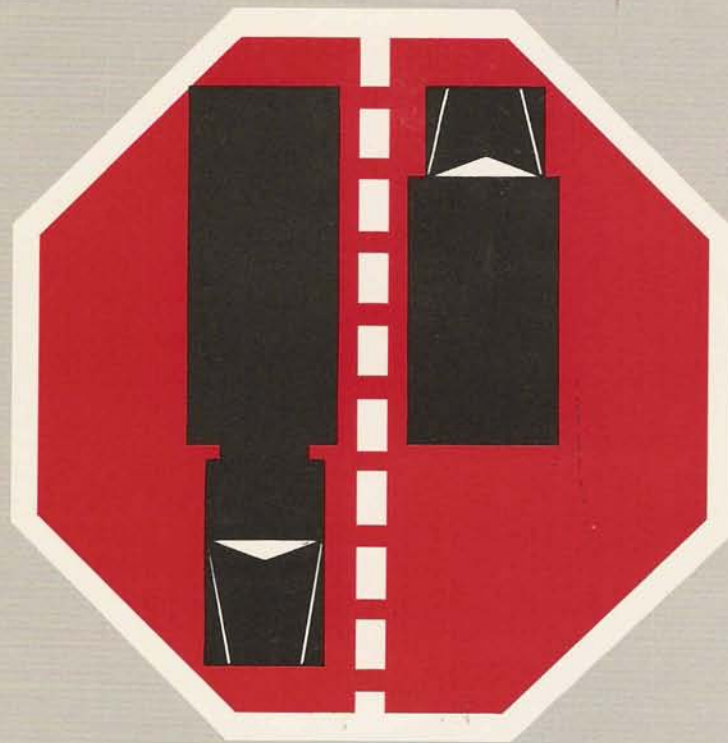


ROCKWELL-STANDARD®

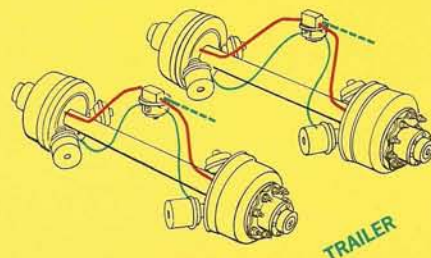
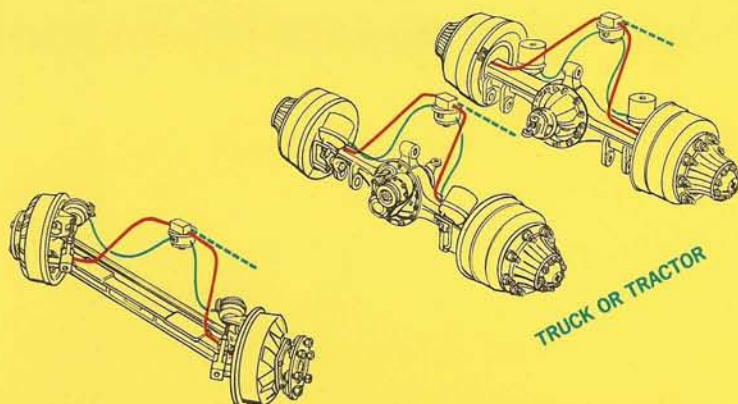
Skid-Trol®



**A computerized skid
control system
for air-braked
commercial vehicles**

DESIGNED TO GIVE CONSISTENT
STRAIGHT STOPS FOR TRUCKS
AND TRACTOR TRAILERS ON
ALL SURFACES, UNDER ALL
ROAD CONDITIONS

THE **Skid-Trol** BRAKE SYSTEM



— SENSOR LINES
— AIR LINES
- - - ELECTRICAL LINES

INTRODUCTION TO ROCKWELL-STANDARD SKID-TROL

Skid-Trol is a product of Rockwell International, the world's largest and most experienced maker of truck axles, truck brakes, trailer axles and trailer brakes. Rockwell International currently supplies the truck and trailer industry with over 70% of its air brake components.

