

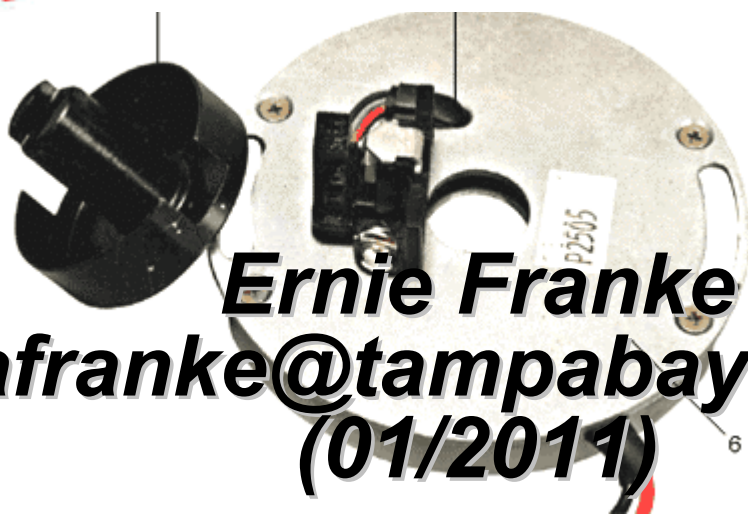
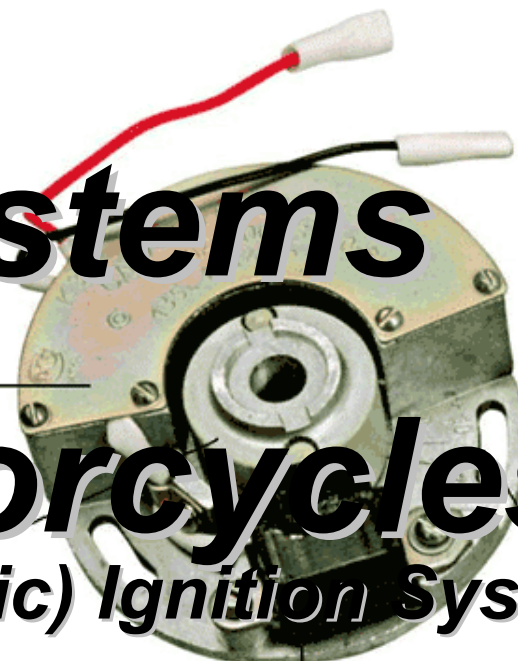


Ignition Systems

for

Russian Motorcycles

(Part IV: Contact-Less (Electronic) Ignition Systems)



Ernie Franke
eafranke@tampabay.rr.com
(01/2011)

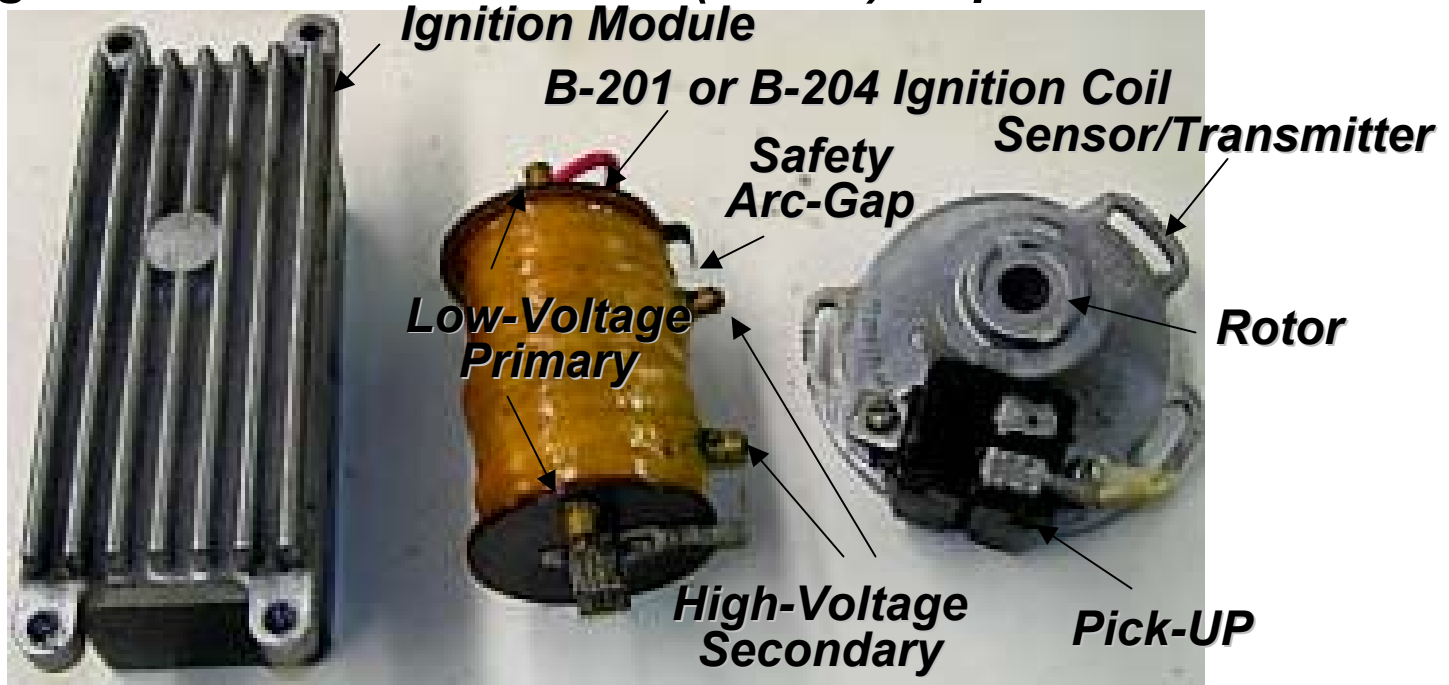
Types of Electronic Ignition *(Vance Blosser, Russian Iron Motorcycle Club)*

- **Type I** - Models from 1994 up to about '96 or '97 had a 'Type I' - a pot metal rotor on the camshaft with 2 steel slugs and a small sensor coil mounted close to the rotor. A hand-wound coil was also mounted under the front cover. The 'brains' of the box were a bit bigger than a VHS cassette and had big heat fins, mounted under the seat. The main problems with this system was a relatively weak spark, and sometimes the timing curve diodes would fail, but could be replaced with after-market ones and usually gave good service after that.
- **Type II** - Somewhere about 1997 or '98 Type II appeared. All the electronics fit inside a small C-shaped module that mounted under the front engine cover, across from the magnetic rotor sensor. A different ignition coil was fitted with a higher output. The components in the module were 'potted' (encased in epoxy) to protect against vibration, like military boards, but had issues with heat buildup.
- **Type III** - A few months after the Type II appeared, it was replaced with the Type III (approximately mid-1998). Physically it looked the same, but the circuit board was modified to prevent heat failure. Partway into the production span of the Type III, a high-output coil was mounted outside the front engine cover so it could stay cool. This system was very reliable, although the heavy mass of the rotor sometimes caused wear of the key. A few cases of the steel slugs coming loose from the pot metal rotor were noted.
- **Type IV** - In 2002, with the adoption of 750 engines, Type IV was introduced, featuring modern electronics. The massive pot metal rotor was replaced by a lighter stamped steel unit with notches that used a Hall-effect sensor mounted in the module cover. The electronics were incorporated inside the front rotor cover. The coil was a newer design high-output unit that mounted under the front engine cover. A plastic engine cover was used for heat dissipation. A built-in diagnostic LED simplified setting timing and gave indication of unit functionality. This unit also had some heat related issues, partly caused by a method of testing during assembly on one line - a surge was damaging a component on this line during testing.
- **Type V** - In 2004 Type V appeared, which is basically a Type IV split into 2 parts. The electronics were moved out into the air-stream for cooling. The LED was visible without any disassembly. Testing in Europe revealed no problems, but there were a few issues in the US under very hot conditions.

In the mid 80's, IMZ introduced a contact-less ignition system (BSZ), produced by the Tyumen factory "Papa". It will not work or fit early 6-Volt Motorcycles which originally had manual advance and retard levers.

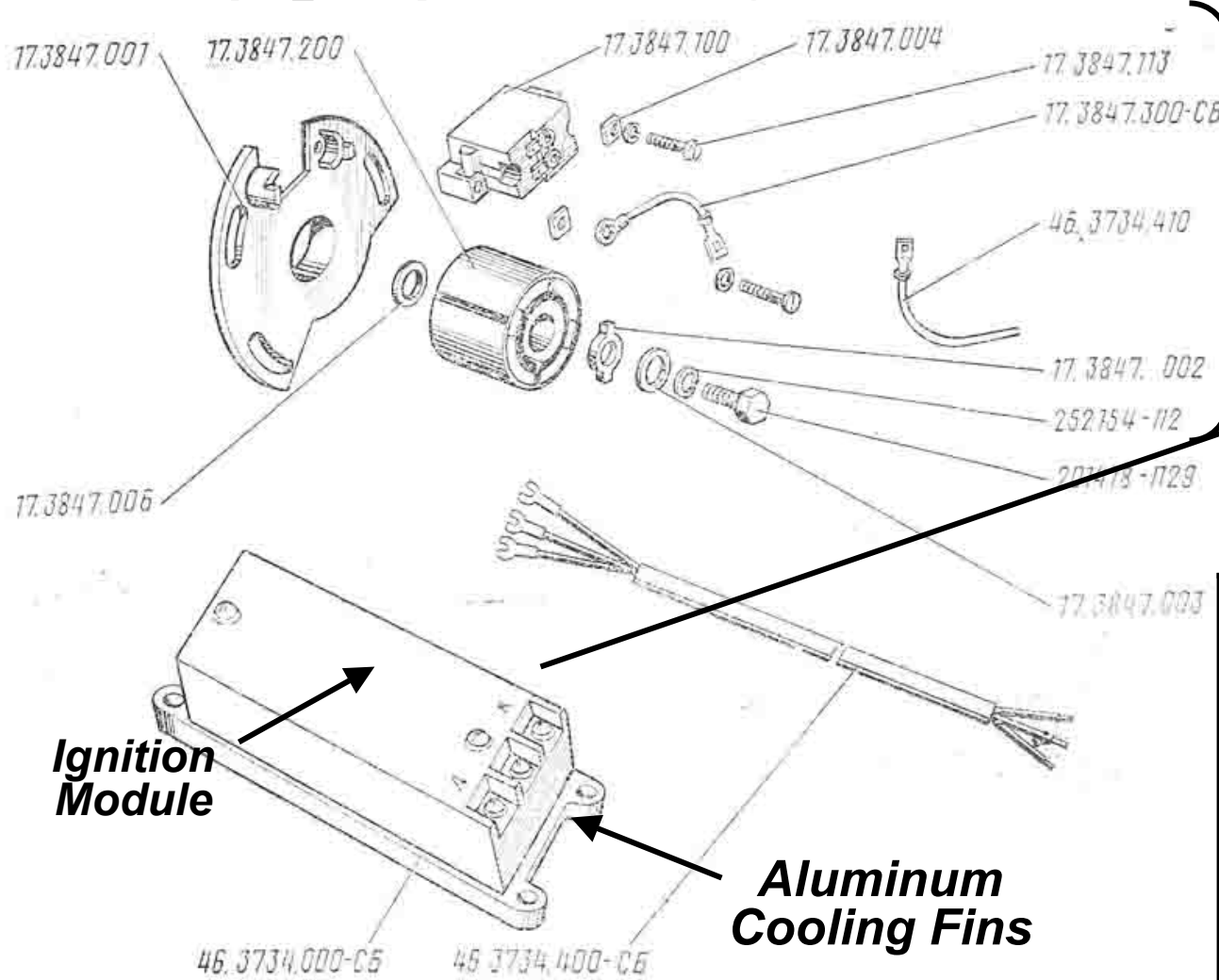
Type I Ignition System (1994)

- **Ignition Module: Plastic Box with Aluminum Cooling Fins on Top**
- **Ignition Module Mounted under Seat**
- **Installed in Urals from 1994 to 1997**
- **Pot-Metal Rotor on Camshaft with 2 Steel Slugs**
- **Sensor Coil Mounted Close to Rotor**
- **Hand-Wound Coil Mounted under Front Ignition Cover**
- **Spark Plug: HGK BP7HS with 0.6mm (0.025") Gap**



Type I ignition systems were used on Dnepr's K-650/ K-750 /MT-9 /MT-10 /MT-10.36 /MT-11 /MT-12 /MT-16 and Ural's M-61/M-62/M-63/M-66/M-67/M-67.36/Tourist and M-72.

