INSTRUCTION / REPAIR MANUAL

FRONT FORK MARZOCCHI MAGNUM

FOR

MuZ / MZ 660E BAGHIRA / MASTIFF

1998 / 2002

MOTORRAD- UND ZWEIRADWERK GMBH / MARZOCCHI PERFORMANCE SUSPENSION SYSTEMS

8080141000

GENERAL

Remote hydraulic fork with static load spring and cartridge mulfivalve damping system. Each fork leg is equipped with adjustment knob: the l.h. fork leg works during the compression phase while the r.h. fork leg works during the rebound phase.
Bleeder screw for inner air.
Sliding bushing for floating damping rod.

STANCHION TUBES:

Special high resistance stainless steel, surface chrome plating. - Diameter: 45 mm.

SLIDER:

G-AISI 9 alloy, internally machined and melted. SLIDING BUSHINGS: Teflon, free from static friction

SEALS:

Computer designed oil seals ensure the highest seal during compression and minimum friction during rebound: covered by MARZOCCHI patent.

SPRINGS:

Available in different lengths for different static loads.

OIL:

MARZOCCHI SAE 7.5 REF. 55 0011. Special formula with no foam building. It keeps the viscosity features unchanged in every working conditions: free from static friction. For particularly cold climates use oil "MARZOCCHI - SAE 5 Ref. 52.48.
Using of equivalent oils of other brands is possible.

IMPORTANT REMARK

This Instruction / Repair Manual is a partly reprint of the INSTRUCTION MANUAL FOR MAGNUM FRONTFORK by MARZOCCHI, NO. 900389, supplemented by specific MuZ / MZ facts for our MuZ / MZ 660E Baghira / Mastiff models.

TABLES OF CONTENT

FORK WORKING (see pictures on page 11 / 33-34)

Here only the hydraulic fork working features will be considered, without dealing with the spring function, which is in each leg and plays a decisive role with respect to the fork reactions against stresses. In order to give a better explanation on how the suspensions work, the moving parts (halftone) are different from the parts fixed to the cycle frame; any oil flowing or movement in the different working stages is represented by means of arrows. Each fork leg is formed by a cartridge (1, FIG. A) with an inner pumping element (2, FIG. A) secured to the upper plug (4, FIG. A) of the stanchion tube by means of a rod (3, FIG.A). An adjustment knob is on the plug. This shuts the flowing area of the fluid coming from the cartridge by means of a conical pin (5, FIG. A). The pumping element is equipped with washers which by-pass the oil flowing.

The structural arrangement of the pumping elements is characterized by a multivalve system which allows all the fork working parameters to be kept under control in the different use conditions and, at the same time, allows an aimed intervention without changing the existing configuration. This system also avoids any dangerous cavitation effect often occurring in forks where the fluid flows through one or two critical points.

Let's see what happens in a (L.H.) COMPRESSION leg if riding on an uneven track (a, FIG. A).
-the oil in the damper cartridge is pushed downwards by the pumping element and flows through the 5 holes in the control cylinder without any problem. This fluid mixes with the fluid coming from the adjustment unit in a depressurized chamber (in practice at atmospheric pressure);
- under this condition the washers on the pumping element piston are still completely closed and the fluid volume flowing through the adjustment pin is not important with respect to the fluid flowing through the 5 holes;
- for this reason, the result will be a not very braked fork able to absorb the small unevenesses of the track.