Skid-Trol wheel anti-lock brake control system combines our comprehensive knowledge of heavy-duty brake equipment with the electronic expertise of our Microelectronic Division.

It is an axle-by-axle system in which the wheel anti-lock system on each axle operates independently of other axles on the vehicle. This offers the vehicle operator the best combination of (1) vehicle stability, (2) reliability, (3) fewer components, (4) ease and simplicity of maintenance, and (5) overall economy of operation.

WHY ROCKWELL-STANDARD SKID-TROL?

Most truck and trailer braking systems provide enough stopping power under maximum loads on dry concrete surfaces.

However, conditions change. Light loads or wet and slippery pavement make it difficult, even for the most

skilled drivers, to apply just the right amount of air pressure during emergency stops under all circumstances. Locked wheels may occur, with a resulting loss of vehicle stability and possible damaging skids.

Skid-Trol was developed to automatically match stopping power—instantaneously—with road and vehicle load conditions. This minimizes wheel lock during braking, improves the driver's ability to steer in heavy braking situations, and helps him make safer, controlled, straight stops.

HOW DOES SKID-TROL WORK?

When the driver depresses the brake pedal, air pressure is delivered by the Skid-Trol valve to both brakes on the axle. As the braking action takes place, the small magnetic wheel speed sensors, at each wheel, send wheel speed signals to the electronic logic in the Skid-Trol valve, and the logic makes an evaluation of the wheel deceleration. During the vast majority of stops this rate of deceleration will not be critical and normal driver controlled braking will take place.

But when wheel deceleration is critical and wheel lock-up is imminent, the electronic logic commands the Skid-Trol valve to automatically reduce the air pressure to a level to minimize wheel lock up while maximizing braking effort. During the stop, the logic continues to monitor wheel speed, and makes constant decisions to maintain optimum braking.

Because the system proportions air pressure, rather than turning it full on or off, it produces a smooth stop and conserves air system reservoir pressure.

Other features of the module include:

1. The electronic module is encapsulated for added resistance to shock and contamination.
2. Electronics operate with either positive or negative battery ground, and have transient protection. The unit also has its own power regulation to accommodate varying vehicle voltage supplies.
3. Electronic power for the system is obtained from the stoplight circuit on trailers, and either the stoplight or continual power circuits on trucks and tractors.

IMPORTANT SKID-TROL ADVANTAGES

Superior Performance

Rockwell International's primary design objective for the Skid-Trol system is to provide vehicle operators with a stable, controllable brake system for emergency stops. In addition, the system was also designed to conform to Motor Federal Safety Standards No. 121 for air-braked vehicles.

This Standard includes truck stopping-distance requirements, truck and trailer 12-foot lane stability requirements, pneumatic system timing specifications and wheel anti-lock performance.

Adaptability, Reliability, Ruggedness, Simplicity

Skid-Trol can be used equally well with cam brakes, wedge brakes or any combination of these.

Skid-Trol can be used on a tractor when there is no anti-lock system on the trailer, or on a trailer with no anti-lock system on the tractor. Since it replaces current relay valves and quick-release valves, it is economical to install and to maintain. Electrical connectors have been held to a minimum and are con-

sidered to be the most reliable available in the industry.

The entire system has been designed by Rockwell International to meet the rugged operating conditions of today's trucking industry—to stand up under the most adverse circumstances.

Serviceability

Skid-Trol has only three basic components per axle. The electronic module and the wheel speed sensors are replaced as units. The Skid-Trol valve can be replaced, or it can be reconditioned with three service inserts. Optional outboard hub cap mounted sensors on trailer axles make servicing and inspection quick and simple.

A compact portable tester is available to simplify and speed up service operations. It quickly checks the electronic module, wheel speed sensors and the Skid-Trol valve. An indicator light will be located in the cab to note a requirement for service for the tractor. An optional light will indicate if service is necessary on the trailer.