Ural (Урал) 8.103 Type I Contact-Less Ignition



**Magnetic Sensor
(Pick-Up)**



**Ignition
Module**

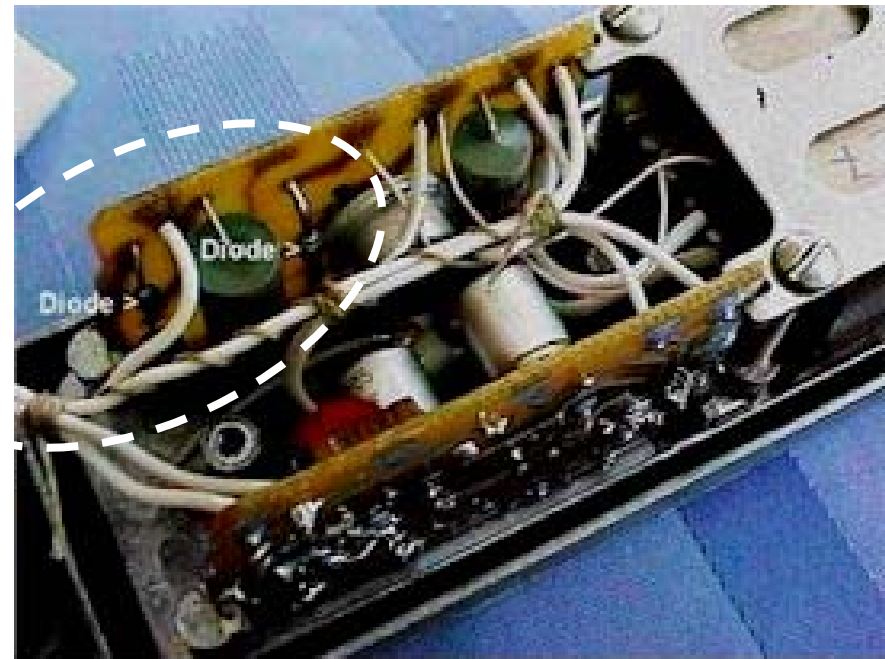
**Aluminum
Cooling Fins**

Component	Part #
Breaker Assembly	47.3734.000
Cable	46.3734.400-C5
Ignition Box	46.3734.000-C6
Transmitter Unit	17.3847.000
Rotor Plate	17.3847.001
Rotor Key	17.3847.0002
Magnetic Sensor	17.3847.100
Rotor	17.3847.200
Ignition Coil	B-201 or B-204

The Type I ignition system had three main components; magnetic sensor, ignition module and ignition coil.

Repair of Timing Diodes in Type I Ignition

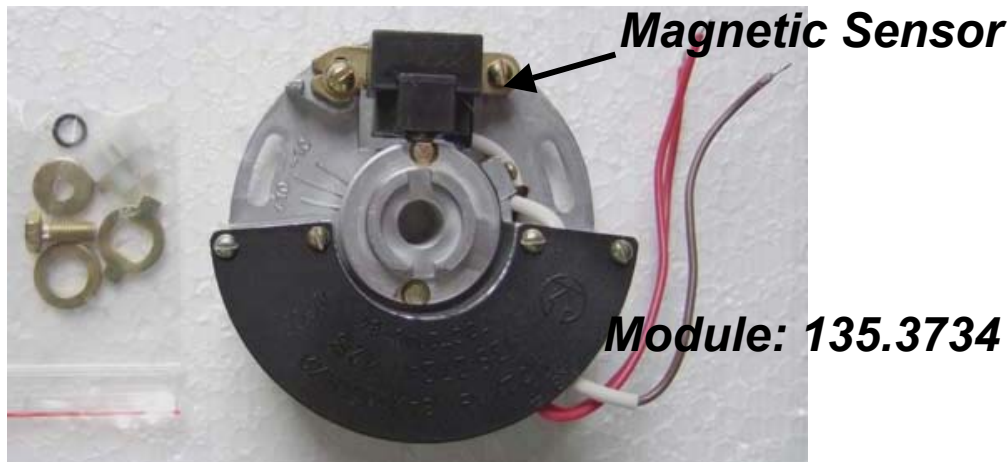
- ***Timing Curve Diodes Often Fail***
- ***Diodes Can Be Replaced with After-Market Ones***
- ***Unsolder Diodes and Replace with either Radio Shack p/n 276-1114 (2.5-Amp/1-kV) Diodes***
- ***Insure White Rings (cathode) Face Same Direction as Old Diodes***



The timing curve diodes in Type I ignition systems are easily replaced with Radio Shack diodes.

Type II Ignition (1997 or 1998)

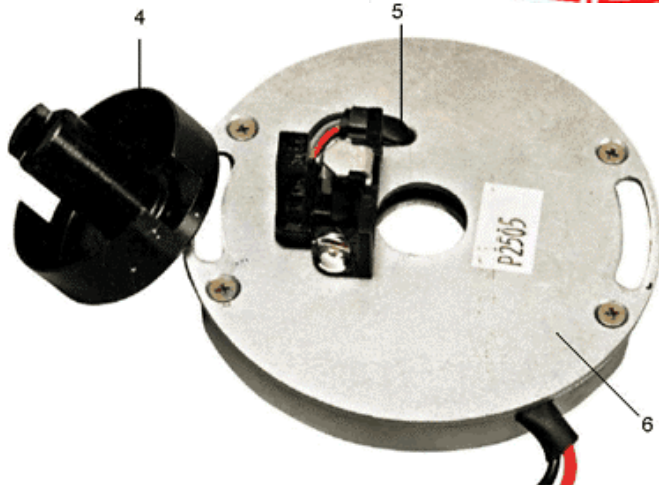
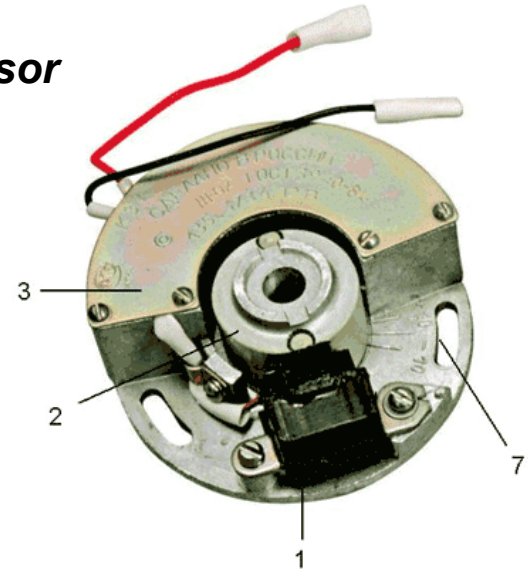
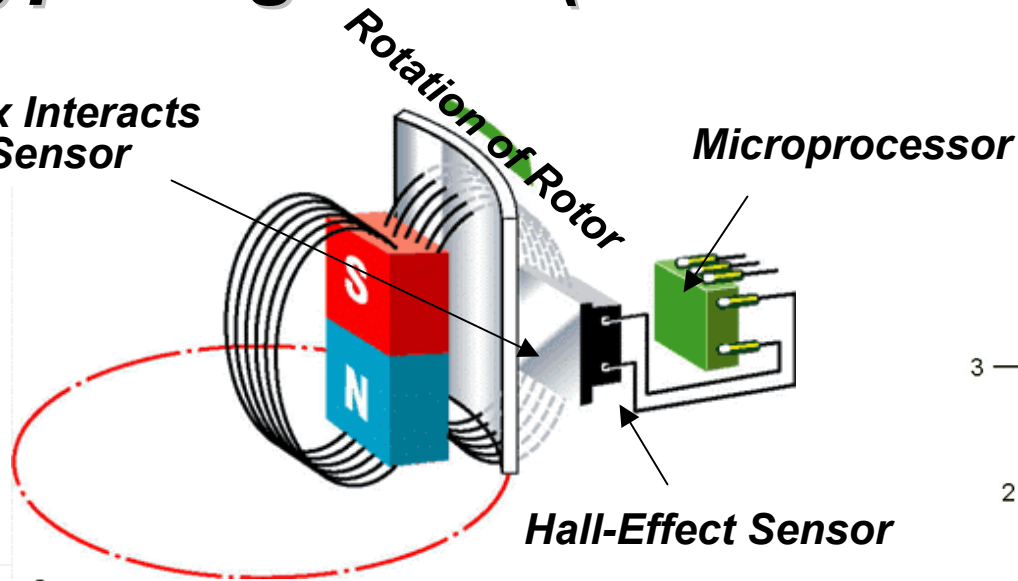
- Designated BC3 (BSZ / BC3)
- Made in USSR: SOAKE (Stary Oskol Plant of Electrical Equipment)
- Replace All Urals & Dneprs with Centrifugal-Advance Ignition (PM-302)
- Electronics Inside Small C-shaped Module Mounted under Front Ignition Cover, Across from Magnetic Rotor Sensor
- Ignition Coil with Higher Output Voltage: 135.3705 (Replaced B-201 and B-204)
- Components in Module Potted (encased in epoxy) to Protect Against Vibration
- Module Had Issues with Heat Build-Up
- Located Entirely within Front Ignition Cover
- Spark Plugs: NGK BP7HS with 0.8-1.0mm (0.03-0.04") Gap



Ural Types II/III electronic ignitions were originally designed as after-market for Ural, but also fit Dnepr. Urals approved for sale in the USA (1994) were approved for contact-less point ignition. Bikes with the manual advance/retard timing unit (PM-05) don't have a threaded hole in the end of the cam for the rotor bolt of the electronic ignition.

Type II Ignition (BSC/BC3/BSZ)

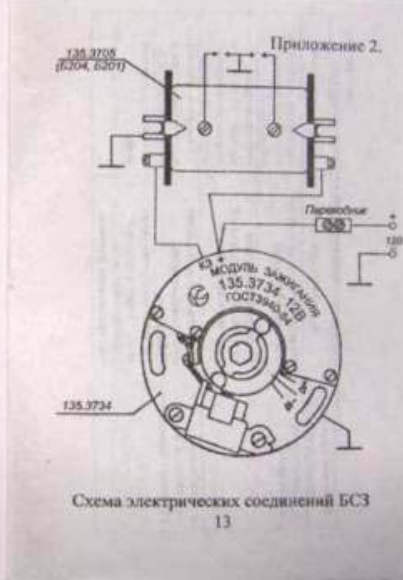
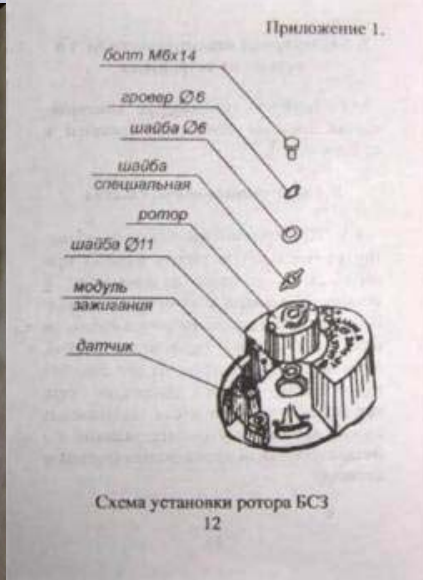
Magnetic Flux Interacts with Hall Sensor



- 1 - Hall-Effect (Inductive) Sensor**
- 2 - Rotor with Permanent Magnets**
- 3 - Electronic Commutator (breaker points)**
- 4 - Rotating Hall-Effect Sensor Screen**
- 5 - Hall-Effect Probe**
- 6 - Base for Electronic Commutator**
- 7 - Timing Marks (grooves to adjust timing)**

The electronic ignition relies on a Hall-effect magnetic sensor to provide a timing signal to the electronic commutator (equivalent to breaker points).

