Ural (Урал) - Dnepr (Днепр)
Russian Motorcycle
Part XXIV: Turn-Signal and Flasher Relay Evolution
(Реле-прерыватель указателей поворотов)

Ernie Franke
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Agenda

• History of Flashers/Blinkers (Turn-Signals) on Russian Motorcycles
• Old, New and Newest Wiring Diagrams
• Where is the Flasher Unit Located?
• How They Work!
• Why Doesn’t It Work?
• Electronic Flashers
• Compatibility with LEDs
Table I: IMZ (ИМЗ) - Ural (Урал) Model/Year vs. Electrical System

<table>
<thead>
<tr>
<th>Model</th>
<th>Year</th>
<th>Engine Size</th>
<th>Voltage</th>
<th>Generator/ Alternator</th>
<th>Regulator</th>
<th>Ignition Coil</th>
<th>Breaker/ Distributor</th>
<th>Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-72</td>
<td>1941-56</td>
<td>750cc</td>
<td>6-Volt</td>
<td>G-11, G-11A</td>
<td>PP-1, PP-31 (1952), IG-4085B (1950)</td>
<td>KM-01, B2B</td>
<td>PM-05</td>
<td>3MT-7 or 3MT-14</td>
</tr>
<tr>
<td>M-72M</td>
<td>1956-61</td>
<td>750cc</td>
<td>6-Volt</td>
<td>G-11A</td>
<td>PP-31A</td>
<td>KM-01</td>
<td>PM-05</td>
<td>None</td>
</tr>
<tr>
<td>M-72K</td>
<td>1954-60</td>
<td>750cc</td>
<td>6-Volt</td>
<td><em>Magneteto</em></td>
<td>None</td>
<td>-</td>
<td>PM-05</td>
<td>None</td>
</tr>
<tr>
<td>M-62</td>
<td>1960-65</td>
<td>650cc</td>
<td>6-Volt</td>
<td>G-414</td>
<td>PP-31</td>
<td>B2B</td>
<td>PM-05</td>
<td>3MT-6 (6A-hrs) or 3MT-12 (12A-hrs)</td>
</tr>
<tr>
<td>M-63 (Ural-2)</td>
<td>1965-68</td>
<td>650cc</td>
<td>6-Volt</td>
<td>G-414</td>
<td>PP-302, PP-302A (1952)</td>
<td>B201</td>
<td>PM-05</td>
<td>6MTS-9 or 6CT-16-36A (18-to-36A-hrs)</td>
</tr>
</tbody>
</table>

Notes:
1. M-64 (1961) and M-65 (1965) were prototypes.
3. М-73 (1976) was an М-72 (750cc) with engageable sidecar wheel.
4. М-75 (1943) was experimental model with 500cc engine (6-Volt) on М-72 frame. М-76 (1947) was experimental (820cc).
5. Г-424 alternator (150 Watts) has external relay/regulator (PP-302 or PP-330). 14.3771 and Nippon Denso alternators have internal regulators.
7. PP-1, PP-30, PP-31 reverse-relay/voltage regulator for generator Г-11/-11А systems were replaced with PP-302/-302A voltage regulator for Г-414, and finally P-330 for the Г-424 alternator.
9. Г-11 and Г-11А have positive lead connected to case (positive-ground).
### Table II: KMZ (КМЗ) - Днепр (Днепр) Model/Year vs. Electrical System

<table>
<thead>
<tr>
<th>Model</th>
<th>Year</th>
<th>Engine Size</th>
<th>Voltage</th>
<th>Generator/Alternator</th>
<th>Regulator</th>
<th>Ignition Coil</th>
<th>Breaker/Distributor</th>
<th>Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-72</td>
<td>1952-56</td>
<td>750cc</td>
<td>6-Volt</td>
<td>G-11A (1952)</td>
<td>PP-31 (1950)</td>
<td>KM-01</td>
<td>PM-05</td>
<td>3MT-7 or 3MT-14</td>
</tr>
<tr>
<td>M-72N (H)</td>
<td>1956-59</td>
<td>750cc</td>
<td>6-Volt</td>
<td>G-11A (1952)</td>
<td>PP-31A (1956)</td>
<td>KM-01</td>
<td>PM-05</td>
<td>3MT-12 or -14</td>
</tr>
</tbody>
</table>

