



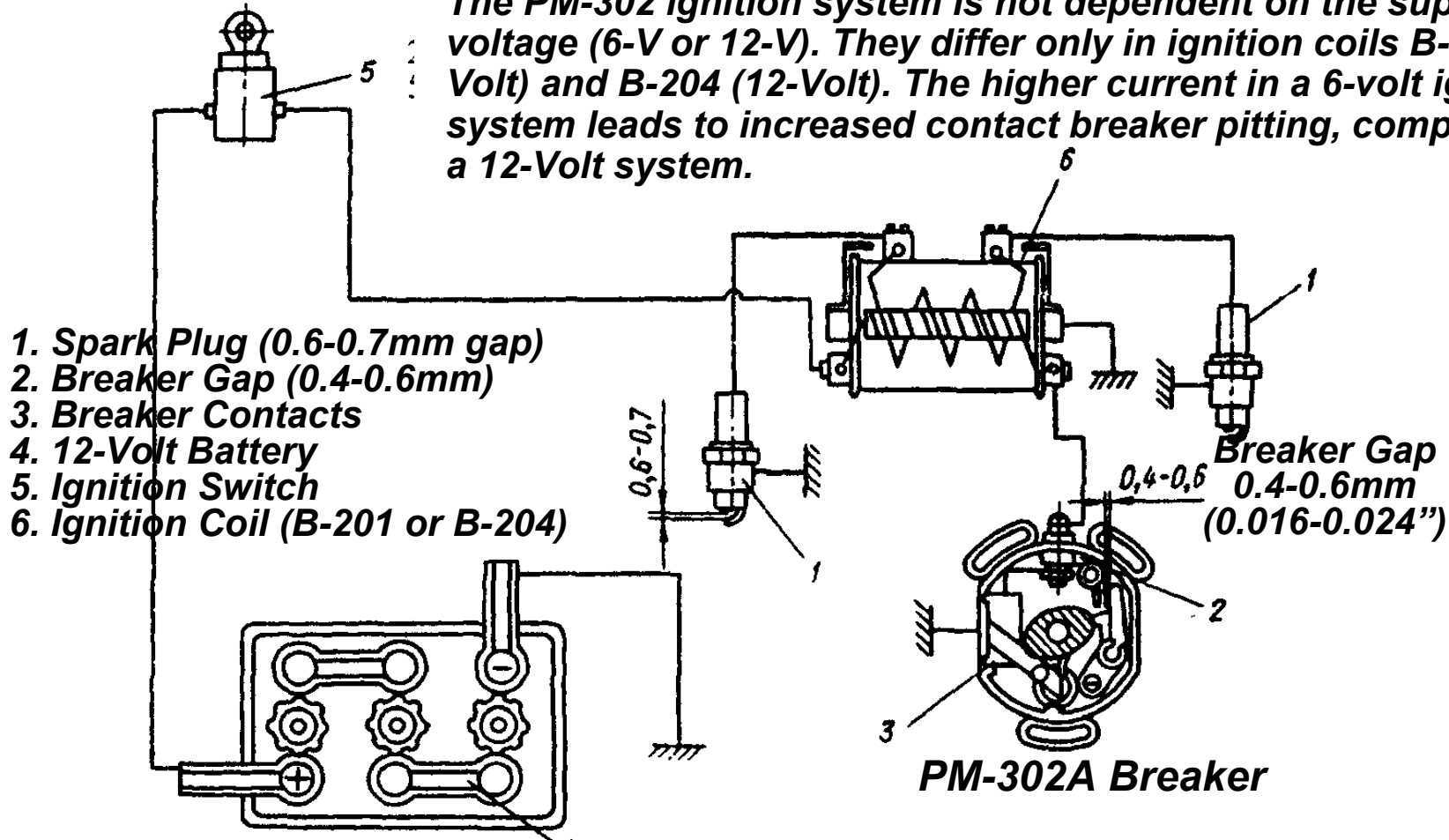
***Ignition Systems***  
***for***  
***Russian Motorcycles***  
***(Part III: PM-11 and PM-302 Breaker)***



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

# PM-11 and PM-302A Breaker Systems

The PM-302 ignition system is not dependent on the supply voltage (6-V or 12-V). They differ only in ignition coils B-201 (6-Volt) and B-204 (12-Volt). The higher current in a 6-volt ignition system leads to increased contact breaker pitting, compared with a 12-Volt system.



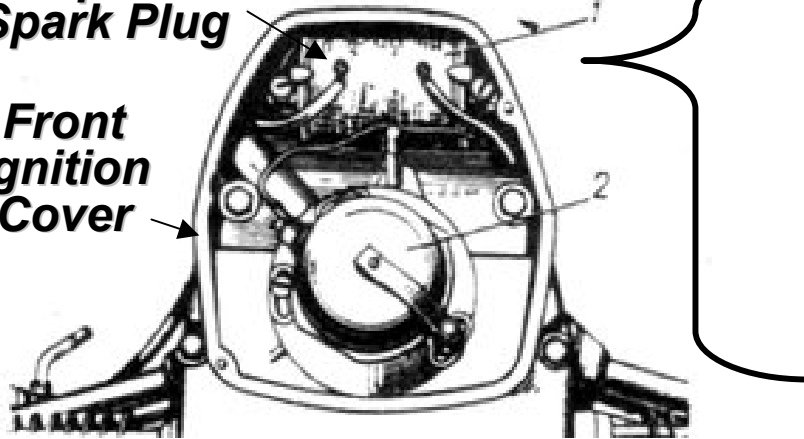
**The basic ignition system is simple. The breaker points are normally closed, allowing the magnetic field to build in the ignition coil. When the cam shaft rises, opening the breaker points, the collapsing magnetic field induces a high-voltage in the secondary winding of the coil.**

# Breaker PM-302 and Ignition Coil B204

- Dnepr MT-10.36 / MT-11 / MT-16 and Ural M-62 / M-63 / M-66 / M-67

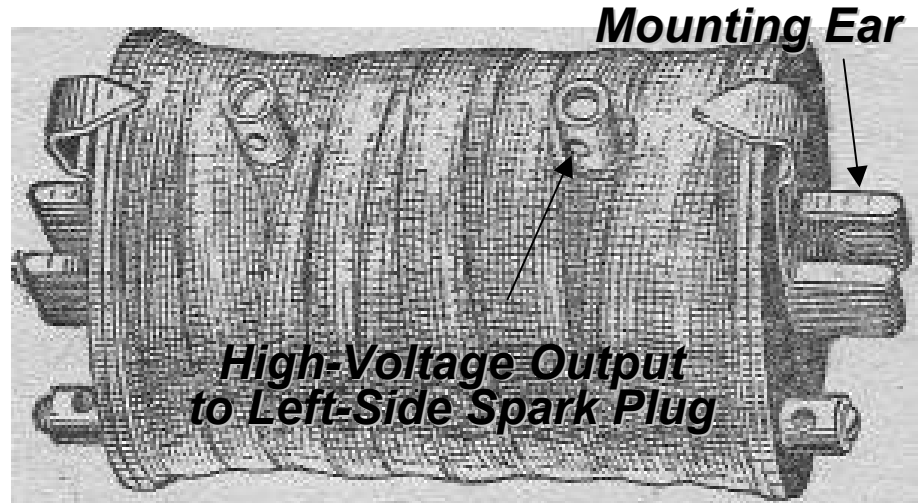
High-Tension  
Output to  
Spark Plug

Front  
Ignition  
Cover



1. B204 Ignition Coil
2. PM-302A (IIM-302A) Breaker Unit

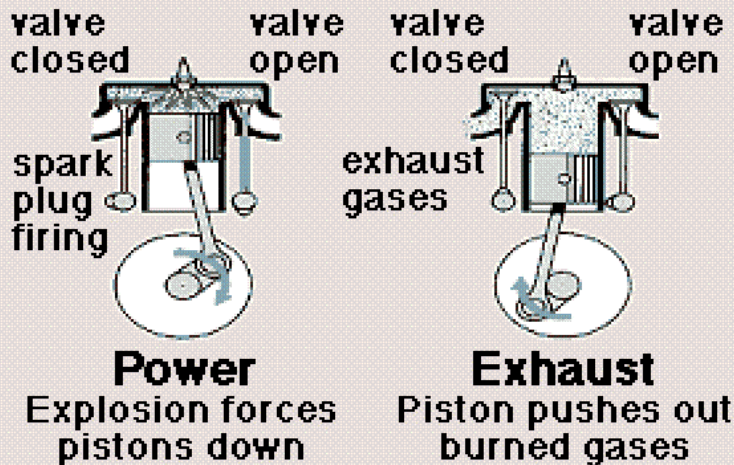
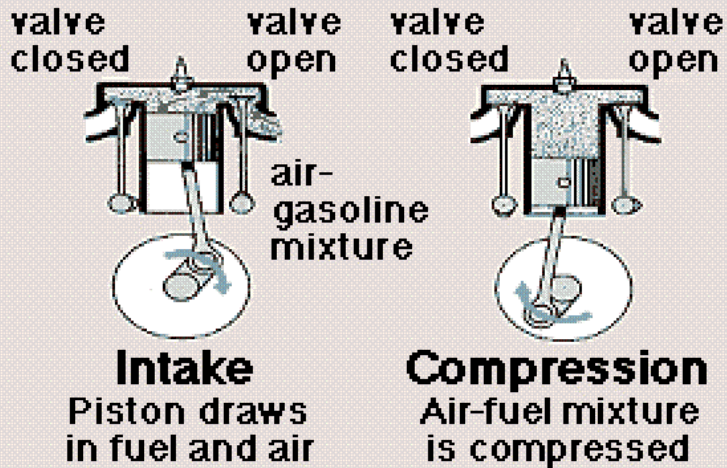
Low-Voltage  
Primary Terminal



The introduction of the PM-301/PM-302 breaker system eliminated any need for a distributor and provided automatic spark advance/retard. The centrifugal breaker points automatically adjusted to engine rpm's. The output of the ignition coil was connected directly to each of the spark plugs.

# ***PM-302 Allowed Elimination of the Distributor***

## **Four-Stroke Cycle**



***Four-stroke engines take two revolutions to reach the firing point.***

***Both plugs fire simultaneously on the left and right cylinders, one spark being formed when the compression stroke finishes in one cylinder and the other (needlessly) during the exhaust stroke.***

# **PM-302A (Центробежен регулатор за ПМ302) 12-Volt Breaker for Dnepr (MT-10.36/ MT-11/ MT-12/ MT-16) and Ural (M-62/ M-63/ M-66/ M-67/ M-67.36/ Tourist)**

*Used with Ignition coil  
B201A 6-Volt) or B204 (12-Volt)*



**Weight Pins**

**Cover**

**Breaker Points**



**Carrier**



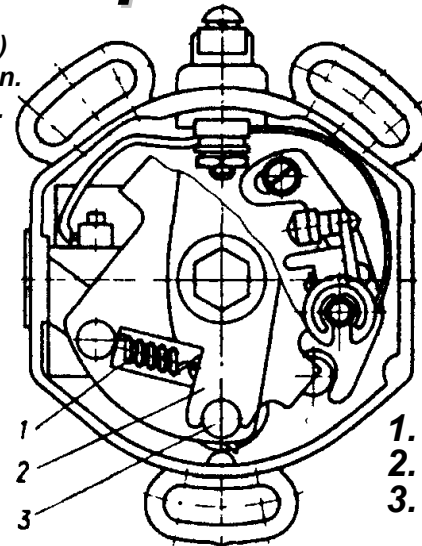
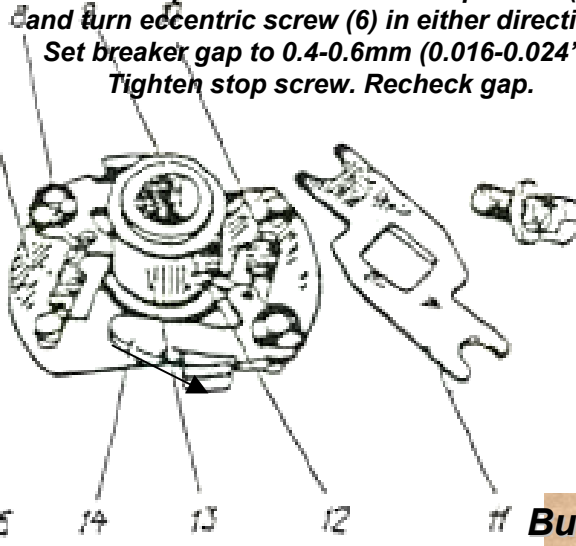
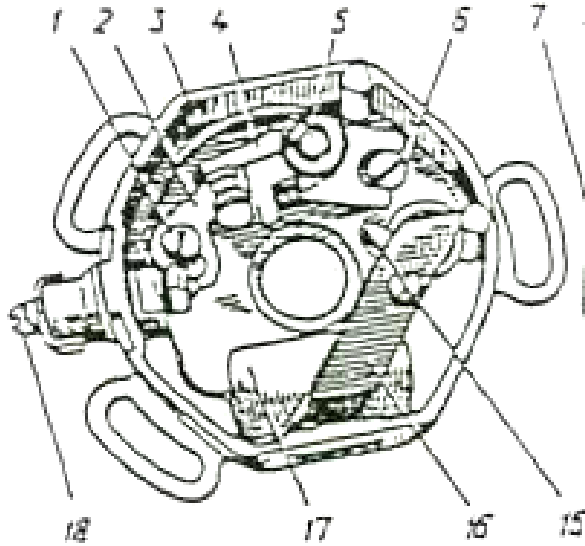
**Centrifugal Advance**



**The PM-302 ushered in the era of automatic spark advance with the introduction of the centrifugal advance/retard, consisting of breaker points, condenser, advance weights and springs, and earned the nick-name "the mixing bowl of doom."**

# PM-302A Breaker with Automatic Spark Advance

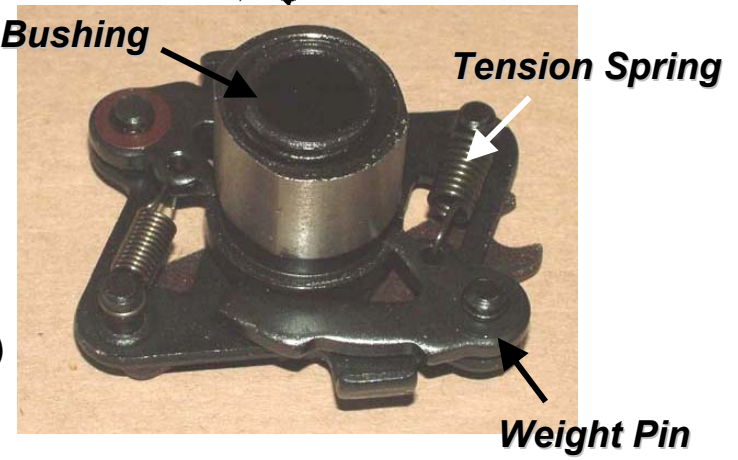
To Adjust Gap: Undo screw fastening the automatic spark timer. Slacken stop screw (1) and turn eccentric screw (6) in either direction. Set breaker gap to 0.4-0.6mm (0.016-0.024"). Tighten stop screw. Recheck gap.



- 1. Stop Screw
- 2. Contact Leg
- 3. Breaker Body
- 4. Breaker's Lever
- 5. Lever Pin
- 6. Eccentric
- 7. Automatic Spark Timer
- 8. Weight Pin
- 9. Bushing

- 10. Spring
- 11. Carrier
- 12. Locking Ring
- 13. Cam
- 14. Weight
- 15. Lubrication Wick
- 16. Capacitor Holder
- 17. Condenser (Capacitor)
- 18. Terminal

- 1. Spring
- 2. Carrier
- 3. Weight Pin



**Spark-advance is determined by the relationship between rotary speed (centrifugal force) and the tension spring. The correct placement of the two-piece advance unit's top plate is a rectangular opening at each side of the mounting bolt.**

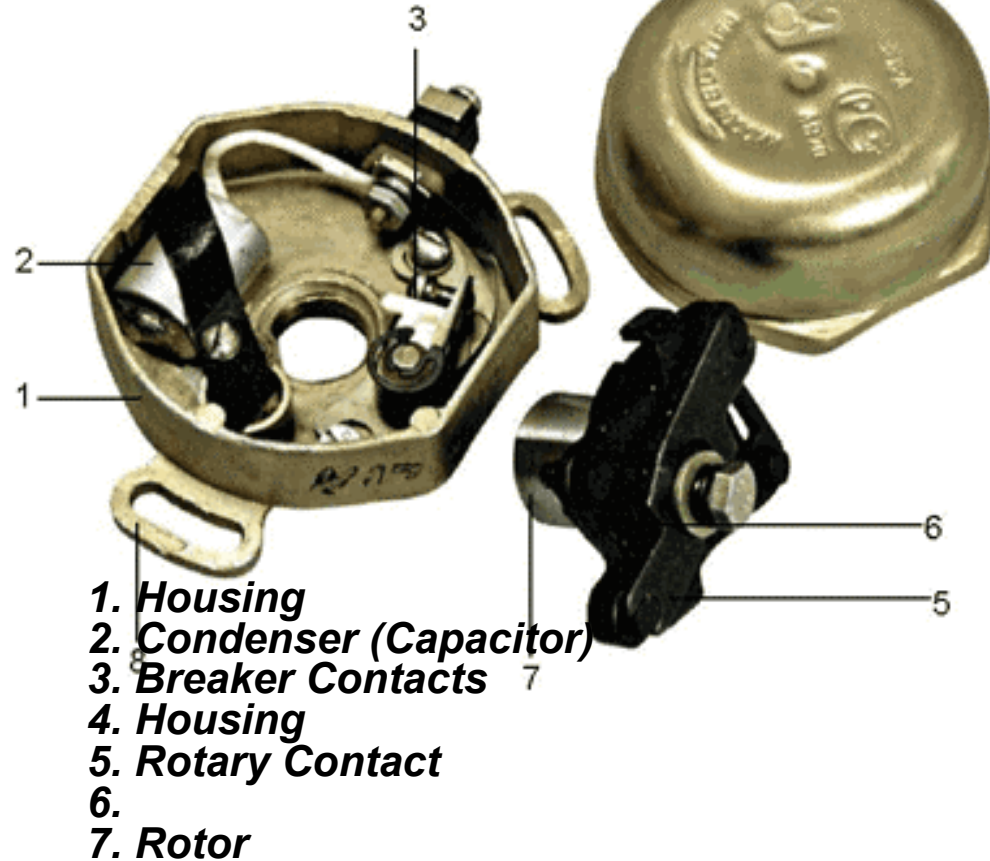
# PM-302-01 12-Volt Breaker



**Centrifugal Advance**

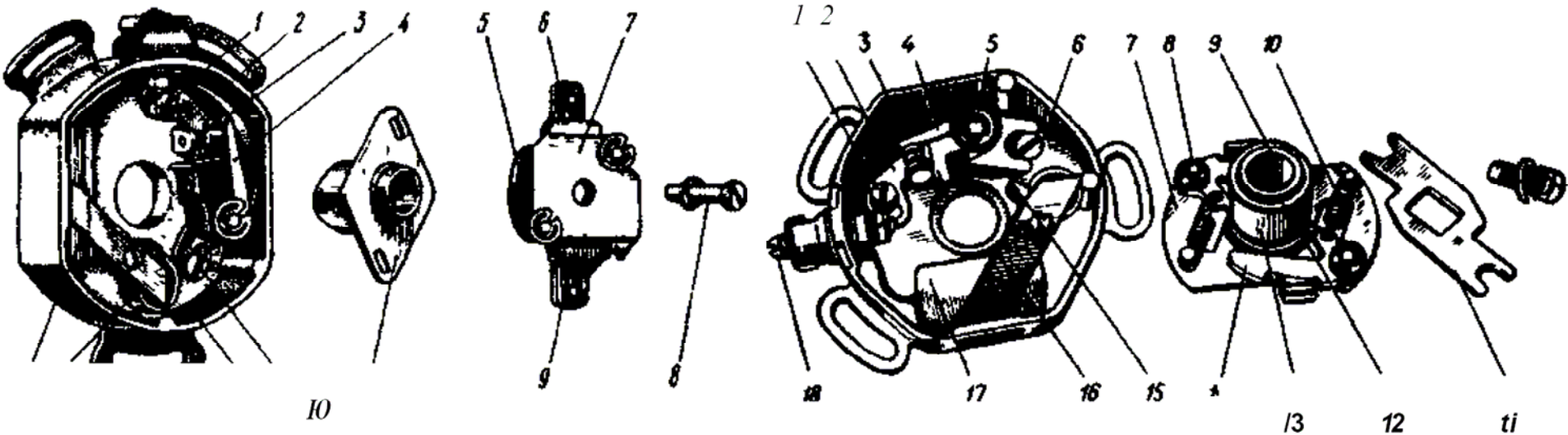


**12-Volt Breaker Points**



**Automatic ignition advance PM-302 Breaker consists of a body with a lid, cam with a centrifugal regulator, breaker contacts, capacitor and a felt pad to lubricate the cam. The breaker is attached to the crankcase with three screws and can be rotated at an angle, through which you can set the desired time of ignition timing. The breaker gap is set using the eccentric adjusting screw.**