Let's see what happens in presence of some remarkable obstacles, such as a series of bumps (b; FIG. A):
- a big part of the damper rod goes into the damper cartridge, thus leading the pumping element to go beyond the two upper holes so that a smaller quantity of oil can flow through the three open holes in the control cylinder.
- the oil pressure is not enough to wear down the resistance of the pumping element washers and, at this stage, the position of the conical pin of the adjustment unit shutting the fluid flowing through the upper valve plays a major role;
- in this way a more braking response of the fork is obtained, above all dependent upon the smaller outlet area of the fluid and the adjustment unit position.
Now let's see what happens inside the leg during a violent compression caused by a big obstacle (c, FIG. A):
- the pumping element unit goes beyond all the fluid outlet holes of the control piston and the oil pressure opens the washers on the piston so that it goes into the chamber over the pumping element which communicates with the depressurized area;
- at this point, the area where the fluid flows through the pin valve plays a major role; - the result will be a very braked fork and this condition can be increased or decreased by means of the adjustment unit.
In the (R.H.) REBOUND leg the foot valve (6, FIG. B) is very important. It meters the damper cartridge filling, it is at the sliding unit end and has washers.

Let's see what happens in a REBOUND leg (FIG. B) after a sharp compression;
- the pumping unit is returned by the spring power and the oil in the upper chamber can flow into the lower chamber, thus wearing down the piston washers resistance;
- the oil also flows through the hole on the rod bottom. This oil flowing is adjusted by means of the upper adjustment unit which, at this point, is all-important;
- the foot valve works under the above conditions and adds fluid taken from the depressurized area to the chamber under the pumping element;
- besides the foot valve at the damper cartridge bottom there is a hole (7, FIG. B) which allows a continuous communication between the two chambers.

GENERAL RULES FOR A PROPER OVERHAULING

1. After a total disassembly, always use new seals during the reassembly stage.
2. Always follow the sequence 1-2-1 when tightening two screws or nuts close one to each other, i.e. always tighten the first screw (1) after tightening the second screw (2).
3. Use not inflammable and possibly biodegradable solvent when cleaning.
4. Always position the pumping element washers with the fin opposite to the bearing surface on the piston.
5. Lubricate all parts in relative contact before reassembling. 6. Always grease the oil seal lips before reassembling.
7. Use only metric wrenches and not inch wrenches. Inch wrenches could have sizes which are similar to millimeter wrenches but could damage the screws, thus being impossible to loosen them.

TROUBLESHOOTING GUIDE

This section deals with some troubles which can occur when using this fork. Possible causes are mentioned as well as recommendation on how to possibly solve the problem any fork fixing.

Always read the following table before performing

TROUBLE	CAUSE	CURE
Oil leakage from the oil seal	1. Oil seal wear	1. Change the oil seal
	2. Scored stanchion tube	2. Change the tube and the oil seal
	3. Dirty seal	3. Clean or replace
Foot oil leakage	1. Faulty foot seal	1. Change the seal
	2. Loose foot screw	2. Tighten the screw
The fork is too soft under any adjustment conditions	1. Low oil level	1. Fill the oil level up
	2. Broken spring	2. Change the spring
	3. Too low oil viscosity	3. Use a different oil viscosity
The fork is too hard under any adjustment conditions	1. Too high oil level	1. Restore the oil level
	2. Too high oil viscosity	2. Use a different oil viscosity
The fork has no reactions when adjustment changes are made	1. Plug pin blocked	1. Disassemble the plug and clean it
	2. Oil containing foreign bodies	2. Clean and change the oil
	3. Foreign bodies occluding damper valves	3. Disassemble and clean

MAINTENANCE RECOMMENDATIONS

MAGNUM fork is the result of years of experience made on the most important racing tracks. Even though it is a high technology product, no particular maintenance is needed. Since it is designed for a sporting use, maintenance is very easy to perform and needs no special tools.

ROUTINE MAINTENANCE

has to be done every 6000km according to the maintenance schedule, see "OPERATING INSTRUCTIONS MZ 660E BAGHIRA I MASTIFF"; PAGE" 26.

N.B.: On muddy or sandy terrain forks should be checked after shorter periods of time (-30%) than those shown in the above table.