**Notes:**
1. MT-14 (1977) was a prototype.
2. MB-650 is a military version of MT-16 and MW-750 is a military version of the MT-12.
4. MT-11 and MT-16 remained in production until 1991 when they were re-named the Dnipro-11 (Dnepr-11) and Dnipro-16 (Dnepr-16).
5. Model #: H = N, MW = MB = MV.
7. Г-424 alternator (150 Watts) has external relay/regulator (PP-302 or PP-330). 14.3771(350 Watts) alternator has internal regulator.
9. Г-11 and Г-11A have positive lead connected to case (positive-ground). Late production of K-750 had positive-ground Г-414 generator.
10. Since 1981, the KMZ factory began to produce spare parts and engines for previous models (K750M and MT) only with 12-volt equipment.
Table III: IMZ (ИМЗ) - Ural (Урал) Flasher vs. Model/Year

<table>
<thead>
<tr>
<th>Model</th>
<th>Year</th>
<th>Engine Size</th>
<th>Voltage</th>
<th>Flasher Unit</th>
<th>Signal Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-72</td>
<td>1941-56</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>M-72K</td>
<td>1954-60</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>M-72M</td>
<td>1956-60</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>M-72M</td>
<td>1956-61</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>M-61</td>
<td>Early 1958-60</td>
<td>650cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Later 1960-63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-62</td>
<td>Early 1962-63</td>
<td>650cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Later 1964-65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-63 (Ural-2)</td>
<td>1965-68</td>
<td>650cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15 (5318931)</td>
</tr>
<tr>
<td>M-66 (Ural-3)</td>
<td>1968-72</td>
<td>650cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15 (5318931)</td>
</tr>
<tr>
<td>M-67</td>
<td>1973-75</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>M-67.36</td>
<td>1976-95</td>
<td>650cc</td>
<td>12-Volt</td>
<td>63P-18046</td>
<td>A12-21-3</td>
</tr>
</tbody>
</table>

Notes:
1. Flasher = Flasher Unit = Flasher Relay = Blinker = Blinker Relay
2. A6-15 is a 6-Volt, 15-Watt bulb. A12-21-3 is a 12-Volt, 21-Watt bulb.
3. RS-419 = PC-419 Transliteration

Based on available schematics and manuals, it appears that Ural introduced turn-sIGNALS to their sidecars around 1963.
<table>
<thead>
<tr>
<th>Model</th>
<th>Year</th>
<th>Engine Size</th>
<th>Voltage</th>
<th>Flasher Unit</th>
<th>Signal Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-72</td>
<td>1952-56</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>M-72N (H)</td>
<td>1956-59</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
</tr>
<tr>
<td>K-750</td>
<td>Early 1959-63</td>
<td>750cc</td>
<td>6-Volt</td>
<td>No Turn Signals</td>
<td>N/A</td>
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<tr>
<td></td>
<td>Later 1963-70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-750M</td>
<td>1963-77</td>
<td>750cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>MT-12 (Dnepr-12)</td>
<td>1977-85</td>
<td>750cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>MB-750</td>
<td>1964-73</td>
<td>750cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>MB-750M</td>
<td>1973-77</td>
<td>750cc</td>
<td>6-Volt</td>
<td>PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>K-650/MT-8</td>
<td>1967-71</td>
<td>650cc</td>
<td>6-Volt</td>
<td>PC-415, PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>K-650/MT-9</td>
<td>1971-74</td>
<td>650cc</td>
<td>6-Volt</td>
<td>PC415, PC419</td>
<td>A6-15</td>
</tr>
<tr>
<td>MB-650</td>
<td>1976-91</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>MB-650M1</td>
<td>1985-late 90s</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>MT-10</td>
<td>1973-76</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>MT-10.36</td>
<td>1976-87</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>MT-11 (Dnepr-11)</td>
<td>1985-95</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
<tr>
<td>MT-16 (Dnepr-16)</td>
<td>1986-95</td>
<td>650cc</td>
<td>12-Volt</td>
<td>PC427 (3726010)</td>
<td>A12-21-3</td>
</tr>
</tbody>
</table>

Notes:
1. Flasher = Flasher Unit = Flasher Relay = Blinker = Blinker Relay
2. A6-15 is a 6-Volt, 15-Watt bulb. A12-21-3 is a 12-Volt, 21-Watt bulb.
3. RS-419 = PC-419 Transliteration

