

BRAKE SYSTEM

Article Text

1993 Mazda 929

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ARTICLE BEGINNING

1993 BRAKES

Mazda Disc & Drum

929

NOTE: For information on anti-lock brake systems, see
ANTI-LOCK BRAKE SYSTEM article in this section.

DESCRIPTION & OPERATION

All models use hydraulic-operated brake system with a tandem master cylinder, proportioning valve and a power brake unit. All models are equipped with front disc brakes and either rear disc or drum brakes.

BLEEDING BRAKE SYSTEM

BRAKE LINE BLEEDING SEQUENCE TABLE

Application		Sequence
929		Longest Line First

ADJUSTMENTS

PARKING BRAKE SHOES

Raise and support rear of vehicle. Remove rear wheel assemblies. Remove service plug from rotor. Insert a screwdriver into service plug hole. Rotate adjuster in direction of arrow marked on rotor until rotor locks. Rotate adjuster 6-8 notches in the opposite direction. parking brake shoe clearance should be .009-.013" (.24-.32 mm). Ensure rotor rotates freely. Install service plug.

PARKING/EMERGENCY BRAKE

1) Depress brake pedal several times. Depress parking brake pedal several times with a force of 44 lbs. (20 kg). If stroke is 5-7 notches, parking brake is properly adjusted. If stroke is not 5-7 notches, rotate adjusting nut, located under parking brake pedal, until stroke is within specification.

2) Ensure rear brakes do not drag. Ensure parking brake warning light illuminates when brake pedal is depressed one notch.

BRAKE PEDAL FREE PLAY

With engine off, depress pedal a few times to eliminate vacuum. Depress brake pedal by hand and check pedal free play. See

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BRAKE PEDAL FREE PLAY SPECIFICATIONS table. Adjust play by loosening push rod lock nut. Turn push rod until correct free play is obtained. On B2200 and B2600i, tighten push rod lock nut to 15-21 ft. lbs. (20-28 N.m). On all other models, tighten push rod lock nut to 18-25 ft. lbs. (24-34 N.m).

BRAKE PEDAL FREE PLAY SPECIFICATIONS TABLE

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Application	In. (mm)
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92920-.31 (5-8)
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BRAKE PEDAL HEIGHT & STOPLIGHT SWITCH

1) Released pedal height is measured from carpet surface on vertical portion of firewall to pedal pad center. Disconnect stoplight switch electrical connector. Loosen lock nut on stoplight switch. Rotate switch away from pedal. Loosen push rod lock nut. Rotate push rod until correct pedal height is obtained. See BRAKE PEDAL HEIGHT SPECIFICATIONS table.

2) Adjust pedal free play. See BRAKE PEDAL FREE PLAY under ADJUSTMENTS. Tighten push rod lock nut. Tighten push rod lock nut to 18-25 ft. lbs. (24-34 N.m).

3) Rotate stoplight switch until it contacts pedal and then rotate an additional 1/2 turn. Tighten stoplight switch lock nut to 10-13 ft. lbs (14-18 N.m). Reconnect stoplight switch electrical connector.

4) Applied pedal height is measured from angled portion of firewall (without carpet) to pedal pad center. Start engine. Depress brake pedal with 132 lbs. (60 kg) pressure.

5) Measure applied pedal height. See BRAKE PEDAL HEIGHT SPECIFICATIONS table. If distance is not as specified, check for air in system, rear brake adjustment or worn shoes or pads.

BRAKE PEDAL HEIGHT SPECIFICATIONS TABLE

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Application	In. (mm)
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Pedal Released

929	7.6-7.8 (193-198)
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Pedal Applied (1)

929	1.6 (40)
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(1) - Minimum height.

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TESTING

PROPORTIONING VALVE

1) Connect 2 pressure gauges to proportioning valve. One to

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input port and other to output port. Bleed brake system. See BLEEDING BRAKE SYSTEM. Depress brake pedal until pressure gauge reads as specified and check output pressure. See PROPORTIONING VALVE PRESSURE SPECIFICATIONS table.

2) Depress brake pedal again, applying additional pressure. Recheck output pressure. See PROPORTIONING VALVE PRESSURE SPECIFICATIONS table. If output pressure is not as specified, replace valve.

PROPORTIONING VALVE PRESSURE SPECIFICATIONS TABLE

Application			
Inlet Pressure		Outlet Pressure	
psi (kg/cm ²)		psi (kg/cm ²)	
With ABS	569 (40)	527-611	(37-43)
	853 (60)	598-711	(42-50)
Without ABS	427 (30)	399-455	(28-32)
	853 (60)	541-654	(38-46)

POWER BRAKE UNIT

1) With engine off, depress brake pedal several times. Press and hold brake pedal and start engine. If brake pedal moves down slightly immediately after engine starts, power brake unit is operating. If brake pedal does not move as specified, go to next step.

