Ural (Урал) - Dnepr (Днепр)

Russian Motorcycle

Part VII - Neutral Indicating Switch Evolution

(контакта датчика нейтраль)

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Neutral Indicating Switch

- Contact Switch on Gear-Box
- Indicates Transmission in Neutral
- Lamp Indicator on Motorcycle Dash
- Study Shows
  - Switch and Indicator Locations
  - Schematics
  - Part Numbers
  - Trouble-Shooting and Adjustment
- Two Types of Neutral Sensors
  - MT804517A
    - Early Sensor
    - Senses Grounding Spring on Gearshift Cam Rim
    - Used on Denpr’s K-650, MT-9 thru MT-16
  - IMZ-8.103-04055
    - Later Sensor
    - Senses Grounding Button on Gearshift Cam Side
    - Used on Ural’s 8.103 and Later

1. Neutral Indicator Light on Dash
2. Neutral Indicator Switch on Transmission
3. Neutral Indicator Switch on Transmission

1 - лампа указателя нейтрали; 2 - провод, 3 – изолирующий Колпачок
1 - neutral indicator light, 2 - wire, 3 – Isolation cap
Neutral Gear Sensor vs. Oil-Pressure Sensor

- Difficult for Some to Distinguish between the Emergency Oil-Pressure Sensor and the Neutral Gear Sensor
  - Emergency Oil-Pressure Sensor and Neutral Gear Sensor Are Minor Parts and thus Covered Inadequately
  - Vendors Confuse Parts: Some Parts Catalogs Are Mislabeled
- Confusion Rectified
  - Use Russian Websites and Translators
    - датчик аварийного давления масла: oil pressure sensor alarm
    - контакт датчика нейтраль: contact sensor neutral
  - Use Indicator Panel Layout on the Headlight Cavity
    - Tracing the Sensor to Corresponding Indicator
      - e.g. Schematic of Днепр (Днепр) MT-10.36 Example Below
      - e.g. Schematic of Урал (Урал) Example Below
  - Ural Schematics and Parts Lists, Russian Maintenance Manuals
  - Ural and Dnepr Schematics
    - Only Ural With Emergency Oil Pressure Sensor: M-66

Ural Indicator Placement

Neutral Indicator “Green” on Dneprs and Urals

Emergency Oil Pressure “Red” on Dneprs Only
## IMZ (ИМЗ) - Ural (Урал) and KMZ (КМЗ) - Днепр (Днепр) Neutral-Gear Sensors

<table>
<thead>
<tr>
<th>Mfr</th>
<th>Model</th>
<th>Year</th>
<th>Engine Size (cm³ / inch³)</th>
<th>Neutral-Gear Sensor</th>
<th>Voltage</th>
<th>Signal Lamp</th>
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<tbody>
<tr>
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<tr>
<td>M-72</td>
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<td><strong>8.1037 “750”Series</strong></td>
<td>2003 - present</td>
<td>745 / 45.2 OHV</td>
<td>IMZ-8.103-04055</td>
<td>12-Volt</td>
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<td><strong>Dnepr</strong></td>
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<td>746 / 45.9 SV</td>
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<td>649 / 39.4 OHV</td>
<td>MT804517A</td>
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<td>649 / 39.4 OHV</td>
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<td>MT-12 (Dnepr-12)</td>
<td>1974 - 1985</td>
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<td>MT804517A (after adding PM-302)</td>
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<td>MT-11 (Dnepr-11)</td>
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<td>MT-16 (Dnepr-16)</td>
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<td>MT804517A</td>
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</table>
MT804517A for Dnepr K-650 (MT-8), MT-9 thru MT-16

Contact to Ground Via Spring Contact in Gearbox

MT804517 Sensor

Terminal to Indicator Light

MT804517-A, DNEPR
Item: 000.589
List Price: 5.04€
(www.oldtimergarage.eu)
The MT804517A neutral gear indicator switch is readily available on the internet.
Neutral Control Light Contact
Dnepr Gearbox
List Price: 5.99€
(www.ural-zentrale.de)

The sensor for the neutral control light is placed at the Dnepr gearbox, resembling a large plastic bolt with an internal steel pin which grounds at neutral with the steel washer of the contact. It is sealed at the gear-box wall with an O-ring.
Pilot Lamp (ПД20-3803000-Д1)

Dnepr (KMZ) ПД20-3803000-Д1
Fits: Dnepr MT-11/16
List Price: $4.95
dnepr-kiev.com