Based on available schematics, it appears that Dnepr introduced turn-signals to their sidecars around 1963/4 (similar to Ural), based on records of their K-750 (’61/’62) with no-turn-signals.
It appears that turn signals were added to Russian heavy motorcycles in the early 1960’s, based on the schematics and manuals for Ural’s M-61, M-62, M-63 and Dnepr’s K-750.
Ural and Dnepr turn-signal relays depend on a bi-metal strip alternating between open and closing at an approximate once-per-second rate.
The blinker circuit starts at the battery, flows thru the flasher unit, and is directed to the appropriate right-or-left signal-lights by the directional-turn switch.
Simplified Turn-Signal Circuitry

- **Sidecar Front Light Assembly**
- **Bike Front Turn Signal**
- **Yellow Dashboard Turn Indicator**
- **Headlight Cavity**
- **Flasher Unit**
- **In-Line Fuse #1**
- **Fuse Block**
- **Ignition Switch**
  - Off
  - Run
  - Park
- **Sidecar Rear Light Assembly**
- **Bike Rear Turn Signal**
- **Turn Signal Switch (Handlebar)**
  - Center
  - Off
- **12 Volt Battery**
  - Pos +
  - Neg -
Flasher Unit Location on 8.103 Urals

- Turn the handlebars all the way to the left and peek behind on the right (Hack) side, behind the headlight bucket, you should be able to reach behind the headlight, and pull the round flasher unit out.
Signaling for a left-turn provides two electrical paths to ground. The primary path is thru the two left-turn lights. In addition a small-current “sneak path” exists thru the dashboard indicator lamp and the right-turn signal lights. The current in the “sneak path” is less than 10% of the primary path, thus only the left-turn lamps glow. However LEDs, which use much-less current, are another matter.
**Old (2-prong) and New (3-prong) Turn-Signal Circuits**

**Old (2-prong) Turn-Signal Circuit**
(All Dnepr with Turn-Signals and All Ural with Turn-Signals pre-2006)

- **Yellow Turn Indicator (Dash)**
  - Off or Rest
  - Unlabelled Terminals (non-Polarized)

- **In-Line Fuse #1**
  - Directional Turn Switch (Left Handlebar)
  - Left-Front Turn Signal A12-21-3 (12-V/2-W)

- **2-Prong Flasher Unit**
  - to Ignition Switch
  - Left Rear Turn Signal A12-21-3 (12-V/2-W)

**New (3-prong) Turn-Signal Circuit**
(Not Used on Dnepr, Used on Ural 2006+)

- **Fuse Block**
  - to Ignition Switch

- **3-Prong Flasher Unit**
  - Bi-metal Heater
  - Chassis Ground
  - Directional Turn Switch (Left Handlebar)

- **Yellow Turn Indicator (Dash)**
  - Left Turn
  - P
  - Y

- **Unlabelled Terminals (non-Polarized)**

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**Ural changed to the three-pronged flasher unit in 2006, thus deleting the “sneak-path” thru the turn-indictor and allowing the use of LEDs.**
New (3-prong) Turn-Signal Circuit with Hazard Lights
(Ural 2006+)

“Steering Diodes” enable the flasher unit to energize both sets of turn signals, by isolating the turn circuitry from the hazard circuitry. This same concept can be used on the 2-prong flashers, as shown in the next slides.
Ural’s new circuitry (2006+) allows the use of the incandescent lamps or upgrades to Light Emitting Diodes (LEDs), with the unbalanced dashboard indicator and the steering diodes.
Extra-Loud Electronic Turn-Signal Beeper

• Automatically Beeps with Turn-Signal Light Reminding You to Cancel Signal
• J.C. Whitney (SKU Number: 1JA 014425) $32
  • Manufacturer: Amperite 12D1buz Turn-Signal Buzzer
  • High-tone, Extra-loud Sound (approx. 86 dB)
  • 6- or 12-Volt systems
  • 1-1/2" x 2-1/2" x 1" thick Black-plastic Housing with Pressure-Sensitive Adhesive Backing
  • Buzzer Box has three leads, One black lead to the Neg. side of the Battery and Two red leads to the Turn-Signal Circuits
• Mounts under Seat or inside Headlight Cavity

Several folks in the IMZ-Ural Discussion Archive tried the J.C. Whitney “Extra-Loud Electronic Turn-Signal Beeper” or simply built their own device (next slide). It’s really simple.
Addition of a “Piezo Buzzer” to Help Remember to Reset the Turn-Signal Switch

(IMZ-Ural Discussion Archive: Larry Mac was spoiled over the years by the audible turn-signal beeper on his BMW. He added a piezo-oscillator in parallel with his turn-indicator, as a reminder that his lights were still blinking, long after the turn.)