Product Integrity

The selection of an anti-skid system should rest, to an important degree, on the reputation, the total involvement, the integrity, the experience of its makers.

Rockwell International is the world's largest manufacturer of truck axles, truck brakes, trailer axles, trailer brakes and microelectronic systems; and is proud of its reputation as builders of products of the highest quality and reliability.

Our years of experience—in engineering, manufacturing and service—stand behind Skid-Trol.

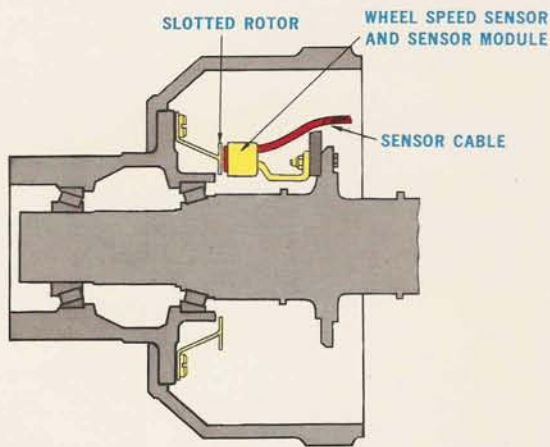
Specify "Skid-Trol" anti-wheel lock system—
From Rockwell-Standard.

WE GIVE YOU MORE OF WHAT YOU WANT!

A SIMPLE AND RELIABLE SKID-TROL BRAKE SYSTEM

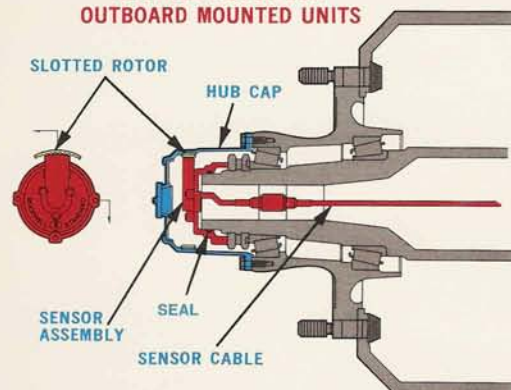
THE SKID-TROL COMPONENTS

THE SKID-TROL WHEEL SPEED SENSOR,
SENSOR BRACKET AND SLOTTED ROTOR
FOR INBOARD MOUNTED UNITS



Each wheel on the vehicle contains a small magnetic speed sensor mounted within a sensor module. The sensor and sensor module assembly is mounted on the non-rotating brake spider. Attached to the hub or cast wheel is a slotted rotor which rotates with the wheel. As the rotating slots pass the speed sensor, wheel speed pulse signals are generated and are fed back to the electronic computer in the Skid-Trol valve.

THE SKID-TROL WHEEL SPEED
SENSOR ASSEMBLY, HUB CAP AND
SLOTTED ROTOR FOR
OUTBOARD MOUNTED UNITS



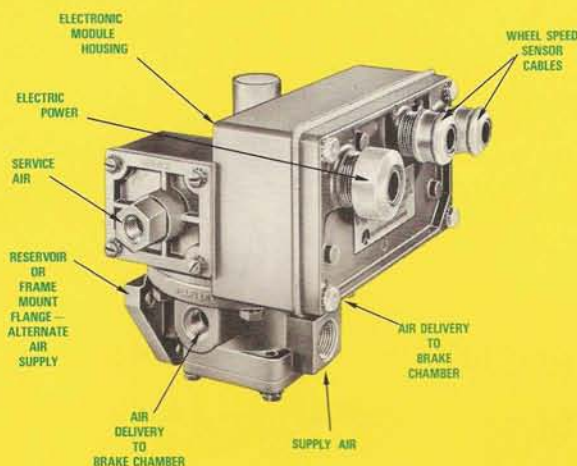
The sensor is a one-piece unit. One is mounted onto each end of the trailer axle spindle. The hub caps, with a slotted rotor unit inside, are bolted to the wheel hubs. This facilitates inspection and wheel end servicing. Sensor and Rotor clearances are self-setting when installed or serviced and require no special tools.