2) Run engine for 1-2 minutes. Stop engine. Press brake pedal several times and note if first pedal stroke is longer than subsequent strokes. If first pedal stroke is longer than subsequent strokes, power brake unit is operating. If length of strokes is equal, test check valve and vacuum hose between vacuum source and power brake unit. Repair as necessary, and go to next step.

3) Start engine. Press and hold brake pedal. Stop engine. Hold pedal down for about 30 seconds. If pedal height remains at same height, power brake unit is operating. If pedal height recedes, test check valve and vacuum hose between vacuum source and power brake unit. Repair as necessary.

REMOVAL & INSTALLATION

FRONT DISC BRAKE PADS

Removal & Installation

1) Raise and support front of vehicle. Remove front wheel assemblies. Remove lower lock pin/guide bolt. See Fig. 1. Pivot caliper upward and support using rope. Remove pads, shims, guide plates or pad guides and "V" springs (if equipped). Replace pad if lining thickness is less than specified. See MINIMUM PAD LINING SPECIFICATIONS (FRONT) table.

2) To install, reverse removal procedure. Use Disc Brake Expand Tool (49-0221-600C) and an old pad to push piston fully inward to install disc pads.

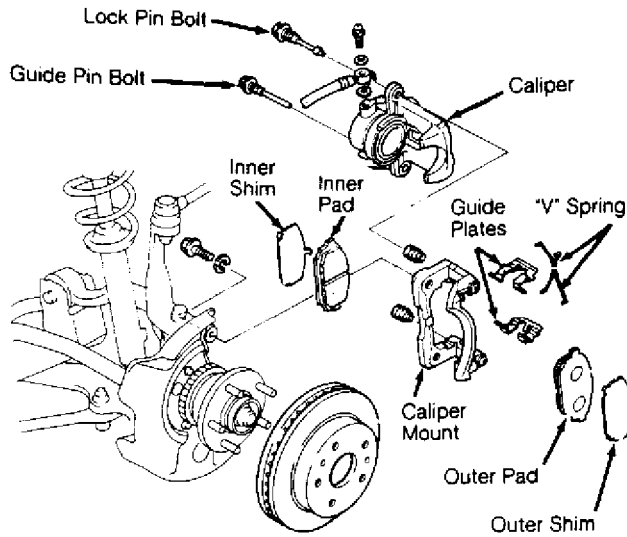
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Fig. 1: Exploded View Of Front Disc Brake Assembly (929)
Courtesy of Mazda Motors Corp.

MINIMUM PAD LINING SPECIFICATIONS TABLE (FRONT)

Application		Thickness In. (mm)
929		.04 (1.0)

FRONT DISC BRAKE CALIPER

Removal & Installation

Raise and support front of vehicle. Remove front wheel assemblies and disconnect brake hose. Plug all openings. Remove front disc brake pads. See FRONT DISC BRAKE PADS under REMOVAL & INSTALLATION. Remove remaining mounting bolt(s). Remove caliper from vehicle. To install, reverse removal procedure. Bleed air from system.

FRONT BRAKE ROTOR

Removal & Installation

1) Raise and support front of vehicle. Remove front wheel assemblies. Remove front disc brake caliper with brake hose connected. Support caliper using rope. Remove grease cap (if equipped). Remove rotor-to-hub screws (if equipped). Remove rotor.

2) Machine rotor if lateral runout exceeds specification. Replace rotor if measured thickness is less than specified minimum thickness. See DISC BRAKE SPECIFICATIONS table at end of this article.

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To install, reverse removal procedure.

CAUTION: DO NOT pry on plastic cam or spacers during removal as damage may result. To prevent damaging spindle threads, remove locking key before removing adjusting nut.

REAR DISC BRAKE PADS

Removal & Installation

1) Raise and support rear of vehicle. Remove rear wheel assemblies. Remove upper guide bolt from caliper. Rotate caliper downward and support using wire. Remove "V" spring. Remove pads, shims and guide plates. Replace pad if lining thickness is less than .04" (1.0 mm).

2) To install, reverse removal procedure. Use Disc Brake Expander (49-0221-600C) and an old pad to push piston fully inward to install disc pads.