ASSEMBLY

IMPORTANT: MAGNUM fork should be assembled on the frame in compliance with the motorcycle Manufacturer's specifications as far as the steering elements and the wheel fastening are concerned. An improper assembly can jeopardize both rider's safety and life.
- Assemble the stanchion tubes in the steering base and head and position them at the same height.
- Tighten the fastening screws of the stanchion tubes on the steering base and head using a torque of 21.5-24.5 Nm, following the above 1-2-1 procedure.
- Tighten the fastening nuts of the wheel pin on the sliders using a torque of 21.5-24.5, following the above 1-2-1 procedure.

DISASSEMBLY (see fig. on page 35)

The reference numbers of this chapter refer to the components of the exploded view of the fork shown on page 37.

FIG. 1
Fix the stanchion tube (19) in a vice equipped with protection jaws. By means of a 36 mm Allen wrench unscrew the upper plug (17-17A). Be sure not to damage the O-ring (4) when removing it. Push the stanchion tube into the slider.

FIG. 2
Stop the plug by means of the above Allen wrench and loosen the check nut (145) by means of a 19 mm Allen wrench. Unscrew completely and remove the plug (17-17A) from the damper rod end. Withdraw the spring (18), the spring guides (62) and the pre-load sleeve (28) from the inside of the stanchion tube.

FIG. 3
Empty the fork leg of oil. For an easier drainage of the oil contained in the damping unit pump up and down pushing with the damper rod (29).

WARNING: pushing the l.h. damper rod and pulling the end of the l.h. damper rod, a pressure oil jet will come out. Aim the rod end at a container in order to avoid any damage.

FIG. 4
Vice the slider and unscrew the foot screw (40) by means of a 8 mm Allen wrench. Remove the screw and its seal (52).
Carefully slide the stanchion tube (19) out of the slider (24-25).

OIL SEALS AND PILOT BUSHING REPLACEMENT

FIG. 5

Remove the dust seal (20) by levering with a screwdriver (be sure not to damage the inner sealing lip).

FIG. 6

By means of a thin screwdriver remove the stop ring (23) from the inside of the slider.

FIG. 7

When removing the oil seal (22), the inner rim should be protected with a special bushing A (Ref. 536064GG). With a screwdriver exert a pressure under the seal in order to let it come out.
Withdraw the upper pilot bushing retaining cup (139) from the inside.
Should the pilot bushing (56) be replaced since it is worn out, it should be removed from the inside of the slider.
When performing these delicate removal operations, be careful not to damage the seat on the slider.

DAMPER OVERHAUL

FIG. 8

Withdraw the damping unit (53-53A) from the stanchion tube and remove the foot pad (39). This could be still assembled on the slider, in this case it should be removed from the inside of the slider.
Push the foot valve (157) with your fingers into the damper body (117-117A).
Remove the stop ring (38N) by means of a screwdriver and then push the foot valve out of the body by means of the rod.

FIG. 9

Completely unscrew the check nut (145) and remove it from the damper rod end. Withdraw the rod and the pumping element from the damper body (117-117A).

FIG. 10 (REBOUND LEG)

Vice the damper rod using special aluminium blocks, then unscrew the piston assembly check nut (41) of the setting unit and withdraw all components.
Carry out necessary checking or replacement operations. Reassemble following the order shown in the illustrations.

WARNING: If the rod is viced without using the proper aluminium blocks, it can be crushed since it is hollow.

FIG. 11 (COMPRESSION LEG)

Carry out the same operation in order to check the setting unit components as well. When reassembling the washers (121-122), make sure that the fin is always opposite to the bearing surface on the piston.

REASSEMBLY (see figures on page 36)

WARNING: before reassembling all components, they should be carefully washed and dried with compressed air. Clean the upper plug and the foot screw paying particular attention.

FIG. 1

After performing all necessary overhaul operation, reassemble the piston-rod unit in the damper body (117-117A).

FIG. 2

Fit the foot valve (157) and the new O-ring (86) at the body bottom (117-117A) and push it beyond the stop ring seat.
Fit the stop ring (38N) into the body seat and push the foot valve by means of the rod until it leans on the ring.

FIG. 3

Tighten the check nut (145) on the rod until the end of the thread is reached and reassemble the foot pad (39) at the body lower end.
Reassemble the damping unit into the stanchion tube.