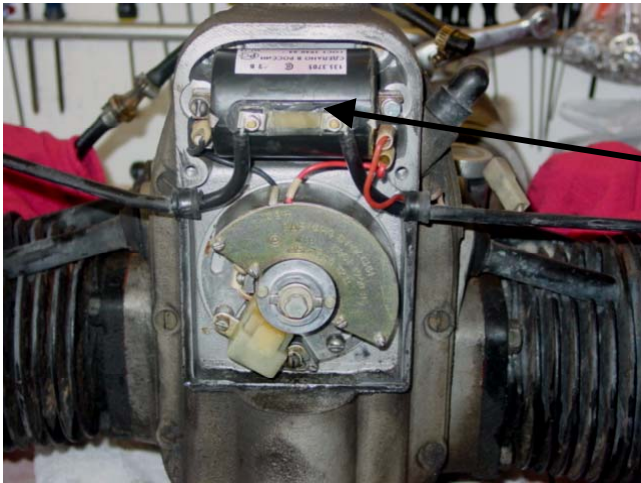
Type II Ural / Dnepr (6 to 16-Volt)



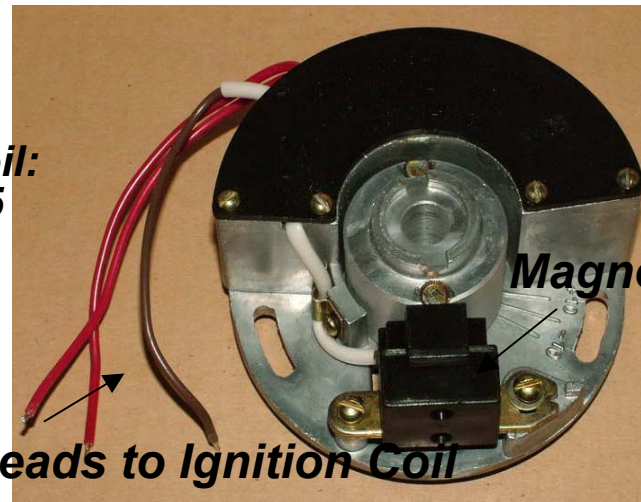
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Type III (mid-1998) (<http://sovietsteeds.com/forums>)

- Designated MSK (Microprocessor Ignition System)
- Made in CIS: SOAKE (Stary Oskol Plant of Electrical Equipment)
- Shortly After Type II Appeared, Replaced with Type III
- Same Appearance as Type II Ignition System
- Located Entirely within Front Ignition Cover
- Circuit Board Modified to Prevent Heat Failure
- Partway into Production Span of Type III, a High-Output Coil Was Mounted Outside the Front Engine Cover for Cooling
- System Very Reliable
- Spark Plugs: NGK BP7HS with 0.8-1.0mm (0.03-0.04") Gap



**Ignition Coil:
135.3705**



Leads to Ignition Coil

Magnetic Sensor

The ignition coil is in the front compartment. There is a horseshoe-shaped electronics, a pick-up and a metal rotor with magnets embedded in it on the end of the camshaft that held in place by a D-washer that is made of "unobtainium".

Type III Ignition (Heavy Mass of Rotor Causes Key-Wear)



**Lower View of Front Ignition
Compartment Showing Key
Washer**



**Upper View of Front Ignition
Compartment Showing
Ignition Coil**

The washer "keying" the rotor to the camshaft can wear over time allowing play in the rotor. The engine will run poorly (backfiring, running on one side better than other, poor performance). Riders need to check for security of the rotor's steel slugs and the magnets.

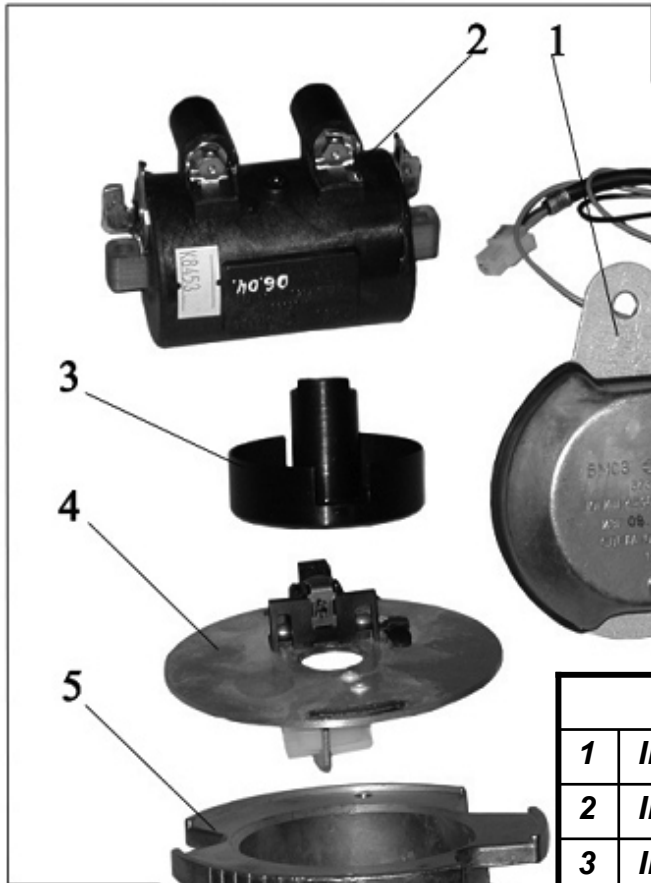
Type IV (2002) *(Bill Glaser's myural.com site and 2002 Ural Manual)*

- **UKTUS Ignition**
- **Introduced in 2002 with Adoption of 750cc Engine**
- **Located Entirely within Front Engine Cover**
- **Massive Pot-Metal Rotor Replaced by Lighter Stamped Steel Unit with Notches**
- **Uses Hall-Effect Magnetic Sensor Mounted in Module Cover**
- **Newer-Design, High-Output Coil Mounted inside Front Ignition Cover**
- **Built-In Diagnostic LED Simplified Timing**
- **Sparking Voltage:**
 - 17-kilovolt (kV)
- **Operating Temperature:**
 - -50 to +100°C
- **Ignition Coil**
 - Best with 3705060
 - Also Works with B-201 and B-204
- **Current Load:**
 - Engine Off: 0.10 to 0.15-Amp
 - Self-cleaning Contacts
 - Engine On (200-6,000 rpm): 1.5-Amp
- **Supply Voltage: Nominal 12-Volt**
 - 7-to-16-Volt Operation



The silver "hockey puck of doom," with the blinking LED, was located inside the front engine compartment and suffered from heat build-up.

Type IV Microprocessor Ignition System (2002)



<i>Microprocessor Ignition System, 37.34010</i>			
<i>1</i>	<i>IMZ-8.108-17013</i>	<i>453619001</i>	<i>CDI (Capacitor Discharge Ignition)</i>
<i>2</i>	<i>IMZ-8.108-17010</i>	<i>KMCZ 3705060</i>	<i>Ignition Coil 135.3705-2 (5-Ohm)</i>
<i>3</i>	<i>IMZ-8.108-17071</i>	<i>301262.008</i>	<i>Rotor</i>
<i>4</i>	<i>IMZ-8.108-17002</i>	<i>687422.009</i>	<i>Hall-Effect Magnetic Sensor (Pick-up)</i>
<i>5</i>	<i>IMZ-8.108-17135</i>	<i>731151.017</i>	<i>Casing</i>
<i>6</i>	<i>IMZ-8.108-17008</i>	<i>3734010</i>	<i>Microprocessor Ignition System (MAS)</i>

If the microprocessor (round silver puck with LED) is under the front ignition cover you have a TYPE IV, if the puck/LED is outside you have a TYPE V.

Type IV for 12-Volt Ural/Dnepr (ural-hamburg.de)



Type IV/V Rotor Evolution: Two-Piece to One-Piece Rotor

(www.myural.com/interrupterreplacement.htm)



**Left: Early-Manufactured, Two-Piece, Swaged-Joint Interrupter; Shoulder Meeting Round Skirt
Right: Newer One-Piece, Machined Interrupter**

**Left: Two-piece, with Swaged Seam on Back
Right: One-piece; Devoid of Swaged Seam**



Type V Ignition Rotor with Swaged seam

Ignition Rotor (750cc)

up to 2006 (MSZ): IMZ-8.1037-17220-20

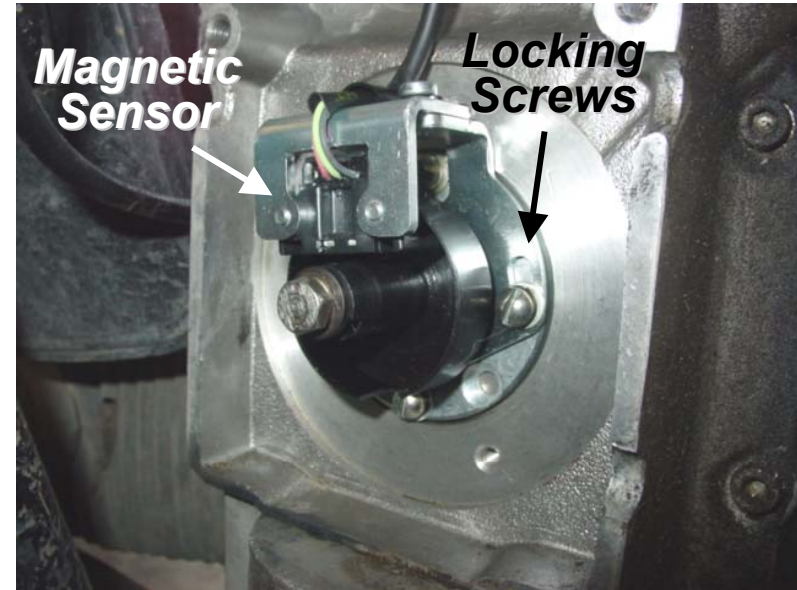
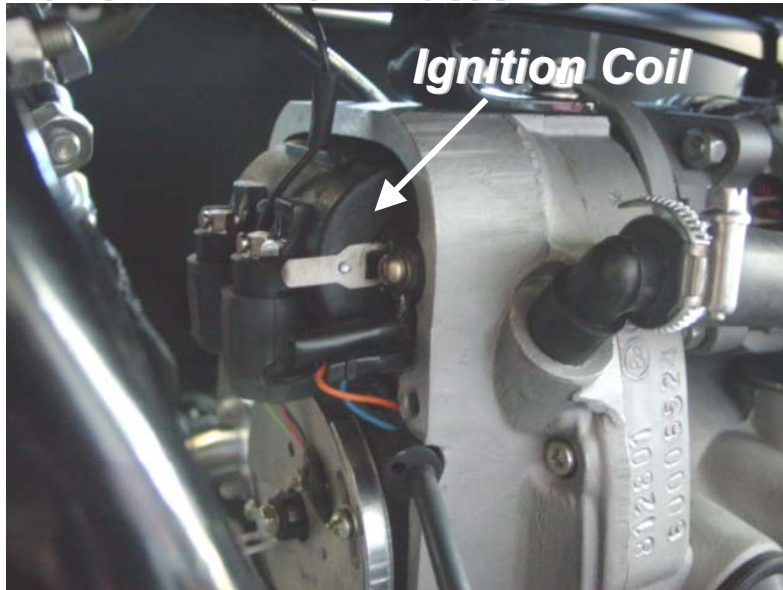
from 2007: IMZ-8.1037-17220-10

Note: New style, one-piece rotors are available for Type IV & V electronic ignition.

The two-piece rotor will fail, causing timing issues (slip, throwing timing out the window) from a slight miss to not running. Replace the two-piece with the one-piece rotor! The ignition rotor was changed to a new "one-piece type" in 2007.

Type V Ignition System (2004) (<http://sovietsteeds.com/forums/>)

- UKTUS Ignition
- Basically Type IV Split into Two Units: Magnetic Sensor and Electronic Commutator (Puck)
- Magnetic Sensor (Pick-Up) and Interrupter Located in Front Ignition Cover
- External Puck: Electronics Moved into Air-stream for Cooling
- Timing LED Now Visible without Disassembly of Front Ignition Cover
- Type IV Failed to Advance Timing Once Engine above 3800-4000 rpm
- Possible Problems under Hot Conditions
- Timing Adjustment:
 - Bring up the Full-Advance Timing Mark on Flywheel and Rotate Sensor Unit until LED Illuminates



The silver "hockey puck" was moved to the frame near the front right side of the gas tank, with an LED that blinks when the engine is running. The coil and rotor/pick-up unit remained inside the front compartment.