REAR BRAKE CALIPER

Removal & Installation

1) Raise and support rear of vehicle. Remove rear wheel assemblies. Disconnect brake hose from caliper.

2) Remove lower guide bolt from caliper. Rotate caliper upward. Pull caliper toward center of vehicle to slide it off of caliper mount. To install, reverse removal procedure. Bleed air from system.

REAR BRAKE ROTOR

Removal & Installation

1) Raise and support vehicle. Remove rear wheel assemblies. Remove rear brake caliper with brake hose connected. Support caliper using wire. Remove rotor-to-hub screws (if equipped). Remove rotor.

2) Machine rotor if lateral runout exceeds specification. Replace rotor if measured thickness is less than specified minimum thickness. See DISC BRAKE SPECIFICATIONS table.

3) To install, reverse removal procedure. Check end play at grease cap. On 929, if end play exceeds .004" (.10 mm), check lock nut torque or replace wheel bearings. On all other models, if end play exceeds .002" (.05 mm), check lock nut torque or replace wheel bearings.

PARKING BRAKE SHOES

Removal

Raise and support vehicle. Remove rear wheel assemblies. Remove service plug. See Fig. 2. Remove brake caliper with brake hose connected. Support caliper using wire. Remove brake rotor. Remove return springs, pull-off spring, and hold springs and pins. Remove parking brake shoes. Minimum parking brake shoe lining thickness is .04" (1 mm). Remove adjuster and operating lever.

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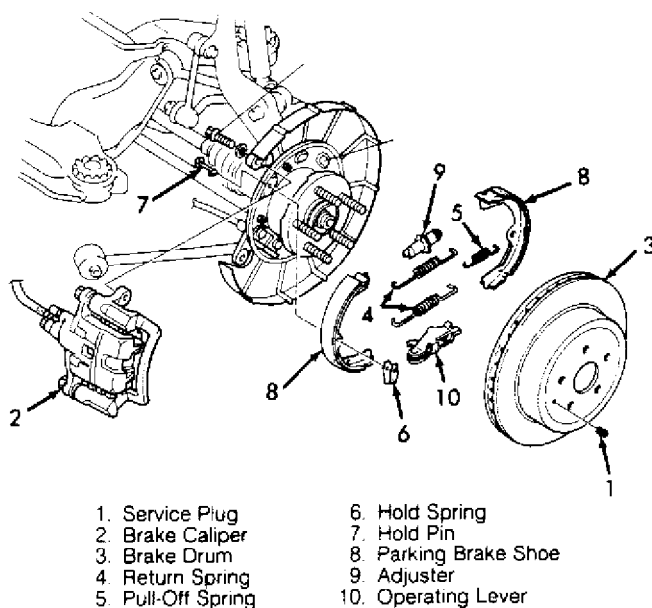
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Installation

To install, reverse removal procedure. Apply brake grease to anchor sliding plate, adjuster threads and shoe contact points on backing plate. Set marked side (with arrow) of operating lever to front side. Ensure threaded side of adjuster faces forward on left wheel and rearward on right wheel. Adjust parking brake shoes. See PARKING BRAKE SHOES under ADJUSTMENTS. Bleed air from system.



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Fig. 2: Exploded View Of Parking Brake Assembly (929)
Courtesy of Mazda Motors Corp.

REAR AXLE BEARING & OIL SEAL

NOTE: For information on models with sealed wheel bearings, see appropriate article in the SUSPENSION section.

MASTER CYLINDER

Removal

Disconnect fluid level sensor electrical connector. See Fig. 3. Disconnect and plug brake lines at master cylinder to prevent entry of dirt and loss of fluid. Remove nuts attaching master cylinder to firewall or power brake unit. Remove master cylinder from vehicle.

Installation

1) Place Adjustment Gauge (49-F043-001) onto master cylinder. Turn screw on adjuster gauge until it contacts piston. Remove adjuster gauge. Apply 19.7 in. Hg to power brake unit.

