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1996 NISSAN Patrol LWB OEM Service and Repair Workshop Manual

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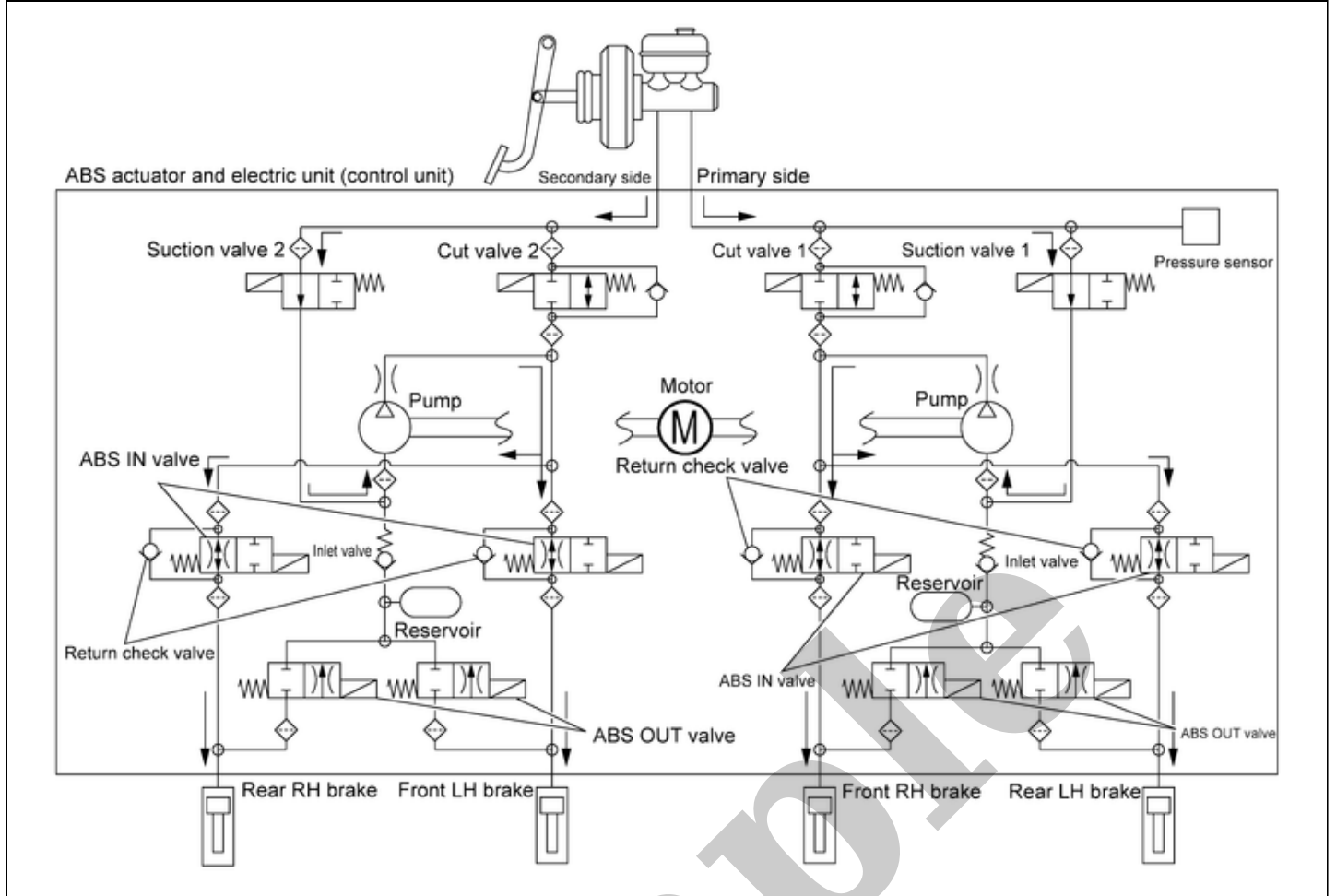
Component parts	Signal description
Parking brake actuator (LH)	Refer to Component Description .
Parking brake actuator (RH)	Refer to Component Description .
VCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • VCM status signal • Accelerator pedal position signal • Traction motor status signal • Traction motor torque signal • Traction motor torque request signal • Shift position signal • Target regenerative torque signal • Current regenerative torque signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Regenerative cooperative executable torque signal • Brake control signal
BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Turn indicator signal • Seat belt buckle switch (driver side) signal • Vehicle status signal • Door switch (driver side) signal • Brake pedal status signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp request signal
Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Intelligent trace control signal • Automatic brake hold release request signal • Automatic brake hold operation request signal • Chassis control module malfunction signal • Electric parking brake operation request signal • Electric parking brake release request signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electric parking brake operation signal (switch)