FIG. 4

Before reassembling the stanchion tube (19) into the slider (24-25), make sure that upper pilot bushing (56) is assembled on it.
Fit the lower sliding bushing (58) into its seat on the stanchion tube.
Fit the stanchion tube (19) into the slider (24-25) and push it down to the counterboring.

FIG. 5

Screw the foot screw (40) with seal (52) and tighten at 50 Nm (36.8 ft.lb).

FIG. 6

Fit the retaining cup (139) and the oil seal (22), well lubricated, in the stanchion tube. Use the proper fitter B (Ref. R5050) and push the oil seal into the slider down to the counterboring. Then assembly the stop ring (23) and the dust seal (20).

FIG. 7

Pour "MARZOCCHI SAE 7.5" oil (Ref. 550009) into the stanchion tube making sure that also ducts inside the damper are full.
Check that an air volume of

135mm (ca.580ml) for MZ 660E Baghira (Street Moto, Black Panther) or

150 mm (ca.700ml) for MZ 660E Mastiff (Baghira HR, Street Moto HR, Black Panther HR)

is left between the top of the stanchion tube and the oil level, with the stanchion tube at its end of.

FIG. 8

Fit the pre-load sleeve (28) and the spring (18) with its spring guide rings (62).

Lift the rod inside the spring by means of a M6 (Ref. 5051) rod and screw the upper plug (17-17A).

IMPORTANT: the pre-load sleeves up to 30 mm long should be assembled between the plug and the
spring while longer pre-load sleeves should be fitted between the spring and the damping unit.

FIG. 9

Check that the 0- ring (4) and all adjustment unit components are assembled on the plug. Screw the plug (17-17A) on the rod until the end of the thread and tighten the check nut (145) against the plug using a torque of 30 Nm (22.1 ft.lb.).

FIG. 10

Lift the stanchion tube and fit it on the plug making sure not to damage the 0- ring (4). Tighten the plug on the stanchion tube using a torque of 25 Nm (18.4 ft.lb.).