Circuit Using Standard 1156 or A12-21-3 Signal Lamps, with Steering Diode

- Headlight Cavity to Ignition Switch
- In-Line Fuse #1
- Flasher Unit
- Directional Turn Switch
- Off or Rest
- Dash Turn Indicator
- Left Turn Signal 2X A12-21-3 (12-V/2-W)
- Right Turn Signal 2X A12-21-3 (12-V/2-W)
- + Piezo Buzzer

Circuit Using Standard 1156 or A12-21-3 “or” LED Signal Lamps, with Steering Diode

- Headlight Cavity to Ignition Switch
- In-Line Fuse #1
- Flasher Unit
- Directional Turn Switch
- Off or Rest
- Dash Turn Indicator
- Steering Diodes (1N4005, 1-A/600-V)
- Right Turn Signal 2X A12-21-3 (12-V/2-W)
- + Piezo Buzzer

Steering Diodes
- (Radio Shack Part# 276-1104)
- (View inside Headlight Cavity)
- Sonalert and Diodes wrapped in electrical tape
- Ground lead to Speedometer nut
- Note: The Piezo Buzzer is Polarized, “+” to 12-Vdc.

Note: Motorcycle will sound like a fork-lift backing up!

The Piezo-Buzzer can easily be wired in parallel with the dash indicator. The current is minimal when using the 1156 or A12-30-3 lamps. Steering diodes are placed before the dashboard indicator if LED’s are used for signaling.
Table V: Radio Shack Piezo-Electric Buzzers

<table>
<thead>
<tr>
<th>R-S Model</th>
<th>Type</th>
<th>Sound Level</th>
<th>DC Voltage</th>
<th>Current</th>
<th>List</th>
<th>Buzz Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>273-074</td>
<td>PC-Board Piezo Buzzer</td>
<td>70 dBA</td>
<td>12-Vdc</td>
<td>7 mA @12Vdc</td>
<td>$3.49</td>
<td>4,200 Hz</td>
</tr>
<tr>
<td>273-059</td>
<td>Piezo Buzzer</td>
<td>76 dBA</td>
<td>6-18-Vdc</td>
<td>10 mA max @ 12Vdc</td>
<td>$3.49</td>
<td>2,800 Hz</td>
</tr>
<tr>
<td>273-060</td>
<td>Pulse Buzzer</td>
<td>80 dBA</td>
<td>4-28-Vdc</td>
<td>10 mA @12Vdc</td>
<td>$9.49</td>
<td>2,900 Hz</td>
</tr>
<tr>
<td>273-060</td>
<td>Piezo Buzzer</td>
<td>85 dBA</td>
<td>4-28-Vdc</td>
<td>5 mA max @ 12Vdc</td>
<td>$4.49</td>
<td>3,600 Hz</td>
</tr>
<tr>
<td>273-080</td>
<td>Piezo Pulse Buzzer</td>
<td>87 dBA</td>
<td>9-16-Vdc</td>
<td>150 mA @12Vdc</td>
<td>$6.49</td>
<td>300 Hz</td>
</tr>
<tr>
<td>273-066</td>
<td>Piezo Pulse</td>
<td>90 dBA</td>
<td>3-28-Vdc</td>
<td>12 mA max @12Vdc</td>
<td>$5.49</td>
<td>2,800 Hz</td>
</tr>
<tr>
<td>273-075</td>
<td>Panel Piezo Buzzer</td>
<td>95 dBA</td>
<td>12-Vdc</td>
<td>7 mA @ 12Vdc</td>
<td>$7.49</td>
<td>3,200 Hz</td>
</tr>
<tr>
<td>273-070</td>
<td>Piezo 2-Tone Buzzer</td>
<td>100 dBA</td>
<td>6-16-Vdc</td>
<td>65 mA max @12Vdc</td>
<td>$11.49</td>
<td>3,200 Hz</td>
</tr>
<tr>
<td>273-057</td>
<td>Piezo Buzzer</td>
<td>108 dBA</td>
<td>7-14-Vdc</td>
<td>150 mA max @12Vdc</td>
<td>$10.49</td>
<td>2,400-3,700 Hz</td>
</tr>
<tr>
<td>273-079</td>
<td>Piezo Siren</td>
<td>102 dBA</td>
<td>6-14-Vdc</td>
<td>150 mA @12V</td>
<td>$5.49</td>
<td>2,000-4,500 Hz</td>
</tr>
</tbody>
</table>