Type V Ignition 2004 Ural Patrol



Contact-Less Electronic Ignition: Model 135.3734



New Model 1135.37 (*Ignition*<http://seriousbill.multiply.com>)

- ***New Type Has LED for Timing***
- ***New Rotor Made of Very Light Flat Plate***
 - ***Will Fix Old Problem of Rotor Breaking-Up or Chattering and Damaging Tabbed Washer***
 - ***Potential for New Problem, as There Is No Way to Positively Lock the Rotor in Position, So It Can Slip***
 - ***Careful Use of Loctite and Proper Tightening of Screw Will Keep Things Where They Should Be***

New Microprocessor-Based Electric Ignition System Model 1135.3734

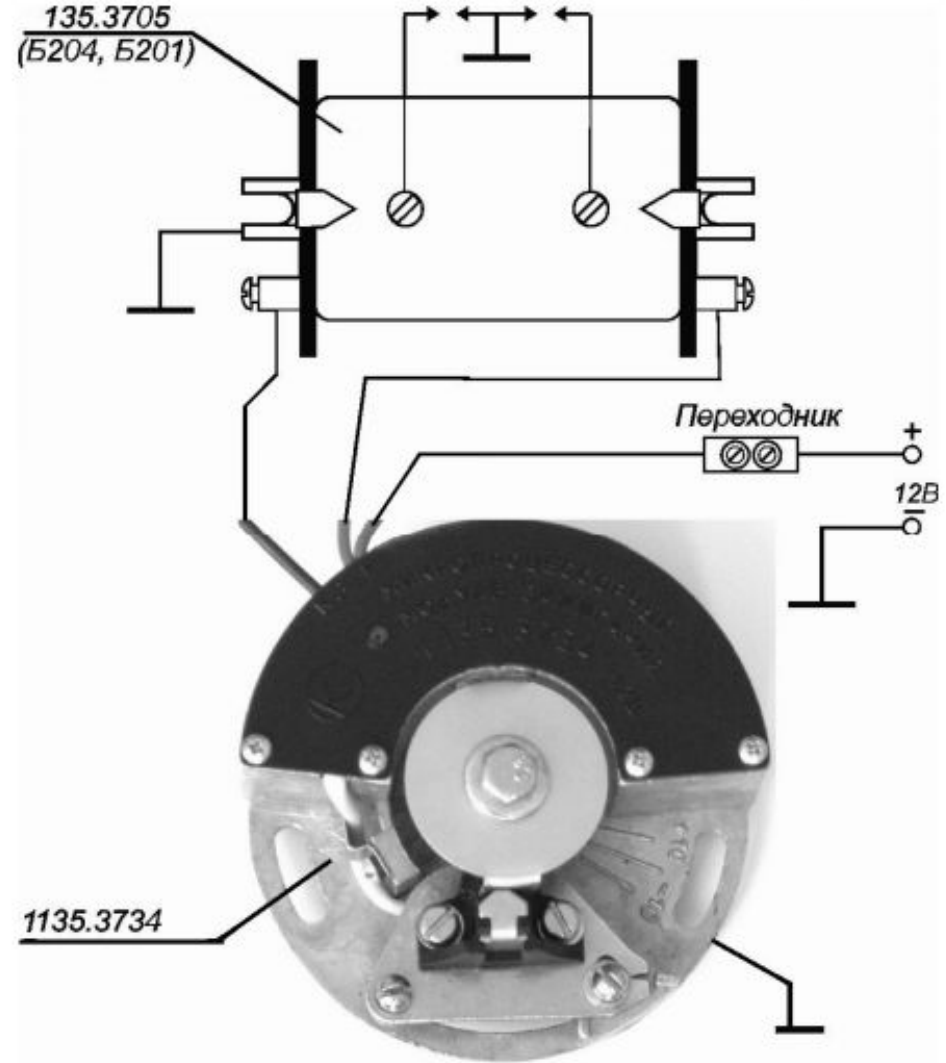
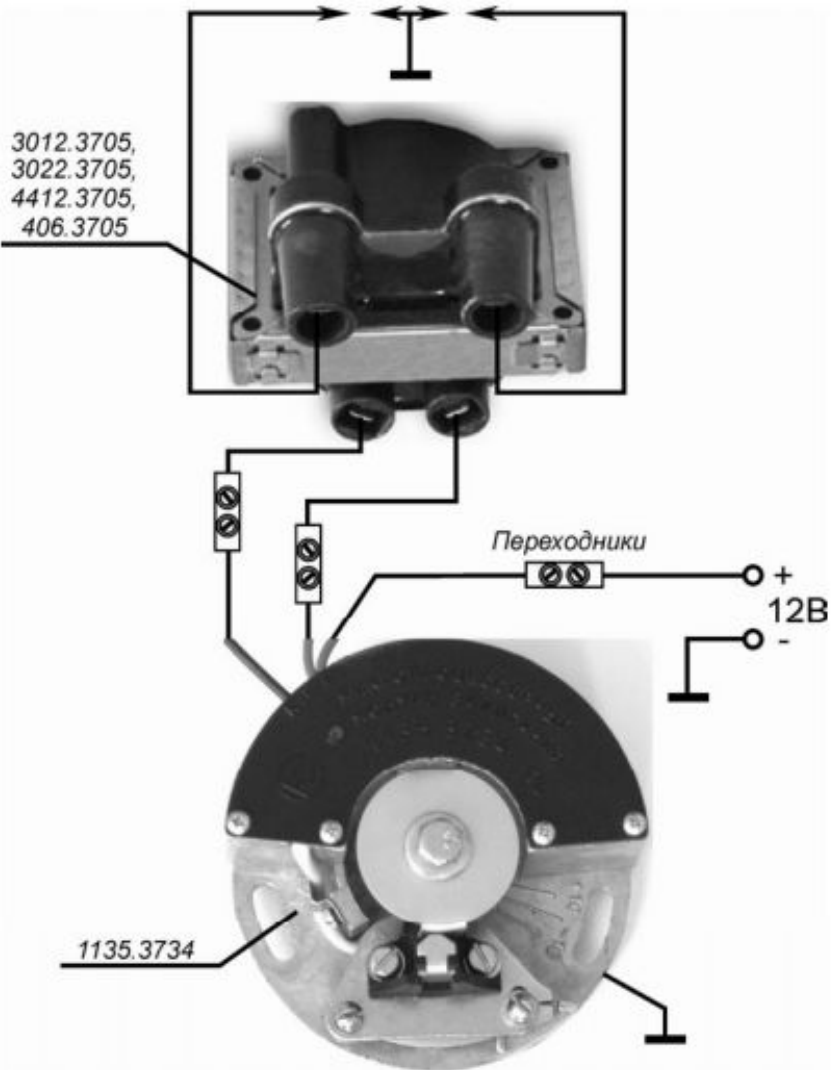
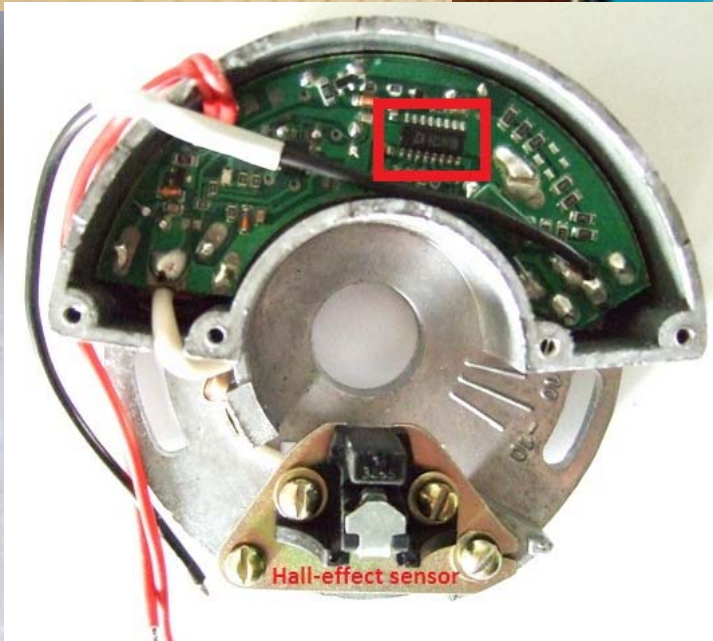
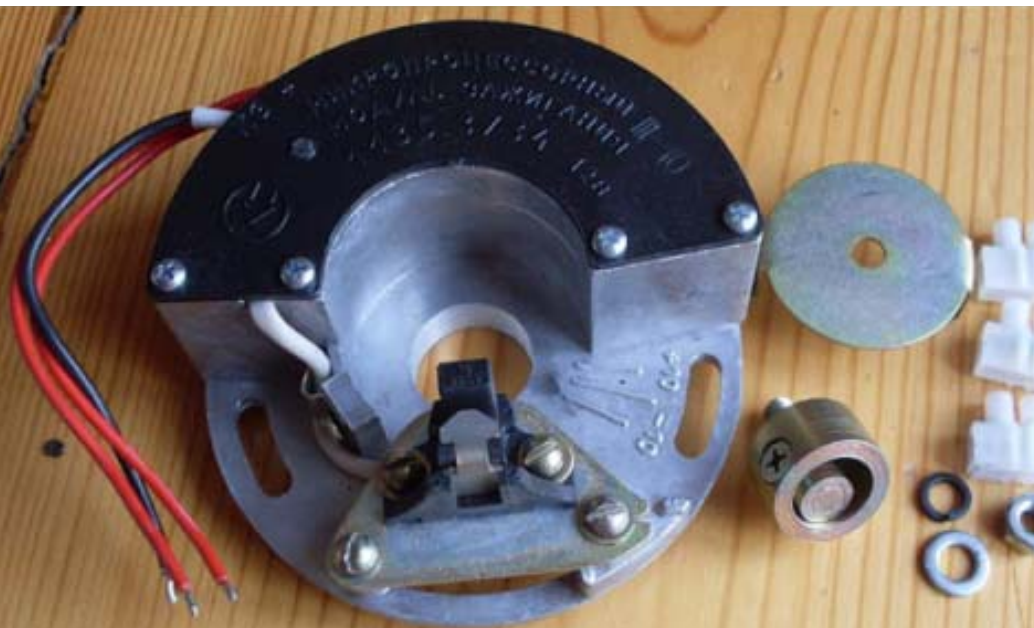
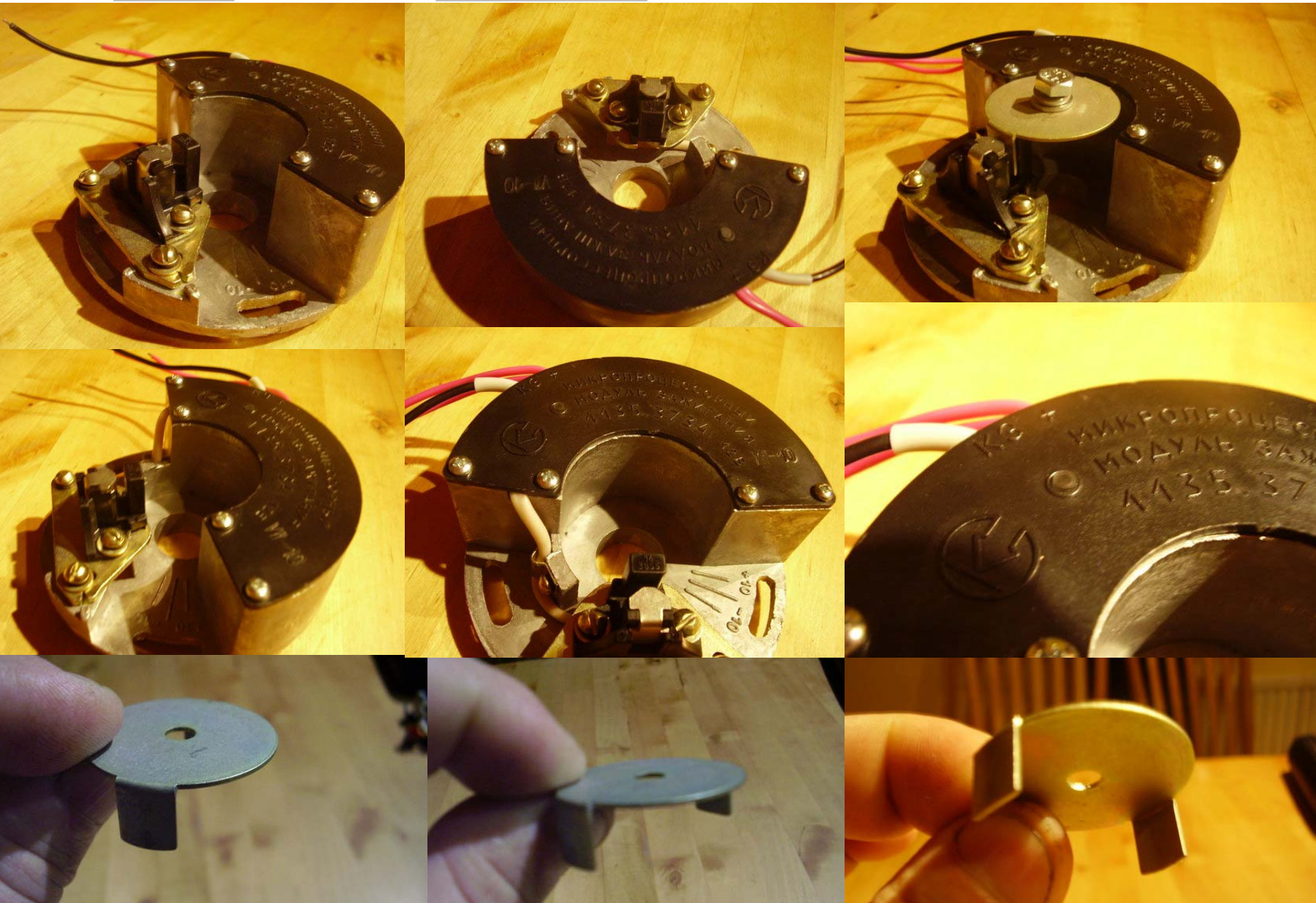