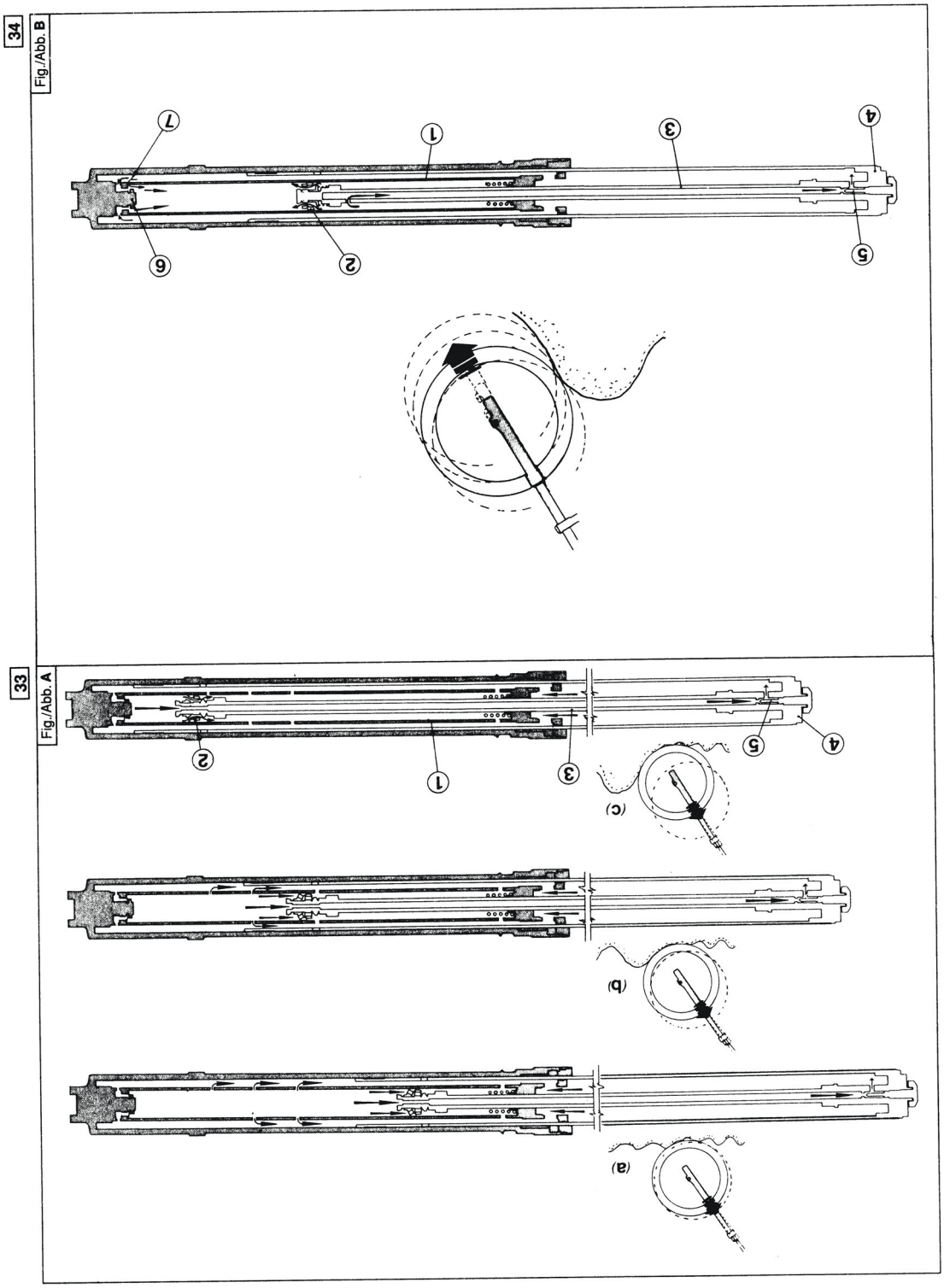
ADJUSTMENT

FIG. 11

Brake during compression (l.h. leg) and rebound (r.h. leg) can be adjusted by turning the knob (162-162A) on the top of each leg. Each adjustment "clicks" in position. In order to change the adjustment unit position, ALWAYS start with the "completely closed" position, which can be reached by turning clockwise the knob until it locks. Under these conditions the maximum braking is reached during compression and rebound. Turn the knob anticlockwise until the wished position is reached.

WARNING: Do not force the adjustment knob beyond the maximum closing and opening position.

FIG. 12
Should either the complete compression setting unit (183) or the complete rebound setting unit (182) be replaced, there is no need to remove all components, as specified in the chapter "DISASSEMBLY" . It will suffice to unscrew the stud bolt from the damper rod. First warm the stud bold in order to melt the "Loctite" used during the assembly and then vice the damper rod using the proper aluminium blocks and unscrew the stud bolt complete with the setting unit.
Reassemble the new setting unit on the rod spreading 0.05 g of "Loctite 638" on the thread. Screw the
stud bolt with the setting unit and tighten it on the rod at a torque of 30 Nm (22.1 ft.lb.).


34
Fig./Abb. B
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33
Fig./Abb. A
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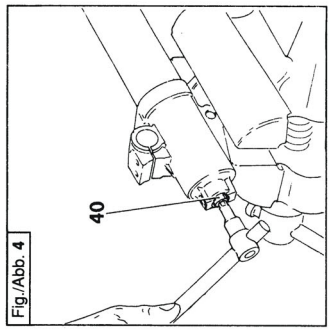