Radio shack has several electronic buzzers similar to the more-expensive Mallory Sonalert. You want something that will handle a supply-voltage of at least 15-Volts to give you some voltage-spike protection.
Table VI: State Requirements for Turn Signals on Motorcycles
(+ district of Columbia and Puerto Rico)
(2009 American Motorcyclist Association (AMA), http://www.ama-cycle.org/)

<table>
<thead>
<tr>
<th>State</th>
<th>Requirement</th>
<th>State</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>Not Required</td>
<td>KY</td>
<td>Not Required</td>
</tr>
<tr>
<td>AK</td>
<td>Not Required</td>
<td>LA</td>
<td>Required</td>
</tr>
<tr>
<td>AS</td>
<td>Not Required</td>
<td>ME</td>
<td>Required after Jan ’74</td>
</tr>
<tr>
<td>AZ</td>
<td>Not Required</td>
<td>MH</td>
<td>Not Required</td>
</tr>
<tr>
<td>AR</td>
<td>Not Required</td>
<td>MD</td>
<td>Not Required</td>
</tr>
<tr>
<td>CA</td>
<td>Required</td>
<td>MA</td>
<td>Required</td>
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<td>CO</td>
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<td>MI</td>
<td>Not Required</td>
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<td>FL</td>
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<td>MT</td>
<td>Not Required</td>
</tr>
<tr>
<td>GA</td>
<td>Required after Jan ’72</td>
<td>NE</td>
<td>Not Required</td>
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<td>HI</td>
<td>Not Required</td>
<td>NV</td>
<td>Required after Jan ’73</td>
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<tr>
<td>ID</td>
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<td>Required after Jan ’73</td>
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<td>NJ</td>
<td>Not Required</td>
</tr>
<tr>
<td>IN</td>
<td>Required after Jan ’56</td>
<td>NM</td>
<td>Required</td>
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<tr>
<td>IA</td>
<td>Not Required</td>
<td>NY</td>
<td>Required after Jan ’85</td>
</tr>
<tr>
<td>KS</td>
<td>Required after Jan ’73</td>
<td>NC</td>
<td>Not Required</td>
</tr>
<tr>
<td>OH</td>
<td>Required after Jan ’68</td>
<td>OK</td>
<td>Required after Jan ’05</td>
</tr>
<tr>
<td>OR</td>
<td>Required after Jan ’73</td>
<td>PA</td>
<td>Not Required</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>Not Required</td>
<td>RI</td>
<td>Not Required</td>
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<tr>
<td>SC</td>
<td>Not Required</td>
<td>SD</td>
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</tr>
<tr>
<td>TN</td>
<td>Not Required</td>
<td>TX</td>
<td>Required after Jan ’60</td>
</tr>
<tr>
<td>UT</td>
<td>Not Required</td>
<td>VT</td>
<td>Required</td>
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<tr>
<td>VA</td>
<td>Not Required</td>
<td>WA</td>
<td>Required if Original Mfgr.</td>
</tr>
<tr>
<td>WV</td>
<td>Required</td>
<td>WI</td>
<td>Required</td>
</tr>
<tr>
<td>WY</td>
<td>Not Required</td>
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Even though two-thirds of the States don’t require turn-signals, safe motorcycle riders maintain and use them as safety equipment.
6-Volt Flasher Units

- PC419
  - Used on Ural Later M-61 thru M-66
  - Used on Dnepr Later K-750, K-750M, MT-12, K-650 / MT-8, MT-9, MB-750 and MB-750M

RS419
Turn indicator interrupter 6V
List Price: 10.00€
(easthighway.com)
12-Volt Flasher Units