Component parts	Signal description
	<ul style="list-style-type: none"> • Electric parking brake status signal
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • VDC setting signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • Brake warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake system warning lamp signal • Electric parking brake warning lamp signal • Meter display signal • Buzzer output signal
IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Power switch ON signal
Steering angle sensor	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Steering angle sensor signal
Electrically-driven intelligent brake unit	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stroke sensor signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electrically-driven intelligent brake control signal

VALVE OPERATION [VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, AND BRAKE FORCE DISTRIBUTION FUNCTION]

Each valve is operated and fluid pressure of brake is controlled.

VDC Function, TCS Function, hill start assist Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, and Brake Force Distribution Function are in Operation (During Pressure Increases)



SIEMD-7262715-02-000382419

Name	Not activated	During pressure increases
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)
Suction valve 2	Power supply is not supplied (close)	Power supply is supplied (open)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure increases

During pressure front RH brake increases

- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 1 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front RH brake through the ABS IN valve. For the left brake, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the left brake is controlled separately from the right brake.

During pressure front LH brake increases

- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front LH brake through the ABS IN valve. For the right brake, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right brake is controlled separately from the left brake.

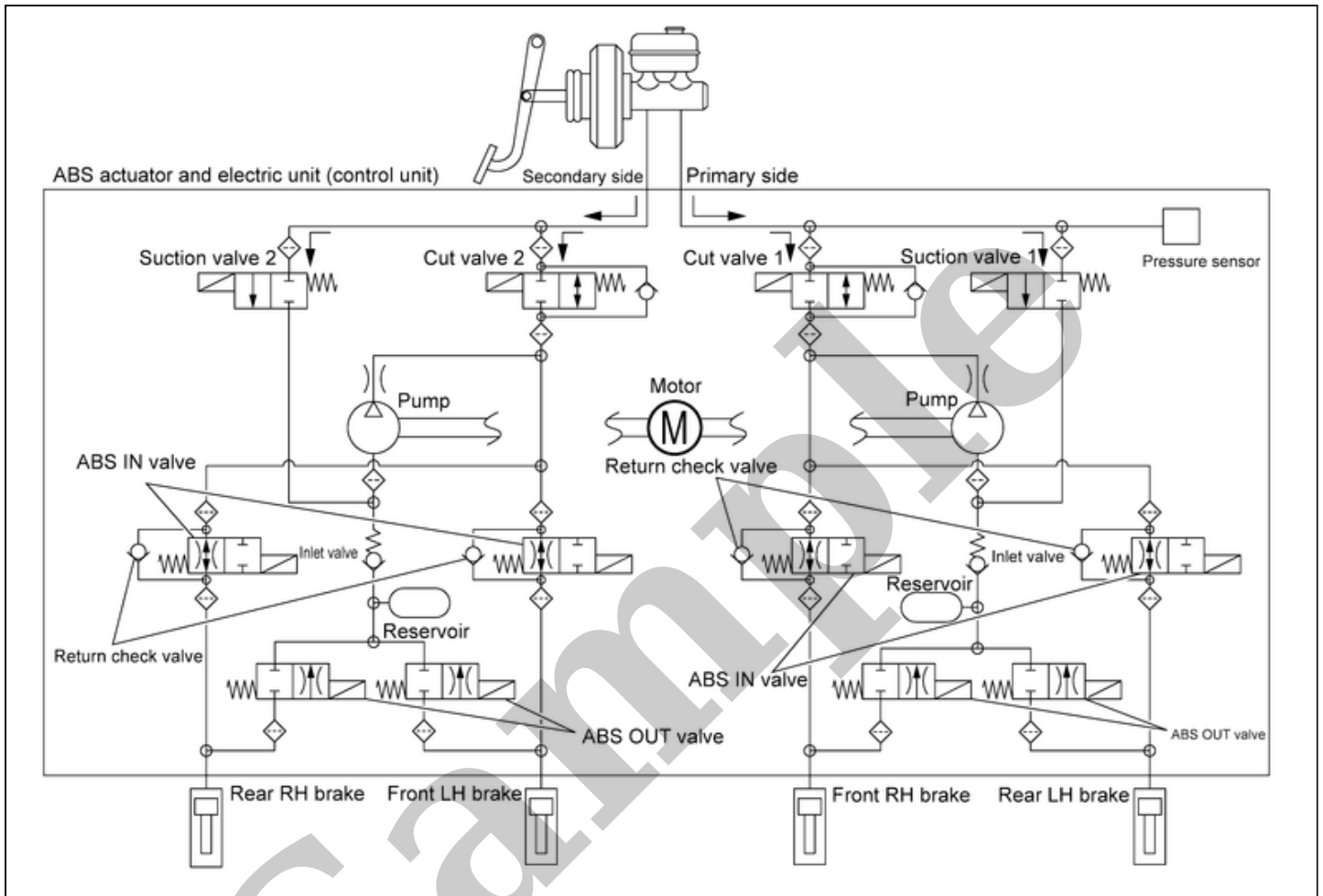
During pressure rear RH brake increases

- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the rear RH brake through the ABS IN valve. For the left brake, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the left brake is controlled separately from the right brake.

During pressure rear LH brake increases

- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 1 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the rear LH brake through the ABS IN valve. For the right brake, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right brake is controlled separately from the left brake.

VDC Function, TCS Function, hill start assist Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, and Brake Force Distribution Function are in Operation (During Pressure Holds)



SIEMD-7262715-03-000382420

Name	Not activated	During Pressure holds
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure holds

During pressure front RH brake holds

- Since the cut valve 1 and the suction valve 1 are closed, the front RH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake. The pressurization for the left brake is controlled separately from the right brake.

During pressure front LH brake holds

- Since the cut valve 2 and the suction valve 2 are closed, the front LH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front LH brake. The pressurization for the right brake is controlled separately from the left brake.