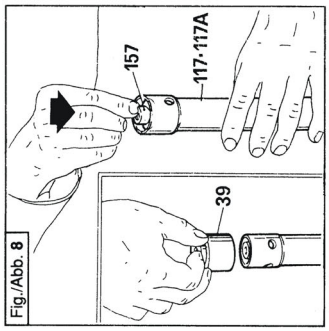

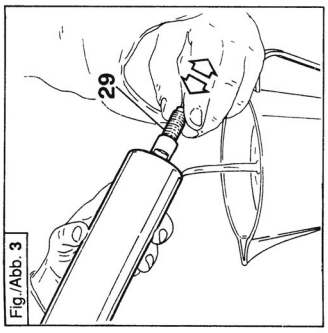

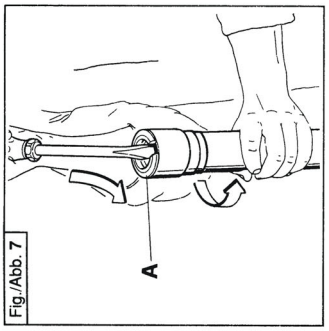

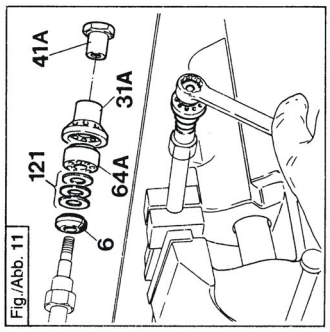

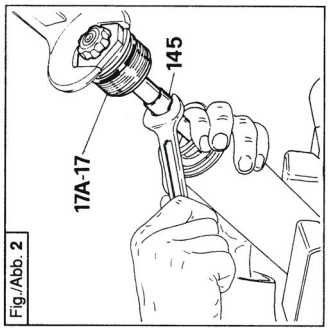

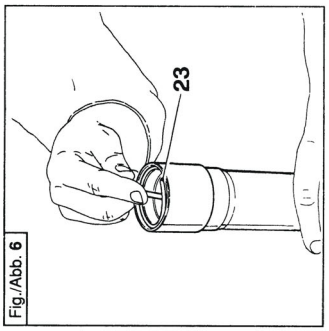