- **PC427**
  - Used on Dnepr MB-650, MB-650M, MT-10, MT-10.36, MT-11, and MT-16
  - Used on Ural M-67 thru IMZ-8.103
  - Equivalent to 63P-18046
  - Used on Ural IMZ-8.103 thru 750cc 2005

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PC-427 Flasher Unit
List Price: 245.38 rubles
(aumperavto.ru)

RS427-3726010
63P-18046
Turn Indicator Interrupter
List Price: 9.00€
(easthighway.com)

PC427-3726010
List Price: 110 rubles
(www.mazepper.ru)

Turn Indicator Relay
(PC427-3726010)
Dnepr MT-11/16
List Price: $7.35
(dnepr-kiev.com)

12-Volt Flasher
Реле поворотов PC 419
List Price: 250 rubles
(baza.drom.ru)
Removal of '05 Troyka Flasher Relay

No way to remove flasher unit from the side.

Flasher assembly has a tab that holds it in place.
Schematics of Ural Sidecars

Ernie Franke
eafranke@tampabay.rr.com
Ural (Урал) Early M-72 (1942)

- Speedometer
- Manual Spark Advance
- Horn
- Hi/Lo Beam Switch
- Generator (Г-11)
- Regulator (РР-1)
- Positive Ground
- Battery (3MT-7)

Russian M-72s did not have turn indicators.
Later Ural M-61s and Dnepr K-750 had turn indicator lamps.
Ural equipped their M-62, M-63, and M-66s with turn indicators.
Ural equipped their M-67 and M-67.36 with turn indicators.
Ural equipped their 650s with turn indicators.
Ural equipped their 650s with turn indicators.
Ural equipped their 650’s with turn indicators.
Ural equipped their 750s with turn indicators.
## Ural Gear-Up (2010-2017)

<table>
<thead>
<tr>
<th>#</th>
<th>Part #</th>
<th>Description</th>
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<tbody>
<tr>
<td>6</td>
<td>Front turn signal</td>
<td>IMZ-8.102-18045</td>
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<tr>
<td>7</td>
<td>Rear turn signal</td>
<td>IMZ-8.102-18056</td>
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<tr>
<td>8</td>
<td>Sidecar front light</td>
<td>IMZ-8.101-18082-10</td>
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<tr>
<td>9</td>
<td>Sidecar rear light</td>
<td>IMZ-8.101-18088-10</td>
</tr>
<tr>
<td>12</td>
<td>Turns relay 2/4 x 21W</td>
<td>IMZ-8.1040-18046</td>
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</tbody>
</table>

### 2. Switch Unit (Left Hand)

- Front Turn Signal
- Rear Turn Signal

### 6. Front Turn Signal

### 7. Rear Turn Signal

### 8. Sidecar Front Lamp (ПФ232-3726000Б)

### 12. Flasher Unit (TH-S502)

### 9. Sidecar Rear Lamp (ФП219-3716000-В)

It is possible to use flasher relays of different manufacturers. (for example: TH-S502 from Peugeot 205, 405, 505; Volkswagen GM)
Schematics of Dnepr Sidecars

Ernie Franke
eafranke@tampabay.rr.com
Russian M-72s did not have turn indicators.
Early Russian K-750s did not have turn indicators.
Dnepr (Днепр) Early K-750
(with PP-31 Voltage Regulator, PM-05 Breaker/Distributor and B2B Ignition Coil)

Early Russian K-750s did not have turn indicators.
Earliest Russian K-750Ms did not have turn indicators.
Dnepr (Днепр) Later K-750, K-750M and MT-12

1. Turn-Signal Switch

3. Flasher Unit

Later Russian K-750s and K-750Ms had turn indicators.
Russian MB-650s had turn indicators.
34. Flasher (PC-427)

13. Turn Indicator Switch
Dnepr (Днепр) Later K-650 (MT-8) and MT-9

1. Turn-Signal Switch

6. Flasher Unit

Oil Pressure Sensor

Generator (Г-414)

Battery (3MT-12)

Voltage Regulator (PP-302A)

Foot-Brake Light-Switch

Horn (C37)

Ignition Coil (B201)

Breaker (PM-302/PM-302A)
MB-750 (with PM-05 Breaker/Distributor and B2B Ignition Coil)
(Nota that turn indicators were not in use until MT-9 / MT-10)