ПД20-3803000-Д1
List Price: 1.65€
www.ebay.es

The ПД20-3803000-Д1 indicator lamp assembly is readily available on the internet.
Dnepr’s K-750 lacked a neutral indicator.
Dnepr’s early K-750M also lacked a neutral indicator.
Dnepr’s MB-750 lacks a neutral indicator.
Dnepr’s Early K-750M, MB-750, K-650 and MB-750M

Some early Dneprs did not have a neutral indicator, until the PM-05 distributor/breaker was up-dated.
Some K-650 schematics don’t show the neutral indicator switch. This was a transition period before the PP-302 regulator and PM-302 breaker.
Later K-650 / MT-8 schematics, with the PP-302 regulator and PM-302 breaker, show the **neutral indicator switch**.
Later K-650 / MT-8 schematics, with the PP-302 regulator and PM-302 breaker, show the neutral indicator switch.
The earliest MT-9 headlight cavity contains ignition switching, warning light / fuse, and hi/lo headlight switching, and no neutral sensor.

The earliest MT-9 headlight cavity contains ignition switching, warning light / fuse, and hi/lo headlight switching.

Note: Only Generator “Alarm” Indicator Present, others Added Later

The earliest MT-9 headlight cavity contains ignition switching, warning light / fuse, and hi/lo headlight switching.
Early MT-9 (with Manual Spark Advance PM-05)

The early MT-9 headlight assembly (ФГ116) contained a hi/lo beam switch, and no neutral sensor.
Later MT-9 with Automatic (PM-302) Spark Advance
(Dimmer Switch in Handlebar Control, No Spark Advance Lever)

The schematic for the MT-9 shows the familiar position of the neutral gear indicator on the headlight panel, after adding the PM-302 (ПМ-302) breaker and B-201 ignition coil.
Later Dnepr (Днепр) MT-9 Headlight Assembly

Later MT-9 schematics show the neutral gear indicator.
The later MT-9 headlight assembly (ΦГ-116) sprouted the additional green neutral indicator.
Later MT-9 headlight assemblies contained a neutral sensor and indicator lamp.
8. Metal Spring for Grounding Contact to Sensor

4. Gearshift Plate with Grooved Cams

Rubber Boot

MT804517A Sensor

Gearbox Casing

The MT804517A neutral gear indicator switch senses a grounding spring on the gearshift cam rim.
Even later Dnepr dash boards have a row of five warning lights, with the green neutral indicator at the far left.

Dnepr MT-9 and early MT-10.36 models have the same dash as early Urals.

(www.cossackmotorcycles.com)
The schematic for the MT-10 shows the familiar position of the neutral gear indicator on the headlight panel.
Dnepr (Днепр) MT-10.36

Dnepr MT10-36 Schematic

**KEY**
- Blue
- Brown
- Grey
- Green
- Red
- Black
- White
- Violet
- Orange
- Yellow
- Green
- Blue
- Black
- White
- Grey
- Red
- Brown

**Components**
- Voltage Regulator (PP-330)
- Alternator (Г-424)
- Breaker (PM-302/PM-302A)
- Ignition Coil (B-204)
- Foot Brake-Light Switch
- Oil-Pressure Switch
- Neutral Switch
- Neutral Sensor (MT804517A)
- Battery (6MTS-9 or 2X 3MT-6)
- Turn Signal Switch
- Flasher
- Ignition (High Beam/Low Beam/Parking)
- Horn
- Neutral Sensor Indicator
- Breaker
- Dimmer Switch
- Spark Plugs
- Neutral Sensor (indicator)
- Motorcycle Left/Right Turn Signal
- Motorcycle Left/Right Turn Signal

**Other Components**
- Oil-Pump
- Running Light
- Headlight
- Rear Light
- Fuel Cap
- Sidecar
- Magneto Switch
- Running Light
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The MT-12 headlight assembly has a green neutral indicator.
Early Dnepr (Днепр) MT-12 parts diagrams do not show a neutral gear sensor.
The early MT-12 doesn’t have a green neutral indicator.
Transition of MB-650 Headlight Assembly

MB-650’s produced after 1969 contained the “new” dashboard design, including the green neutral indicator.
MB-650’s produced after 1969 contained the “new” dashboard design, including the green neutral indicator.
Headlight Assembly: фара ФГ-137 (FG-137)
1. Instrument Panel
2. Central Switch (Ignition Switch)
3. Speedometer / Odometer
4. Neutral Indicator (green)
5. Generator “Alarm” Indicator (red)
6. Hi-Beam Indicator (blue)
7. Oil Pressure “Alarm” Indicator (red)
8. Turn Indicator (green)