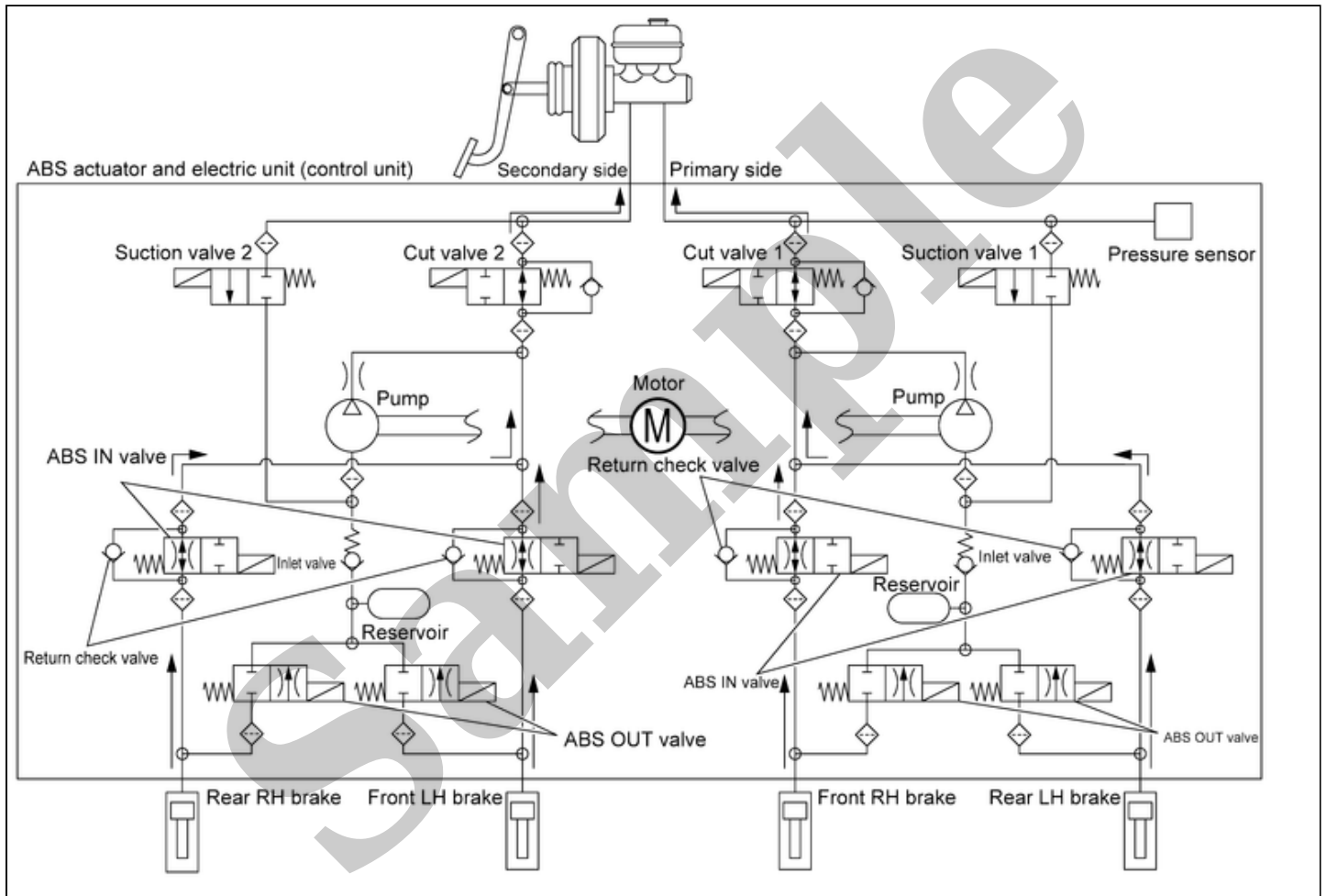
During pressure rear RH brake holds

- Since the cut valve 2 and the suction valve 2 are closed, the rear RH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the rear RH brake. The pressurization for the left brake is controlled separately from the right brake.

During pressure rear LH brake holds

- Since the cut valve 1 and the suction valve 1 are closed, the rear LH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the rear LH brake. The pressurization for the right brake is controlled separately from the left brake.

VDC Function, TCS Function, hill start assist Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, and Brake Force Distribution Function are in Operation (During Pressure Decrease)



SIEMD-7262715-04-000382421

Name	Not activated	During pressure decreases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure decreases

During pressure front RH brake decreased

- Since the suction valve 1 and the ABS OUT valve close and the cut valve 1 and the ABS IN valve open, the fluid pressure applied on the front RH brake is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 1. The pressurization for the right brake is controlled separately from the left brake.

During pressure front LH brake decreased

- Since the suction valve 2 and the ABS OUT valve close and the cut valve 2 and the ABS IN valve open, the fluid pressure applied on the front LH brake is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 2. The pressurization for the left brake is controlled separately from the right brake.

During pressure rear RH brake decreased

- Since the suction valve 2 and the ABS OUT valve close and the cut valve 2 and the ABS IN valve open, the fluid pressure applied on the rear RH brake is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 2. The pressurization for the right brake is controlled separately from the left brake.

During pressure rear LH brake decreased

- Since the suction valve 1 and the ABS OUT valve close and the cut valve 1 and the ABS IN valve open, the fluid pressure applied on the rear LH brake is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 1. The pressurization for the left brake is controlled separately from the right brake.

