Ural (Урал) - Днепр (Днепр) Motorcycle Brakes
Part X: Brembo Disc Brake Evolution
(See also Russian Motorcycle Brake Lights and Switches)

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11 / 2017
Ural Brembo Brakes

- Urals from 2003 thru 2103 Equipped with Hydraulic Disc Brake in Front, with Manual Shoe-Type Drum Brakes in Rear and Sidecar
  - Front Wheel Hydraulic Disc Brake Consists of Caliper, Brake Pads and Disc
  - Front Brake Responsible for 70% of Total Stopping Power
  - Sidecar Brake Connected to Rear Brake Pedal
  - Spare Tire, Used to Directly Replace either Rear Wheel or Sidecar Wheel, but Disc Brake Prevents All-Around Replacement, as in the Old Days (pre-2003) when Ural Used a Drum Front Brake
- WARNING in Owner’s Manual: Never Use Front Brake to Stop when Motorcycle Is Moving in Reverse
  - Severe Damage to Front Brake Caliper and Mounting Plate Will Occur
- Order of Presentation
  - Brembo (Italy) Disc Brakes
  - Calipers
  - Replaceable Pads
  - Hydraulic Reservoir
  - Hydraulic Brake Line
  - Ural by Year and Model
  - Fixed / Floating Rotor Disc: New and Old
- Front Disc Brakes Require Periodic Inspection, but Do Not Require Adjustment
  - Brake Pads Inspected by Removing Dust Shield from Top of Caliper
  - Check Thickness Pads: Should Be Replaced when Less than 1/8” of Pad Remaining on Either Pad
  - Brake Hose Inspected for Leaks and Cracks along Length of Hose and Banjo Fittings on Both Ends

Brembo Brakes are found on modern Urals (2003+), but not on Dnèprs.
Ural Disc Brake Parts
Stainless Steel, Braided Cable, Hydraulic Brake Line (Hose)

- Banjo Fitting
- Bleed Valve
- Brake Pad Dust Cover
- Pins for Retaining Brake Pads
- Disc Rotor
- “Floating” Disc Rivets (Buttons)
Brake Disc Evolution by Part Numbers

- Front Disc Brake Caliper Introduced to Urals in 2003
  - Front Brake Caliper (Brembo): IMZ-8.1238-27005-01 (Brembo 20.6800.10)

- Brake Rotor Disc
  - 2003-2007: IMZ-8.1037-06026 (Russian) 300 mm diameter
    - Not Available Anymore: Upgrade Using Brembo Items;
      - 8 IMZ-8.1037-06026-10 Brembo Floating Rotor Installed from 2007
      - 8a IMZ-8.1037-06132 (steel) IMZ-8.1037-06132-10 (aluminum) Brembo Brake Adapter - Used to Mount Brembo Rotor (adapter plate has width to it to shim the rotor out from the hub)
  - Brake Disc (2007-2009): IMZ-8.1037-06026-10 (Brembo 08.4899.72) 320 mm diameter
    - Disc a Little Bit Thinner
    - European Recall in Fall 2010 to Add Washers beneath Rotor Screws
      - Original Bolts Too Long in Some Cases
      - Bolts Fit Brembo Discs, which Were Thicker
  - Brake Disc (2010+): IMZ-8.1037-06026-NG (www.ngbrakedisc.com) 295 mm diameter

- Front Brake Switch
  - Brake Switch (Brembo) Up to 2006: IMZ-8.1037-17048-07
  - Brake Switch (Brembo) 2009+: IMZ-8.1037-17048-2009 (Brembo 10.4671.61)

- Front Master Brake Cylinder (MBC) Assembly
  - Front Master Brake Cylinder: IMZ-8.1238-27003-10 (Brembo 10.4620.79)