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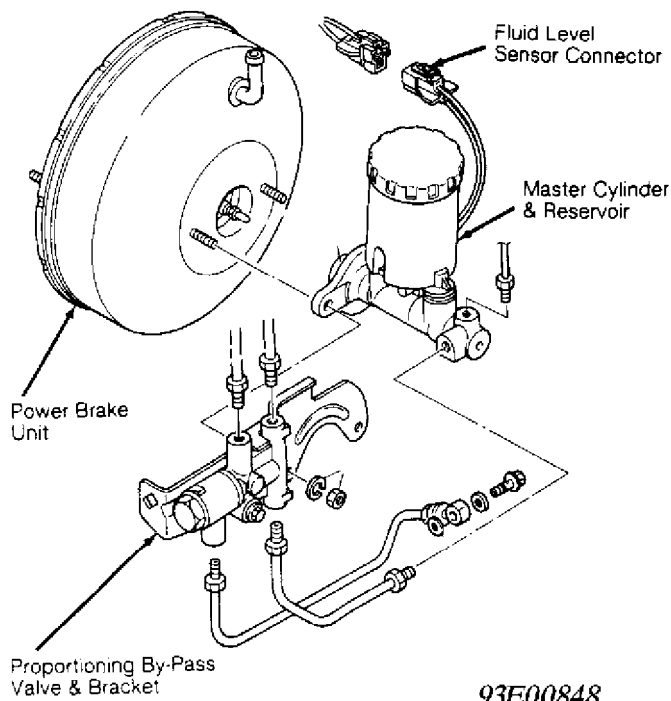
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2) Invert adjuster gauge and place it on power brake unit. Adjust push rod on power brake unit until there is no clearance between push rod and adjuster gauge screw. To install master cylinder, reverse removal procedure. Bleed air from system.



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Fig. 3: Removing Master Cylinder (Miata Shown; 929 Similar)
Courtesy of Mazda Motors Corp.

POWER BRAKE UNIT

Removal & Installation

Remove master cylinder from power brake unit. See MASTER CYLINDER under REMOVAL & INSTALLATION. Disconnect vacuum line at power brake unit. See Fig. 4. From inside vehicle, remove cotter pin and clevis pin. Separate push rod from brake pedal. Remove power brake unit-to-firewall nuts. Remove power brake unit. To install, reverse removal procedure. Bleed air from system.

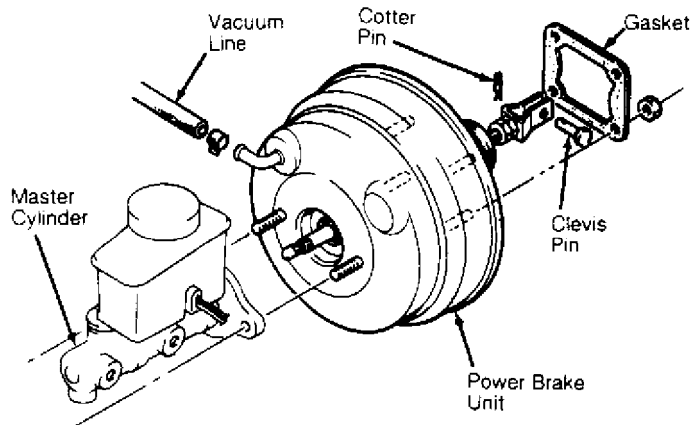
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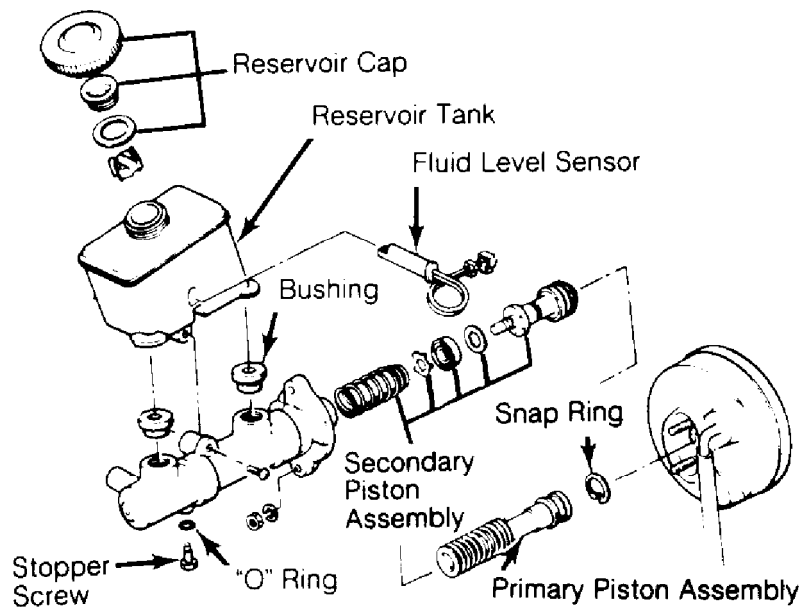


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Fig. 4: Removing Power Brake Unit
Courtesy of Mazda Motors Corp.

OVERHAUL

NOTE: Use appropriate illustrations for exploded view of rear caliper assembly, master cylinder and power brake unit. See Figs. 5 & 6.