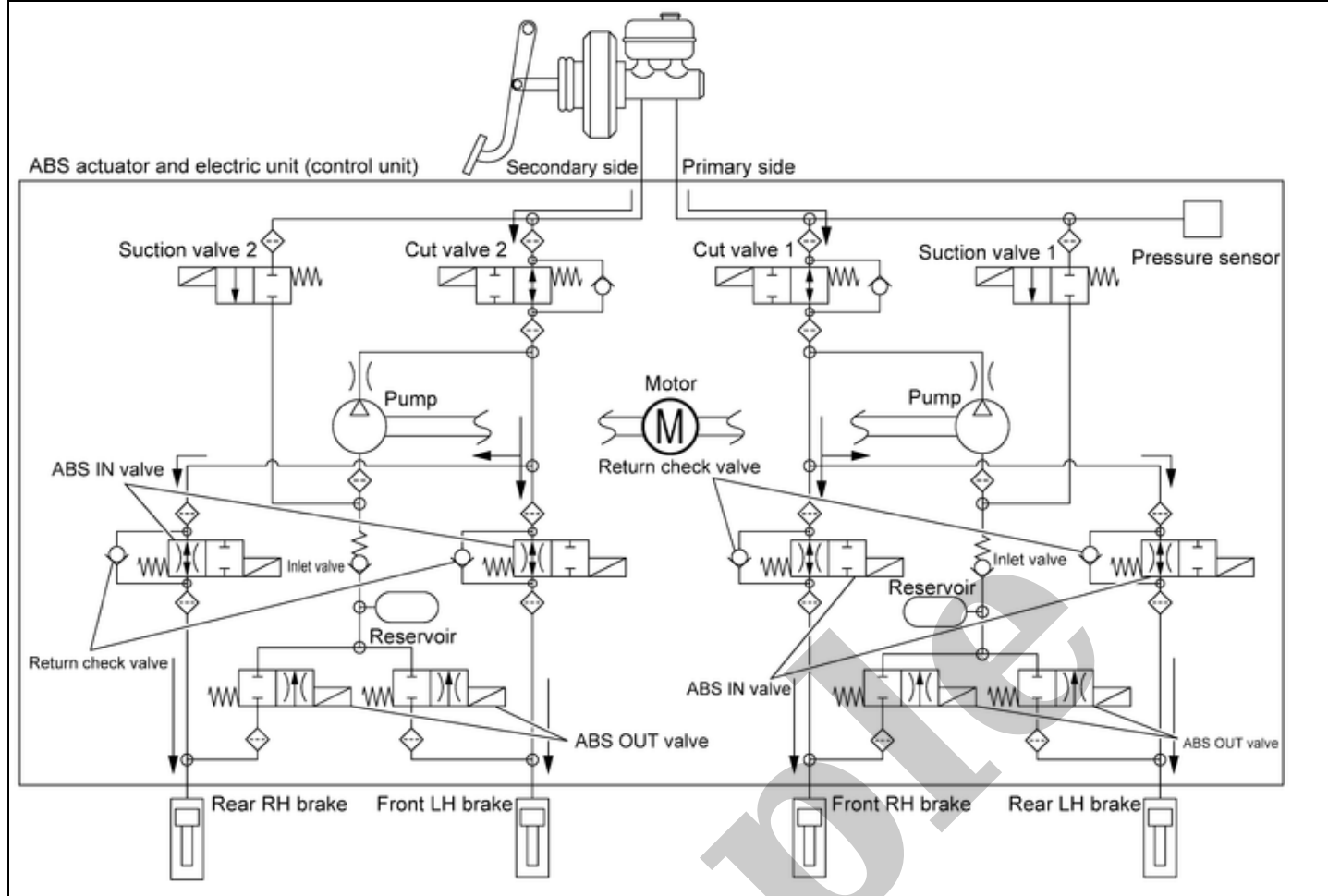
Component Parts and Function

Component parts	Function
Pump	<ul style="list-style-type: none">• Returns the brake fluid reserved in reservoir to electrically-driven intelligent brake unit by reducing pressure.• Pressure the brake fluid and send.
Motor	Activates the pump according to signals from electric unit (control unit).
Cut valve 1 Cut valve 2	Shuts off the brake line from electrically-driven intelligent brake unit to each brake.
Suction valve 1 Suction valve 2	Opens the brake line from electrically-driven intelligent brake unit to pump.
ABS IN valve	Switches the fluid pressure line to increase or hold according.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according.
Check valve	Brake fluid does not back flow.
Return check valve	Returns the brake fluid from each brake to electrically-driven intelligent brake unit by bypassing orifice of each valve when brake is released.
Reservoir	Temporarily reserves the brake fluid drained from each brake, so that pressure efficiently decreases when decreasing pressure of each brake.
Pressure sensor	Detects the brake fluid pressure and transmits signal to electric unit (control unit).

VALVE OPERATION (ABS FUNCTION)

Each valve is operated and fluid pressure of brake is controlled.

When Brake Pedal is Applied



SIEMD-7262715-05-000382422

Name	Not activated	During Pressure increases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure increases

During pressure front RH brake increases

- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the front RH brake from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

During pressure front LH brake increases

- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the front LH brake from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