Dnepr’s MB-650M’s dashboard included the green neutral indicator.
Dnepr’s MB-650M’s dashboard included the green neutral indicator.
Dnepr’s MB-650M’s dashboard included the green neutral indicator.
Dnepr (Днепр) MB-650, MT-11 and MT-16

- Neutral Indicator “Green”
- Neutral Sensor Switch
6. пробка контакта (neutral contact)
12. контакта датчика нейтраль (contact sensor neutral PD20Д)

Dash-Board for Dnepr (Днепр) MT-11 / MT-16

Ignition Lock (141.3704)

Speedometer (СП-102)

Neutral (green) ПД20 3803000-Д1 (A12-1)

“Charge” Alarm (red) ПД20 3803000-Е1 (A12-1)

Neutral (blue) ПД20 3803000-М1 (A12-1)

Turn (green) ПД20 3803000-Д1 (A12-1)

Oil-Pressure Alarm (red) ПД20 3803000-Е1 (A12-1)

Helpful “Cheat-Sheet” Added to Indicators (www.cossackmotorcycles.com)
Earlier Urals did not contain a green neutral indicator.
1970's Urals (M-63 and M-66) have a very nice simple light, with the speedometer set into it and the ignition key in front, and no neutral gear indicator.
Ural Retro with Classic Instrument Array

- Turn Signal
- Trip Odometer Reset
- Neutral
- Alternator Alarm
- Hi-Beam
- Ignition
Ural’s M-67 and M-67.36 did not have a neutral gear indicator.
Ural (Урал) М-67.36

Alternator “Charge” Alarm

Turn Indicator

Speedometer Separate from Headlight Cavity
Ural’s M-67 and M-67.36 did not have a neutral gear indicator.
Ural Headlight Evolution

Ignition Switch

Alternator Alarm

“Hi-Beam” Indicator

“Neutral” Indicator

“Turn” Indicator

2003 Ural Bavarian Classic (www.motorbyte.com)

- Later Ural’s Have Modern Dash, Set above the Light, with more Indicator Lights than before
- Ignition Key Re-Located to Left Headlight Support Bracket
- Square Indicator Lights Replaced Round Ones around 1998
2003-2007 Gear-Up, Patrol, Tourist and Troyka

Note: Even though the speed is given in mph and in km/hr, the odometer reads in km’s.

The dashboard of a modern Ural motorcycle has four indicator lamps and a speedometer. Square warning lights replaced round ones around 1998.
Since 2017, the standard indicators are now contained within the speedometer.
Neutral Gear Sensor in the Dnepr Gearbox

- Spring Is Attached to Shift Disc, Which in Neutral Position (between the 1st and 2nd gears), Rests Against the “Neutral” Sensor and Completes the Circuit to “Ground”
- At the Same Time, the Lamp Indicator on the Headlight Assembly Turns On
- Sensor Must Be Screwed in Sufficiently That It Barely Touches the Spring
- If It Doesn’t Touch, There Will Be No Contact and the Signal Light Will Not Turn On
- If, However, It Is Screwed In More Tightly Than Required, the Indicator Light Will Be Turned On Before the “Neutral” Is Engaged or When It Is Already Disengaged
- This interference of Parts Could Lead to a Breakdown of the Spring and Disappearance of the Signal
- To Test the Signaling System, Remove the Wire from the Sensor and Touch It to “Ground or Chassis.“ If the Signal Light Turns On, Then the Electrical Circuit Is Working, and the Cause Is the Sensor Itself
- To Investigate the Contact, Establish the Main Neutral Position of the Gear Mechanism (between I and II gears), Tilt the Motorcycle to the Left (lifting the wheel of the sidecar) and Screw Out the Sensor
- Remove the Rubber Sealing Ring and Insert a Suitable Rod (for example, a pencil) Into the Threaded Hole for the Sensor to a Depth of about 30 mm and Pressed Against It
- If the Spring Is Intact, Its Elastic Resistance Is Felt. With a Broken Spring, the Rod Rests Against the Hard Disk of the Switch. To Replace the Spring, One Must Disassemble the Gearbox
- If the Spring Is Intact and Does Not Reach the Sensor, It May Be Slightly Bent by a Wire Hook
Neutral Gear Sensor on MT804 Gearbox (MT-10.36, MT-11/16)

The MT804517A neutral gear indicator switch is mounted on the lower part of the gearbox.

