

**GROUP 22****FRONT AND REAR BRAKES****INDEX**

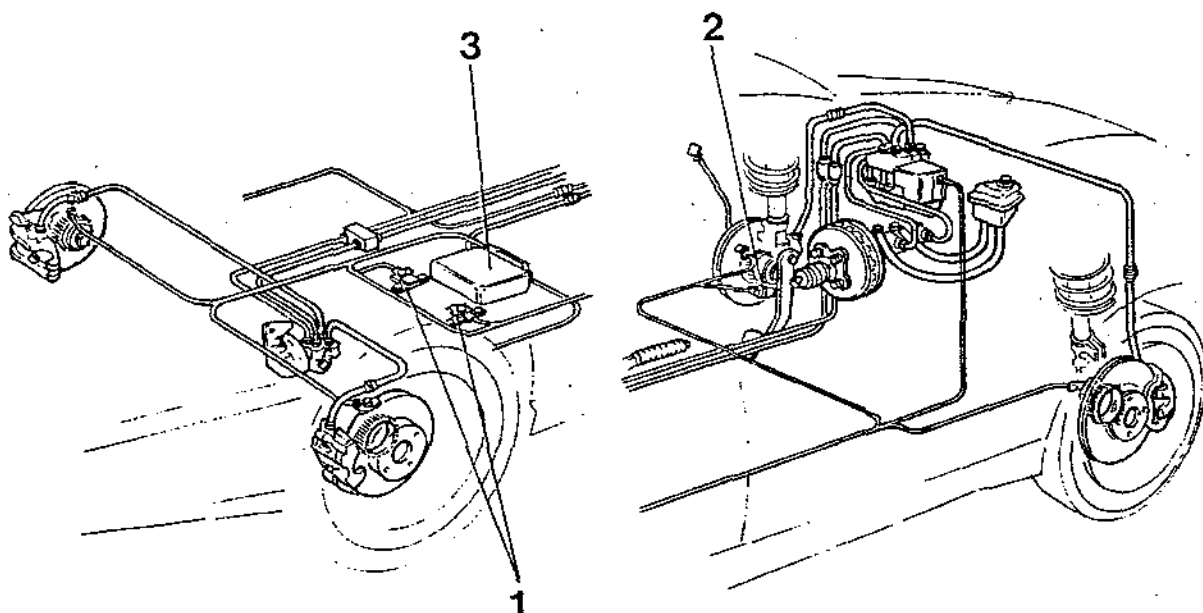
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## FRONT AND REAR BRAKES

### HYDRAULICALLY CONTROLLED BRAKING SYSTEM WITH A.B.S. (Anti Blockier System) BOSCH 2S

#### DESCRIPTION



1. Longitudinal and transversal acceleration sensors
2. Switch on clutch pedal
3. Integrated A.B.S. / engine control unit

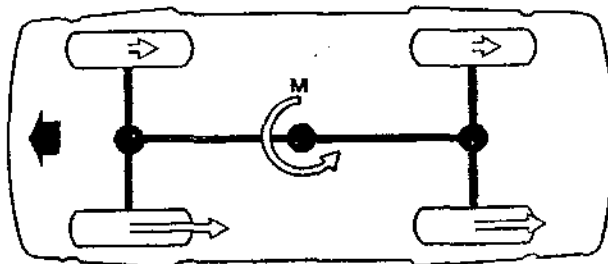
#### System identification

The hydraulically controlled braking system is integrated as standard on the 2.0 T.B. 4x4 version, by an A.B.S BOSCH 2S anti-wheel lock system (6 sensors, 4 channels).

#### System components

The system, specifically designed for vehicles fitted with four-wheel drive, differs from the 2E type used for other versions in the 155 range in that it has the components listed below and for the different method of operation;

- two supplementary sensors (1) for the measurement of both longitudinal and transversal acceleration to which the vehicle is subject when in motion.





- a switch applied to the clutch pedal which informs the electronic control unit whether the clutch is engaged or not
- electronic control units both of the ABS system and the integrated engine management system are interfaced with each other in order to optimize the functioning of the system itself.

#### Operation logic ("prudential" or maximum anti-lock efficiency)

One of the characteristics of four-wheel drive vehicles is the tendency to increase the spinning effect to which the vehicle is subject when braking in situations where there is a difference in traction between the two sides of the vehicle.

The spinning effect is caused by the almost rigid coupling between the two axles and between the two wheels of the same axle.