- Hydraulic Brake Line (Hose)
  - Rubber Brake Hose (2003-2007)
    - IMZ-8.1037-27014-10 (for Telescopic Fork)
    - IMZ-8.1037-27015 (for Leading Link)
  - Steel-Flex Braided Brake, incl. banjo bolts and sealing rings (2008+): IMZ-8.1037-27015-08

- Front Brake Pads
  - Set of Two Brake Pads: IMZ-8.1238-27097 (Brembo 107.6708.10 Organic Compound)
  - Set of Two Brake Pads: Brembo Sintered: 07.6708.02
  - Set of Two EBC Double-H Sintered Metal Brake Pads: FA244HH

- Conversion Kit for Drum Brake to Brembo Disc Brake
  - Complete Assy. Converts Russian Drum Brake to a 2007-Style Brembo Disc Brake, Includes All Components (front wheel, fork leg, rotor, caliper mounts, reaction link, all hardware, etc.)
  - Front Forks
    - Telescopic Fork (Russian): IMZ-8.103-08001-30 (750 cc)
    - Leading Link Fork Assy for Disc Brake from 2007: IMZ-8.1037-08001-41
    - Leading Link Fork Assy for Disc Brake from 2008: IMZ-8.1037-08001-08

As you can see, it’s hard to keep up with the changes associated with Brembo disc brakes.
Disc Brake Evolution on Urals (2003-2004)

It takes a heap of investigation to determine the evolutionary path of such a simple arrangement.
The forks’ leading link design, though archaic, actually works better for sidecar handling than do conventional telescopic forks.
The evolution of disc brakes involves rotors, calipers, brake lines, switches, pads, master cylinders and conversion kits.
Disc Brake Evolution on Urals (2009-2011)

- 2009 Patrol Floating Rotor Disk Right-Hand Caliper
- 2009 Gear-Up Floating Rotor Disk Right-Hand Caliper
- 2009 Sahara Floating Rotor Disk Right-Hand Caliper
- 2009 Retro Floating Rotor Disk Left-Hand Caliper
- 2009 Ural T Floating Rotor Disk Right-Hand Caliper
- 2010 Red October Floating Rotor Disk Right-Hand Caliper
- 2011 Patrol Floating Rotor Disk Right-Hand Caliper
- 2011 M-70 Floating Rotor Disk on Telescopic Fork Right-Hand Caliper Steel-Braided Hose
Leading-Link versus Telescopic Front Forks

• Leading Link Fork
  – Used on Patrol, Gear-Up and Tourist
  – Mounts Brembo Caliper on Right-Hand Side

• Telescopic Fork
  – Used on Retro, Troyka
  – Mounts Brembo Caliper on Left-Hand Side

  • Except for Ural T and M-70 (Telescopic Fork and Right-Hand Caliper)

Differing front forks require differing brake solutions.
# Owner’s Manuals

## Component (750 cc)

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<td>Front Wheel Bracket Mounting Set</td>
<td>IMZ-8.1037-27001</td>
<td>IMZ-8.1236-27001</td>
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</table>
2006-2011 Ural Maintenance Manuals

Telescopic Fork (Retro)
Brembo Caliper on Left Side
Floating Rotor Disc
Rubber Brake Line

Caution: The maintenance manuals for Patrol, Gear-Up and Tourist show figures that may not indicate the correct year or model.
Brembo full-floating disc proved more than capable of stopping the 700-plus pound bike (along with rider and passenger) with ease.
**Disc Brake Evolution on Urals**

- **2009 Ural Gear-Up / Tourist / Patrol / Wolf**
- **2010 Solo sT (solo tour)**
- **2010 Patrol**
  - Newer Steel-Braid Hydraulic Line
- **2011 Patrol / Gear-Up**
  - Steel-Braid Hydraulic Line
- **2009 Ural-T**
  - Floating Disc (Note Rivets)
- **Marzocchi Telescopic Fork on sT**
- **2010 Solo sT (solo tour)**
- **Flexible-Braid Brake Line**
Disc Brakes (2000 How Stuff Works)