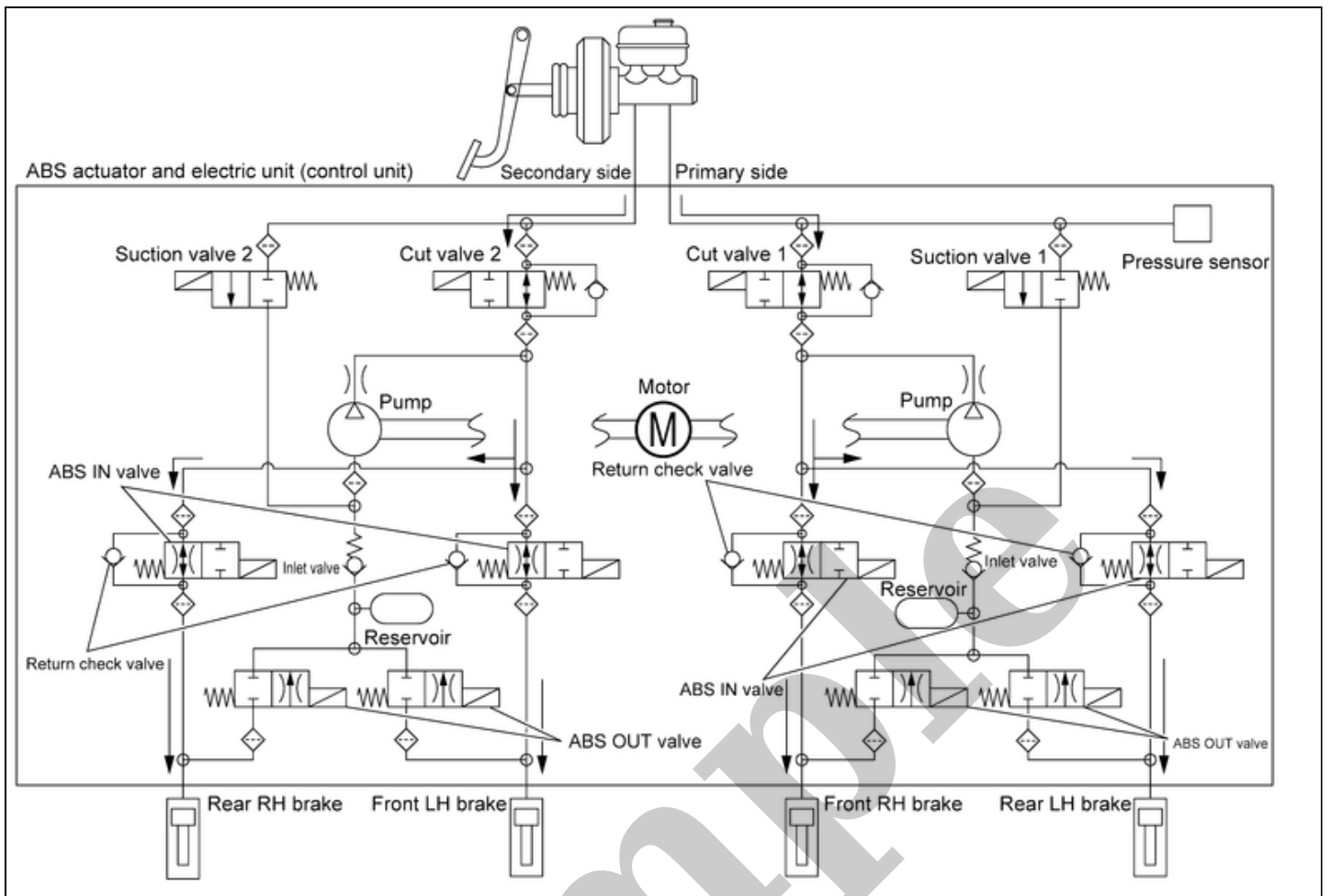
During pressure rear RH brake increases

- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the rear RH brake from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

During pressure rear LH brake increases

- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the rear LH brake from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

When ABS Function is in Operation (During Pressure Increases)



SIEMD-7262715-06-000382422

Name	Not activated	When Pressure increases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure increases

During pressure front RH brake increases

- Brake fluid is supplied to the front RH brake from the electrically-driven intelligent brake unit through the cut valve 1 and the ABS IN valve. Since the suction valve 1 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the front RH brake from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

During pressure front LH brake increases

- Brake fluid is supplied to the front LH brake from the electrically-driven intelligent brake unit through the cut valve 2 and the ABS IN valve. Since the suction valve 2 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the front LH brake from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