Схема электрических соединений МПБСЗ

Improved Version replacing Old Model 135.3734: Model: 1135.3734 (5 to 12-Volts)



New Model 1135.37 (Ignition<http://seriousbill.multiply.com>)



Ducati Ignition System (2006)

- **IMZ-8.108-17008-07: Conversion Kit**
- **Ignition by Ducati Energia (not affiliated with Ducati Motorcycles)**
- **One-Piece Rotor Standard**
- **Standard with January 06 Ural Production**



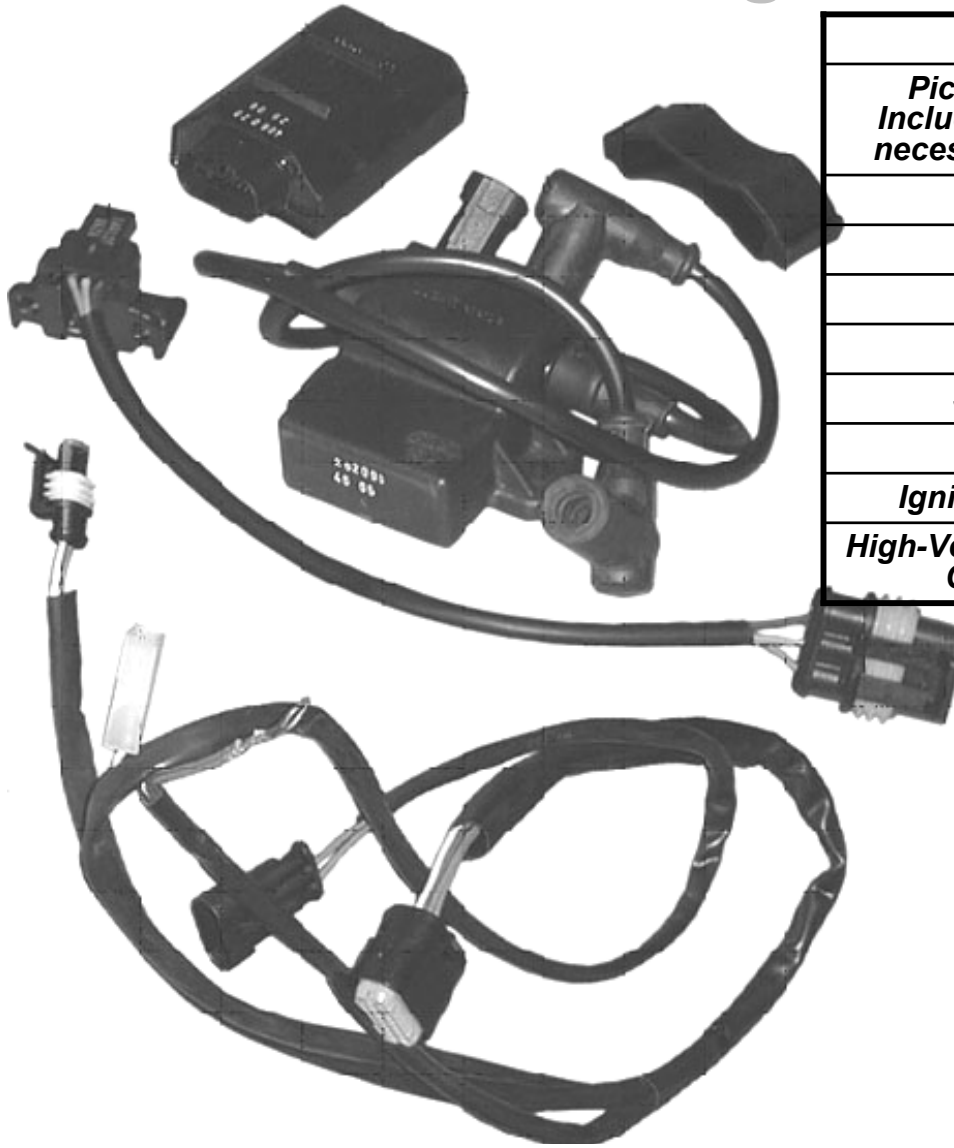
Not much in the front compartment other than the interrupter and the pickup. The ignition coil is a small square box mounted under the front of the gas tank and the spark plug wires go to that box. The brain box for the Ducati is placed near the battery.

Ducati Ignition System

Ignition Coil



Ducati Ignition System



<i>Ducati Ignition assembly IMZ-8.108-17008-07</i>	
<i>Pick Up Without Support Plate, Includes all brackets and hardware necessary to install ignition system</i>	<i>433138540</i>
<i>Support plate for pickup</i>	<i>'IMZ-8.1037-17120-10</i>
<i>Digital CDI</i>	<i>432406020</i>
<i>Ignition Coil</i>	<i>432262000</i>
<i>Rubber Holder</i>	<i>534801720</i>
<i>Support plate for Ignition</i>	<i>IMZ-8.1037-17123-10</i>
<i>Support bracket for CDI</i>	<i>IMZ-8.1037-17016</i>
<i>Ignition mounting set for pickup</i>	<i>IMZ-8.1037-30026</i>
<i>High-Voltage Cables with Caps Ignition Coil with Spark Plug Caps</i>	<i>532165770</i>

Ducati, introduced in 2006 Urals, has proven to be a reliable electronic (contact-less) ignition system for Urals and retro-fitted Dneprs.

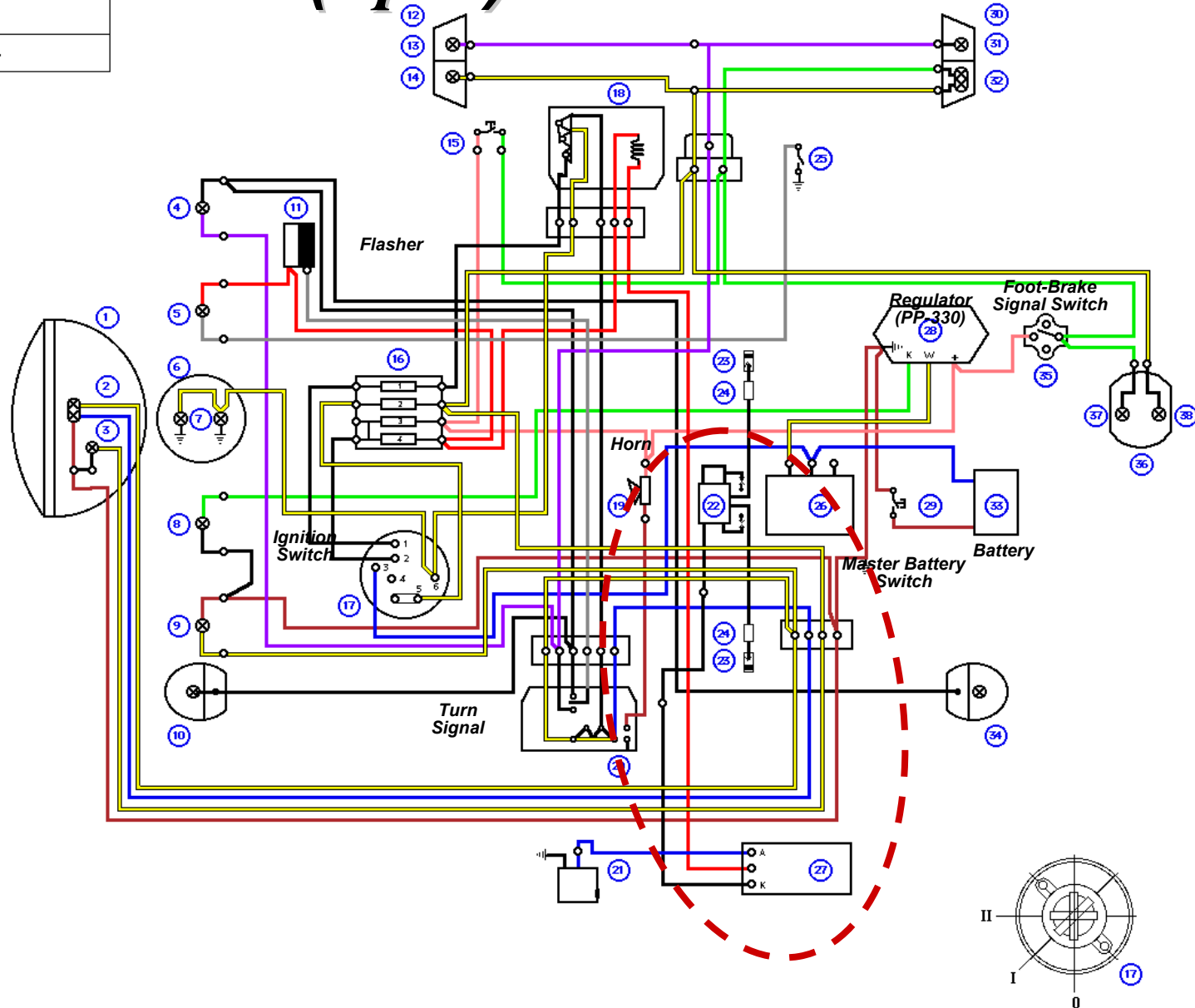
Ural Power Arc Ignition System (racewayservices@gmail.com)

- **Retrofit Ducati or Types II-thru-V Russian Ignitions**
- **Two Ignition Curves Loaded into Processor**
 - **Standard Ural/Ducati Curve**
 - **Second Curve Accessed via Momentary Toggle Switch**
- **Coil Receives No Current if Engine Not Running**
 - **No “hot” Coil**
- **Multi-Spark Feature (fires three times each firing cycle)**
- **Simple Installation**
 - **Built -In LED Timing Light**
 - **Tachometer Lead and Rev-Limiter Available**
- **Exclusively Distributed by Raceway Services**



Raceway Services offers the Power Arc System to cure the problems of previous Type II thru V ignition systems and provide improved performance.