- Disc Brake Similar to Brakes on a Bicycle
  - Bicycle Brakes Have Caliper, which Squeeze Brake Pads against Wheel
  - Motorcycle Disc Brake Pads Squeeze Rotor instead of Wheel
  - Force Transmitted Hydraulically, Instead of thru a Wire Cable
  - Friction between Pads and Disc Slows Disc Down

How a Disc Brake Works
Ural’s Floating (two-piece) Rotor

  • Fixed Brake Disc (introduced on 2003 Urals)
    – One Piece Disc
      • Brake Pad Contact Face and Wheel Mounting Face All Part of Same Piece of Metal
      – Relatively Inexpensive to Produce
      – Perform Perfectly Well
      – If Subjected to Serious, Possibly Unable to Dilate or Expand
  • Floating Brake Disc (introduced on 2007 Urals)
    – Constructed in Two Parts
      • Aluminum Center Part Fixed to Motorcycle Wheel and Stainless Rotor
    – When Rotor Subjected to Serious Heat, It Expands
    – By Allowing It to Float Separately from the Mounting Face, It Is Free to Expand and Shrink at Will without Being Constrained by Its Mounting
    – Expansion Takes Place in All Directions at Once and Not Constrained
      • If you prevent this from happening in one direction (by fixing it on its mounting face) it has no choice but to warp, so floating discs are made in two parts to allow the discs to expand and prevent them from warping. Mainly a high performance type brake disc.
  • Which Is Better?
    – Fixed disc is much better for high-performance braking. For daily driving, floating disc is good. And why most car manufacturers prefer floating discs? Because these are easier to design and fabricate, thus lower manufacturing costs.
    – Floating rotors are two piece rotors that has the hub and the disc joined by bolts. That way you can have lightweight alloys for the hub and a different compound/fabrication for the disc and have the best of both worlds. Also heat dissipates faster in floating rotors, why I'm not sure.
    – The main complain about floating rotors is that they're much louder than normal rotors because they're two-piece, thus allowing more noise to be eminate when the disc "vibrate" under braking.

The floating disc heats up more uniformly, and the controlled float which is present allows for the differential expansion of the hot disc, and the relatively cool aluminum bell.
Bembo Directional Brakes

• Are Brembo Calipers Directional?
  – Brembo’s calipers are directional, due to the use of differential piston sizes (30/40 mm). The leading pistons are smaller in diameter in order to combat uneven wear of the brake pads. Upon close examination of the caliper, you will find a small arrow cast in place which denotes the direction of disc rotation. Additionally, when mounted on the vehicle, the bleed screw must be at the top of the caliper.

• Brembo Brakes in Australia
  – The disc brake is one of the reasons that sidecar Urals cannot be sold in Australia. Certifying engineers, DOTARS and the various state and territory rego authorities all take a rather dim view of brake components rubbing or bending when applied in reverse. And when that then ceases to allow the front brake to work in the forward direction, it is referred to as a catastrophic failure. Now, while putting a warning in the owner's manual not to use the front brake in reverse may work in Europe, the USA and Canada, it doesn't cut it here for a vehicle fitted with a reverse gear in Australia.
  (http://bcozz.multiply.com/journal/item/345)
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<td>or 4A</td>
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<td>EBC Brake Pads</td>
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<td>Sealing Washer</td>
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<td>10284460 (650/750)</td>
<td>Sealing Washer</td>
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<td>IMZ-8.1037-27001-01</td>
<td>Brembo Hydraulic Brake Assembly</td>
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</table>
Front Disc Brake Part Evolution

- 2006-2007
  - #7 Wheel Hub: IMZ-8.1037-06020-10
  - #8 Front Brake Rotor: IMZ-8.1037-06026
    (Not Available - Upgrade to Brembo item 8A and 8B)
  - #8A Front brake rotor IMZ-8.1037-06026-10
    (from 2007 (Brembo))
  - #8B Brembo Brake Adapter IMZ-8.1037-06132
    (Used to mount Brembo Rotor)
  - #20 Screw M8x16 200299-P27C