Each unit is sealed in lubricant and is inside the wheel; therefore, they are protected from contaminants and flying objects thrown up by the wheels.

SOME IMPORTANT FEATURES:

1. The same type of inboard sensor electronics and pneumatic valves are used on steering, drive or trailer axles.
2. The sensor is a variable reluctance type magnetic speed transducer. The speed signal fed to the computer is strong and clear down to a very low wheel speed, and enables the Skid-Trol system to function down to a vehicle speed of three miles per hour.
3. The sensor assembly automatically sets the proper gap between the sensor and slotted rotor when the wheel is assembled. If a wheel end is serviced, the proper sensor-rotor relationship is automatically reset when reassembled.
4. The sensor and the electric cable leading into the sensor are encapsulated for maximum protection and long life and is resistant to temperature sensitivity.

THE SKID-TROL VALVE



The Skid-Trol Valve

The Skid-Trol valve, one for each axle of the vehicle, is a high capacity pneumatic valve which also houses the electronic logic of the system. It takes the place of existing quick-release or relay valves on trucks, and relay emergency valves on trailers and governs the wheel anti-lock function.

The valve operates in this way:

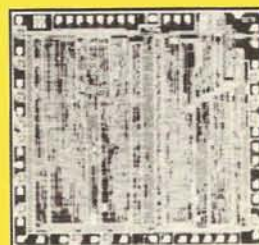
During normal braking, service air pressure flows through a solenoid to the top of a diaphragm in the valve. This diaphragm depresses a piston, and air delivery is made to the brake chambers at the pressure commanded by the driver.

If the logic receives a signal that indicates imminent wheel lock-up, air pressure is reduced by solenoid action. The pressure level determined by the logic minimizes wheel lock-up, but is high enough also to minimize stopping distances.

Important features of the Skid-Trol valve include:

1. Corrosion resistant, aluminum, die-cast body.
2. Electrical connections are made within the Skid-Trol valve. The two-wheel speed cables and the electrical power cable plug into the valve with polarized, compression-type, water-tight, screw-on fittings, designed especially by Rockwell-Standard.
3. The valve may be mounted directly to the air reservoir, or to the vehicle frame.

THE SKID-TROL COMPUTER



MAGNIFIED 10 TIMES



ONE DIME

ACTUAL
COMPUTER
SIZE

4. Same type of Skid-Trol valve is used on steering, drive and trailer axles.
5. The Skid-Trol valve replaces existing quick-release valves, relay valves, and relay emergency valves.
6. It is compact and serviceable. Service inserts can be removed and replaced without removing the Skid-Trol valve.

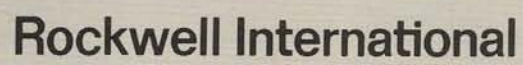
The Electronic Module

Housed in the Skid-Trol valve is an electronic module containing the heart of the Skid-Trol system—the M.O.S. (metal oxide semi-conductor) silicon chip.

The M.O.S. chip, a product of the Rockwell International Microelectronics Division, contains the logic system. This tiny digital computer, is a solid state device with the equivalence of 2000 transistors.

This highly accurate, temperature and shock resistant solid state miniature computer has the ability to make decisions on 500 system and braking conditions 50 times per second.

Rockwell-Standard Skid-Trol is the only anti-wheel lock system utilizing advanced M.O.S. digital micro-electronics with its extensive ability to solve the many complex vehicle stopping conditions. It does not require a decelerometer or add on computer components. The result is excellent vehicle control and short stopping ability on ice, wet or dry pavement, or any combination or road and load conditions.



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