# PM-11 and PM-302A Breakers



**PM-11**

**PM-302A**

*There are two styles of cam and flyweights. The one piece unit, less desirable due to soft pins that tend to wear out. The two piece unit better quality, but tricky as the top plate has to be put on correctly. When done correctly there are two square opens created, if done wrong the opens created are angular and the flyweights will not fling out and advance the timing.*

**The PM-11 was the predecessor to the more-popular PM-302/PM-302A. The weights and springs are attached to the points cam. As the cam spins on its shaft, centrifugal force causes weights to move and turn the cam on its shaft, advancing the timing of the spark, thus giving the combustion process more time to occur as the rpm increase. Full advance is usually reached around 3,000 rpm.**



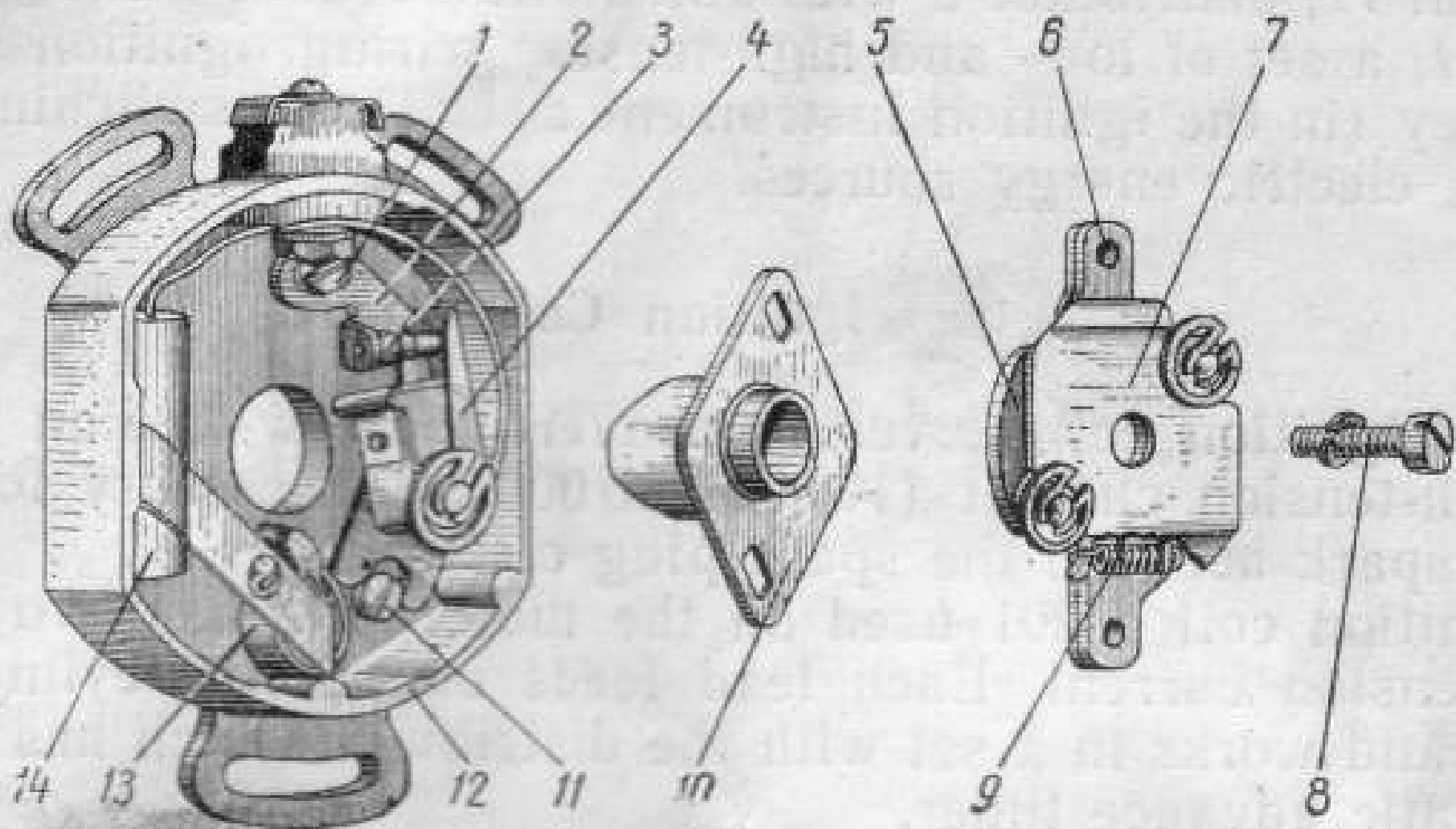


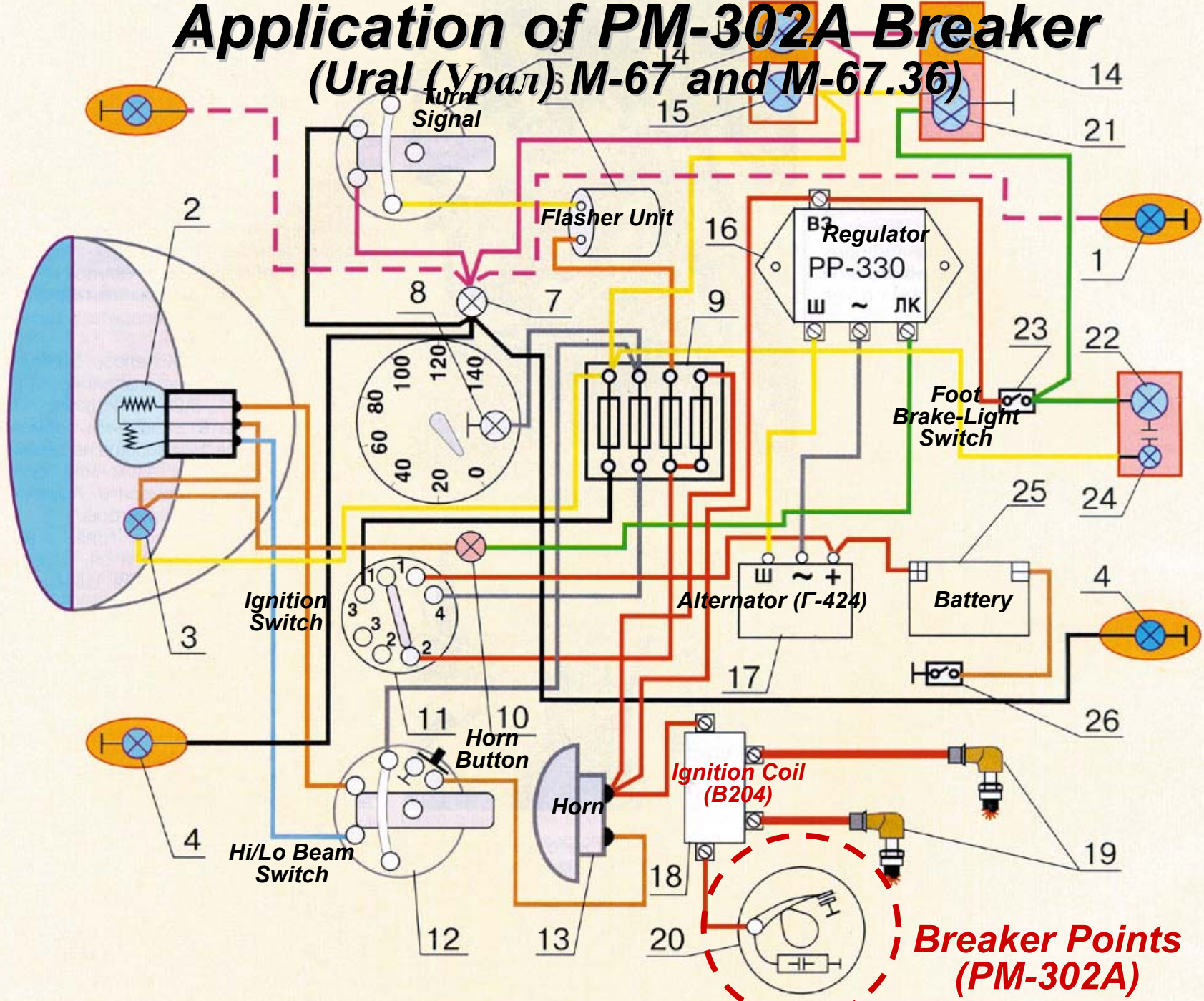
Fig. 13. Distributor with Automatic Advance Timer:

1 — contacts support fastening screw; 2 — contacts support; 3 — fixed contact; 4 — moving contact; 5 — timer weight; 6 — weight pin; 7 — fixed plate; 8 — fastening screw; 9 — spring; 10 — cam; 11 — adjusting screw; 12 — distributor body; 13 — stay with felt; 14 — condenser

# ***Centrifugal Regulator for PM-302***

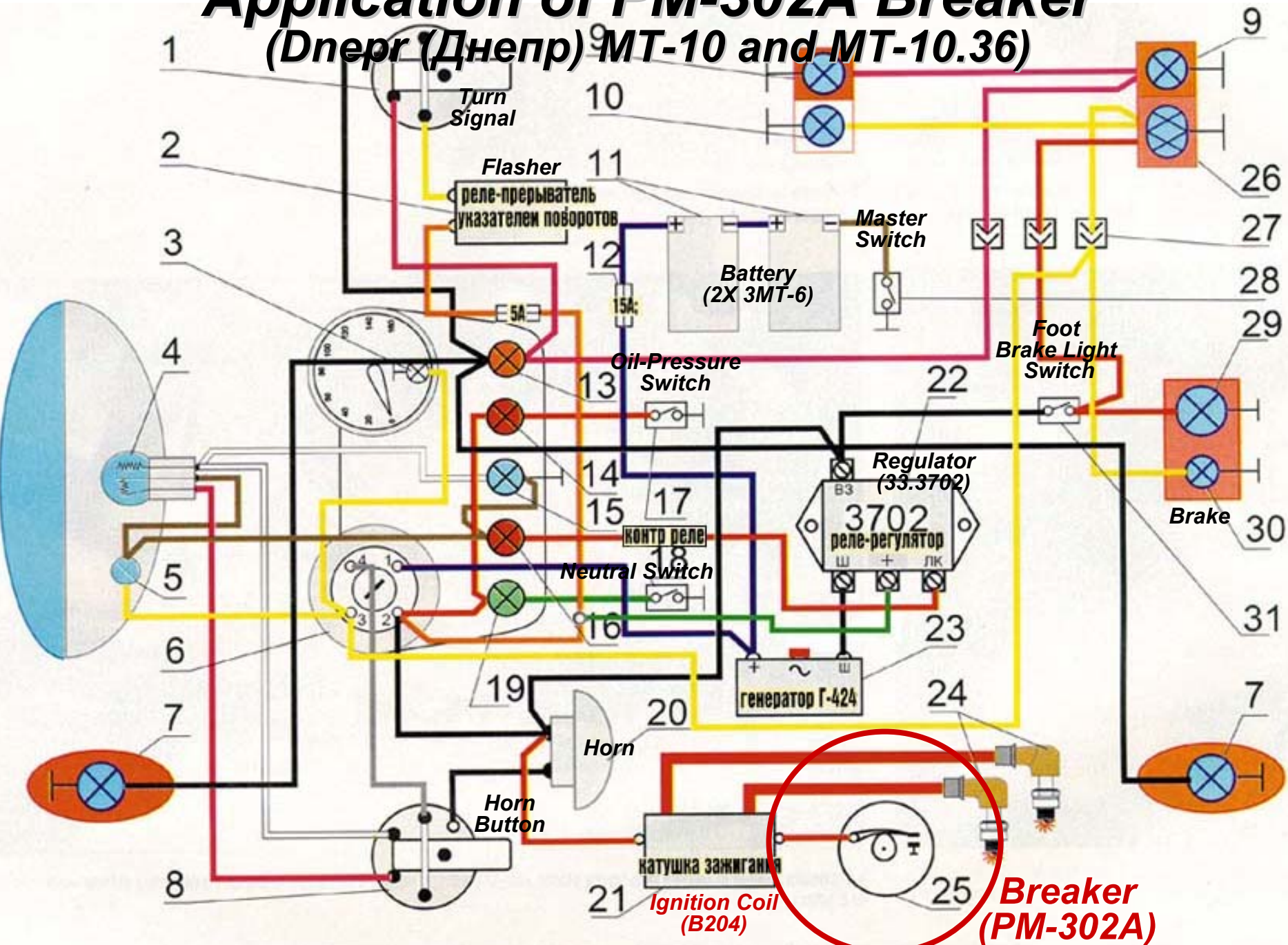


# Application of PM-302A Breaker (Ural (Урал) M-67 and M-67.36)



**Breaker Points  
(PM-302A)**

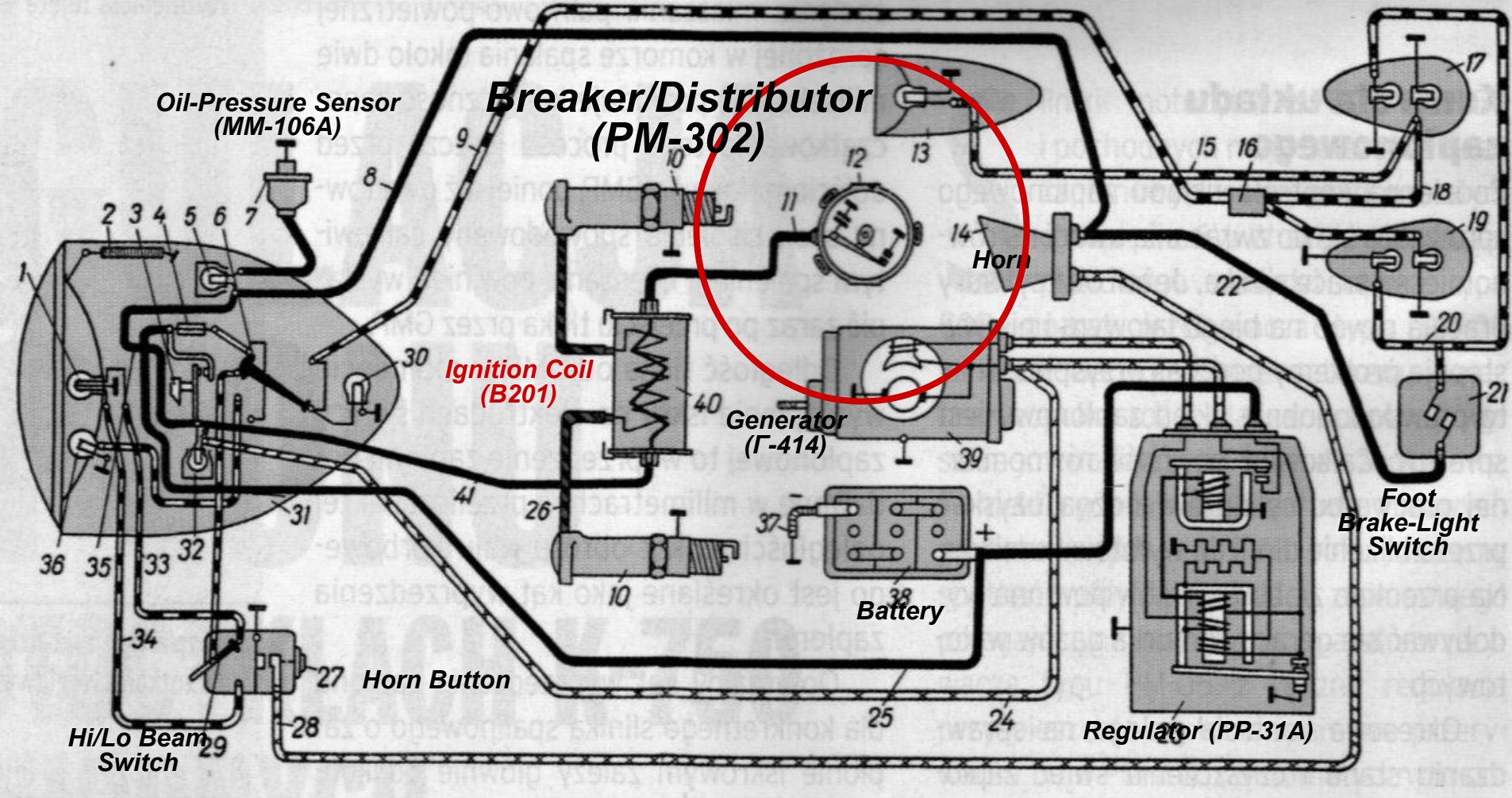
# Application of PM-302A Breaker (Днерг (Днепр) МТ-10 and МТ-10.36)



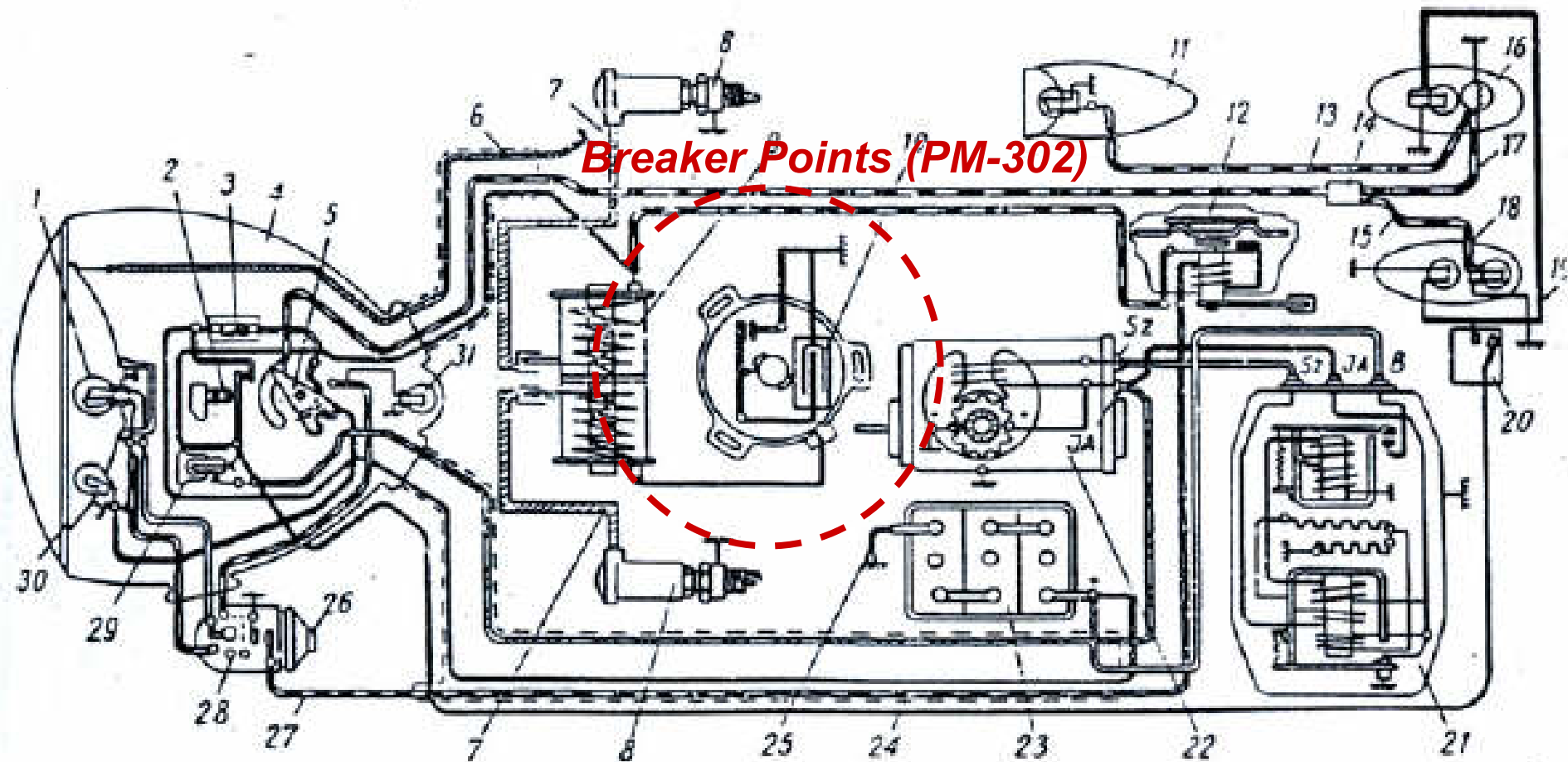
# Днепр (Днепр) Later K-750

(with Breaker PM-11A, PP-302 and B201 for Automatic Control of Firing Angle)