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Mazda

Fig. 5: Exploded View Of Typical Master Cylinder
Courtesy of Mazda Motors Corp.

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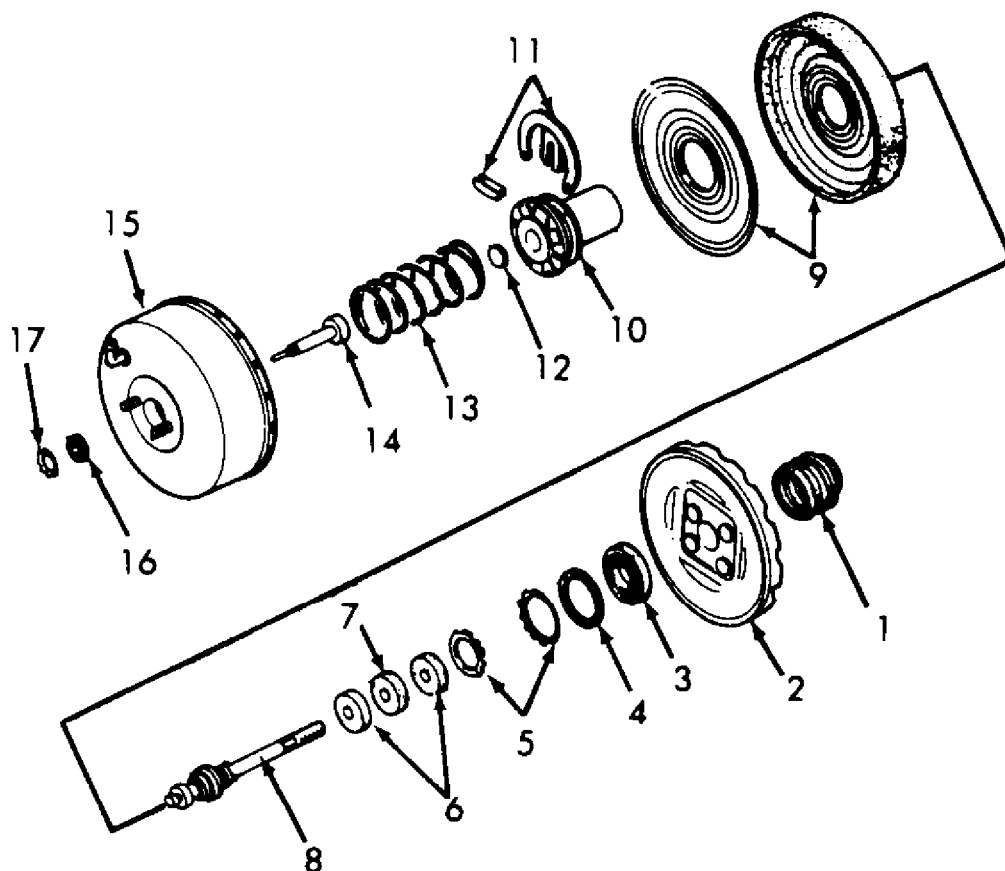
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- | | |
|------------------------|-------------------|
| 1. Dust Boot | 10. Power Piston |
| 2. Rear Shell | 11. Retainer Key |
| 3. Dust Seal | 12. Reaction Disc |
| 4. Bearing | 13. Spring |
| 5. Retainer | 14. Push Rod |
| 6. Air Filter | 15. Front Shell |
| 7. Air Silencer | 16. Seal |
| 8. Valve Rod & Plunger | 17. Retainer |
| 9. Diaphragm & Plate | |

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Fig. 6: Exploded View Of Power Brake Unit
Courtesy of Mazda Motors Corp.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

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Application	Ft. Lbs. (N.m)
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Caliper Guide Bolt	
929	

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Front	46-62 (63-84)
Rear	27-36 (37-49)
Caliper Mounting Bracket Bolt	
929	
Front	75-87 (102-118)
Rear	34-49 (46-67)
Wheel Lug Nut	
929	65-87 (88-118)
	INCH Lbs. (N.m)

Wheel Cylinder Mounting Bolt	
929	88-108 (10-12)
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DISC BRAKE SPECIFICATIONS

DISC BRAKE SPECIFICATIONS TABLE

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Application	In. (mm)
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929	
Front (1)	
Original Thickness94 (24)
Discard Thickness87 (22)
Rear (1)	
Original Thickness71 (18)
Discard Thickness63 (16)

(1) - Maximum lateral runout is .004" (.10 mm).

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END OF ARTICLE