MT804571
Sealing Ring 16 x 2.5
(Gearbox MT804)
Item: 000.070
List Price: 1.00€
(www.oldtimergarage.eu)

MT804529
Lock Washer, Dnepr
(Gearbox MT804)
Item: 003.888
List Price: 3.00€
(www.oldtimergarage.eu)

MT804517-A
Neutral Sender Contact, Dnepr
Item: 000.589
List Price: 5.04€
(www.oldtimergarage.eu)
5. Контакт Датчика Нейтрального Положения (Contact Neutral Position Sensor)
Gearbox for Dnepr MT-11, MT-12, MT-16, MT-10.36, MB-650

- **Reverse Lever**
- **Neutral Sensor**
22. пробка контакта (contact sensor neutral)
41. Лампа (Lamp A12-1)

22. Neutral Sensor Switch

41. Neutral Indicator “Green”
The IMZ-8.103-04055 neutral gear indicator switch senses grounding button on gearshift cam side.
The IMZ-8.103-04055 neutral gear indicator switch senses grounding button on the gearshift cam side.
Ural’s M-67 and M-67.36 have no neutral sensing indicator.
Ural’s M67 and M-67.36 only have a “generator alarm” and “turn signal” indicator, but no neutral gear indicator.
Рис. 4.19. Механизм переключения передач: 1 - педаль переключения, 2 - манжета, 3 - втулка; 4 - штифт кривошипа; 5 - зацепка пружины; 6 - кривошип; 7 - штифт диска переключения; 8 - картер; 9, 11 - вилка включения соответственно 3-й и 4-й, 1-й и 2-й передач; 10 - пружина датчика нейтрали; 12 - диск переключения передач; 13 - рукоятка отключения заднего хода; 14 - фиксатор рукоятки; 15 - кон-

Metal Spring for Grounding Contact to Sensor

10. пружина датчика нейтрали;
Spring Probe Neutral
15. контакта датчика нейтрали:
Contact Sensor Neutral
Neutral Sensor Switch (IMZ-8.103-04055)

Neutral Indicator “Green”

Horn Button

Wiring diagram
Ural 650
copyright by Lars Lassen
Ural (Урал) 650cc (1990)

13. Neutral Indicator “Green”

8. Neutral Sensor Switch (IMZ-8.103-04055)

Ignition Switch

Turn Signal

Flasher

Battery

Batteries
Ural Neutral Sensor Switch Location

Unofficial Ural 750cc Service Manual
by Bill Glazer
2003 Ural Patrol Neutral Sensor
Ural 8.103 (650 and 750 cm³)

11. 250510-P29 Nut M8
12. IMZ-8.103-04055 Contact Assembly
13. IMZ-8.103-04362 Contact sleeve
2005 Ural Gear-Up Transmission Showing the Neutral Gear Sensor

Neutral Sensor Switch (IMZ-8.103-04055)
Ural 2010 Parts List

47. IMZ-8.103-04055-10 Contact Assembly
48. IMZ-8.103-04362 Contact Bush
49. 250510-P27C Nut M 8-6H
Ural (Урал) 1998 Deco Classic, Italia, Tourist, Sportsman, Solo, Utility (IMZ 8.103-10 or -40 (Deco or Tourist))

Neutral Sensor Switch

Neutral Indicator “Green”

Neutral Indicator

Hi-Beam Indication

Speedometer Lights

Fuse Block

Ignition Switch

Spark Plug

Hand-Brake Signal Switch

Day/Night Switch & Kill Switch

Neutral Switch

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

Master Battery Switch

Alternator (Г-424)

Battery

Brake Light

Foot-Brake Signal Switch

Charging Indicator

Hi-Beam Indicator

Left Turn Light

Turn Signal

Sidecar Front Light

Turn Signal

Sidecar Rear Light

Neutral Indicator

“Green”

Neutral Sensor Switch

Interruptor

Brake Light

Ignition lock
Neutral Indicator "Green"
Neutral Sensor Switch
11. Neutral Indicator “Green”

15. Neutral Sensor Switch
Updated Wiring Harnesses Available
(www.oldtimergarage.eu)

Wiring for M-72; with Optional Wire for Neutral Switch and Electronic Regulator

Wiring for K-750, MB-750, MT-12 with Optional Wire for Neutral Switch and Electronic Regulator
Ural Neutral Indicator Light Trouble-Shooting