## Breaker Points (PM-302)



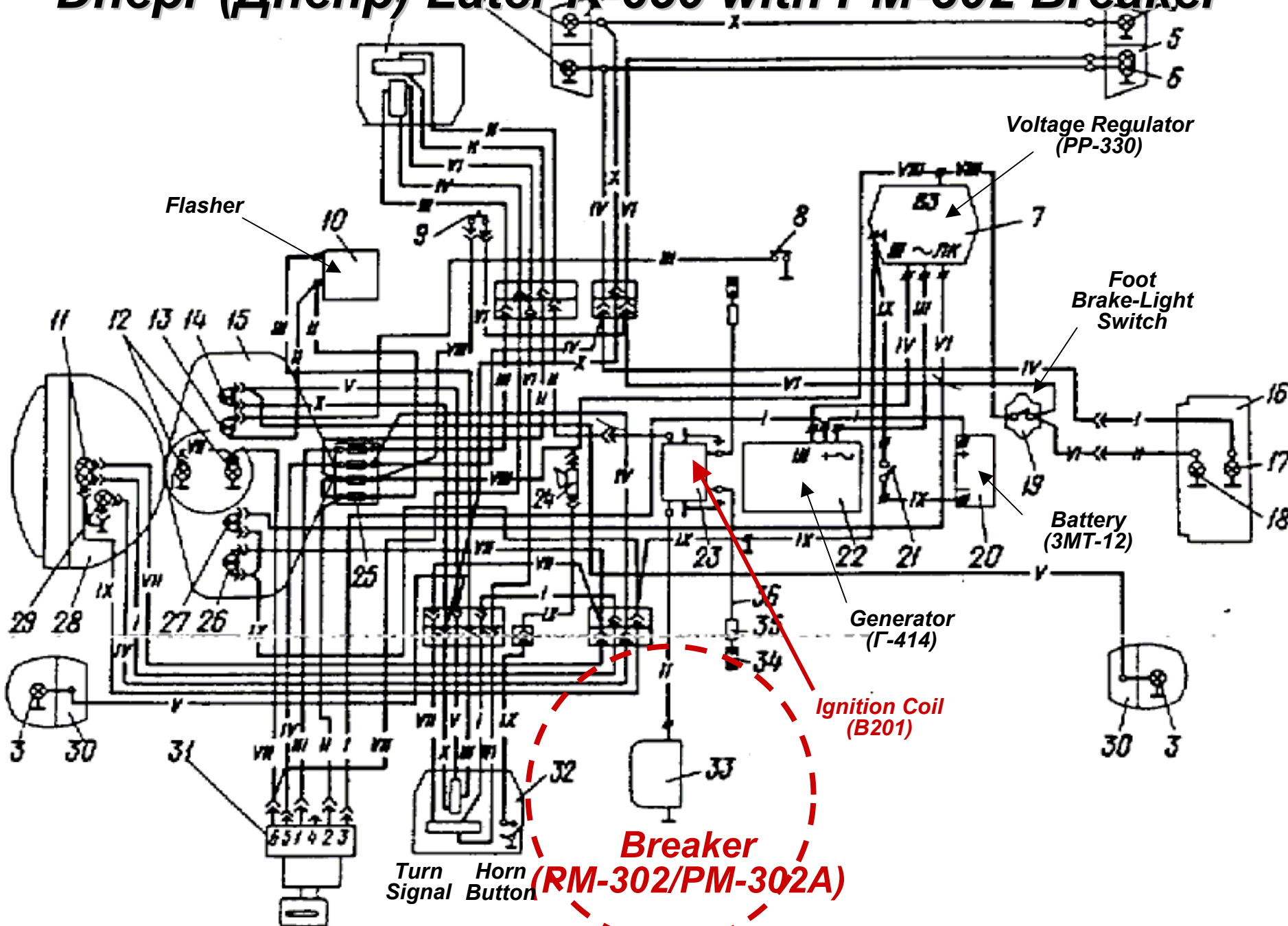
# K-750M with Automatic Spark Advance



Rys. 70. Schemat instalacji elektrycznej motocykla K-750 W z zastosowaniem urządzenia przyspieszania zapłonu PM16 i prądnicy 65 W

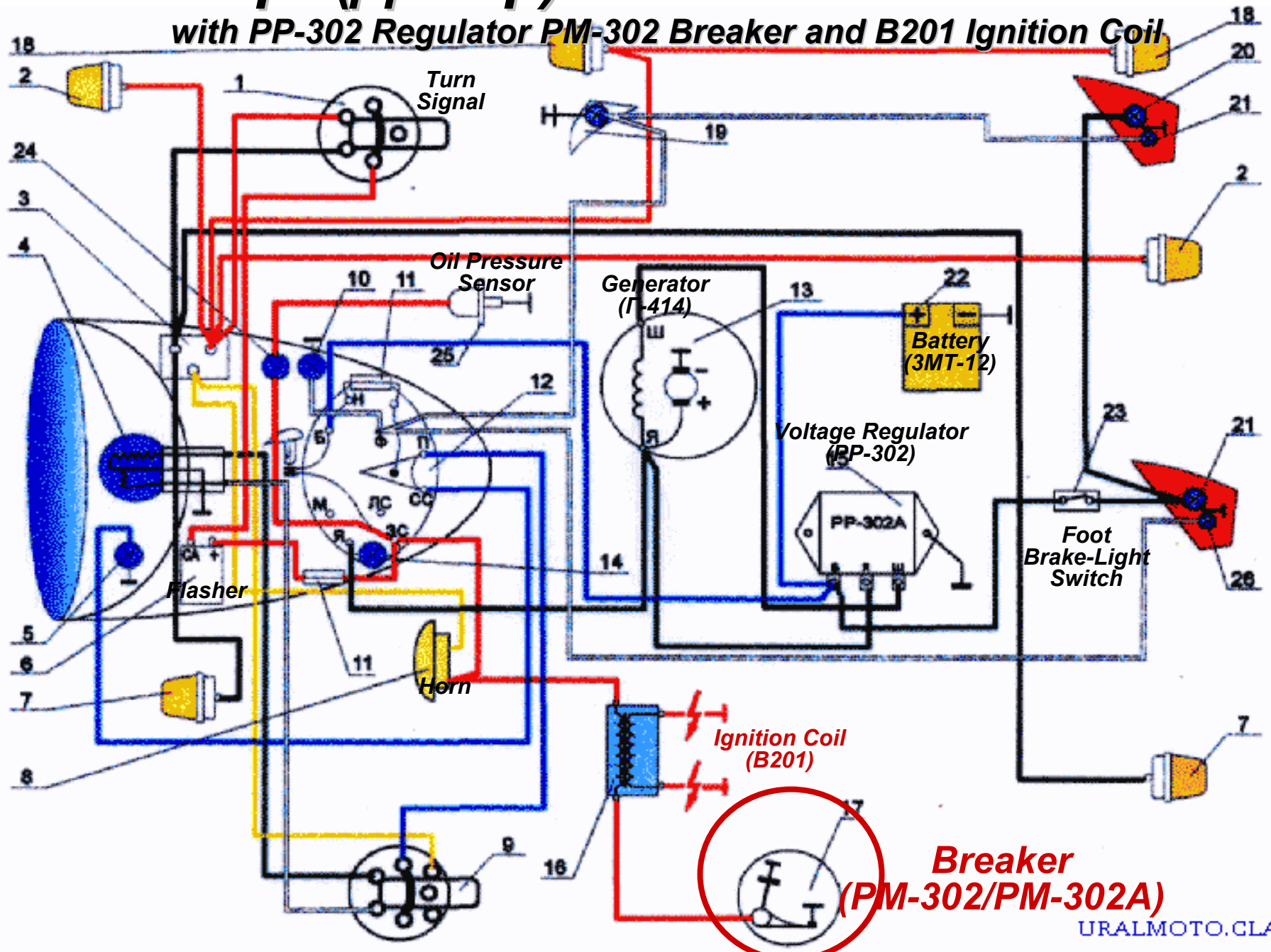
1 — żarówka światła szosowego i światła mijania, 2 — kluczyk, 3 — bezpiecznik, 4 — reflektor, 5 — główny przełącznik, 6 — przewód do „masy”, 7 — przewód wysokiego napięcia, 8 — świeca zapłonowa, 9 — cewka zapłonowa, 10 — przerywacz, 11 — lampa przednia przyczepty, 12 — sygnał dzwinkowy, 13 — przewód przedniej lampy przyczepty, 14 — gniazdo przewodów, 15 — przewód tylnej lampy przyczepty, 16 — lampa tylna motocykla, 17 — przewód tylnej lampy przyczepty, 18 — lampa tylna motocykla, 19 — przewód światła hamulcowego („stop”), 20 — włącznik światła hamulcowego („stop”), 21 — regulator prądnicy, 22 — prądnica prądu stałego, 23 — bateria akumulatorów, 24 — przewody niskiego napięcia, 25 — przewód łączący baterię akumulatorów z „masą”, 26 — przycisk sygnału dzwinkowego, 27 — przewód sygnału dzwinkowego, 28 — przełącznik świateł, 29 — lampka kontrolna, 30 — żarówka światła postojowego, 31 — żarówka oświetlenia skali szybkościomierza

# Днепр (Днепр) Later K-650 with PM-302 Breaker



# Днепр (Днепр) Later K-650 and MT-9

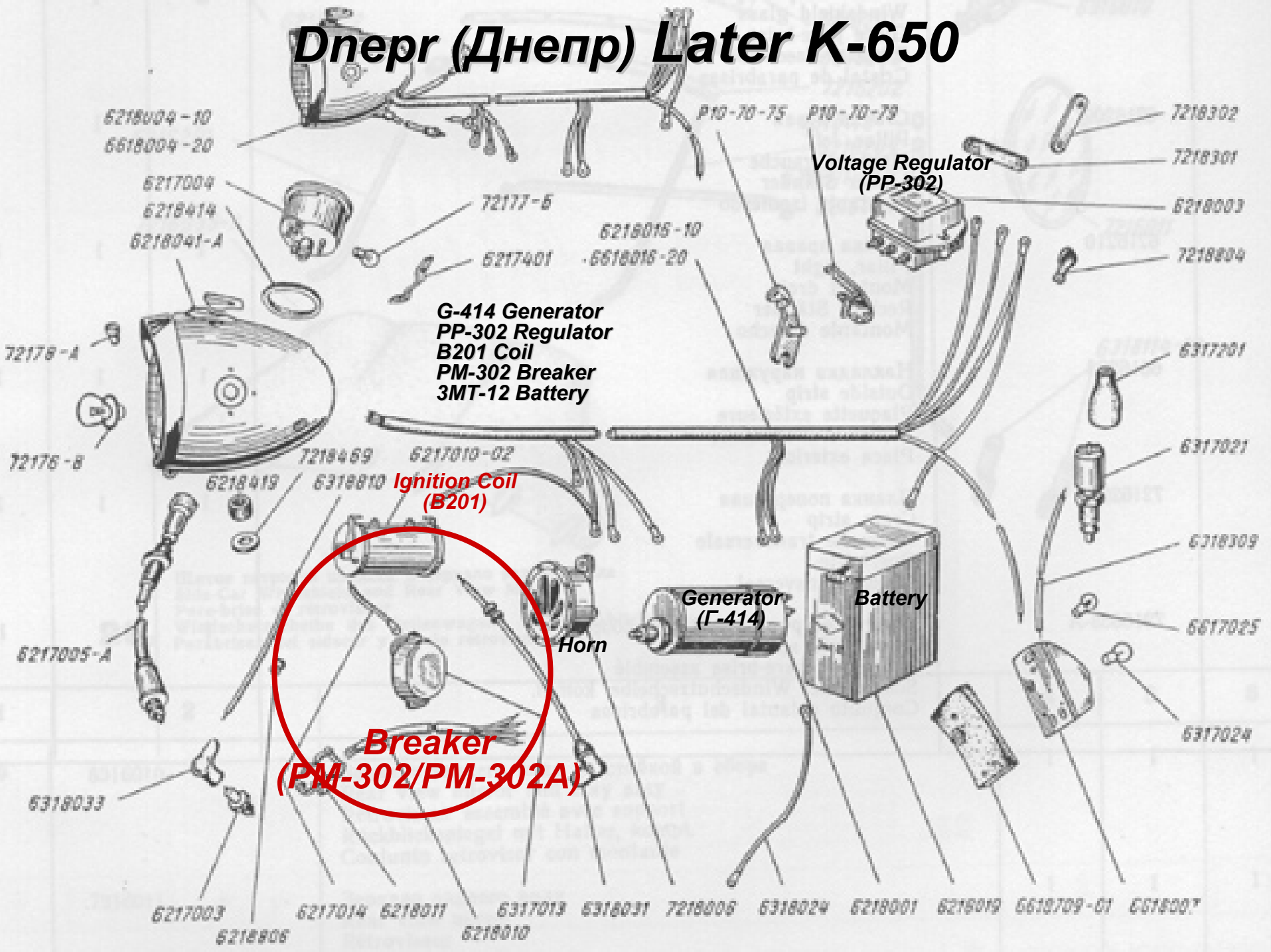
with PP-302 Regulator PM-302 Breaker and B201 Ignition Coil



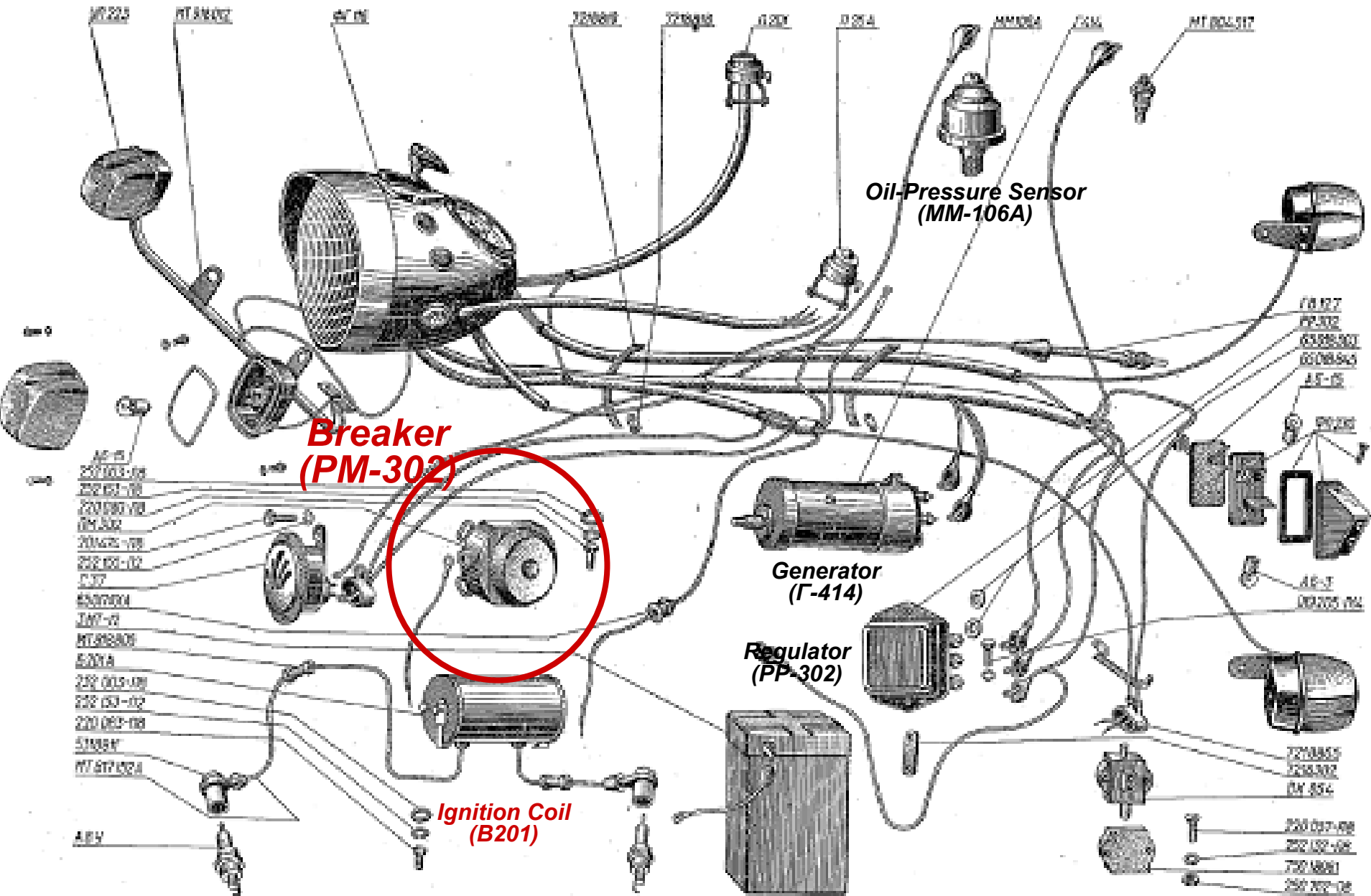
**Breaker (PM-302/PM-302A)**



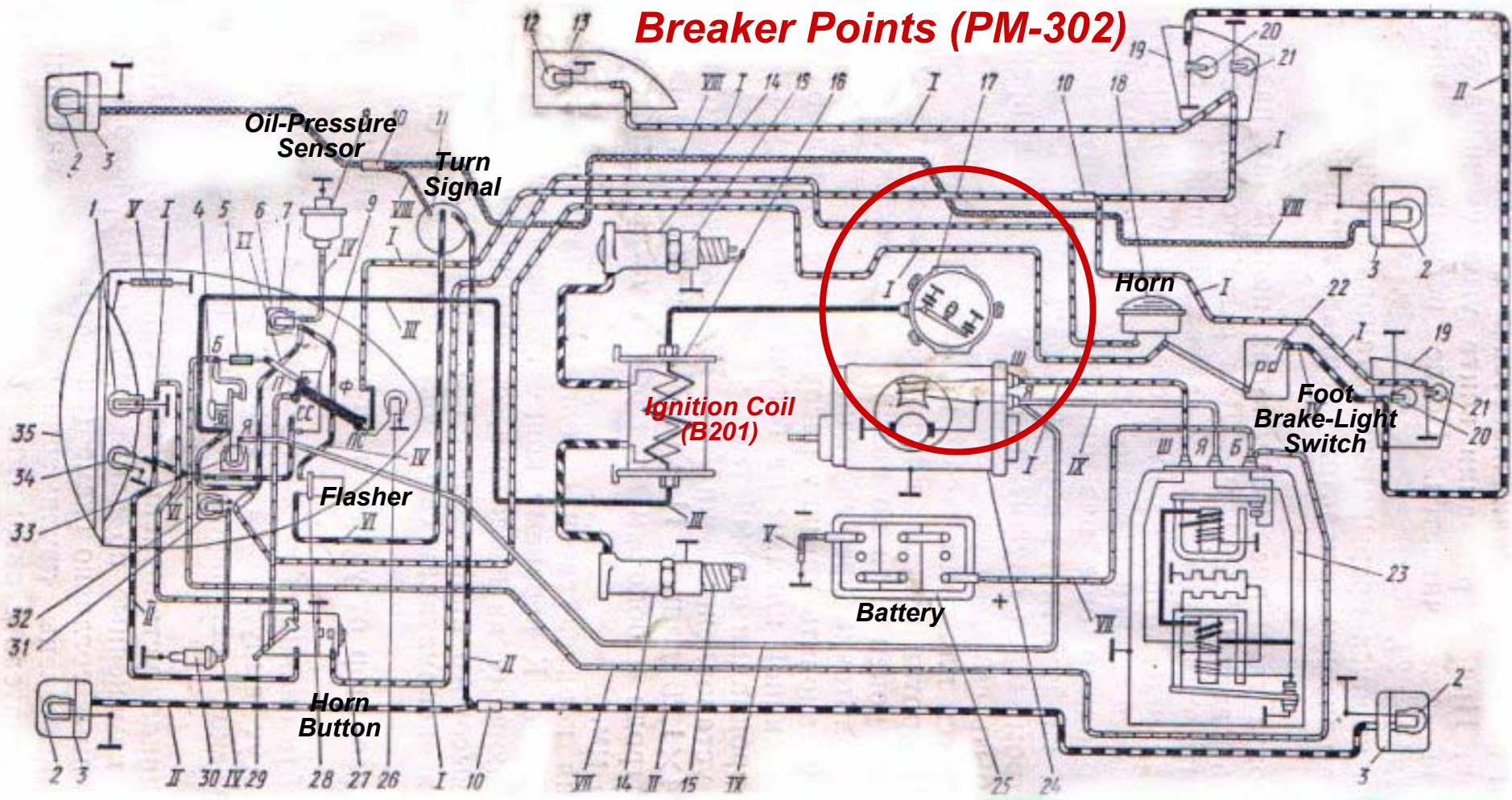
# Днепр (Днепр) Later K-650



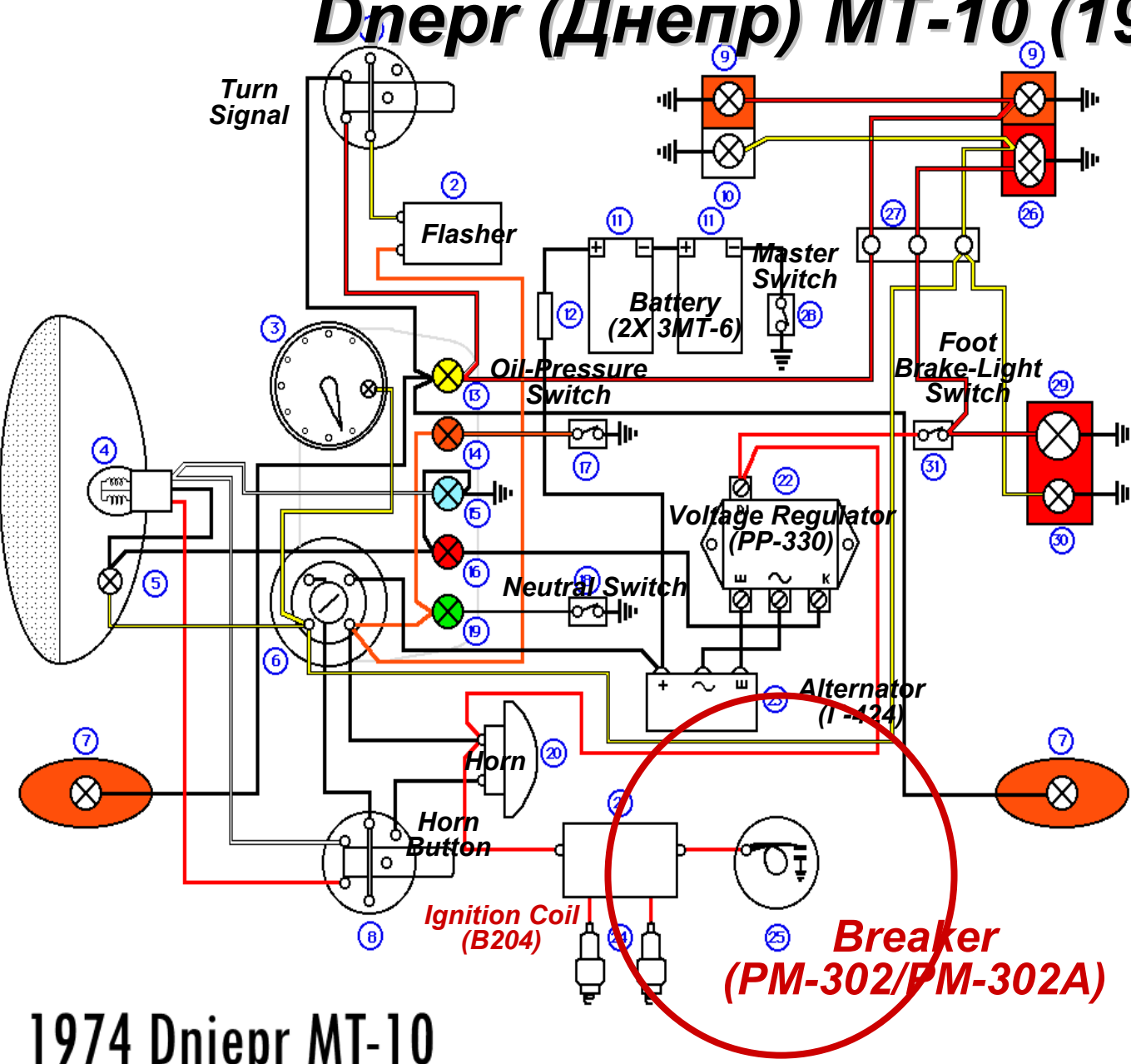
# Днепр (Днепр) МТ-9 with Automatic Control of Firing Angle (B201A Ignition Coil and PM-302 Breaker)