- 2008-2010
  - #7 Wheel Hub: IMZ-8.1037-06020-10
  - #8 Front Brake Rotor: IMZ-8.1037-06026-10
    (Brembo 08.4899.72)
  - #20 Screw M8x16 DIN 6912 M8x16
  - #21 Rotor Spacer (Intermediate Bushing):
    IMZ-8.1037-06132-10
Ural Hydraulic Disc Brakes
(Уральский гидравлические дисковые тормоза)

- Hydraulic Disk Brakes
  - Master Cylinder, Located on Right Side of Steering Handlebar
  - Hydraulic Fluid Hose, Connecting the Master Cylinder to the Brake Caliper
  - Brake Disk, Bolted on the Front Wheel Hub

Caliper Piston (Cup)  Right-Hand Brake Lever

Hydraulic Brake Line
The Brembo part number is stamped on the bottom of the master cylinder reservoir, where the two number indicate the piston diameter.
Front Brake Light Switch (www.f2motorcycles.ltd.uk)

- Brake Light Micro-Switch for Disc Brake
  - Ural 750’s Fitted with Brembo Disc Front Brake
  - Two Slightly Different Types
    - 2003-2008
      - IMZ-8.1037-17048-2007 (Discontinued in favor of a pressure switch on a banjo fitting)
      - f2Motorcycles: F23307/TO 2007
      - Brembo Part #: 110.4418.14 (switch is soldered into the harness a couple of inches from the switch, so you'll be splicing into the harness)
      - Most Switch Vendors List Distance between Mounting Holes, the one that fits is 10 mm, center-to-center.
      - IMZ-8.1037-17048-EU: Brake Switch, Italian, for European Wire Harness 2007
    - 2009-201X
      - IMZ-8.1037-17048-2009
      - f2Motorcycles: F23307/AFTER 2007
      - Brembo Part #: 10.4671.61
Brembo Front Brake Micro-Switch (www.oppracing.com)

- Brembo 110.4418.13
- List Price: $12.43
The front brake-light switch is placed in parallel with the rear brake-light switch.
The front brake-light switch remains the same over the years.
Brembo Fixed Caliper
P4 30/34 F (Brembo Part #: 20.6800.10)

• Fixed Caliper: 6800 Series
• Four Opposed Pistons (2 x 30mm + 2 x 34mm dia.)
• Pads Supported by Two Pins
• Material: Cast Aluminum Body

Brembo Part #'s:
Bleeder Screw: 105.3246.14
Dust Cover: 105.1502.10
Retainers: 105.4542.18
Pin/Retainer: 120.3942.30
Pad Spring: 120.2255.90

65 mm Mounting Distance

34 mm dia. Piston

30 mm dia. Piston

17 mm Mounting Bolts
Hydraulic Brake Caliper and Brake Hose
(downloads.imz-ural.com)

- Caliper Parts:
  #1 Front Brake Caliper: Brembo 20.6800.10
  #4 Brake Hose Assy: AMP1165
  #12 Bolt M10-1,25-6g x40 201682-P27C 4 each
  #14 Adapter: IMZ-8.125-27228
  #18 Sealing Washer: 10284460 7 each
  #20 Washer 10L: 252156-P27C 2 each
Front Brake Assembly, Brembo Caliper

List Price: $695.98
SKU: PT270
(www.uralne.com)
NG Front Brake Disk

List Price: $299.95
SKU: PT061 Front Brake Disk for All 750cc Motorcycles
(www.uralne.com)
Disc Brake and Hydraulic Line Inspection