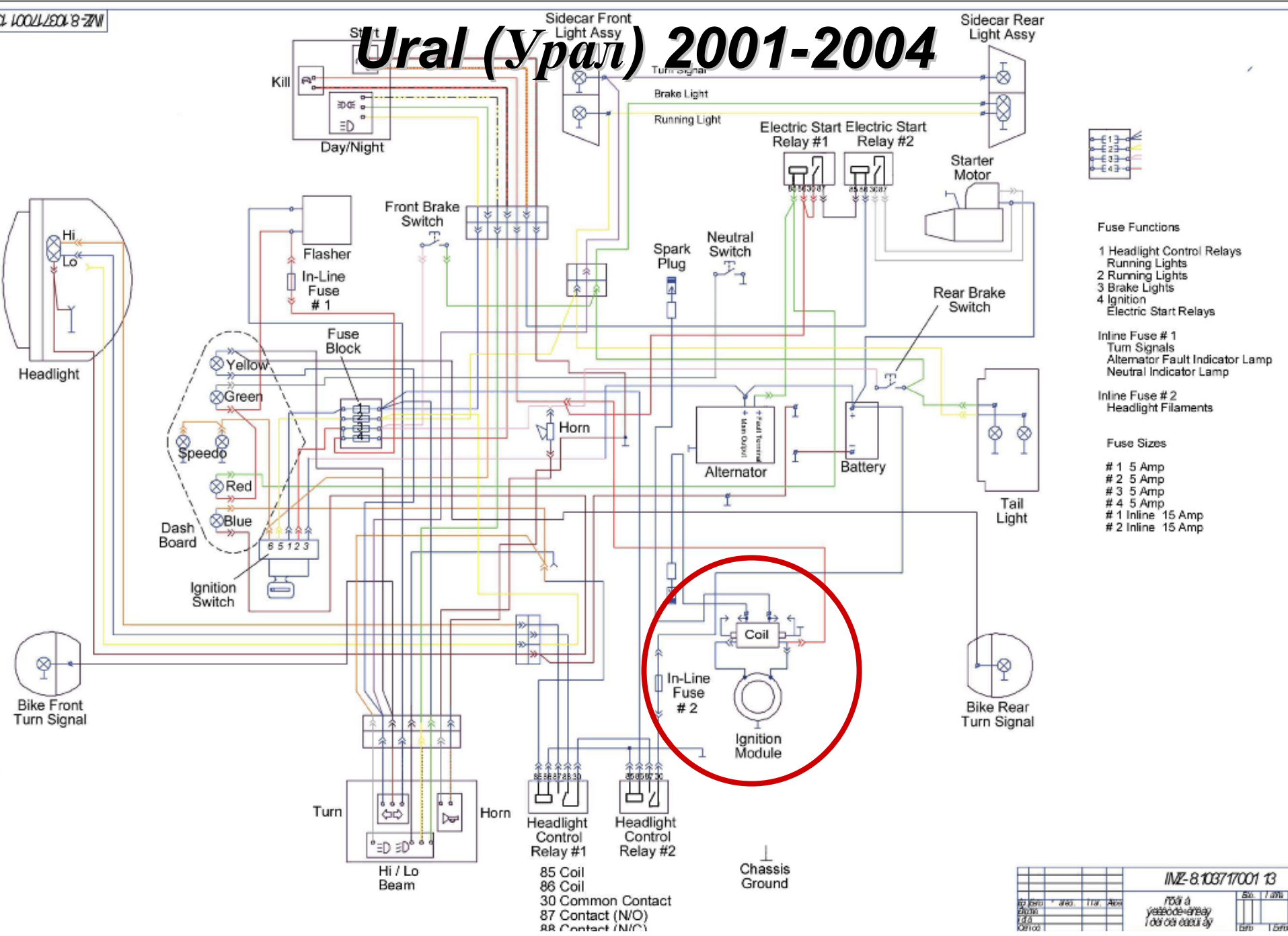
Ural (Урал) 1995



1. Motorcycle head lamp
2. High-low beam headlight bulb
3. Side and parking bulb in headlight
4. Turn indicator bulb
5. Neutral gear indicator bulb
6. Speedometer
7. Speedometer illumination bulb
8. Generator
9. Highbeam indicator lamp
10. Left turn indicator
11. Turn signal flasher
12. Sidecar front lamp
13. Sidecar side bulb
14. Traffic indicator bulb
15. Front brake light switch
16. Fuse plate
17. Ignition lock
18. "Day-night" switch with emergency "ignition out" switch
19. Horn
20. Light and turn indicator switch, horn button
21. Distributor
22. Induction coil
23. Spark plug
24. Spark plug cap
25. Neutral gear indicator switch
26. Generator
27. Ignition module
28. Voltage regulator
29. Earth disconnect switch
30. Sidecar rear lamp
31. Sidecar lamp
32. Sidecar side and brake bulb
33. Battery
34. Left rear turn signal
35. Foot brake signal switch
36. Motorcycle rear lamp
37. Brake light
38. Side bulb and number plate illumination bulb

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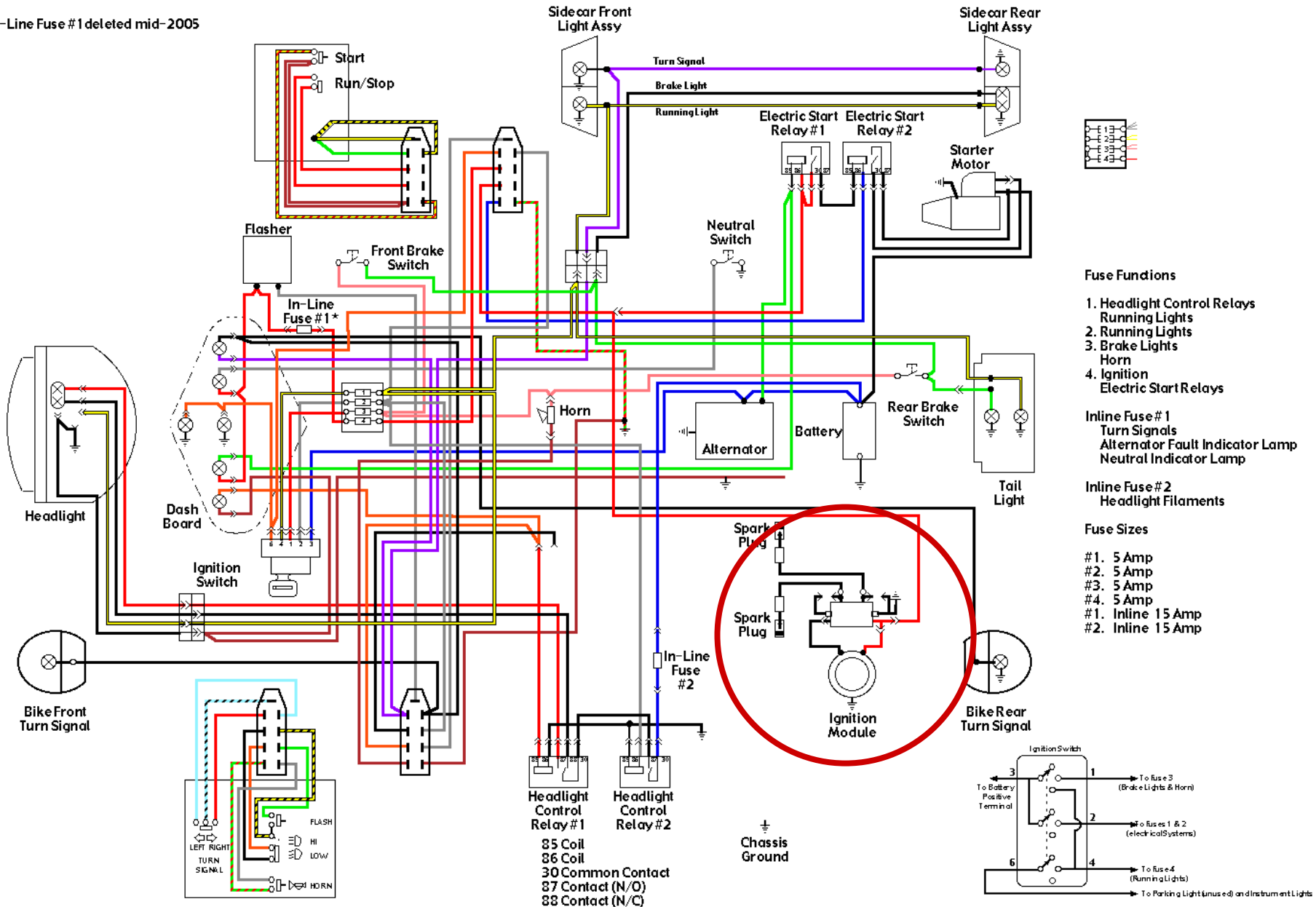
Ural (Урал) 2001-2004



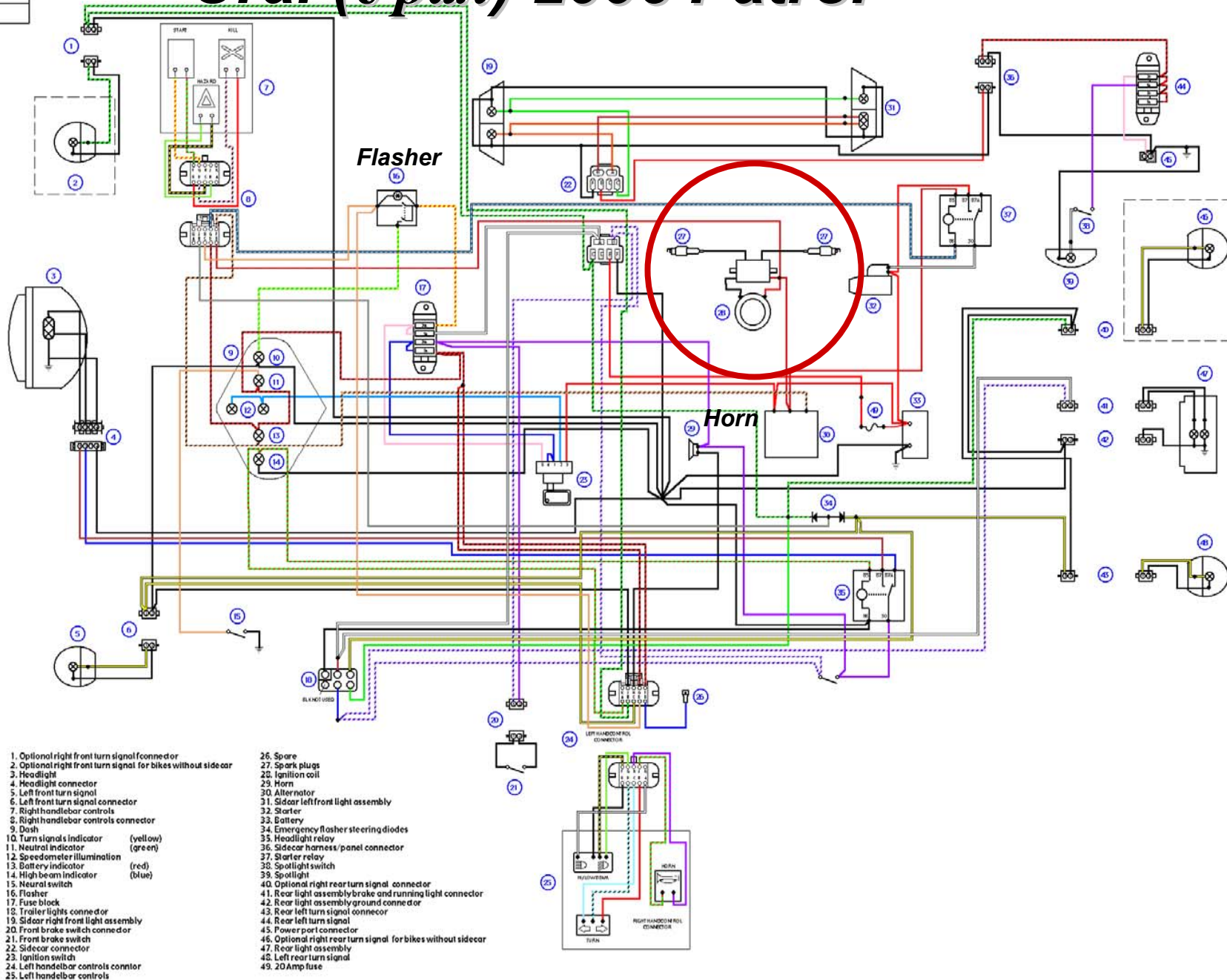
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82	83	84	85	86	87
88	89	90	91	92	93
94	95	96	97	98	99
100	101	102	103	104	105