# Dnepr (Днепр) MT-9: Automatic Control of Firing Angle (B201A Ignition Coil and PM-302 Breaker)



# Днепр (Днепр) МТ-10 (1974)

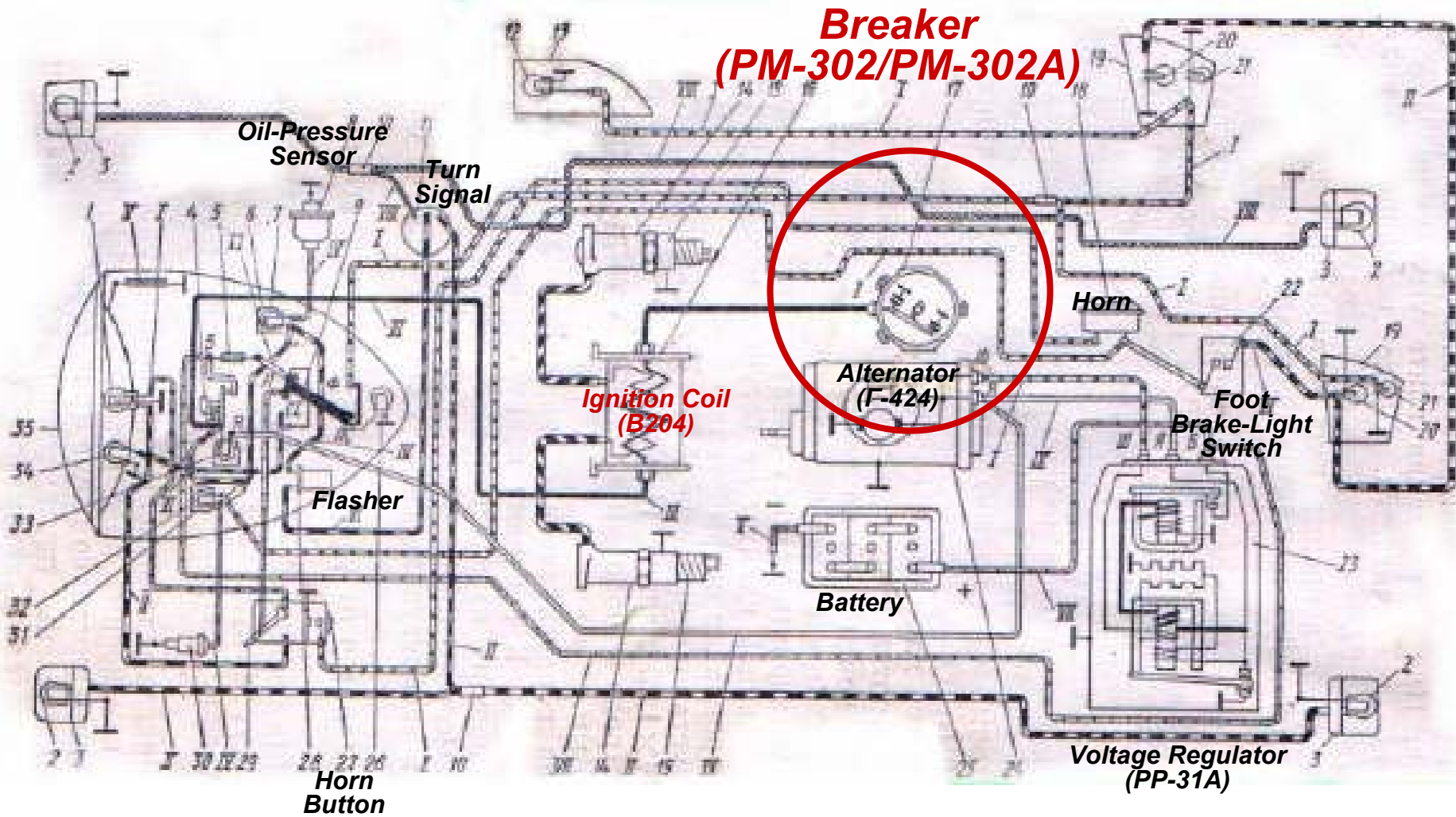


- 1. Turn Signal Switch
- 2. Turn Signal Flasher
- 3. Instrument Illumination
- 4. Headlight
- 5. Parking light
- 6. Ignition Switch
- 7. Front Left Turn Signal - Bike
- 8. High Beam Switch
- 9. Right Turn Signal - Sidecar
- 10. Front Right Turn Signal - Bike
- 11. Battery
- 12. Fuse
- 13. Turn Signal 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

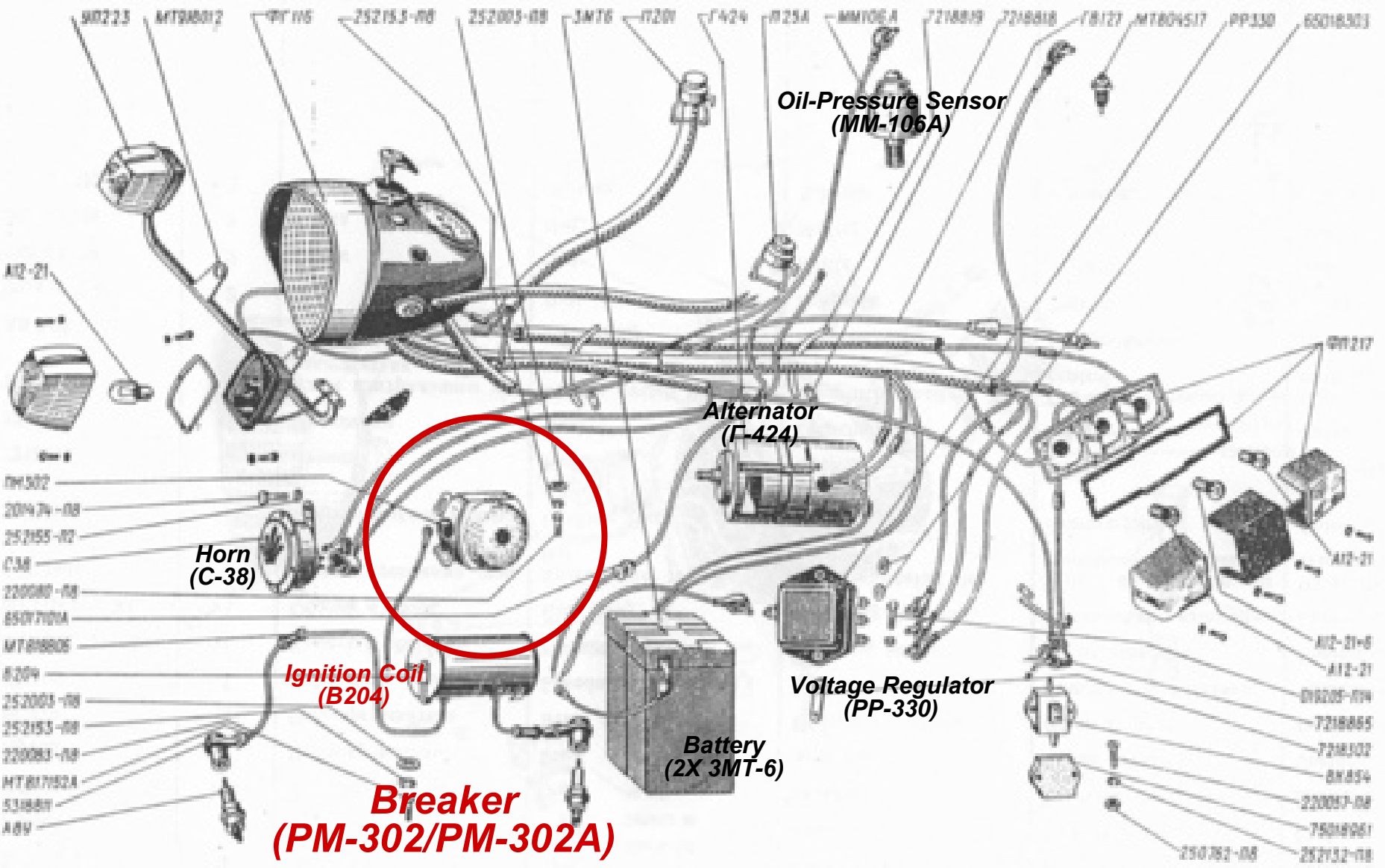
1974 Dniepr MT-10

**Breaker  
(PM-302/PM-302A)**

# Днепр (Днепр) МТ-10

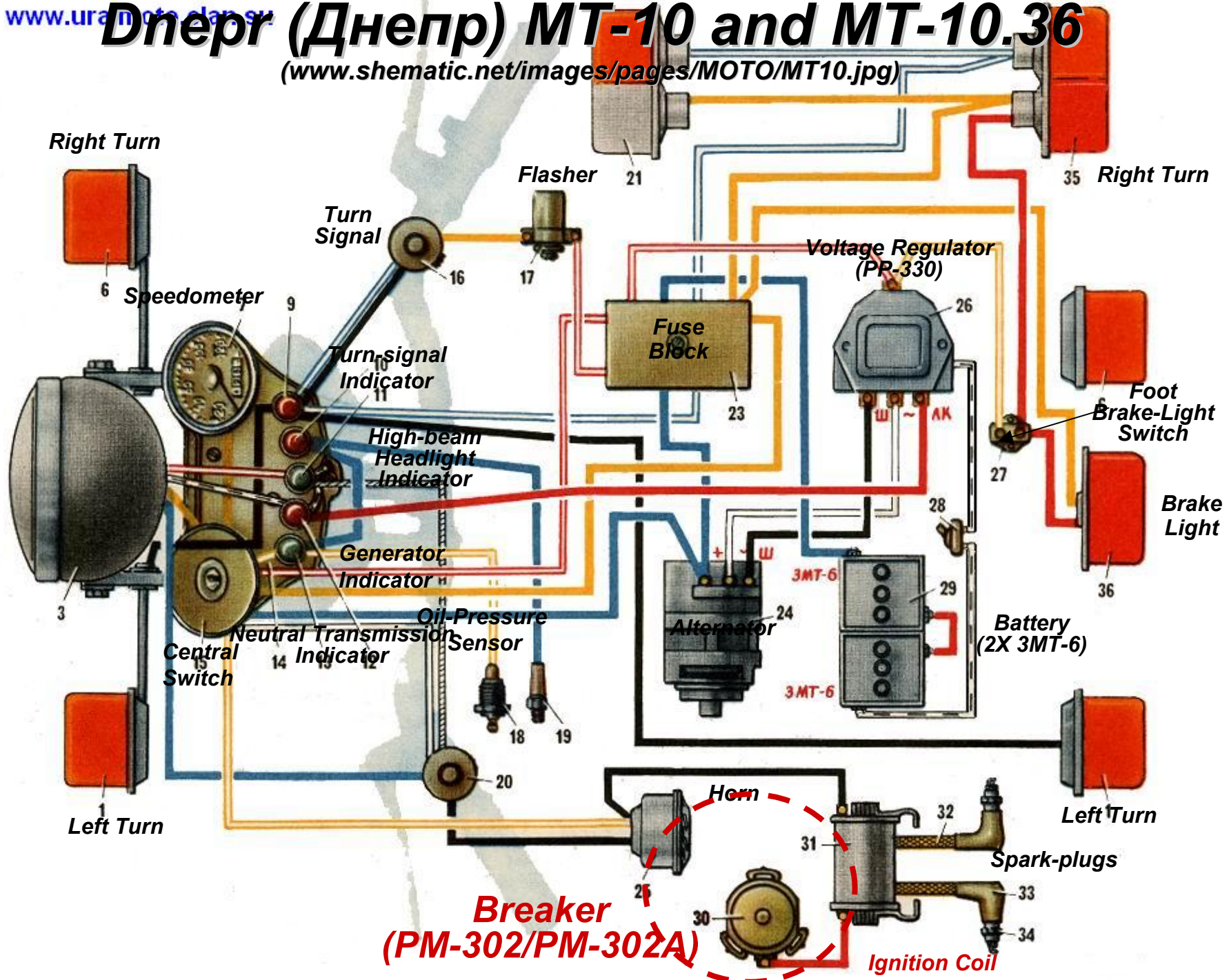


# Днепр (Днепр) МТ-10



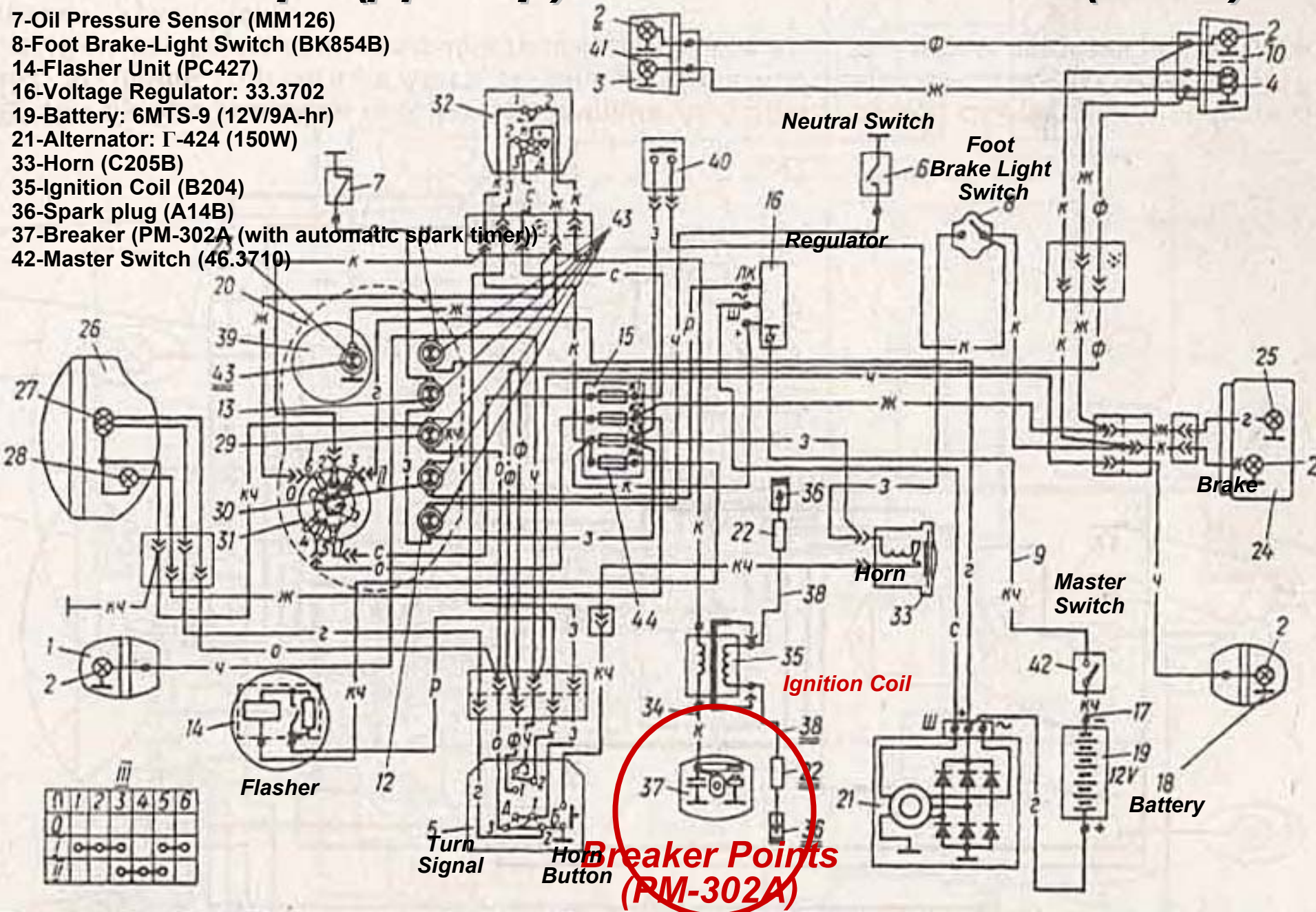
# Днепр (Днепр) MT-10 and MT-10.36

(www.schematic.net/images/pages/MOTO/MT10.jpg)



# Днепр (Днепр) МТ-11 and МТ-16 (1992)

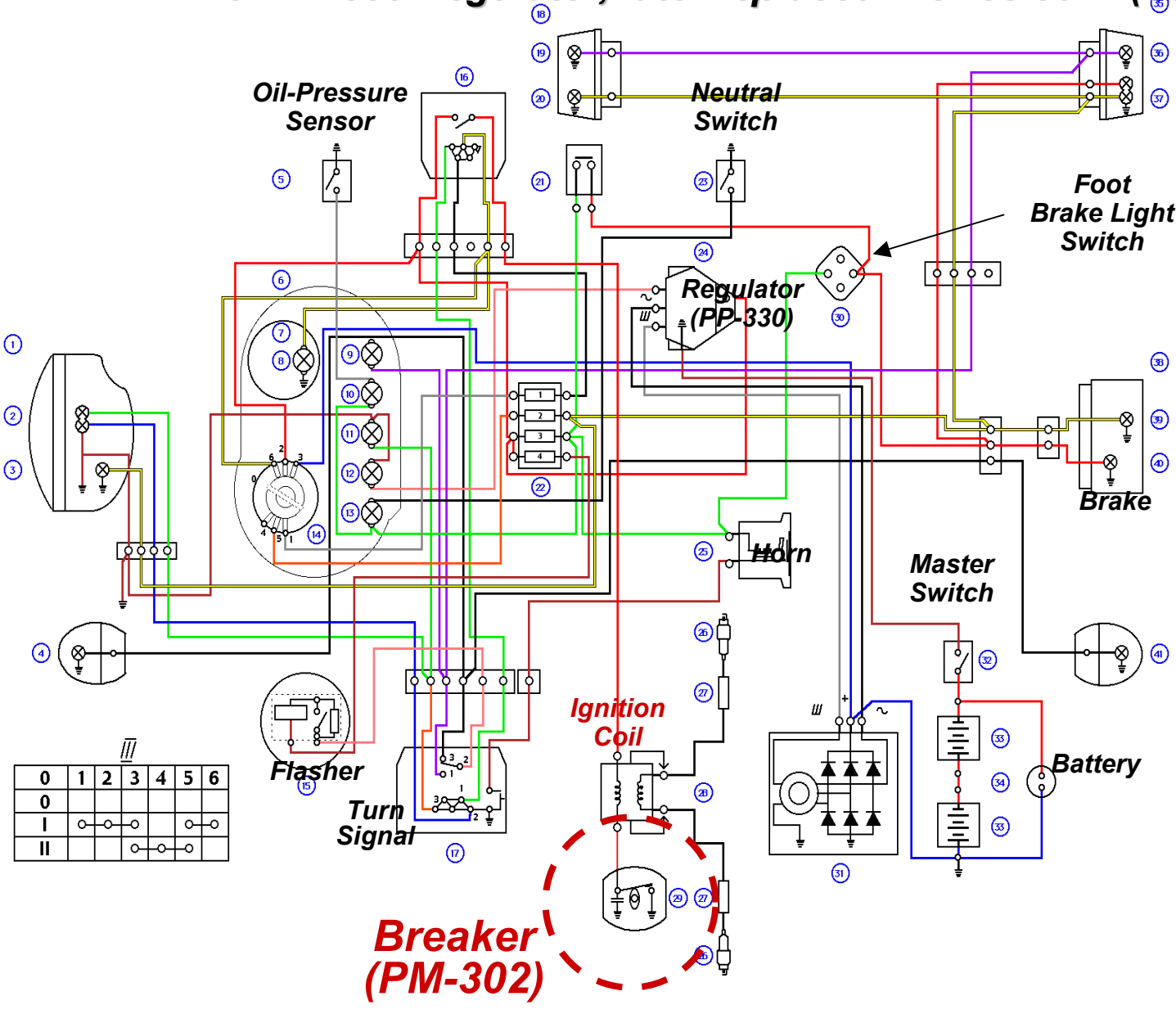
- 7-Oil Pressure Sensor (MM126)
- 8-Foot Brake-Light Switch (BK854B)
- 14-Flasher Unit (PC427)
- 16-Voltage Regulator: 33.3702
- 19-Battery: 6MTS-9 (12V/9A-hr)
- 21-Alternator: Г-424 (150W)
- 33-Horn (C205B)
- 35-Ignition Coil (B204)
- 36-Spark plug (A14B)
- 37-Breaker (PM-302A (with automatic spark timer))
- 42-Master Switch (46.3710)