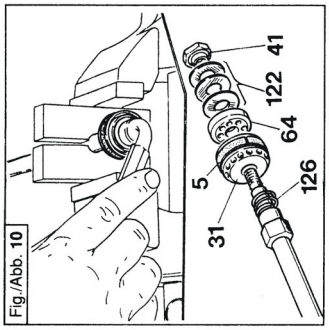

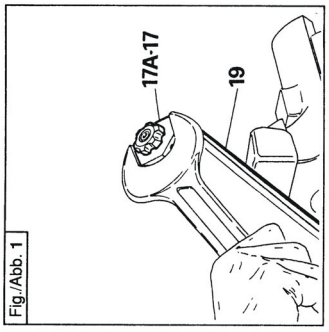

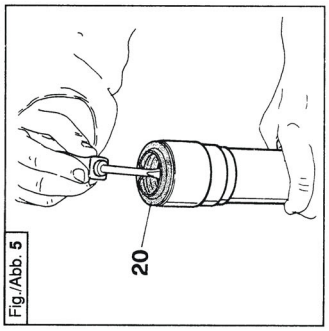

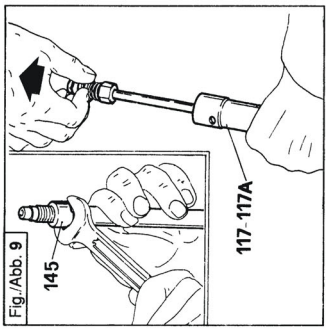

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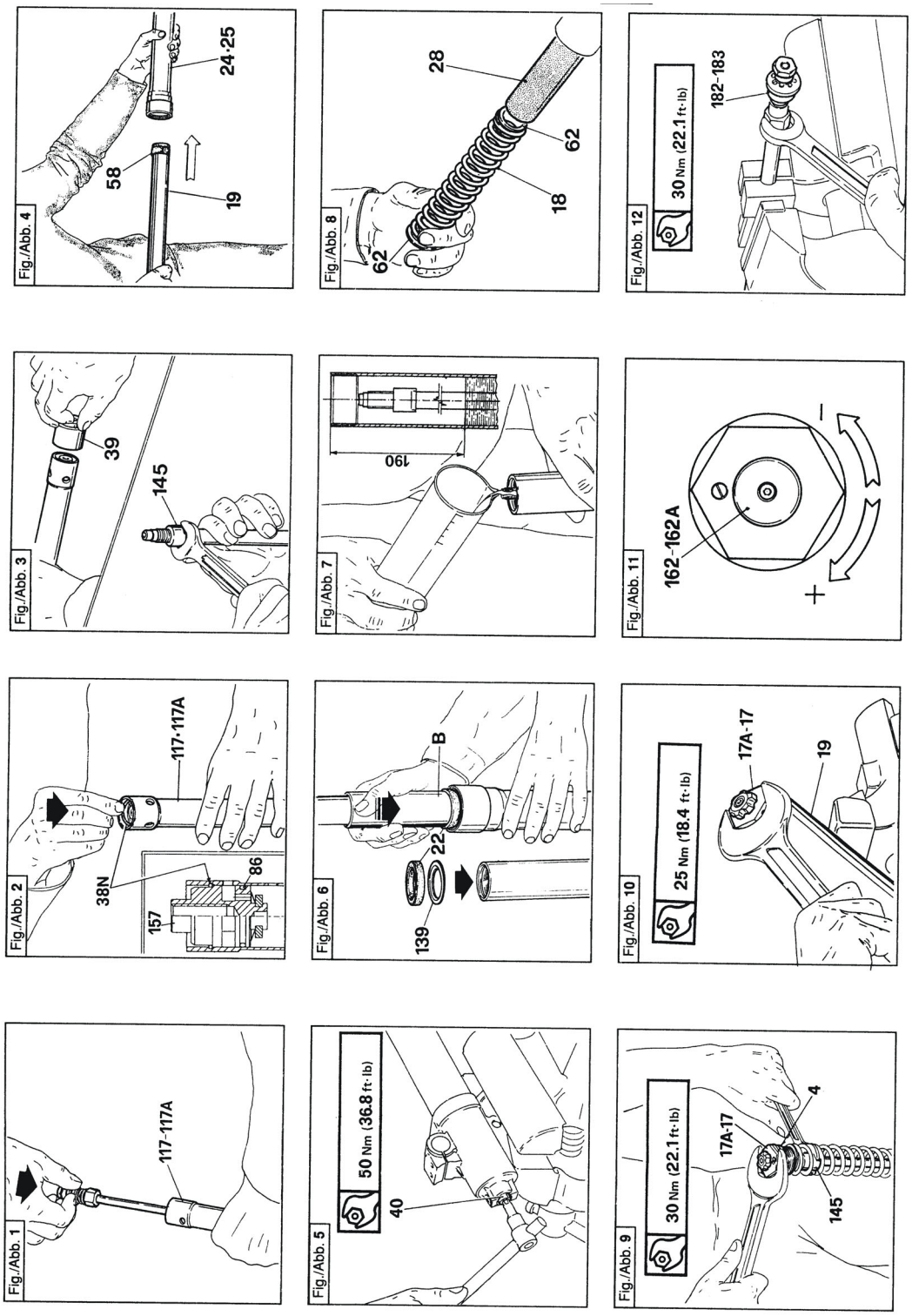