Рис. 35. Схема электрооборудования мотоцикла MB-750:
1 — лампа дальнего и ближнего света; 2 — ключ; 3 — предохранитель; 4 — фара; 5 — центральный переключатель; 6 — провод-масса; 7 — провод высокого напряжения; 8 — свечи; 9 — провод высокого напряжения; 10 — катушка зажигания; 11 — передний фонарь коляски; 12 — сигнал; 13 — провод переднего фонаря коляски; 14 — задний фонарь коляски; 15 — задний фонарь мотоцикла; 16 — датчик стоп-сигнала; 17 — реле-регулятор; 18 — генератор постоянного тока; 19 — аккумуляторная батарея; 20 — пучок проводов низкого напряжения; 21 — провод аккумулятор-масса; 22 — прерыватель; 23 — распределитель; 24 — провод высокого напряжения; 25 — кнопка сигнала; 26 — провод сигнала; 27 — манетка опережения зажигания; 28 — трос переключателя дальнего и стояночного света; 29 — переключатель дальнего и стояночного света; 30 — контрольная лампа; 31 — лампа стояночного света; 32 — лампа подсветки спидометра; 33 — соединитель проводов; 34 — провод фонарей коляски; 35 — провод от датчика к лампам стоп-сигнала; 36 — провод от соединителя к лампе освещения номерного знака.
Dnepr (Днепр) Later K-650 / MT-8
(with PP-302 Regulator, PM-302 Breaker and B201 Ignition Coil)

1. Turn-Signal Switch

6. Flasher Unit

П201-3709000
Turn Indicator Switch
Dnepr MT-9 Showing PC419 (Flasher Unit) Mounted in Headlight Assembly

PC419 (RS419)
Turn Indicator Interrupter 6V
Early MT-9 with Manual Spark Advance

28. Turn Light Blinker PC419

16. PM-05 Manual Spark Advance

27. Horn Button

29. Hi/Lo Beam Lever

Fig. 7. Diagram of electrical equipment and colour of wires:

1 — far and passing beam lamp A6 32+32; 2 — lamp A6-15; 3 — turn light УП223; 4 — ignition key; 5 — fuse 15A; 6 — control light ПД-20; 7 — oil low-pressure warning light A6-1; 8 — oil low-pressure pick-up MM 106A; 9 — central switch; 10 — wire connector; 11 — direction indicator switch 25A; 12 — side lamp A6-2 of sidecar front light; 13 — sidecar front light ПФ200; 14 — plug shell; 15 — spark plug A8У; 16 — distributor-and-contact breaker unit ПМ05; 17 — ignition coil Б2Б; 18 — horn С37А; 19 — tail ПФ230; 20 — lamp A6-15 of stop light; 21 — side lamp A6-3 of tail light; 22 — stop light switch BK854; 23 — regulating relay PP302; 24 — direct-current generator Г414; 25 — storage battery 3МТ-12; 26 — speedometer brightening lamp A6-2; 27 — horn button; 28 — turn light blinker PC419; 29 — timing angle adjustment lever; 30 — neutral position pick-up (contact plug); 31 — dim-switch cable; 32 — control light ПД-20Г; 33 — lamp A6-1, indicating neutral position of gearshift mechanism; 34 — dim-switch П45; 35 — storage battery charge control lamp A6-0.25; 36 — parking lamp A6-2; 37 — head lamp ФГ116; I — black; II — white; III — red; IV — green; V — brown; VI — yellow; VII — blue; VIII — violet; IX — grey.
Early Dnepr MT-9 (with Manual Timing)

Russian MT-9s had turn indicators.
1. Turn Signal 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 Dnepr MT-10
Dнепр (Днепр) МТ-12

- Turn-Signal Indicator
- Oil-Pressure Switch
- Flasher Unit
- Foot-Brake Light-Switch
Dnepr (Днепр) Early MT-11 and MT-16
with PP-330 Regulator, later replaced with 33.3072 (solid-state)
Dnepr MT-11 / 16 Showing PC427 Flasher Unit

Turn Indicator Interrupter, 6V
PC419
(RS419)

Turn Signal Switch
IMZ-8.103-18013
171.3709.000
Dnepr MT-11 / MT-16 Turn Indicators

162.3726010
(IMZ-8.102-18045-01)
Front Turn Indicator

163.3726010
(IMZ-8.102-18056)
Rear Turn Indicator