# Dnepr (Днепр) Early MT-11 and MT-16

with PP-330 Regulator, later replaced with 33.3072 (solid-state)



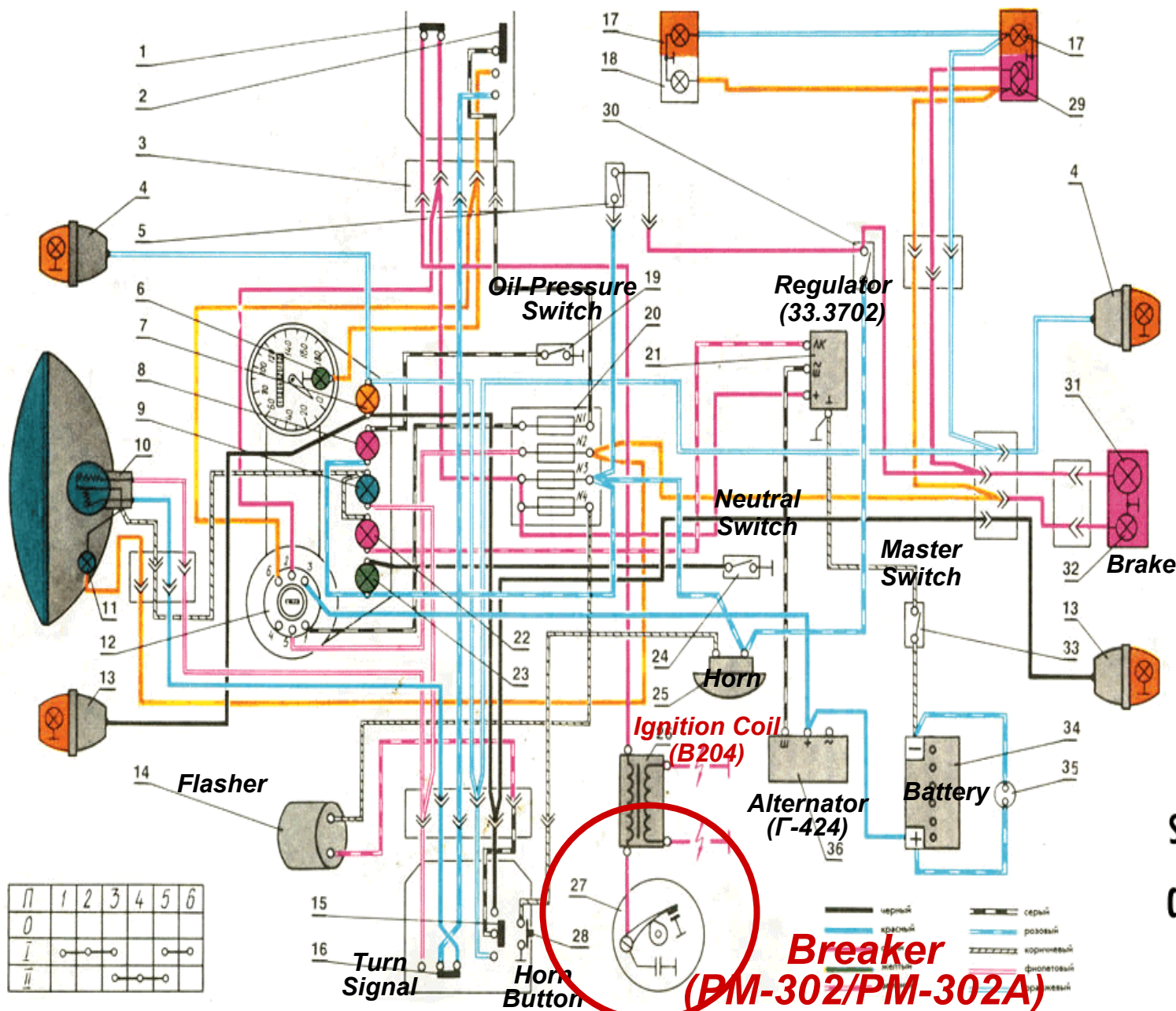
1. Headlamp
2. Hi/Lo beam bulb 45W/40W
3. Parking light
4. Left front turn signal
5. Oil pressure switch
6. Dashboard
7. Speedometer
8. Speedometer light
9. Turn signal indicator
10. Oil pressure indicator
11. High beam indicator
12. Generator indicator
13. Neutral indicator
14. Ignition switch
15. Flasher
16. Right handlebar controls
17. Left handlebar controls
18. Front sidecar lamp
19. Front left turn signal light
20. Front sidecar running light
21. Hand brake stop signal switch
22. Fuse block
23. Neutral switch
24. Voltage regulator PP330
25. Horn
26. Spark plug
27. Noise suppressor
28. Ignition coil
29. Points
30. Rear stop light switch
31. Generator
32. Battery disconnect switch
33. Storage battery
34. Socket 47K
35. Rear sidecar lamp
36. Right rear turn signal bulb
37. Sidecar position and brake light
38. Motorcycle rear lamp
39. License plate light
40. Motorcycle brake light
41. Left rear turn signal

	0	1	2	3	4	5	6
0							
I	○	○	○	○			○
II					○	○	

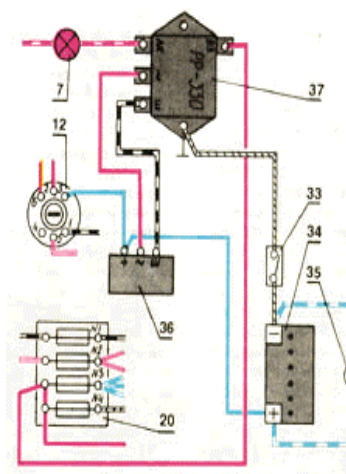
**Breaker (PM-302)**

# Днепр (Днепр) MT-11, MT-14 and MT-16

(showing replacement of PP-330 Regulator with the Solid-State 33.3702)



Older Models:  
PP-330



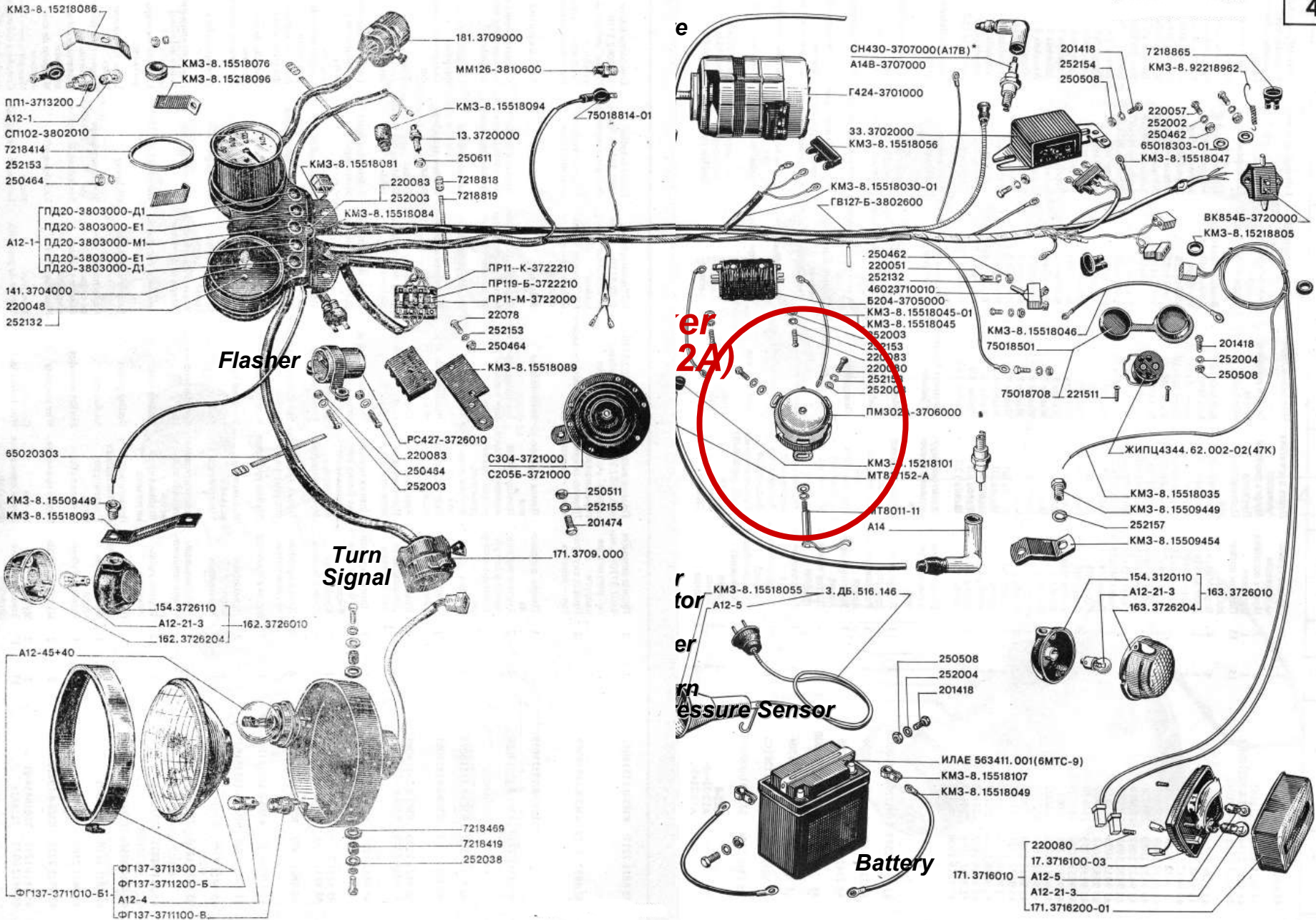
schemat instalacji  
do Dniepra MT-11,  
14 i 16

П	1	2	3	4	5	6
0						
I	⊗	⊗	⊗	⊗	⊗	⊗
II	⊙	⊙	⊙	⊙	⊙	⊙

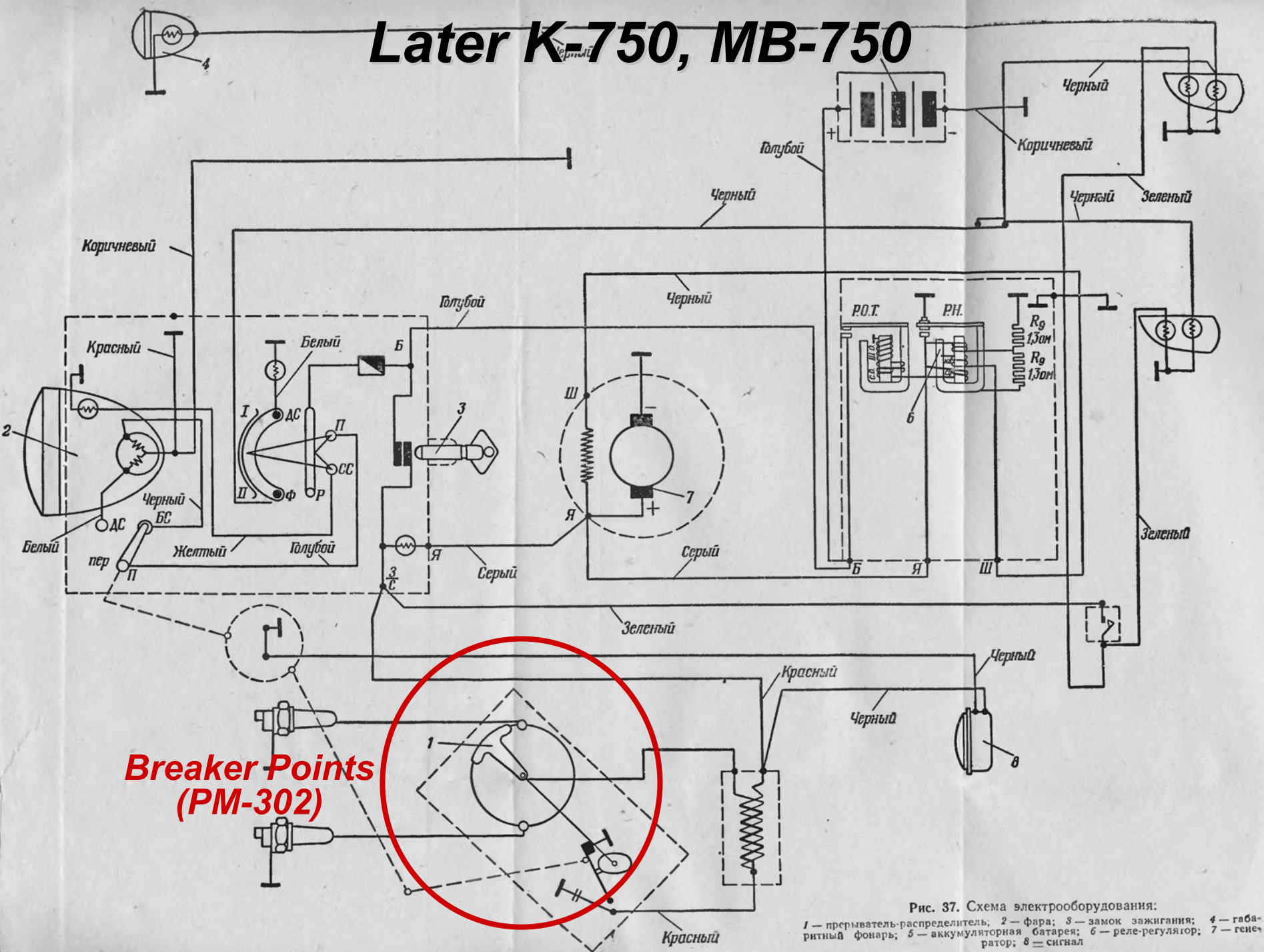
— черный — серый  
— красный — розовый  
— желтый — коричневый  
— фиолетовый — белый

**Breaker (PM-302/PM-302A)**

# Днепр (Днепр) МВ-650, МТ-11 and МТ-16



# Later K-750, MB-750



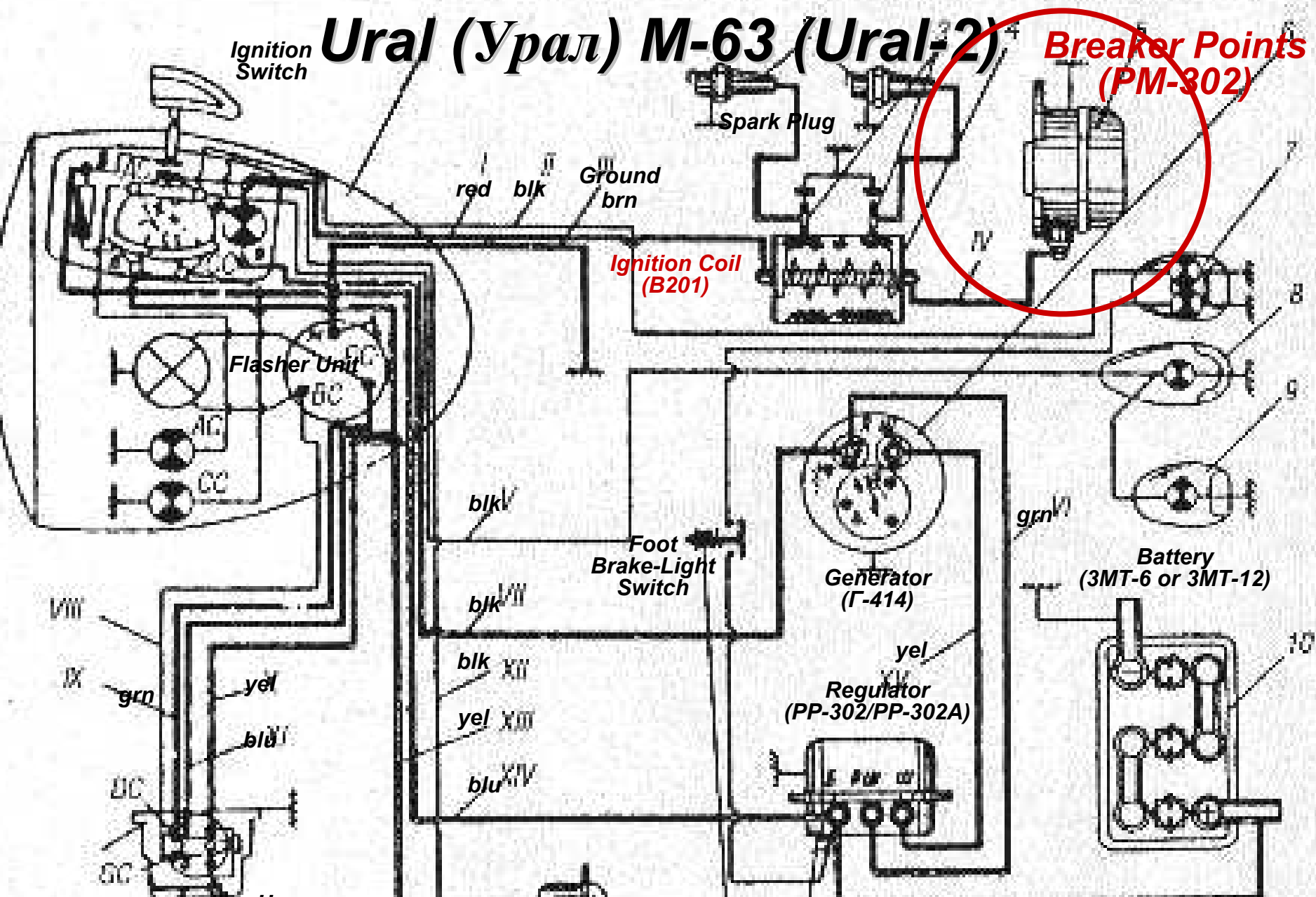
**Breaker Points  
(PM-302)**

Рис. 37. Схема электрооборудования:

- 1 — прерыватель-распределитель; 2 — фара; 3 — замок зажигания; 4 — габаритный фонарь; 5 — аккумуляторная батарея; 6 — реле-регулятор; 7 — генератор; 8 — сигнал