• Make Sure Bike is in Neutral
• Did Green Neutral Indicator Light Illuminate?
  – Use Short Piece of Wire to Ground the Contact of Neutral Switch to Bike Frame
• Did Neutral Light Illuminate when Contact Was Grounded?
  – No - Check Fuses, Indicator Bulb and Its Wiring. Also Check Wire that Connects Indicator Lamp to Neutral Switch, Looking for Break in Wire. Check that Connection of Wire to Neutral Switch Is Clean and Tight. DO NOT OVERTIGHTEN THE NUT on Switch Contact or You Will Misadjust the Neutral Switch!
  – Yes - Use Instructions in Repair Manual (later slide) to Adjust Neutral Switch. (see photo below)
• Shift Transmission into 1st Gear. Did Green Neutral Light Extinguish?
  – No - Check Wire that Connects Transmission Switch to Indicator Light, Looking for Bare Wire Showing. Adjust Neutral Switch If Required.
Ural Neutral Switch Adjustment
(2000 Ural Repair Manual)

• Following Shift Stroke Adjustment, Check Operation of Neutral Switch
  – Adjusting Shift Stroke Tends to Disturb Neutral Switch Adjustment. If Neutral Light Does Not Illuminate with Gearbox in Neutral, the Sensor Switch Can Be Adjusted as Follows (engine off).

1. Shift Gearbox to Neutral
2. Slacken Wire Terminal Fastening Nut and Pick-Up Screw Locking-Nut
3. Switch On Ignition
4. Turn Pick-Up Screw In or Out, until Green Neutral Light on Dashboard illuminates
5. Check that Neutral Light Goes Out as Gearbox Is Shifted to 1st and illuminates when Shifted Back to Neutral. Do Not Screw in Adjusting Screw Any Farther than Needed. If It Is Screwed-In Too Far, It Can Prevent Gearbox from Shifting Properly.
6. Lock Screw with Nut and Secure Pick-Up Wire Terminal
Adjustment of Neutral Sensor


- **Adjustment of Sensor for Neutral lamp**
  - Loosen Outer Lock-Nut while Holding Screw Steady with Screwdriver
  - Back Screw Out 1/2 turn or Slightly More
  - Turn Ignition "ON"
  - Put Gearbox in Neutral and Slowly (very slowly) Turn Screw in (CW) until Lamp illuminates
  - Slowly Depress Shift Pedal to See if Green Lamp Flickers...you should continue adjust the screw until the lamp does not flicker or go out until you are starting to feel pressure (or slightly before) on the shift pedal BEFORE going into 1st gear.
  - When Happy, Tighten Lock-Nut whilst Holding Screw Steady. Does Not Need to Be Gorilla-Tight, Just Snug. BE CAREFUL AS IF YOU SCREW THE ADJUSTMENT SCREW IN TOO FAR IT WILL NOT ALLOW YOU TO SHIFT THE GEARBOX AND CAN SHEAR THE ADJUSTMENT SCREW OFF. You Have Been Warned. It Isn’t As Scary as It Sounds.
Neutral Sensor Contact Adjustment of URAL IMZ-8.103-10

• When Using the Gearbox, the Neutral Sensor Contact in the Gearbox May Be Damaged
• For adjustment, the Gearshift Mechanism Must Be Installed in a Fixed Neutral Position (between I and II gears)
• Loosen the Wire Clamp Nut and Screw Nut of Sensor Screw
• Turn the Ignition On and Turn the Sensor Screw Until It Comes into Contact
• Green Control Lamp on Instrument Panel Glows, Having Checked the Control Lamp Circuit First
• Lock the Screw with a Nut and Secure the Sensor Wire Terminal

Neutral Sensor Switch (IMZ-8.103-04055)
Neutral Sensor Adjustment of the Ural

- Set the gear lever to neutral
- Untighten the nut fixing the sensor wire terminal and Take It Off
- We loosen the counter nut of the sensor, put on the adjusting screw the neutral wire of the sensor, turn it around, but do not tighten the nut of the terminal of the wire.
- We turn on all electric circuits of the motorcycle by turning the key in the ignition switch to the all-inclusive position.
- Using a slotted screwdriver, turn the adjusting screw of the sensor until it contacts the contact on the gearshift sector.
- When the screw and the sector come into contact with the motorcycle's instrument panel, the green neutral indicator light comes on.

Unlike the Ural detector, the Dnepr sensor is not regulated by a screwdriver.