- Check Disc Brake Pads Every Service Interval
  - Disc Brakes Do Not Require Adjustment
  - Brake Pads Inspected by Removing Dust Shield from Top of Caliper and Check the Thickness of the Pads
  - Pads Replaced when Less than 1/8” of Pad Remaining on Either Pad
- Check Brake Hose Every Service Interval
  - Brake Hose Inspected for Leaks and Cracks along Length of Hose
  - Check Banjo Fittings on Either End
- 2008: Steel-Braided Brake Hoses
  - Stainless Brake Line - BIG Difference! (sovietsteeds.com) Rougaroo
  - Far Superior to Rubber Flex Lines
  - Brake Is Way More Responsive
  - With Stainless, There Is No Sponginess At All
Early Rubber Brake Hose for Disc Brake
Vendor ID: S2073-S
Manufacturer: SASIC FRANCE
Length: 96 cm
Pressed-on 10 mm Banjo Fittings with Protecting Tube
List Price: 11.89 EUR
(www.ural-zentrale.de)

IMZ-8.1037-27015-08
Steelflex Brake Hose
For All Bikes with Front Disc Brake
Except for Wolf with High Handlebar
(www.ural.cc)
A Banjo fitting comprises a perforated hollow bolt and spherical union for fluid transfer, commonly found in automotive fuel, oil and hydraulic brake systems. The name stems from the shape of the fitting, having a large circular section connected to a thinner pipe, generally similar to the shape of a banjo.
Disk Brake System (www.ural-zentrale.de)

- Product #: S2073
- List Price: 275 EUR
- Disk brake conversion kit for all models
- Brake disc is simple plugged in the wheel splines
- Delivered with brake disk with flange, mounting and cover, brake calliper with brake pads, hydraulic hoses with fittings, master cylinder with lever and bolts.
- Caution: Caliper bracket has to be welded on the fork or swing-arm. Suitable only for experienced DIY mechanics!
Disc Brake Conversion for **Dnepr Front Wheel:**

-Christian's Dneprseiten (dnepr.at/e/tech_26.htm)

- **Dnepr Front Drum Brake Not Made for Panic Braking**
- **The Conversion:**
  - Front Wheel Yamaha SR500 (also possible: XS650)
  - Two Brake Discs SR500 diameter = 298mm (or XS1100)
  - Brake Pliers and Pump Yamaha XS850 (identically XS1100)
  - Steel-Flex Hose without Distributors Directly to the Pump
  - Taper Roller Bearing for the Steering
  - Bearings at the Front Wheel Were Changed to 20mm inner diameter, an Appropriate Spacer Was Made
  - Disc Brake Lugs Made of Steel Plates (5mm) on Roller Bearings Situated on the Axle
Three-Wheel Disc Brake Conversion (dnepr.at/e/ga_monega.htm)

• Based on Dnepr
• Disc Brakes on All Three Wheels (Brembo d'Or – Gold Brembo)
  – Quick-Locking Mechanisms for Hydraulics
  – Adapters from Full Aluminum, etc.
• Foot Brake Pedal Operates the Side Car - and Rear Wheel AND a Small Caliper behind the front caliper
• Real Integral Brake Assembly with Full Exchangeability of Wheels
Conversion Set for Ural Front Disc Brake (swingarm)

Kit to Change Front Drum Brakes to Disc with Swingarm Fork
Number: IMZ-8.1037-30030-set
Wheel Rim: Chrome, Matt Black or Green
Right Swingarm Tube: Matt Black or Green

Kit Includes:
- Complete Laced Wheel with Tire and Brembo Floating Disc
- Front Brake Lever to Pump Brembo
- Armored Brake Hose Plugs and Screws
- 4-Piston Brembo Caliper
- A Set of Calipers
- Right Tube Swingarm

Does NOT Include Brake Fluid

List Price: 27 980 Kč (CZK)
(shop.ural.cz)
Dnepr MT-16 Motorcycle (www.vostokmotors.com)

Front Disc Brake (retrofit)