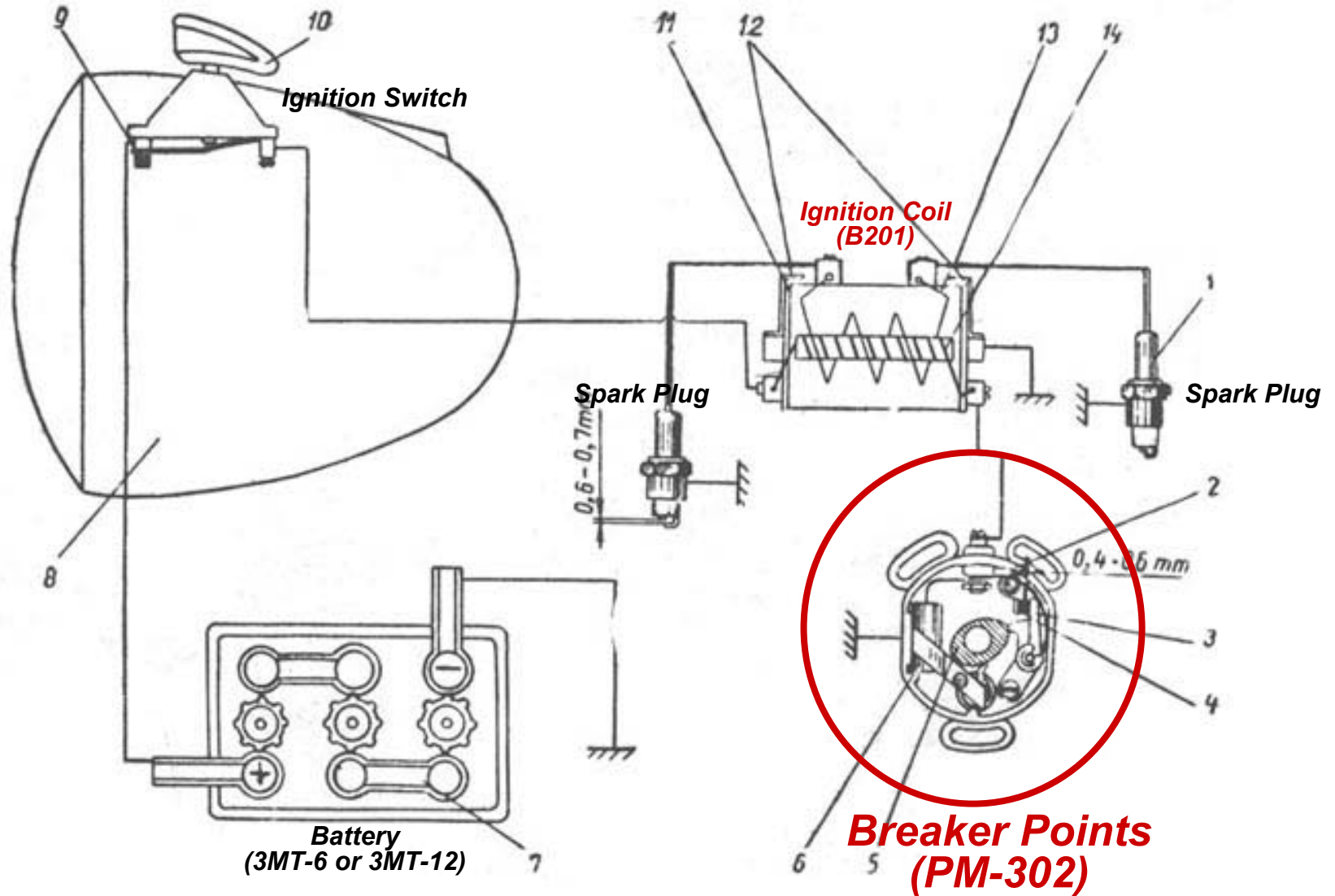
# Ural (Урал) M-63 (Ural-2)

**Breaker Points (PM-302)**



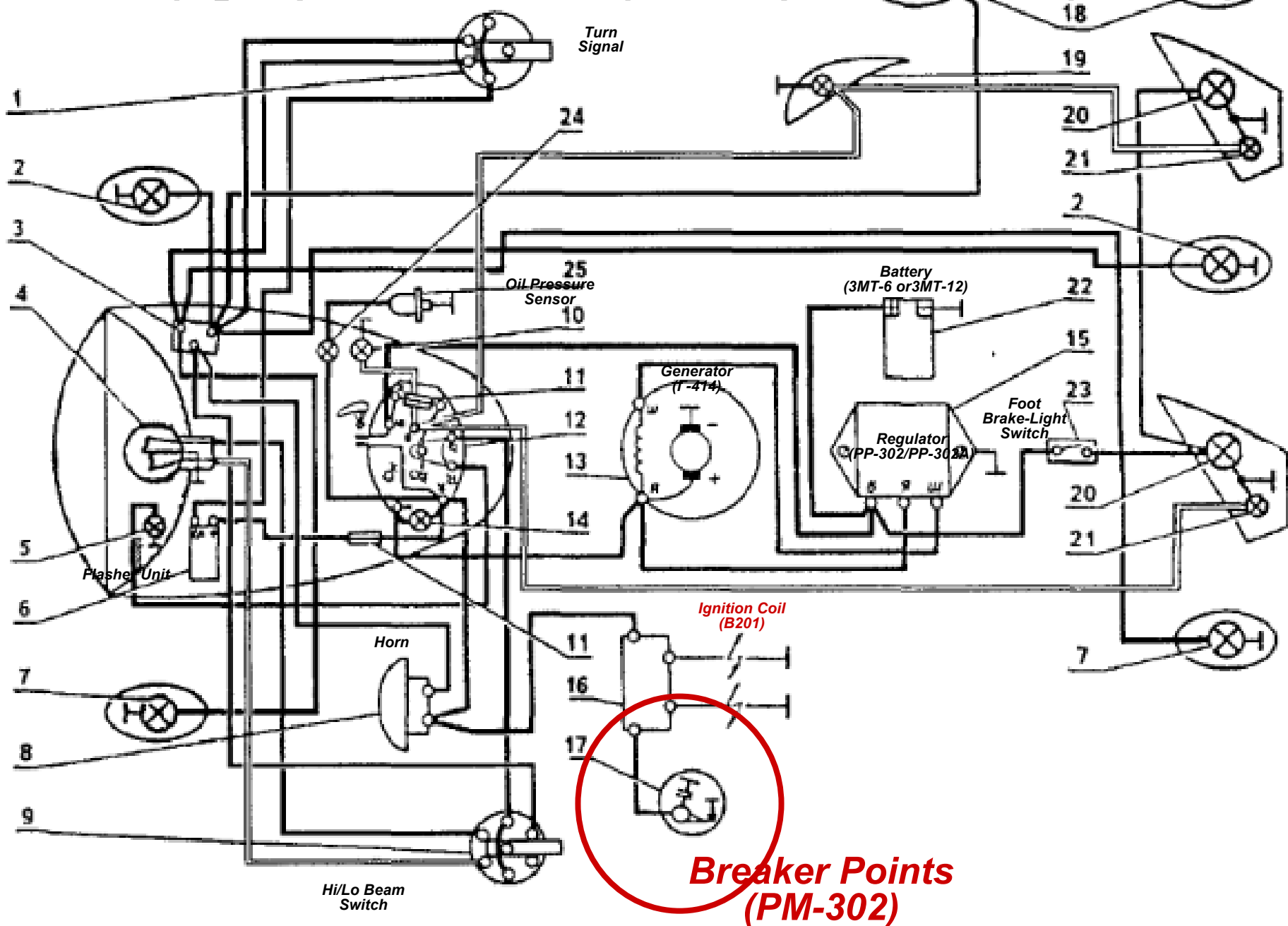
1 - lamp, 2 - an incendiary spark, 3 - spark gap, 4 - ignition coil, 5 - breaker with automatic ignition advance, 6 - generator, 7 - taillight motor, 8 - front position lamp sidecar; 9 - taillight sidecar; 10 - battery, 11 - relay-regulator, 12 - stop light switch; 13 - signal, 14 - light switch and button signal I-to the ignition coil (red); II-bike to the lamp (black); III-on "ground" (brown); IV-to-breaker (red); V - to sidecar lamp (black); VI - from generator to terminal; JS relay-regulator (green); VII-I to generator terminal (green); VIII-filament lamp to dim light (black); IX-filament lamp to beam (green); X-button on signal to the lamp (yellow); XI - to light switch (blue); XII-to-signal ratio (black); XIII - the signal to lamp (yellow); XIV-B switch to time-control (blue); XV - from relay controller to terminal W generator (brown); XVI-in battery (blue)

# Ural (Урал) M-63 (Ural-2)



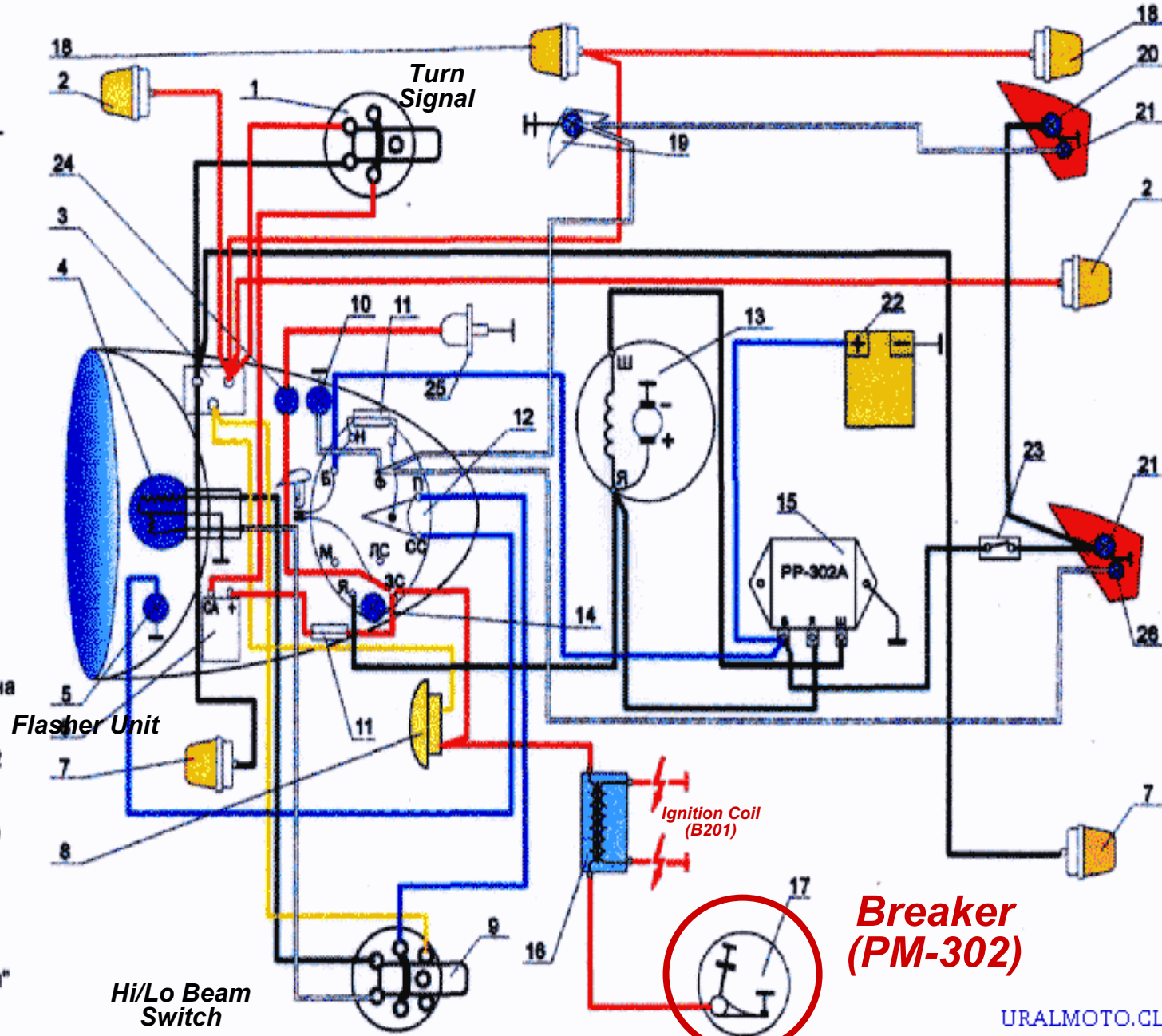
1 - sparkplug, 2 - circuit breaker, 3 - hammer breaker, 4 - anvil breaker, 5 - cam plugs, 6 - condenser, 7 - battery, 8 - headlight, 9 - ignition contact, 10 - ignition key, 11 - ignition coil, 12 - spark gap, 13 - secondary winding, 14 - primary winding

# Ural (Урал) M-62, M-63 (Ural-2) and M-66 (Ural-3)



# Ural (Урал) M-62, M-63 (Ural-2) and M-66 (Ural-3)

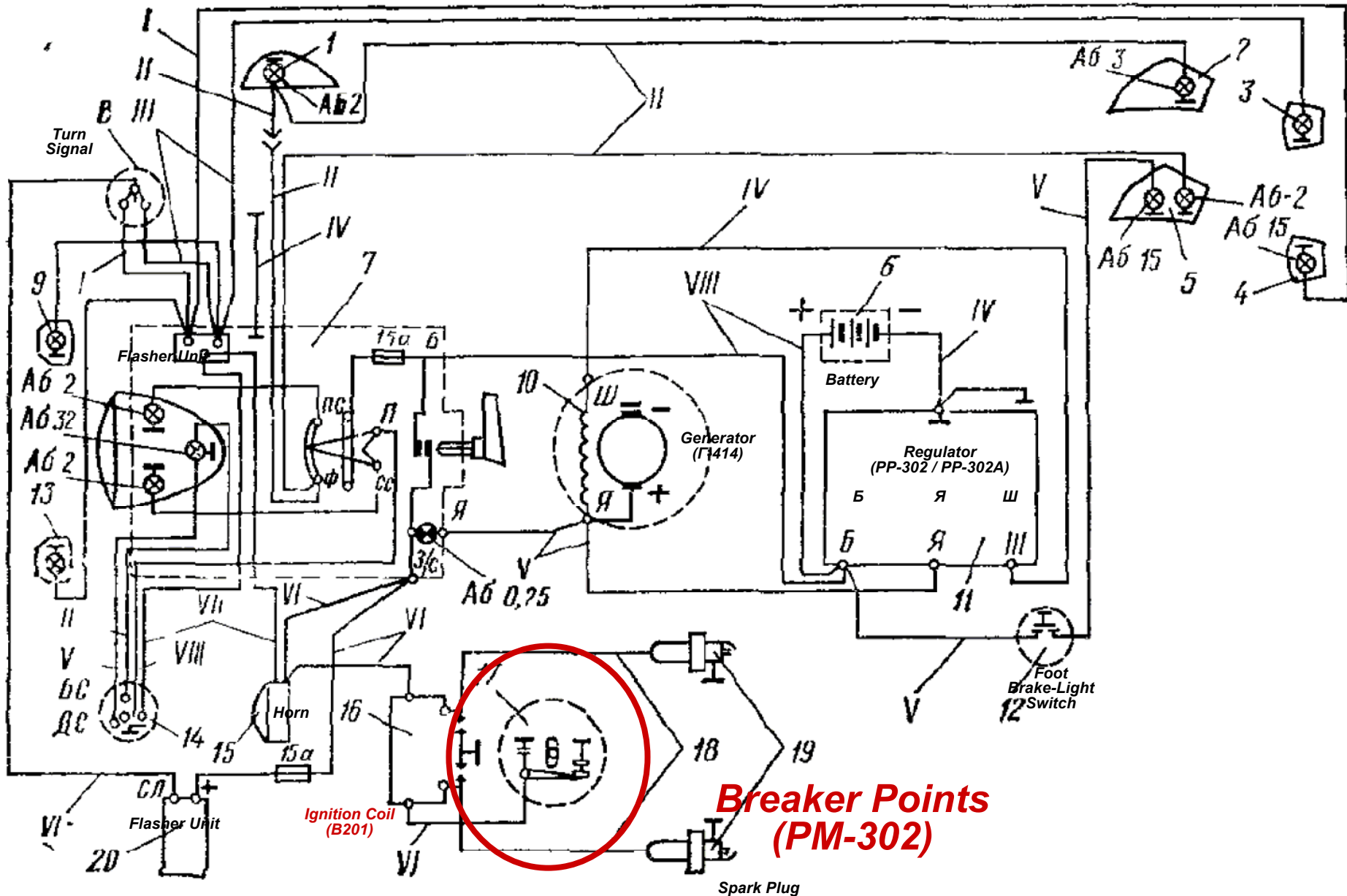
1. Переключатель указателей поворотов П-201
2. Правые указатели поворотов с лампами А6-15 на мотоцикле-одиночке
3. Соединительная колодка
4. Лампа головного света фары А6-32+32
5. Лампа стояночного света фары А6-2
6. Реле-прерыватель указателей поворотов
7. Левые указатели поворотов с лампами сА6-15
8. Звуковой сигнал С-37А
9. Переключатель света с кнопкой звукового сигнала П-200
- Ю. Лампа подсветки шкалы спидометра А6-2
11. Предохранитель 15А
12. Центральный переключатель
13. Генератор Г-414
14. Контрольная лампа работы генератора А6-0,25
15. Реле-регулятор РР-302А
16. Катушка зажигания Б-201
17. Прерыватель ПМ-302
18. Правые указатели поворотов с лампами А6-15 (на коляске)
19. Передний габаритный фонарь на коляске с лампой А6-2
20. Лампы стоп-сигнала А6-15
21. Задние габаритные лампы А6-2
22. Аккумулятор ЗМТ-6
23. Выключатель стоп-сигнала
24. Контрольная лампа аварийного давления масла А6-2
25. Датчик давления масла.



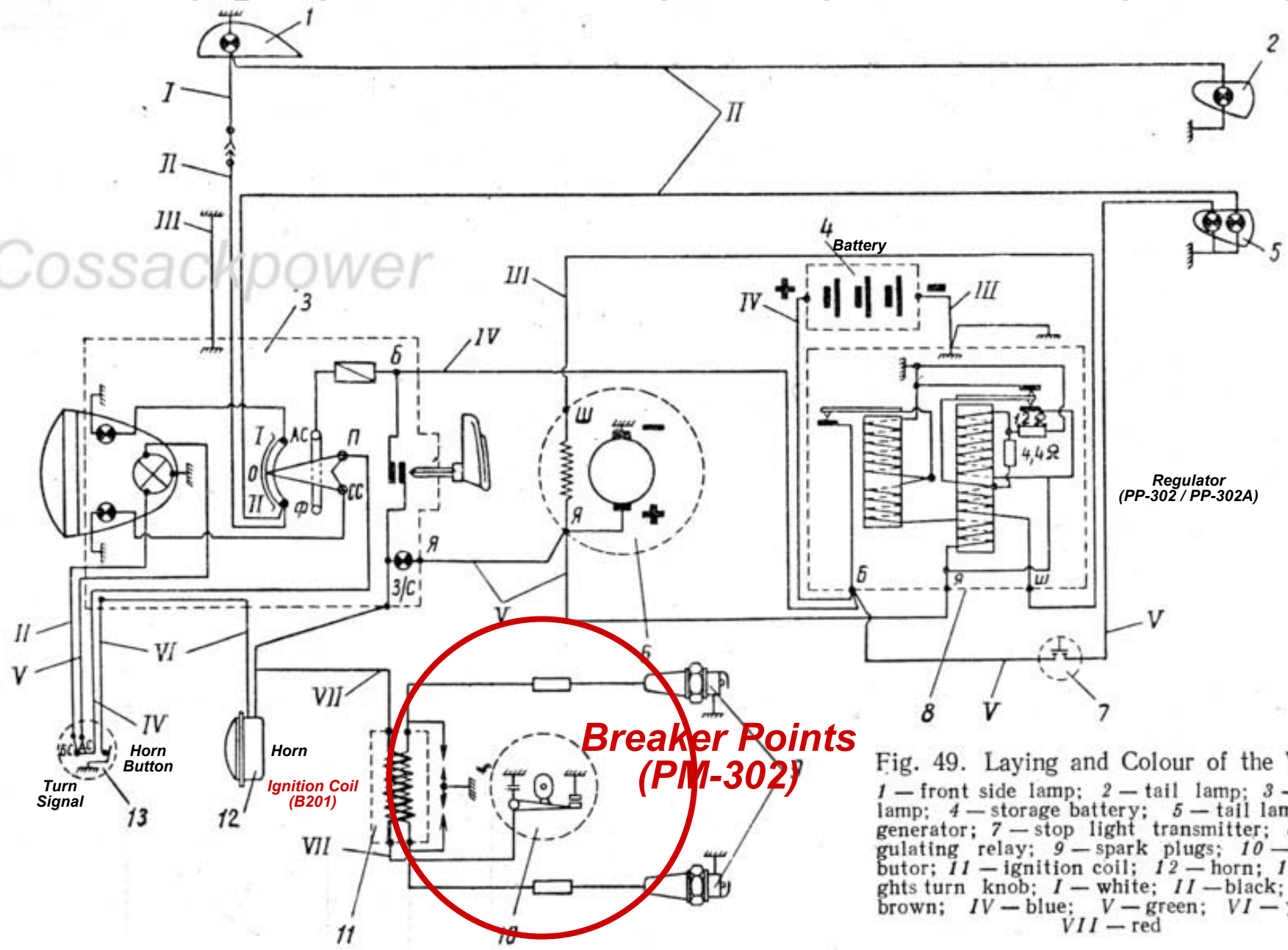
Детали поз. 24 и 25 - только на мотоциклах "Днепр", указателями поворотов оснащены только "Урал" М-66 и "Днепр" МТ-9.