In order to reduce this phenomenon, the control unit adopted for the 2S version of the ABS BOSCH system uses an operational logic indicated by the letters GNC, of the "prudential" type. This logic, which aims to generate a more even braking torque, is based on the modulation of the braking torque on the wheels with the greatest degree of traction and is already used on the two-wheel drive vehicles fitted with a last generation ABS system even though in these cases the braking regulation is very short (only one modulation cycle).

For the 155 four-wheel drive, the GMA logic is active for successive braking modulation cycles.

In addition to the advantages of this system there is also a disadvantage in that this type of logic, to prevent the vehicle from spinning, penalizes the braking action when cornering if road holding is low. If the risk of spinning is minimal or if the bend is taken at high speed, the control unit abandons the "prudential" function restoring the full ABS efficiency.

The specific conditions which permit the exclusion of the new type of logic are communicated to the control unit by the ABS system via the longitudinal (minimal spin) and transversal (bend at high speed) accelerometers.

#### Corrective function of the "fast idle"

When there is a situation of combined deceleration and braking on vehicles fitted with four-wheel drive (like the 155 2.0 TB 4x4), especially when this occurs on snow or ice, the two braking actions (engine and brakes) are also distributed to the rear axle which is already in a critical position, resulting in the tendency to brake this axle more than needed. In this situation the ABS control unit induces that of the electronic management of the engine integrated with it (3) to momentarily increase the idle speed. This corrective function, called "fast idle", is excluded if switch (2) located on the clutch pedal signals that the engine is disengaged from the drive system.

**TECHNICAL DATA AND SPECIFICATIONS****TECHNICAL DATA****BRAKE PUMP**

Model	Type	Diameter	Stroke
155 ☒ (167A2C-167A2E)	ISOVAC	15/16" (23.8 mm)	5/8" (16+16 mm)

**SERVO-BRAKE**

Model	Type	Diameter of cylinder
155 ☒ (167A2C)	ISOVAC	7"+8" (17.78+20.32 cm)
155 ☒ (167A2E)		9" (22.86 cm)

**FRONT BRAKE CALIPERS**

Model	Type	Piston diameter (mm)	Area of brake pads (cm <sup>2</sup> )	Nominal thickness of brake pads (mm)
155 ☒ (167A2C-167A2E)	ALTECNA	54	50	18.3 ± 0.2

**REAR BRAKE CALIPERS**

Model	Type	Piston diameter (mm)	Area of brake pads (cm <sup>2</sup> )	Nominal thickness of brake pads (mm)
155 ☒ (167A2C-167A2E)	GIRLING	34	21	14 <sup>-0</sup> / <sub>+0.4</sub>



# GENERAL SPECIFICATIONS

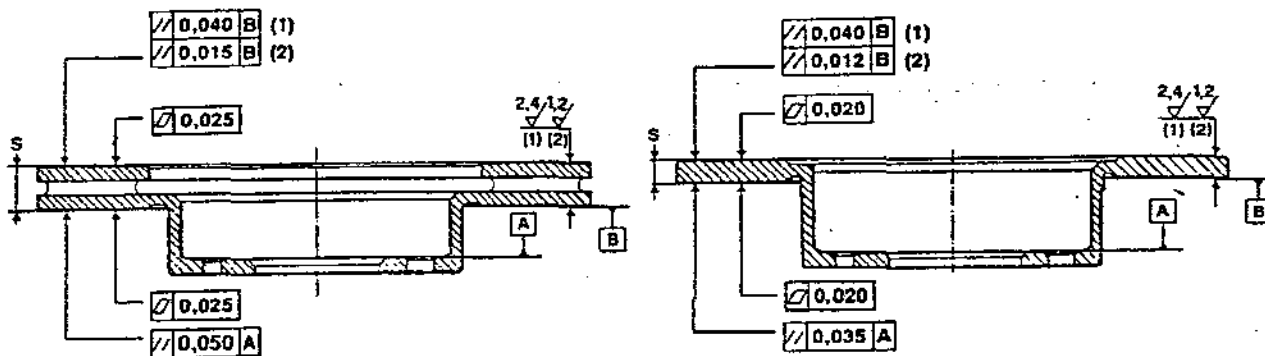
## FLUIDS AND LUBRICANTS

APPLICATION	TYPE	NAME
Pedal joints and bushes	GREASE	TUTELA MR3
Brake/clutch hydraulic system refill	FLUID Class: DOT 4 SAE J170 3F	ALFA ROMEO BRAKE FLUID SUPER DOT 4
Seat for anti-lock front/rear wheel inductive sensor	GREASE	FIAT Zeta 2