Ural (Урал) 2005 Patrol

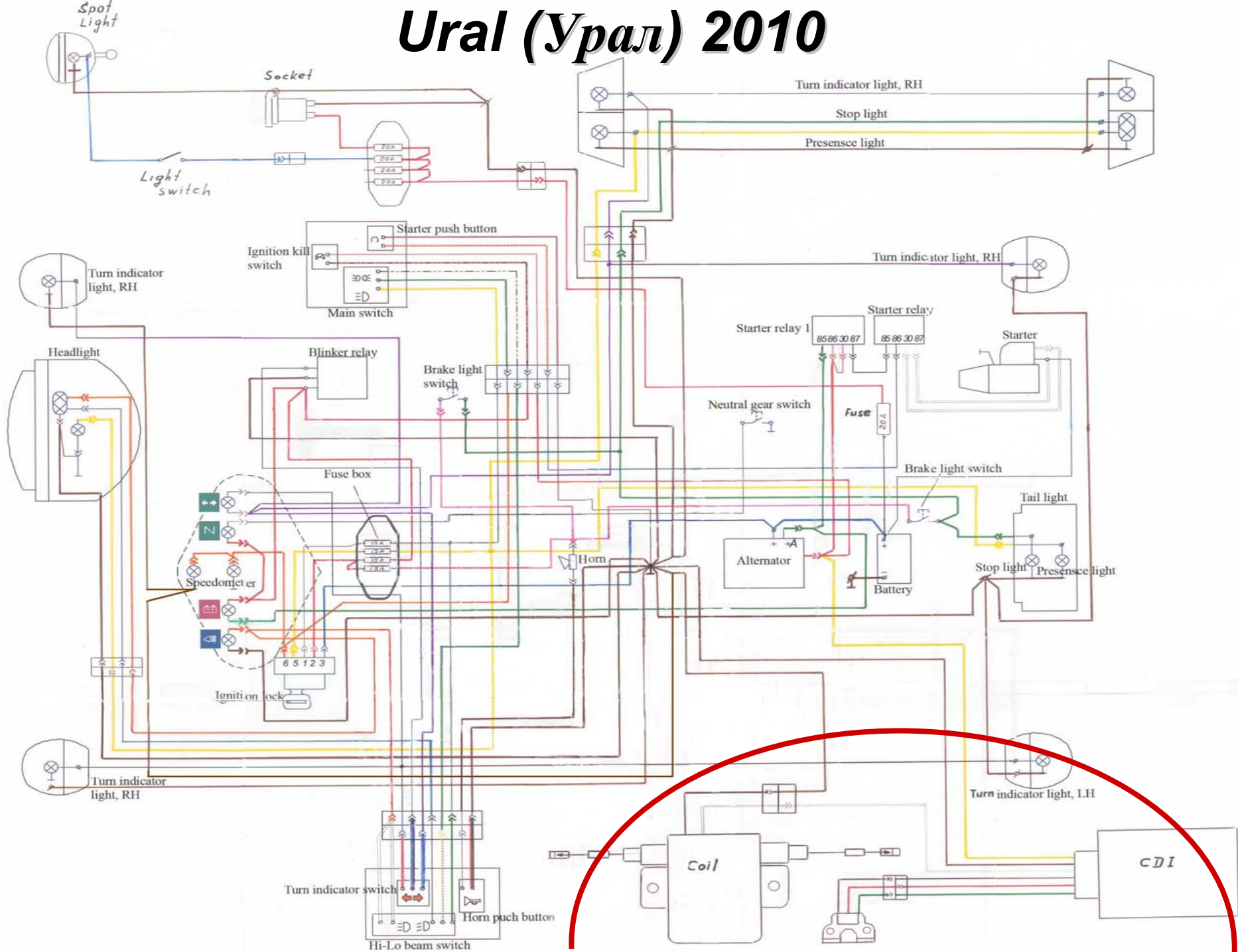
*In-Line Fuse #1 deleted mid-2005



Ural (Урал) 2006 Patrol



Ural (Урал) 2010



Ural (Урал) IMZ-8.1230 "Solo"

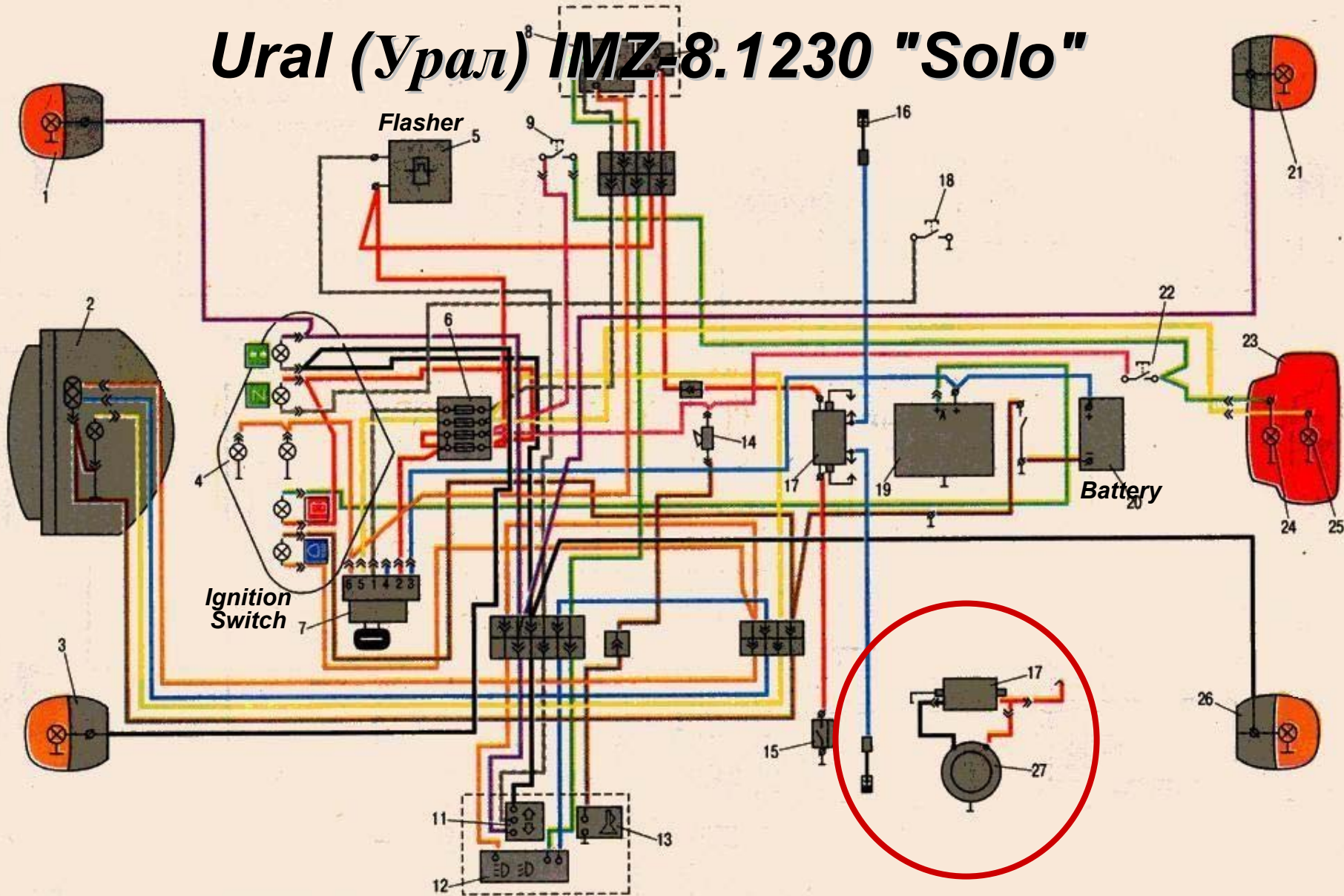
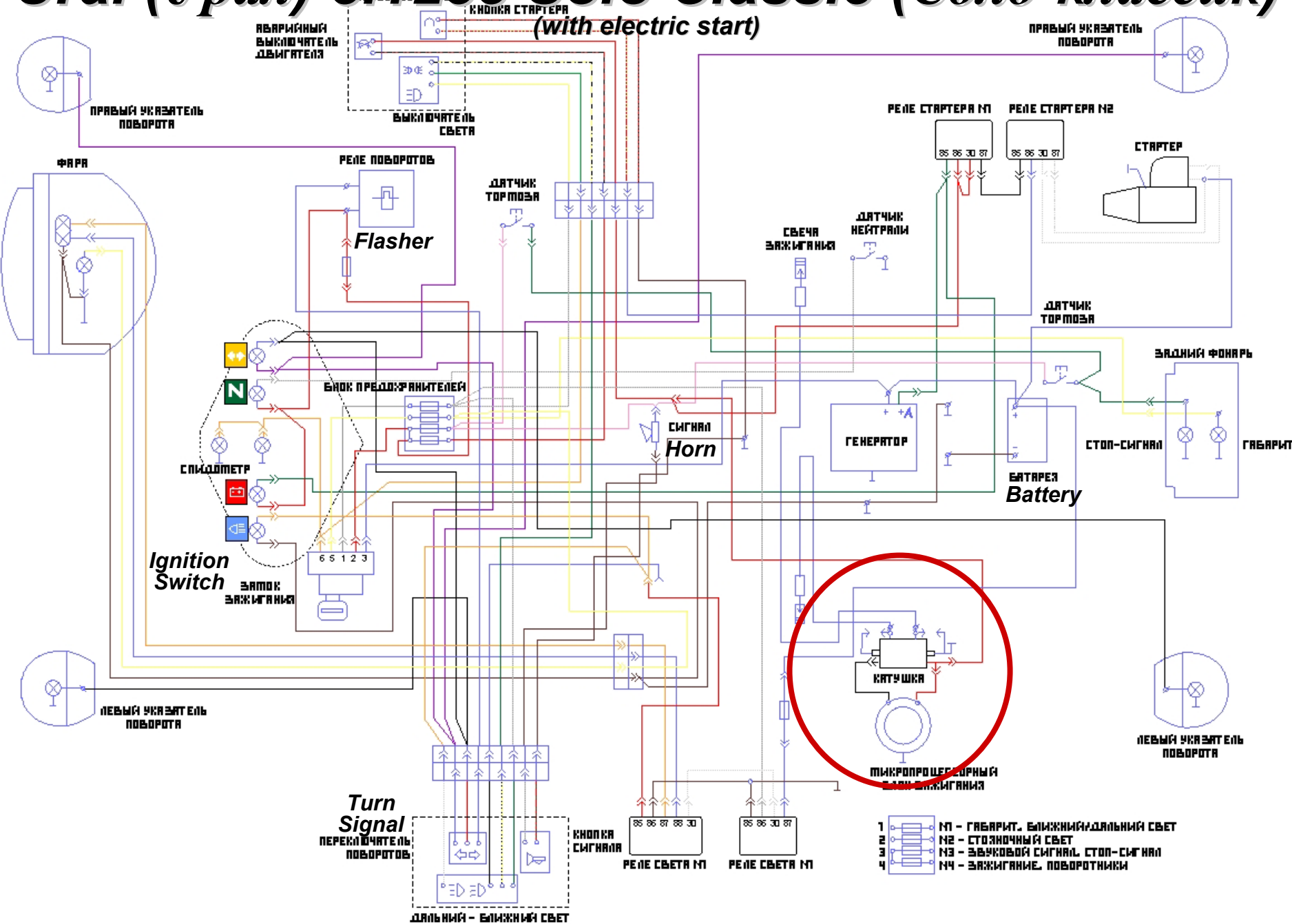


Схема электрооборудования мотоцикла ИМЗ-8.1230 «Соло» (без электростартера):

