical Rotor Axis
- Drive-Side Has Rubber Gasket (2) for Environmental Protection
- Internal Bearings Lubricated with Single- and Double-Sided Seals
- Rotor (3) Rotates with Windings Excitation Powered Via Slip Rings
- Three-Phase (4) Stator Winding Connected into a Star with Insulated Neutral
- All Phases Soldered to Head Bolts Fastening Rectifier Unit (8)
- Two Covers, End Shield (6) and Stator Fastened with Three Screws MB
- Brush with Wire Attached to Plate and Holder (7) with Six Captive Screws
- Integrated Semiconductor (8) Rectifier Unit type MSF-2A
- Rectifier Unit (8) Consists of Three Mono-Blocks, Cast Aluminum Heat Sink Fins
- Axial Fan (9), Under Protective Cover (10) on Rotor Shaft (3), Cools Rectifier
- Terminal Block (5) for Connection to Alternator
Disassembling and Reassembling the Alternator

• To Disassemble Alternator
  – Remove Two Screws and Take Off the Guard (10)
  – Remove Screw and Fan (9)
  – Remove Respective Nuts and Bolt to Remove Rectifier Unit (8), Terminal Block (5) and Brush Holder (7)
  – Mark the Ends of Connected Wire
  – Push the Stator Slightly, Extending Bolts Inside End Shield (6)
  – Undo Coupling Screws and Remove End Shield (6) by Striking Uniformly with a Wooden Hammer on the Bosses for Coupling screws
  – Take Stator (4) Out of End Shield (1)

• To Replace Bearings
  – Remove Bearing from Shaft Using a Pulley-Puller from Slip-Ring End
  – Fit New Bearing on the Shaft
  – Uncotter and Unscrew Slotted Nut from Drive End
  – Remove the Gear and Key
  – Scrape Metal from Splines of Screws Fastening the End Shield
  – Remove the Screws and the End Shields
  – Remove Shaft from the Bearing Using a Pulley-Puller by Resting It Against the Shaft Center-Hole and the Flange of End Shield (1)
Disassembling and Reassembling the Alternator (cont.)

– Press the Bearing Out of Its Seat in the End Shield by Resting the Tool Against the Bearing Inner Ring
– Fit New Bearing and Reassemble End Shield (1) in Reverse Order
– After Replacing the Screws That Fasten the End Shield, Punch Its Metal in the Screw Splines

• To Reassemble Alternator
  – Observe the Reverse Order
  – Locks on Alternator End Shields and Stator Should Form a Straight Line
  – Before Assembling the End Shield (6), Insert Extending Bolts in Stator Holes So That Insulating Bushing Fitted Are Sunk in Respective Recesses of the End Shield, While the Bolt Heads Are Placed in Respective Recesses of These Bushings
  – To Fit the Gear on the Generator Shaft, It Will Be Necessary to Remove the Generator Guard So That the Shaft End Is Rested on a Rigid Support
Wiring diagram
Ural 650
copyright by Lars Lassen

Horn
Button

Regulator (PP-330)

(Later Up-graded with 33.3702 Solid-State Regulator)

Alternator (Г-424)

Sidecar rear lamp
turn
tail / brake

Sidecar front lamp

switch right side of handlebar

ignition on/off lights - off / parking - on

position lamp

switch braking light front

neutral switch

Regulator (PP-330)

Alternator (Г-424)

spark plug cap

rear brake switch

rear brake

brake
tail

tail light

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Dnepr (Днепр) MT-10 (1974)

21. Ignition Coil (B204)
22. Voltage Regulator (PP-330)
Alternator (Г-424)

Battery (2X 3MT-6)
Foot Brake-Light Switch
Master Switch
Flasher
Turn Signal
Neutral Switch
Horn
Neutral Switch

22. Voltage Regulator Switch
2. Turn Signal Flasher
3. Instrument Illumination
4. Headlight
5. Parking light
6. Ignition Switch
7. Front Left Turn Signal - Bike
8. High Beam Switch
9. Right Turn Signal - Sidecar
10. Front Right Turn Signal - Bike
11. Battery
12. Fuse
13. Turn Signal Indicator
14. Oil Pressure Indicator
15. High Beam Indicator
16. Charge Indicator
17. Oil Pressure Switch
18. Neutral Switch
19. Neutral Indicator
20. Horn
21. Coil
22. Voltage Regulator
23. Generator
24. Sparkplugs
25. Points/Contact Breaker
26. Rear Right Turn Signal - Bike
27. Wire Connector
28. Ground
29. Brake Light
30. Tail Light

1974 Dniepr MT-10

wykonal: Carl Allison
Dnepr (Днепр) MT-10 and MT-10.36

1. Turn Signal
2. Flasher
3. Neutral Switch
4. Oil Pressure Switch
5. Battery (2x 3MT-6)
6. Breaker (PM-302A)
7. Horn Button
8. Horn
9. Master Switch
10. Foot Brake-Light Switch
11. Brake
12. 22. Regulator (33.3702)
13. 23. Alternator (Г-424)
14. 21. Ignition Coil (B204)
15. Breaker (PM-302A)
7-Oil Pressure Sensor (MM126)
8-Foot Brake-Light Switch (BK854B)
14-Flasher Unit (PC427)
16-Voltage Regulator: 33.3702
19-Battery: 6MTS-9 (12V/9A-hr)
21-Alternator: Г-424 (150W)
33-Horn (C205B)
35-Ignition Coil (B204)
36-Spark plug (A14B)
37-Breaker (PM-302A (with automatic spark timer))
42-Master Switch (46.3710)
Dnepr (Днепр) MT-14 and MT-11 / 16
(showing replacement of PP-330 Regulator with the Solid-State 33.3702)

Older Models:
PP-330

Battery
Regulator (33.3702)
Brake Master Switch
Neutral Switch
Ignition Coil (B204)
Oil Pressure Switch
Flasher Horn
Button
Turn Signal
Horn
Breaker points
Alternator (Г-424)

Older Models:
PP-330

schemat instalacji do Dniepra MT-11, 14 i 16