## CHECKS AND ADJUSTMENTS

BRAKE DISK		2.0 T.B. 4x4	
		FRONT	REAR
Diameter	(mm)	284	240
Limit operating thickness	(mm)	20.2	9.2
Minimum thickness after grinding	(mm)	21.2	10.2
Nominal thickness	(mm)	22.2	11.2

## BRAKE DISK GRINDING DIMENSIONS



1. Radial
2. Circumferential

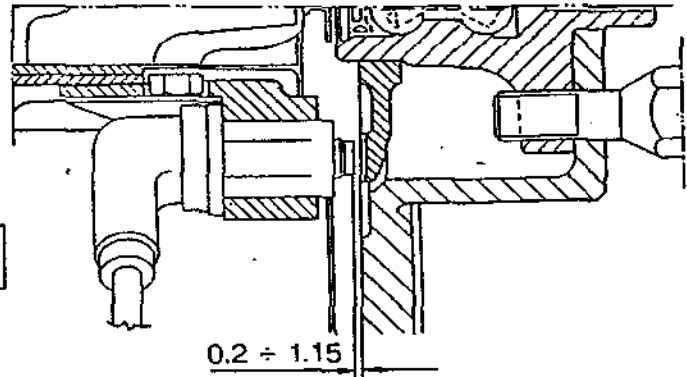
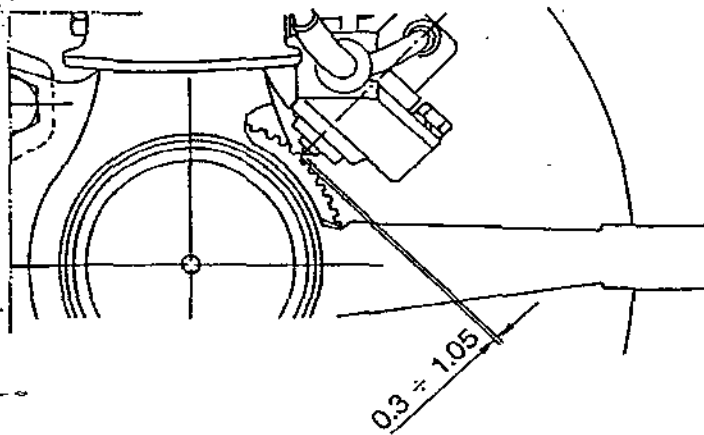


BRAKE PAD	FRONT	REAR
Limit operating thickness	3 mm	

**ADJUSTMENT OF AIR GAP BETWEEN INDUCTIVE SENSORS AND PHONIC WHEELS**

Front wheels

Rear wheels





## TIGHTENING TORQUES

Description	N·m	kg·m
Connection for pipe fitting on master cylinder	15.3 + 18.9	1.55 + 1.93
Nut securing master cylinder	13 + 21	1.33 + 2.14
Nut securing servo brake to pedal support	9.75 + 15.75	0.99 + 1.61
Nut securing accelerator pedal to pedal support	2.86 + 4.62	0.29 + 0.47
Columns (screws) securing front and rear wheels	83.3 + 102.9	8.49 + 10.49
Screw securing front brake calipers	74.8 + 92.4	7.62 + 9.42
Screw with centering pin for securing front and rear brake disks	5.4 + 12.6	0.55 + 1.28
Screw securing front and rear brake disks	5.4 + 12.6	0.55 + 1.28
Bleeder screw on brake calipers	3.71 + 5.99	0.38 + 0.61
Fitting connecting hose to brake calipers	15.3 + 18.9	1.55 + 1.93
Screw securing rear brake calipers	45.05 + 55.65	4.60 + 5.67
Connection between hoses and pipes	15.3 + 18.9	1.55 + 1.93
Screw securing braking regulator to rear crossmember	3.74 + 4.62	0.38 + 0.47
Screw for braking regulator control lever	20.4 + 25.2	2.08 + 2.57
Fitting connecting pipe on braking regulator and 4-way distributor	9.35 + 11.55	0.95 + 1.18
Screw securing handbrake to body	18.2 + 29.4	1.86 + 3.00
Screw securing clutch-brake fluid reservoir to body	3.32 + 4.05	0.34 + 0.42
Nut securing hydraulic control unit to bracket	3.4 + 4.2	0.35 + 0.43
Screw securing control unit support bracket to body	20.4 + 25.2	2.08 + 2.57
Screw securing front and rear wheel inductive sensor	4.8 + 6.0	0.49 + 0.61
Screw securing front and rear, right and left guards to strut	5.1 + 6.3	0.52 + 0.64
Pipe connection on brake pump	9.35 + 11.55	0.95 + 1.18