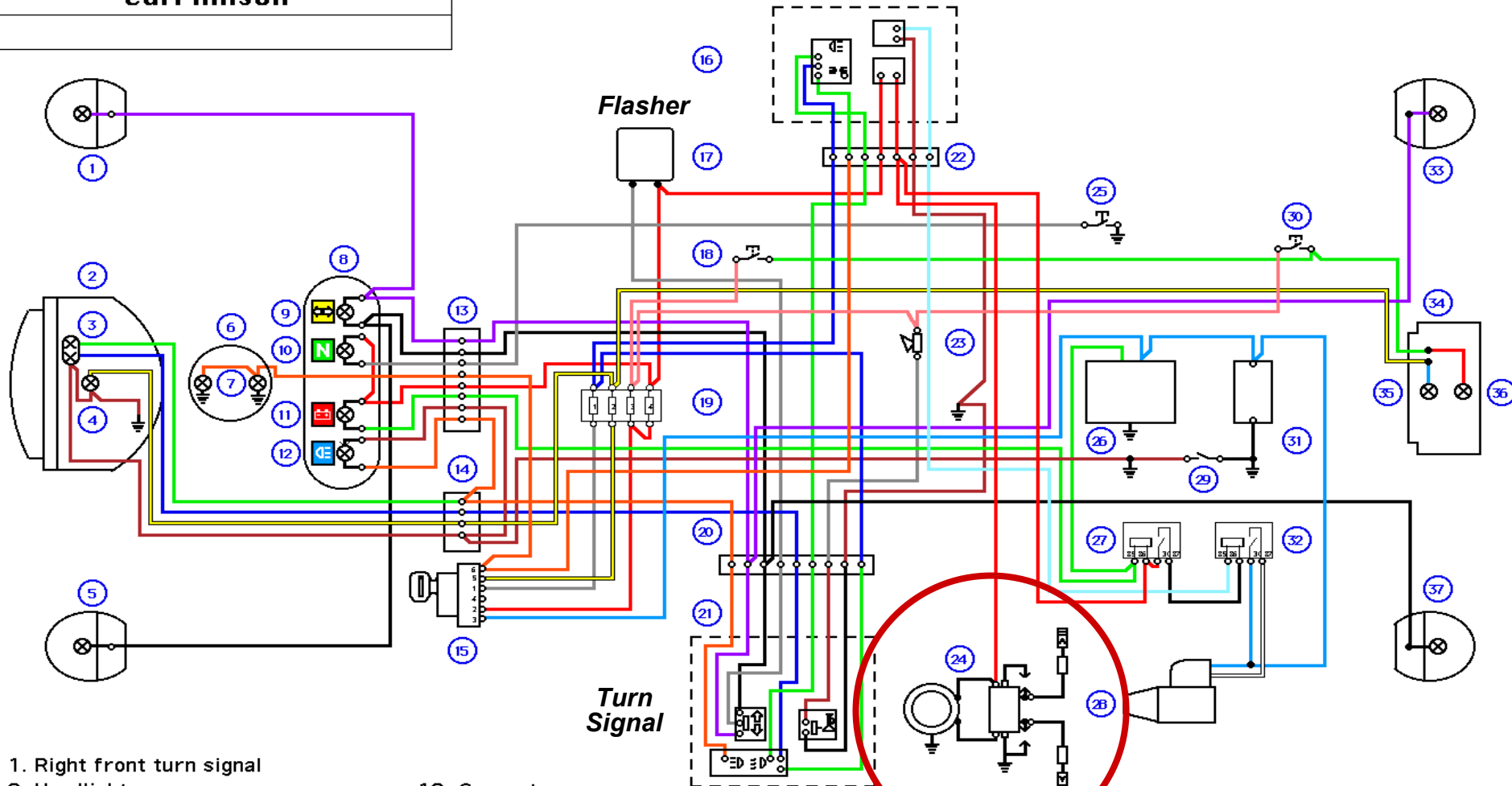
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|---------------------------------|---|---|---------------------------------|--|---------------------------------------|
| 1 - правый указатель поворота; | 7 - замок зажигания; | 11 - переключатель поворотов; | 16 - свеча зажигания; | 22 - датчик стоп-сигнала от заднего тормоза; | 26 - левый указатель поворота; |
| 2 - фара; | 8 - выключатель света; | 12 - переключатель дальнего/ближнего света; | 17 - катушка зажигания; | 23 - задний фонарь; | 27 - микропроцессорный блок зажигания |
| 3 - левый указатель поворота; | 9 - датчик стоп-сигнала от переднего тормоза; | 13 - кнопка звукового сигнала; | 18 - датчик нейтрали; | 24 - стоп-сигнал; | |
| 4 - лампы подсветки спидометра; | 10 - аварийный выключатель двигателя; | 14 - звуковой сигнал; | 19 - генератор; | 25 - лампа габарита и освещения номерного знака; | |
| 5 - реле поворотов; | | 15 - прерыватель системы зажигания; | 20 - аккумуляторная батарея; | | |
| 6 - блок предохранителей; | | | 21 - правый указатель поворота; | | |

Ural (Урал) 8.1233 Solo Classic (Соло-классик) (with electric start)



- 1 - ГАБАРИТ. БЛИЖНИЙ/ДАЛЬНИЙ СВЕТ
- 2 - СТОЯНОЧНЫЙ СВЕТ
- 3 - ЗВУКОВОЙ СИГНАЛ СТОП-СИГНАЛ
- 4 - ЗАЖИГАНИЕ, ПОВОРОТНИКИ

Ural (Урал) Wolf 1991



- 1. Right front turn signal
- 2. Headlight
- 3. High/Low beam bulb
- 4. Parking light
- 5. Left front turn signal
- 6. Speedometer
- 7. Speedometer illumination bulbs
- 8. Instrument cluster
- 9. Turn signal indicator
- 10. Neutral indicator
- 11. Charge indicator
- 12. High beam indicator

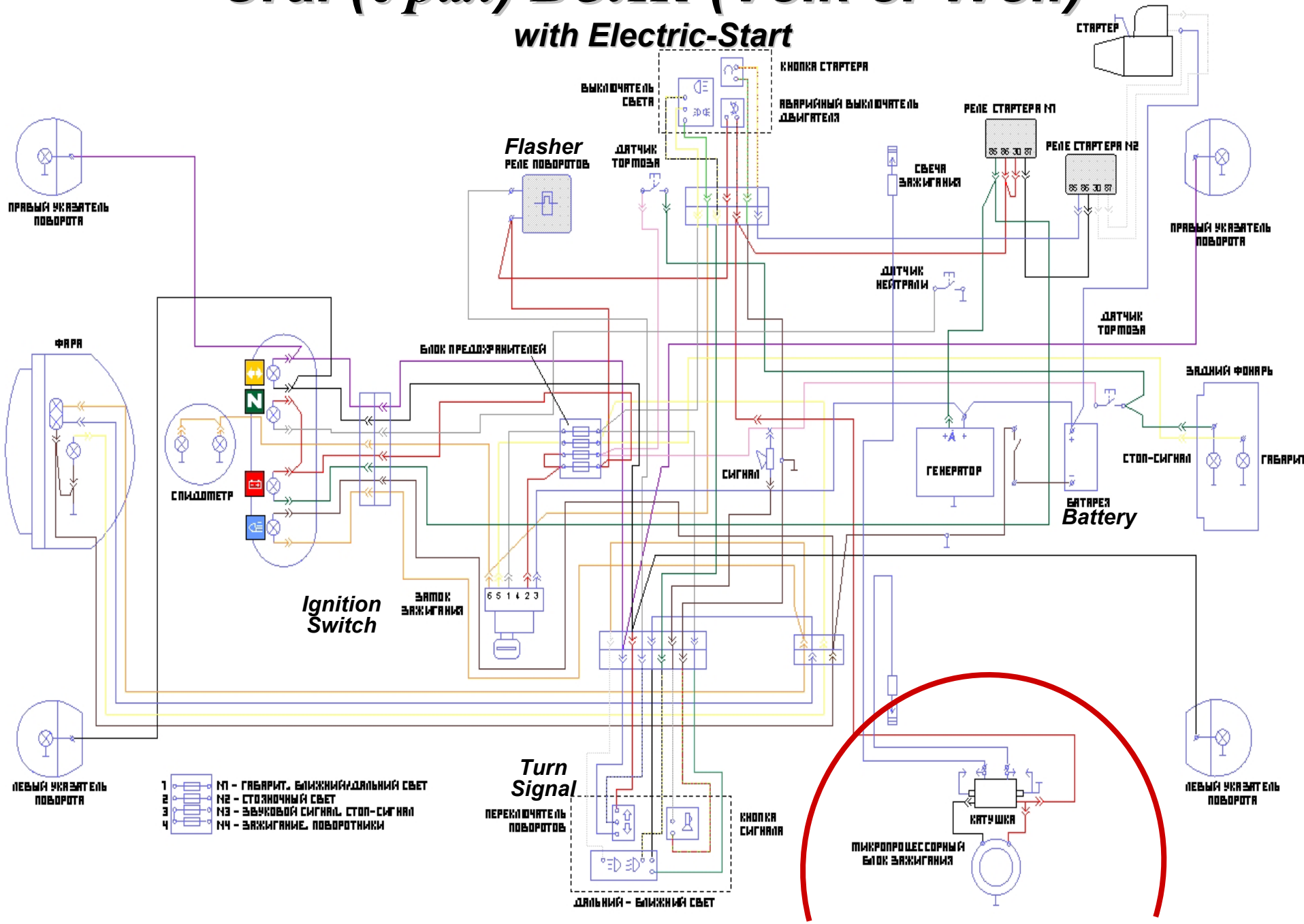
- 13. Connector
- 14. Connector
- 15. Ignition switch
- 16. Right handlebar controls
- 17. Flasher
- 18. Front brake light switch
- 19. Fuse block
- 20. Connector

- 21. Left handlebar controls
- 22. Connector
- 23. Horn
- 24. Ignition module
- 25. Neutral switch
- 26. Alternator
- 27. Starter interlock relay

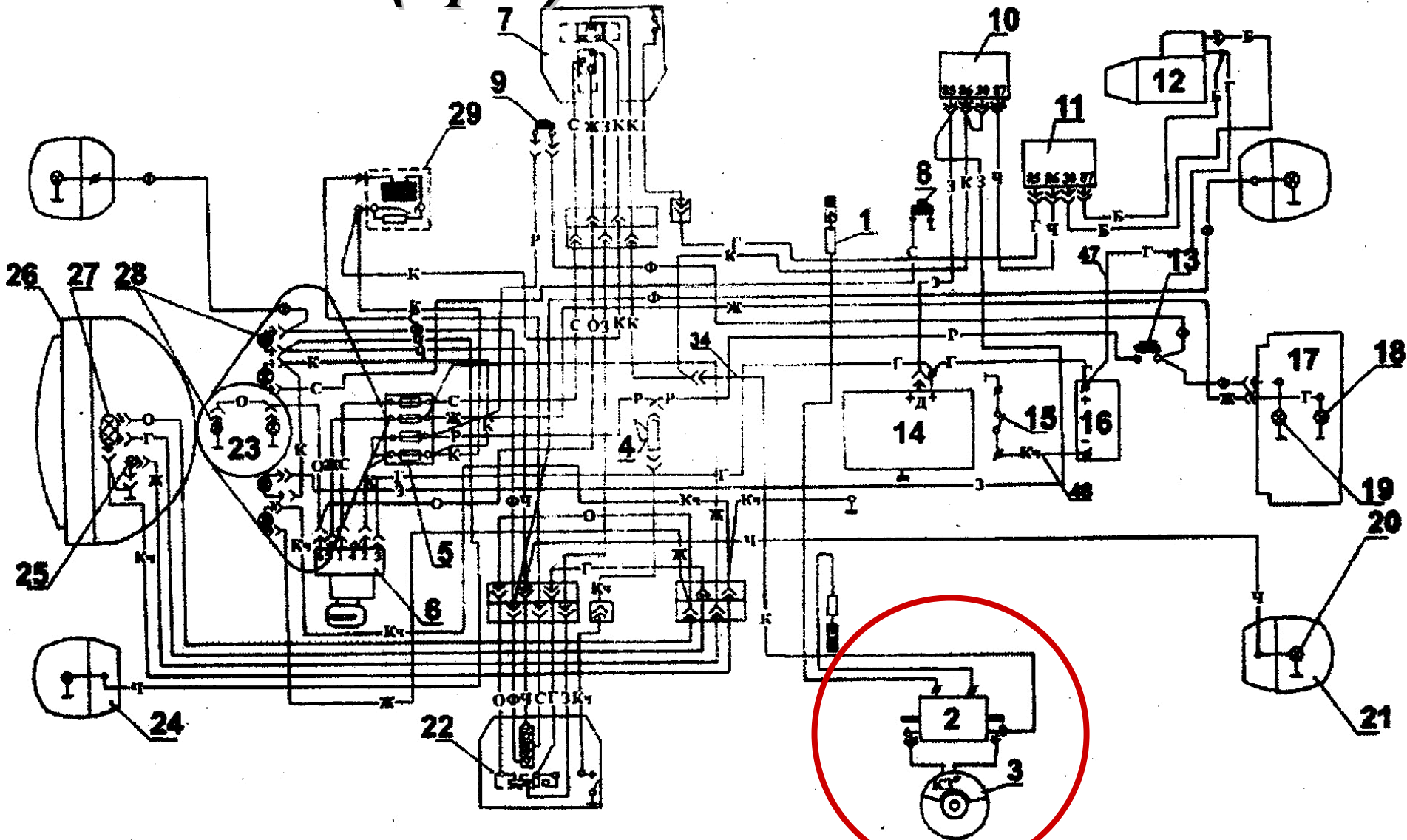
- 28. Starter motor
- 29. Master disconnect switch
- 30. Rear brake light switch
- 31. Battery
- 32. Starter relay
- 33. Right rear turn signal
- 34. Tail light housing
- 35. Tail and license light
- 36. Brake light
- 37. Left rear turn signal

Ural (Урал) ВОЛК (Volk or Wolf)

with Electric-Start



Ural (Урал) IMZ-8.1237 "Wolf"



1.Ignition 2.Ignition Coil 3.Ignition module BSZ 4. Horn 5.Fuse block 6.ignition 7. "Day-Night" with accidental ignition is turned off and switch starter 8.pointer neutral gear 9. "stop" signal front brake 10.Starter Relay 11.Starter Relay 12.Starter 13."stoplight" rear brakes 14.Generator 15.Ground switch 16.Battery 17.Rear Lights 18.Lamp marker light A12-5 19.Lamp braking signal A12-21-3. 20.Lamp flashers A12-21-3 21.Turn Signal 22. light and direction indicators 23.Speedometer 24.Turn Signal 25.Lamp A12-4. 26.Headlight 27.Lamp A12-45 +40 28.Lamp A12-1 29.Flasher