# Ural (Урал) M-63 (Ural-2) and M-66 (Ural-3)



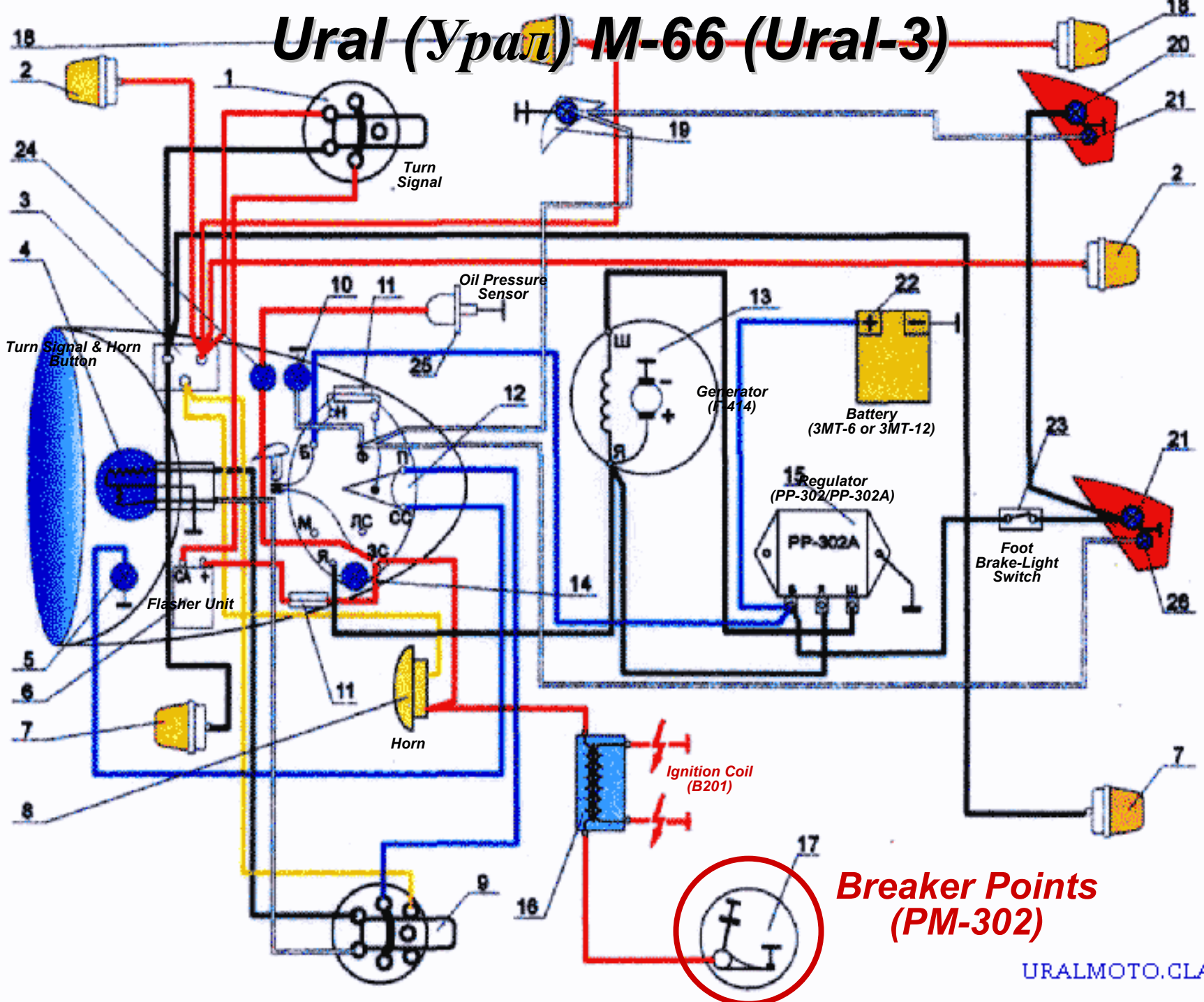
# Ural (Урал) M-62, M-63 (Ural-2) and M-66 (Ural-3)



**Breaker Points  
(PM-302)**

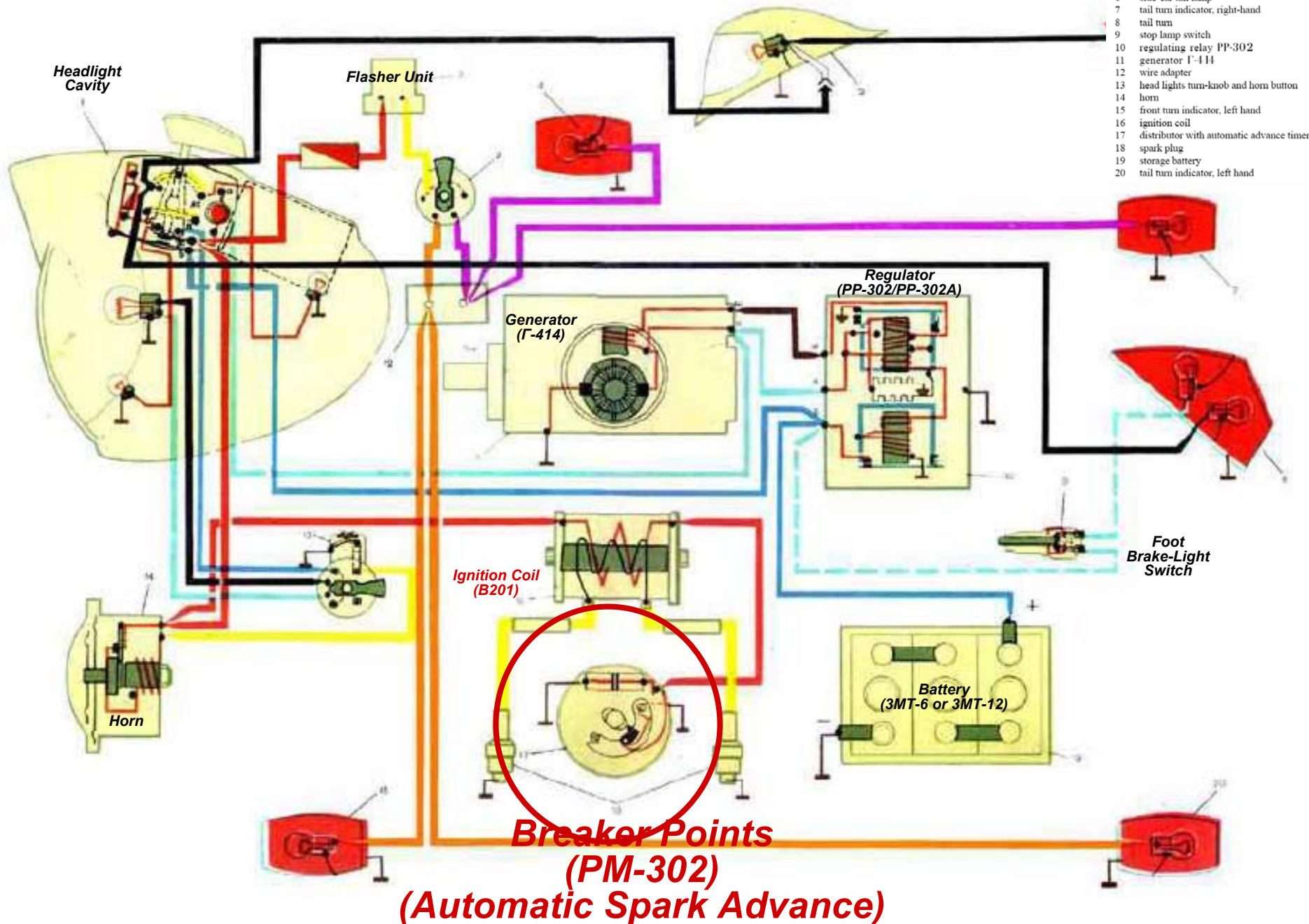
Fig. 49. Laying and Colour of the Wires:  
 1 - front side lamp; 2 - tail lamp; 3 - headlamp; 4 - storage battery; 5 - tail lamp; 6 - generator; 7 - stop light transmitter; 8 - regulating relay; 9 - spark plugs; 10 - distributor; 11 - ignition coil; 12 - horn; 13 - lights turn knob; I - white; II - black; III - brown; IV - blue; V - green; VI - yellow; VII - red

# Ural (Урал) M-66 (Ural-3)



**Breaker Points  
(PM-302)**

# Ural (Урал) M-66 (Ural-3)



# Ural (Урал) M-67 and M-67.36

([www.schematic.net/images/pages/MOTO/M67.jpg](http://www.schematic.net/images/pages/MOTO/M67.jpg))

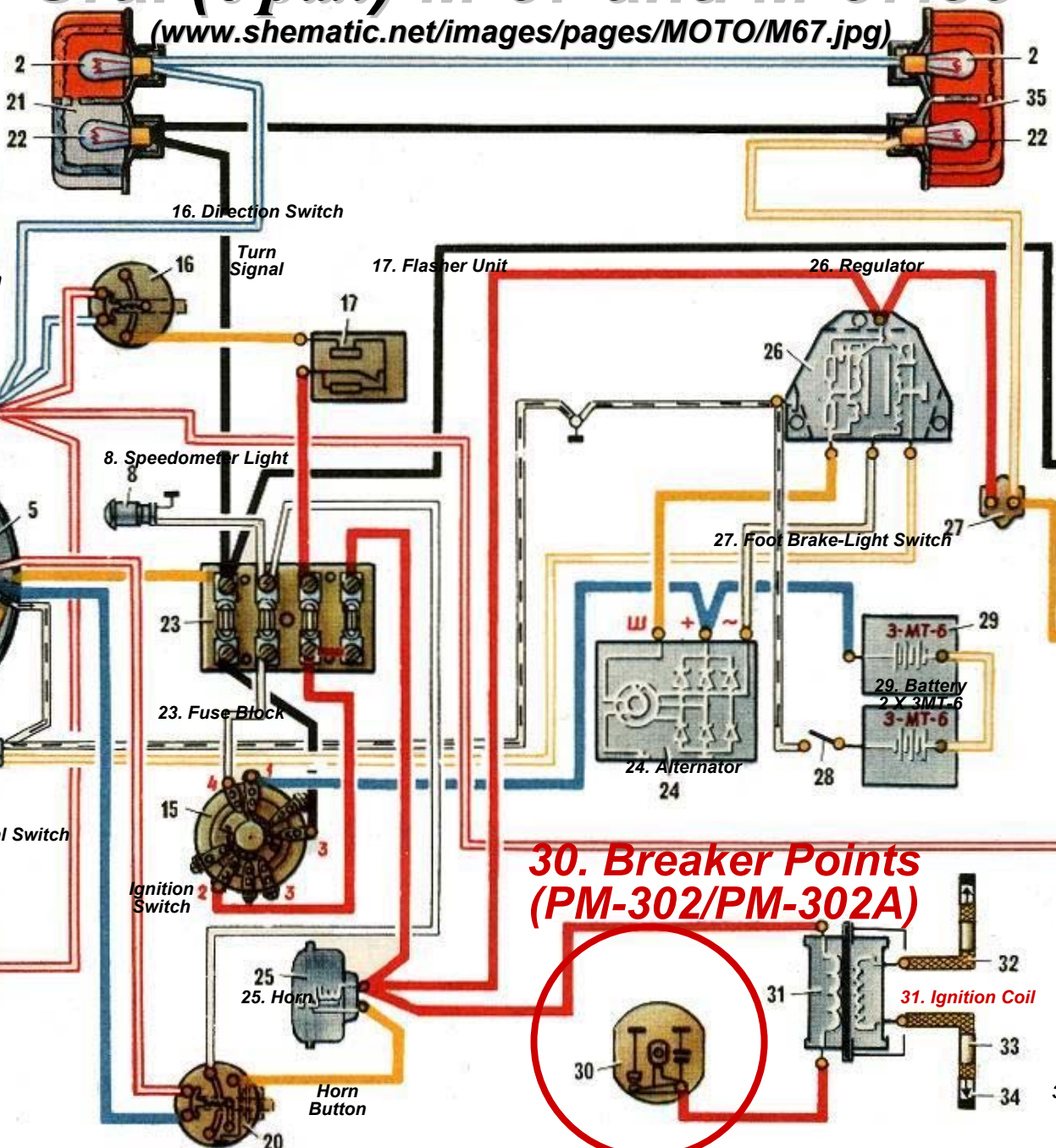
13. Neutral transmission indicator

6. Right Illuminated Direction Indicator

9. Turn-signal Indicator

12. Generator Indicator

1. Left direction indicator

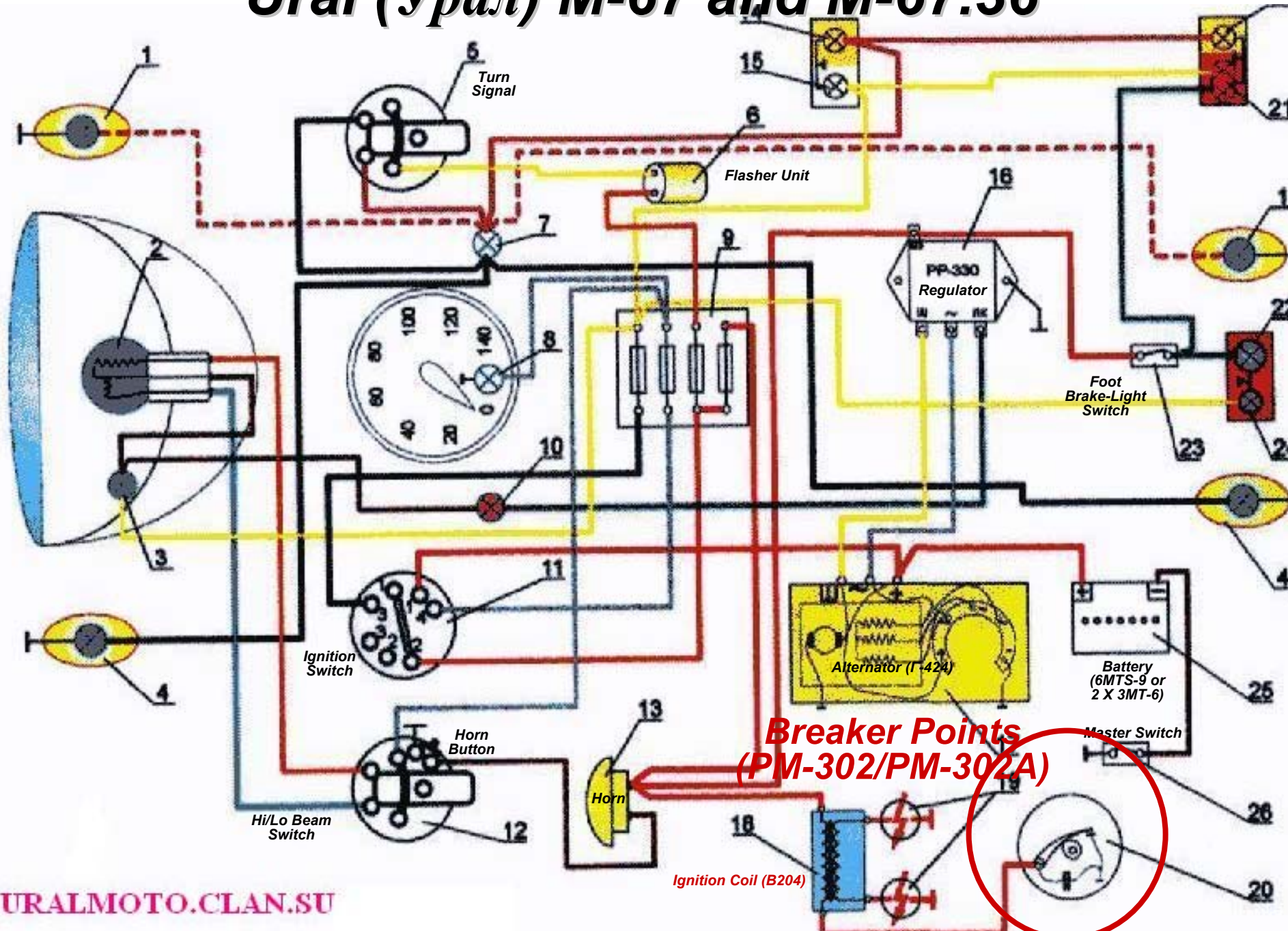


**30. Breaker Points (PM-302/PM-302A)**

1. Left direction indicator

34. Spark-plugs

# Ural (Урал) M-67 and M-67.36



**Breaker Points  
(PM-302/PM-302A)**

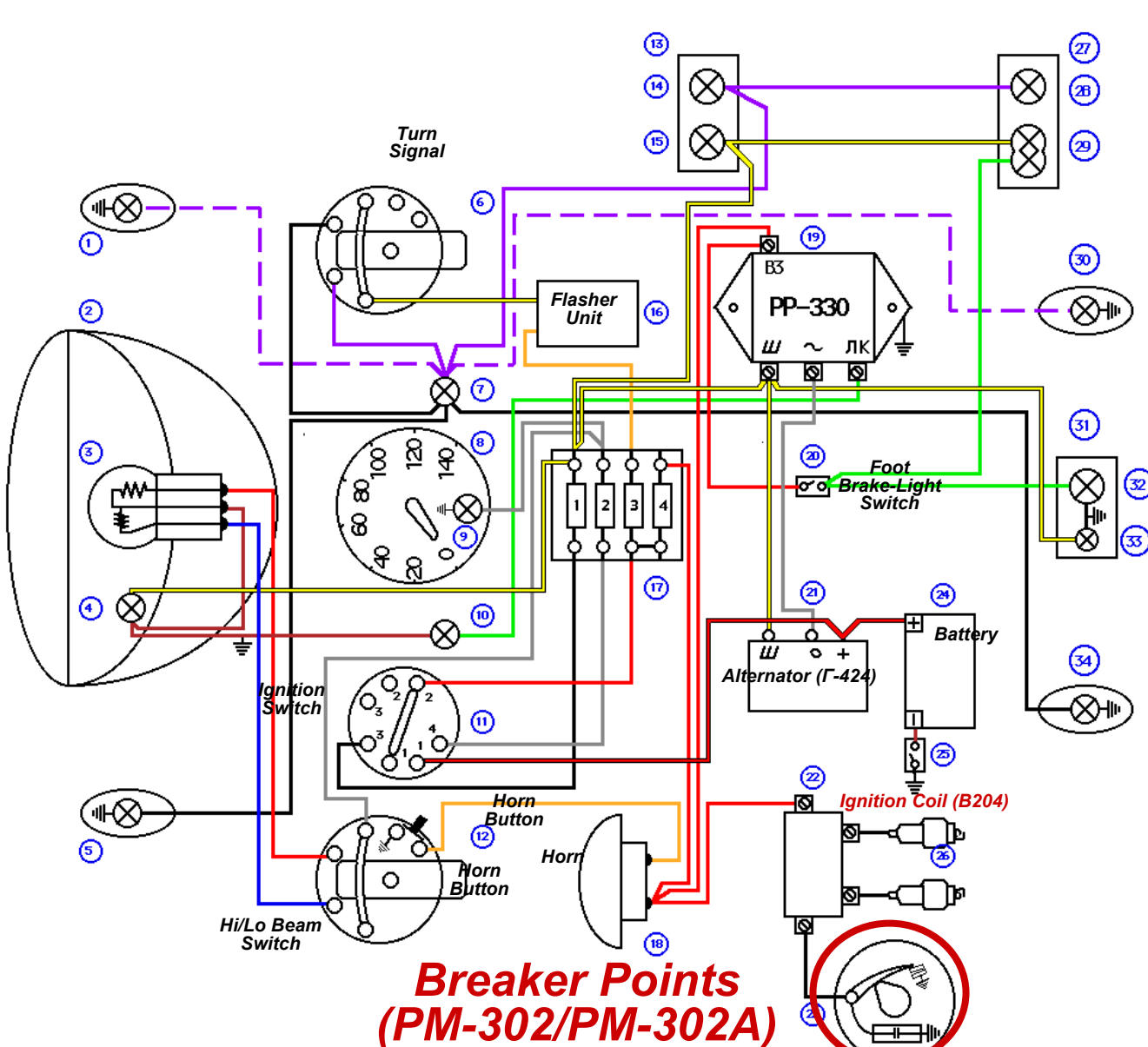
1974 M67-36

17 October 2017

Carl Allison

Absolutely no guaranty that wire colors are correct.