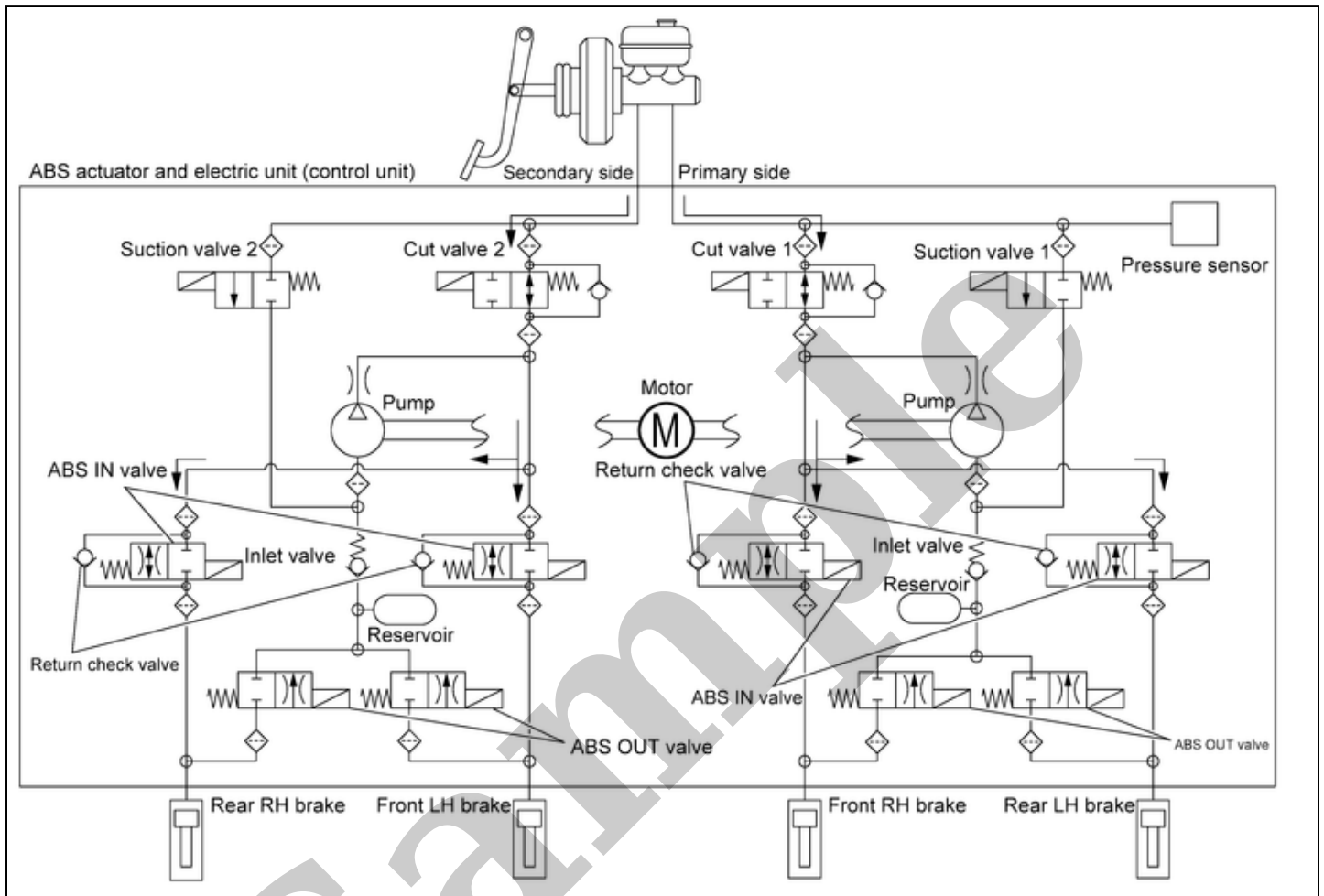
During pressure rear RH brake increases

- Brake fluid is supplied to the rear RH brake from the electrically-driven intelligent brake unit through the cut valve 2 and the ABS IN valve. Since the suction valve 2 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the rear RH brake from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

During pressure rear LH brake increases

- Brake fluid is supplied to the rear LH brake from the electrically-driven intelligent brake unit through the cut valve 1 and the ABS IN valve. Since the suction valve 1 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the rear LH brake from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

When ABS Function is Operating (During Pressure Holds)



SIEMD-7262715-08-000382423

Name	Not activated	During pressure holds
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure holds

During pressure front RH brake holds

- Since the ABS IN valve and the ABS OUT valve are closed, the front RH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake.

During pressure front LH brake holds

- Since the ABS IN valve and the ABS OUT valve are closed, the front LH brake, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front LH brake.

During pressure rear RH brake holds