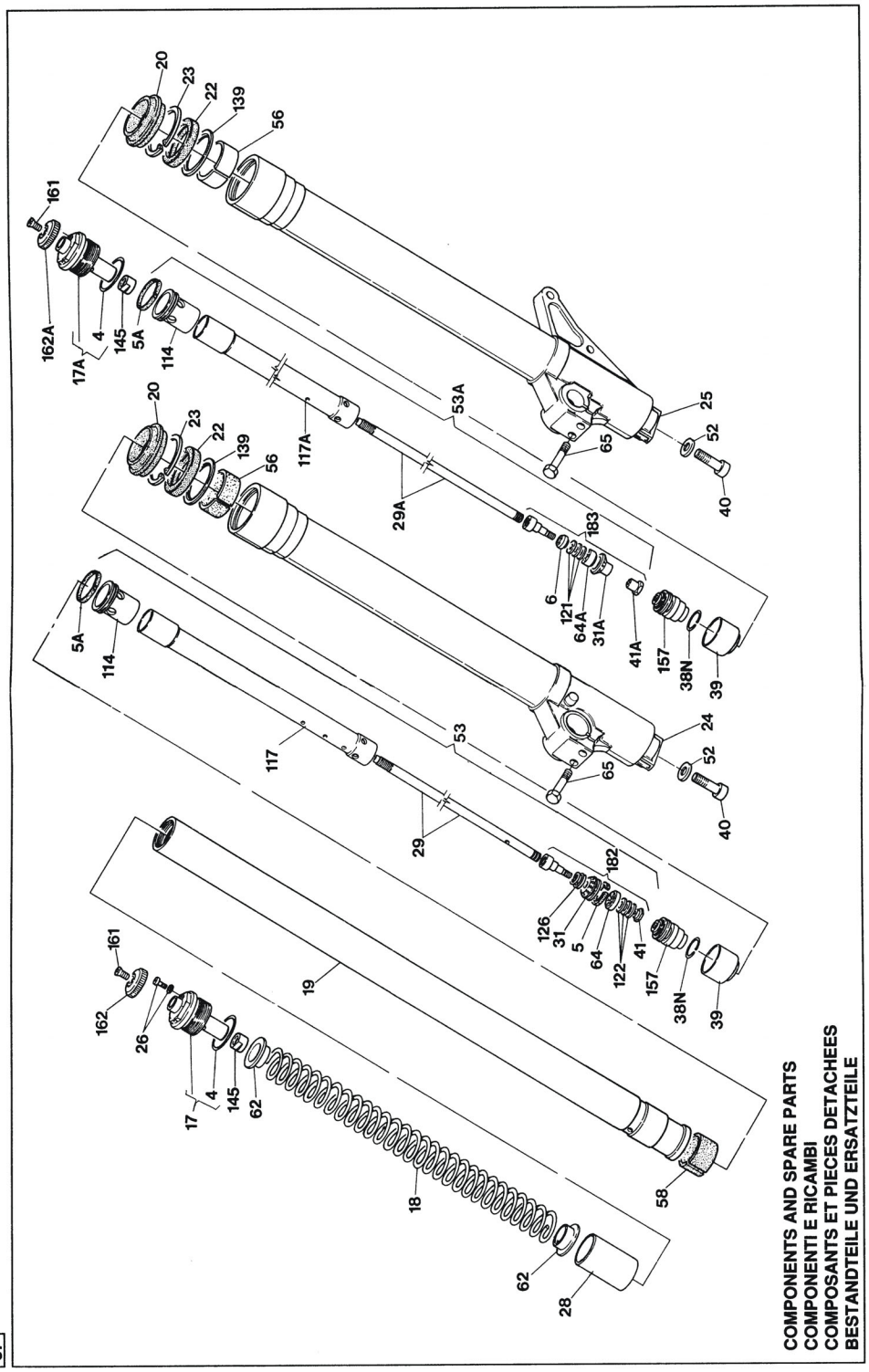

Our Parts Department supplies a kit of seals for a complete overhauling of the fork (850212)

Il Ns Servizio Ricambi fornisce la serie guarnizioni per la revisione completa della forcella (850212)

Notre Service "Pièces Détachées" fournit le kit de garnitures pour la révision complète de la fourche (850212).

Unser Ersatzteilservice hat das Dichtungsset für die komplette Überholung der Gabel (850212) zur Verfügung stehen.

MZ

MUZ 660E

MASTIFF

5. TELESKOPGABEL
FRONTFORK