# Ural (Урал) M-67 and M-67.36

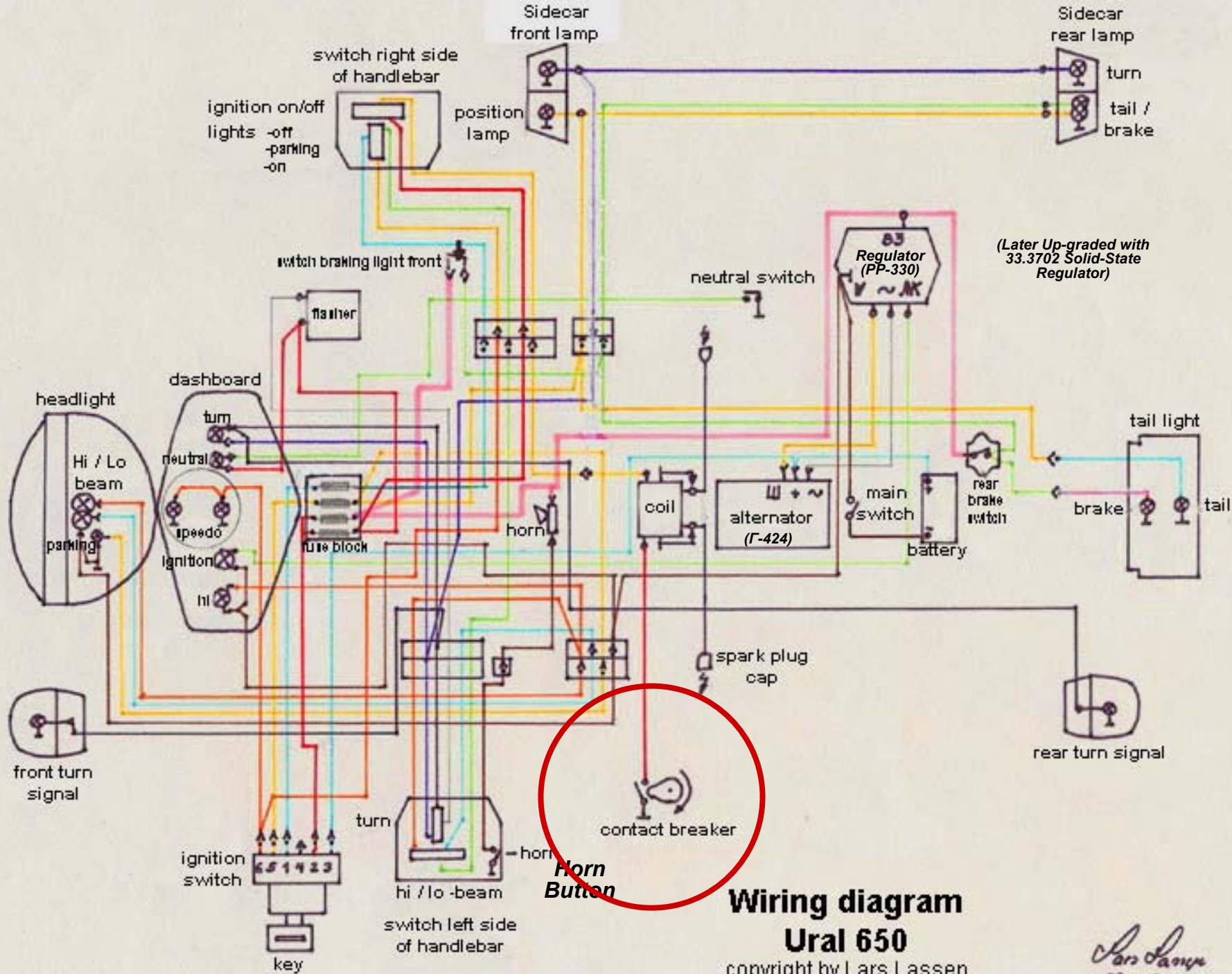


1. Right front turn indicator (sidecar not attached)
2. Headlight
3. Hi/Lo headlamp bulb
4. Parking lightbulb
5. Left front turn indicator
6. "Day/night" switch , Run/Stop switch
7. Highbeam ON indicator bulb of lamp
8. Speedometer
9. Speedometer light
10. Alternator warning light
11. Ignition switch
12. Light and turn indicator switch, horn button
13. Sidecar front light
14. Sidecar front side and parking light
15. Sidecar front running light
16. Flasher
17. Fuse block
18. Horn
19. Regulator
20. Rear brake light switch
21. Alternator
22. Ignition module
22. Spark plug
23. Points
24. Battery
25. Master Battery Switch\*
26. Spark plugs
27. Sidecar rear light
28. Sidecar rear side and parking light
29. Sidecar brake and taillight
30. Rear right turn indicator (sidecar not attached)
31. Motorcycle rear light
32. Motorcycle brake light
33. Motorcycle tail light
34. Rear left turn indicator

\* Deleted on electric start

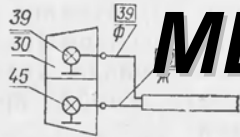
## Breaker Points (PM-302/PM-302A)



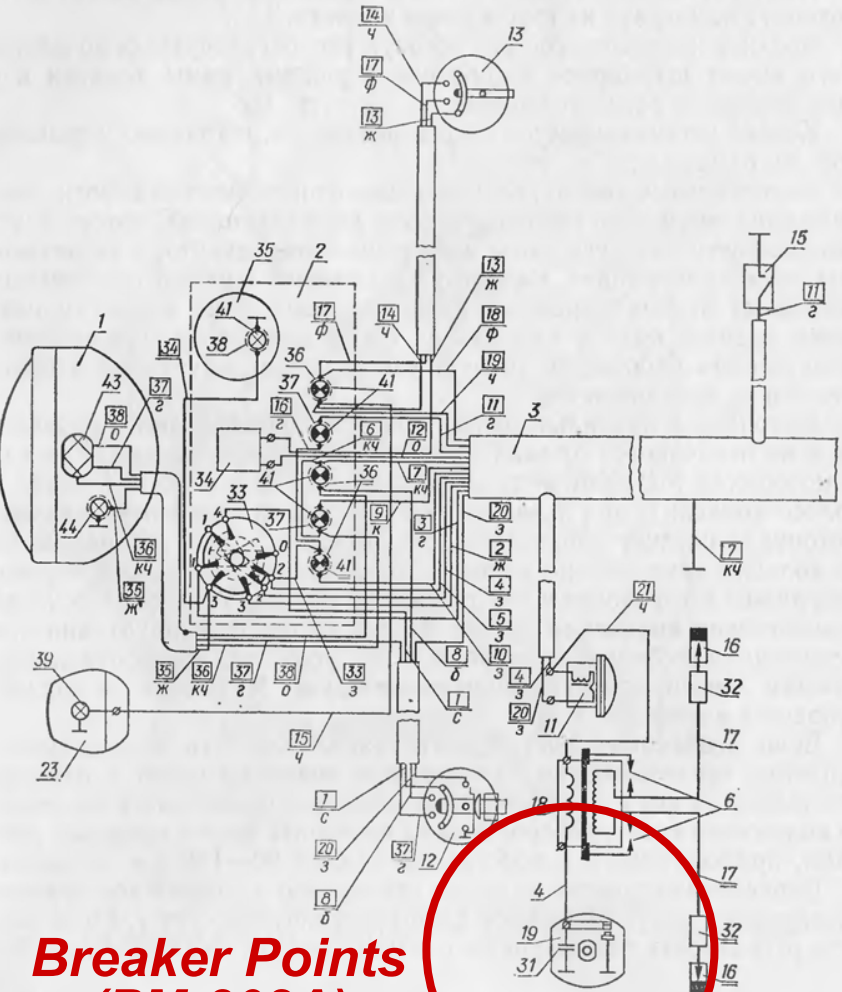
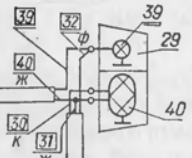


Lars Lassen  
29.12.93





# MB-650M



## Breaker Points (PM-302A)

1 — фара ФГ137; 2 — панель приборов; 3 — пучок проводов мотоцикла; 4 — провод телей ПР11-В; 6 — разрядники катушки зажигания; 7 — провод «массы» аккумулятора; 8 — пучок проводов выключателя сигнала торможения и задних фар; 9 — провод аккумулятора; 10 — генератор 1424; 11 — сигнал 304; 12 — перелка торможения ВК854; 15 — датчик аварийного давления масла ММ126; 16 — свеча 19 — прерыватель ПМ302А; 20 — аккумуляторная батарея ЗМТ6; 21 — реле-регулятор мотоцикла задний ФП246; 25 — блок предохранителей ПР11-В; 26 — пучок проводов коляски ФП219Б; 30 — фонарь передний коляски ПФ232Б; 31 — конденсатор прерыватель ВК857; 34 — реле-прерыватель РС427; 35 — спидометр СФ102; 36 — патрон лампы ПП1-200; 39 — лампа А12-21; 40 — лампа А12-21 + 6; 41 — лампа А12-8; 46 — штек-

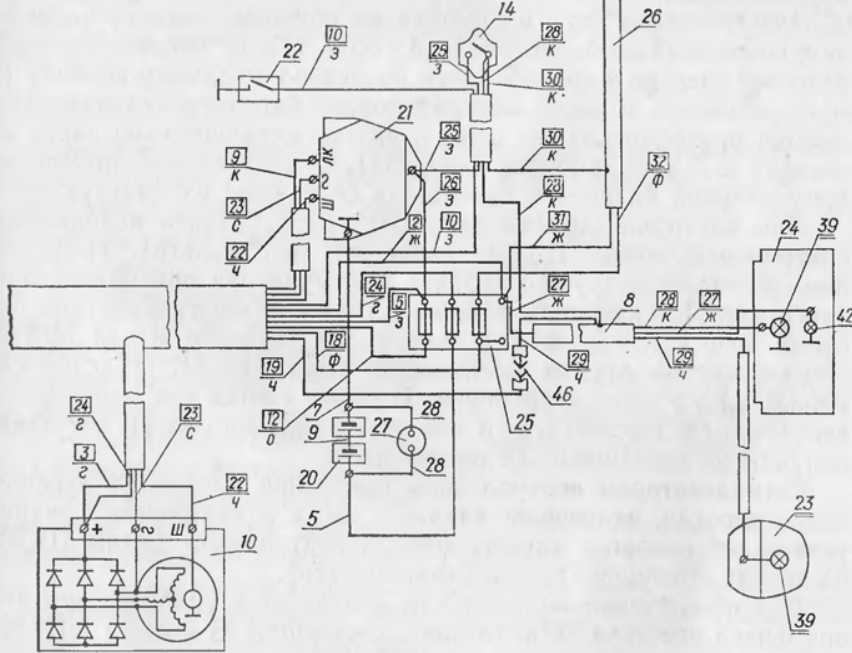


Схема коммутации центрального переключателя ВК857

Положение ключа		Обозначение клемм	Наименование клемм
III	0		
Зажигание		1-1	„+“ источника питания
Фара		2-2	Зажигание
Габаритные огни		3-3	Габаритные огни
„+“ источника питания		4	Фара

### электрооборудования:

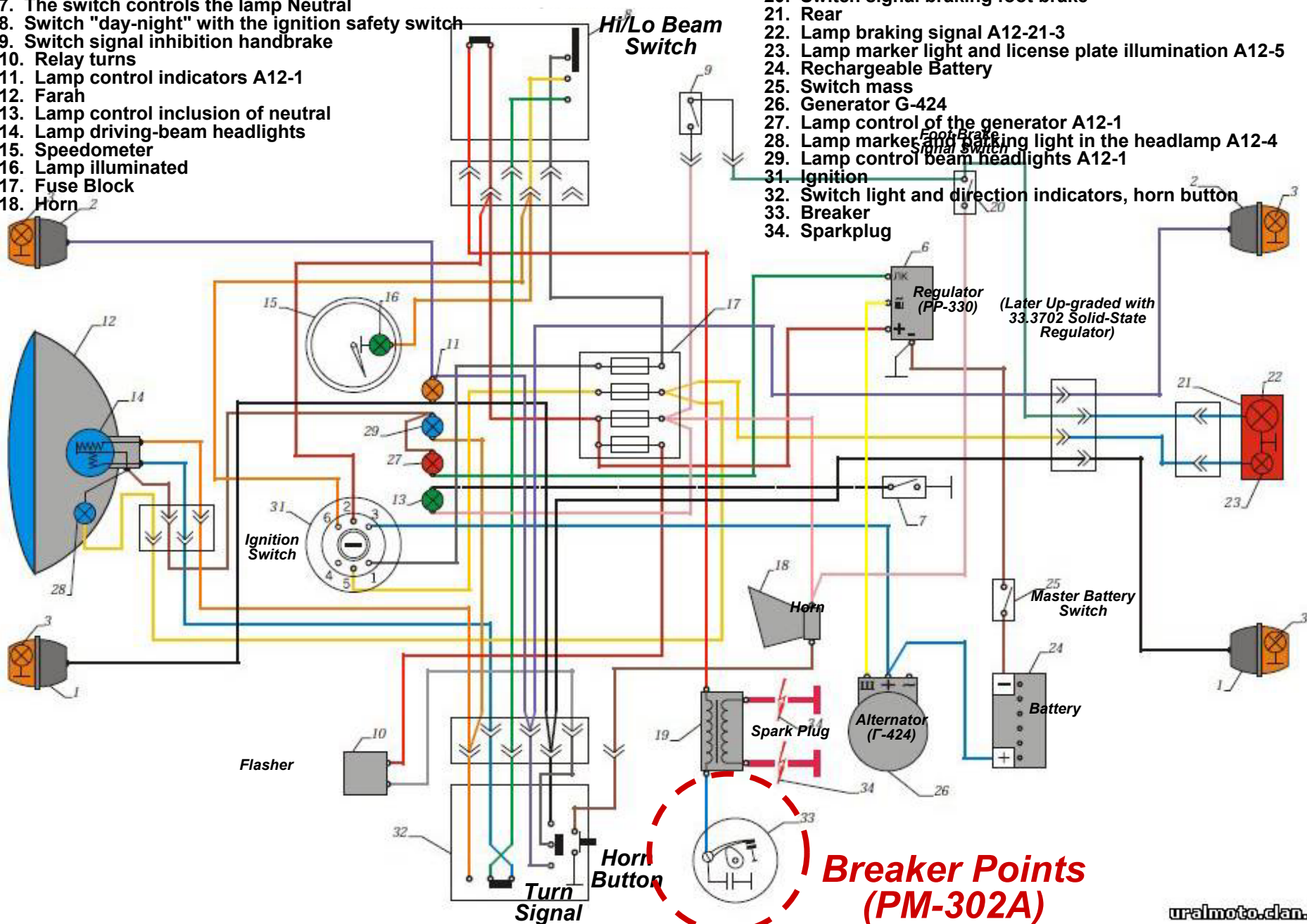
Бобина-прерыватель; 5 — провод аккумуляторная батарея ЗМТ6 — блок предохранитель — реле РР330; 8 — пучок проводов выключателя сигнала торможения и задних ключатель света П25; 13 — переключатель поворотов П201; 14 — выключатель сигнала зажигания А14В; 17 — провод высокого напряжения; 18 — катушка зажигания Б204; РР330; 22 — пробка контакта; 23 — фонарь указателей поворота УП223Б; 24 — фонарь фонарей коляски; 27 — розетка; 28 — провод аккумулятор — розетка; 29 — фонарь задний теля; 32 — наконечник свечи с помехоподавительным сопротивлением; 33 — центральный фонарь контрольной лампы ПД20Д; 37 — фонарь контрольной лампы ПД20Е; 38 — А12-1; 42 — лампа А12-3; 43 — лампа А12-45 + 140; 44 — лампа А12-4; 45 — ламкерное соединение

Рис. 35. Схема

# Early Ural 8.103-10 (40), 8.123-10

1. Left indicator lamp
2. Right direction indicator
3. Lamp indicators A12-21-3
6. Regulator
7. The switch controls the lamp Neutral
8. Switch "day-night" with the ignition safety switch
9. Switch signal inhibition handbrake
10. Relay turns
11. Lamp control indicators A12-1
12. Farah
13. Lamp control inclusion of neutral
14. Lamp driving-beam headlights
15. Speedometer
16. Lamp illuminated
17. Fuse Block
18. Horn

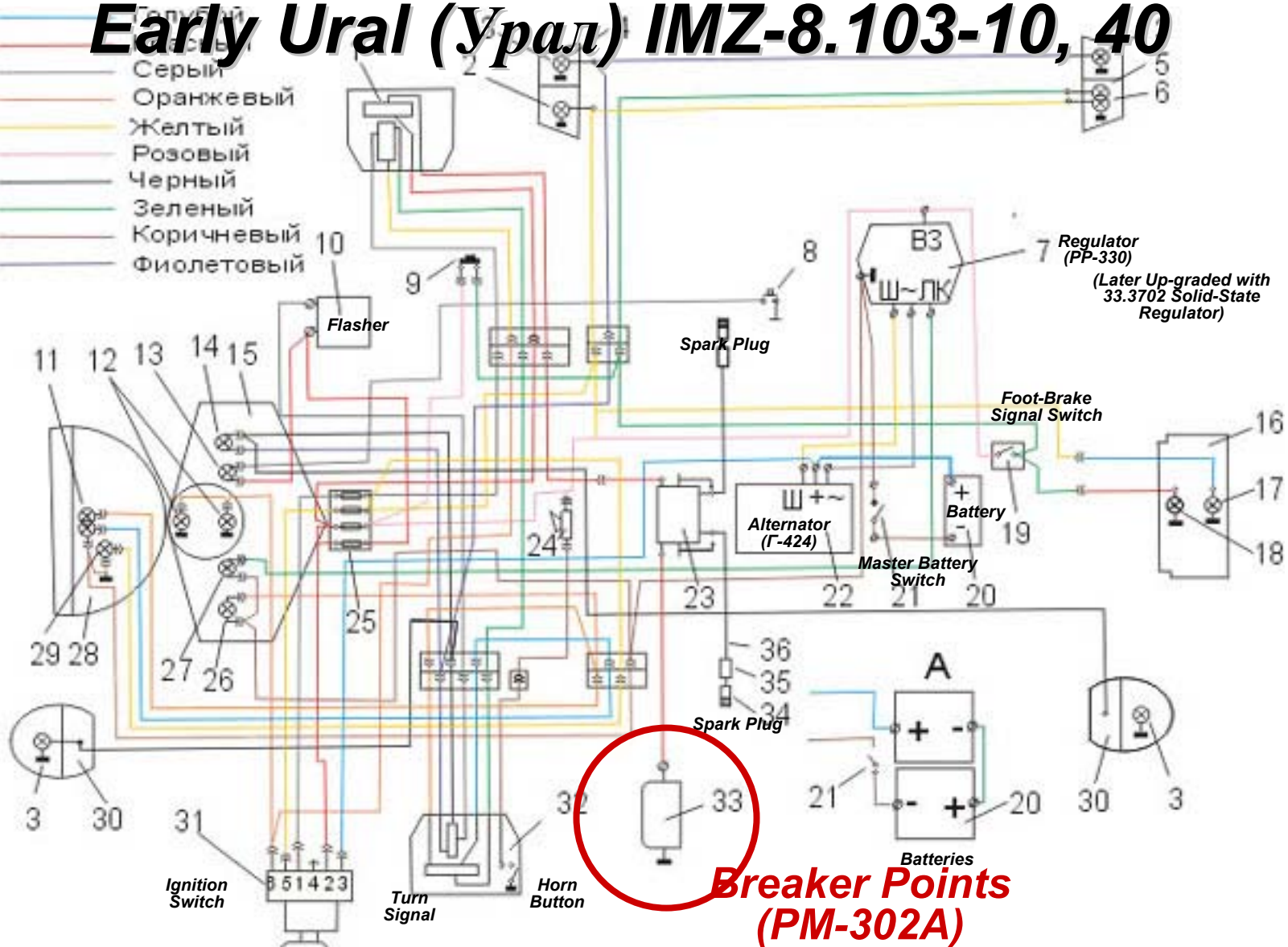
19. Ignition coil
20. Switch signal braking foot brake
21. Rear
22. Lamp braking signal A12-21-3
23. Lamp marker light and license plate illumination A12-5
24. Rechargeable Battery
25. Switch mass
26. Generator G-424
27. Lamp control of the generator A12-1
28. Lamp marker foot brake light in the headlamp A12-4
29. Lamp control beam headlights A12-1
31. Ignition
32. Switch light and direction indicators, horn button
33. Breaker
34. Sparkplug



**Breaker Points (PM-302A)**

# Early Ural (Урал) IMZ-8.103-10, 40

- Серый
- Оранжевый
- Желтый
- Розовый
- Черный
- Зеленый
- Коричневый
- Фиолетовый

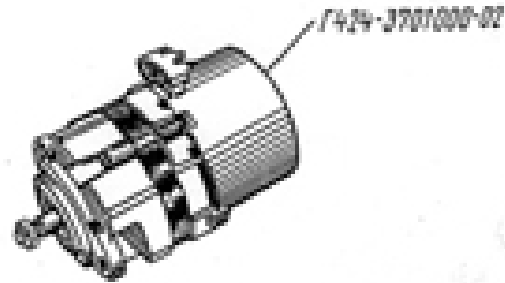


**Breaker Points  
(PM-302A)**

1-select "day-night" with ignition safety switch, 2-side marker light bulb on sidecar A12-8, 3-lamp indicators of A-12-21-3, 4-light front sidecar, 5-Rear sidecar, 6- bulb marker light and a braking signal in a wheelchair A12-212 5, 7-relays, lights, 8-contact (switch controls lamp neutral) 9-switch braking signal handbrake, 10- flashers, 11-driving lamp and low beam headlights A12-45 +40, 12-illumination speedometer A12-1, 13-light control switch neutral A12-1: 14-lamp control indicators A12-1, 15-dashboard; 16-Rear, 17-bulb marker light and license plate illumination A12-5, 18-brake signal A12-21-3, 19-switch braking signal; 20- rechargeable battery; 21-ground switch; 22-generator; 23-ignition coil, 24-horn; 25-fuse box, 26-light beam control A12-1, 27- generator lamp A12-1, 28- headlight; 29-side marker lamp and parking lamp SWERA in A12-4, 30-Index left turn; 31-ignition switch; 32-light switch and indicator lamps; 33-chopper; 34- spark plug; 35-tip of plug; 3 -high voltage wire, and A -option to connect two batteries 3MT6.



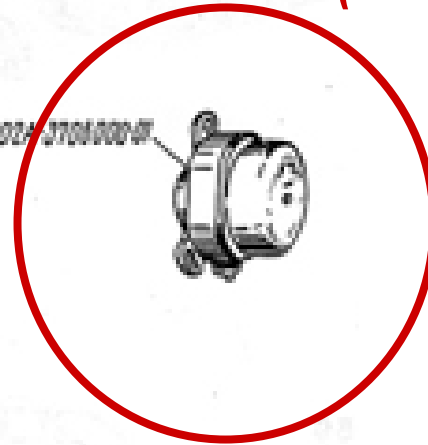
# Early Ural 650 Parts



**Breaker Points  
(PM-302A)**

54

004302A-3701000-02

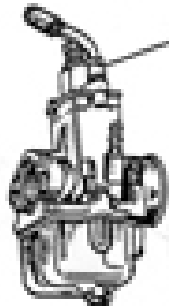


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K60-1107527



K6397-1107010



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91137-3711010-5