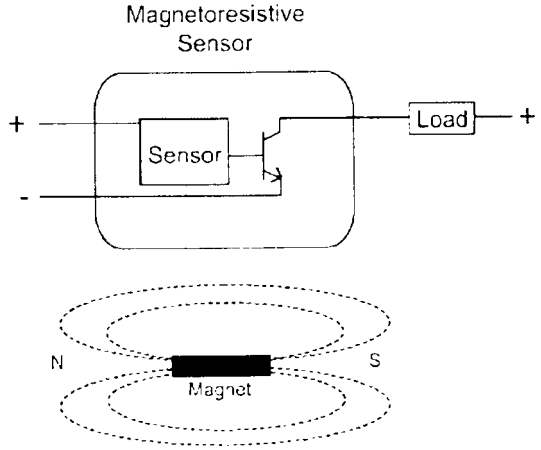
HALL SWITCH TECHNICAL BULLETIN
AHS031/AHS331/AHS032/AHS332

1. HALL SENSOR WORKING PRINCIPLE

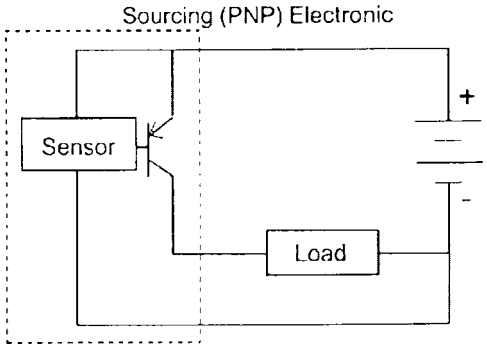
Aurora Hall effect sensors use a solid state (no moving parts) magnetorestrictive sensor. The Hall sensor responds to a North or South magnetic pole, as shown below by providing a digital signal to the output control circuit. The magnetorestrictive sensing technique enables our switch to outperform typical Hall switches by sensing much weaker magnetic fields. Also there is no limit to the maximum strength of the magnetic field a magnetorestrictive sensor will work with as opposed to a normal Hall effect sensor.



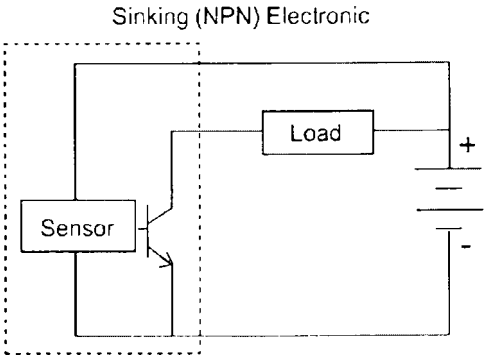
Sinking (NPN) versus Sourcing (PNP):

DC electronic switches are available in Sinking or Sourcing versions. The basic difference between these two ways of solid state switching is as follows:

The SOURCING method connects or switches one side of the load to the positive (+) side of the supply. The negative (-) side is common or connected to the other side of the load as shown below. PNP is the acronym used to describe the transistor that performs this type of switching in a solid state sensor.



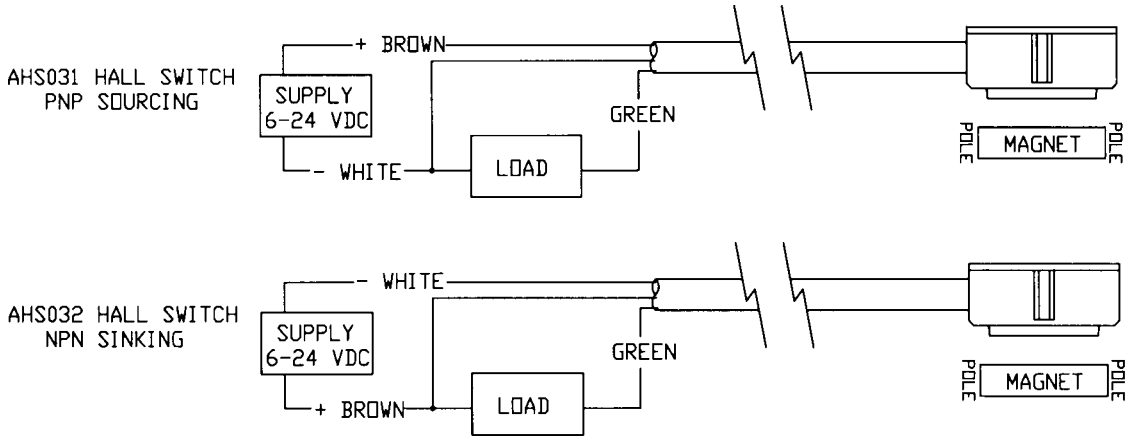
The SINKING method connects or switches one side of the load to the negative (-) side of the supply. The positive (+) side is common or connected directly to the other side of the load as shown below. NPN is the acronym used to describe the transistor that performs this type of switching in a solid state sensor.

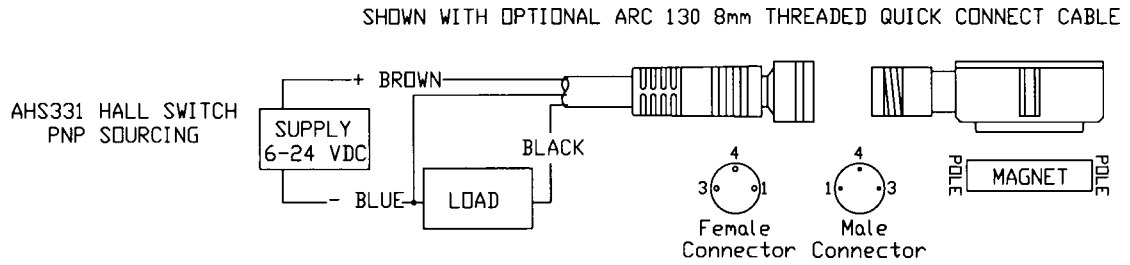


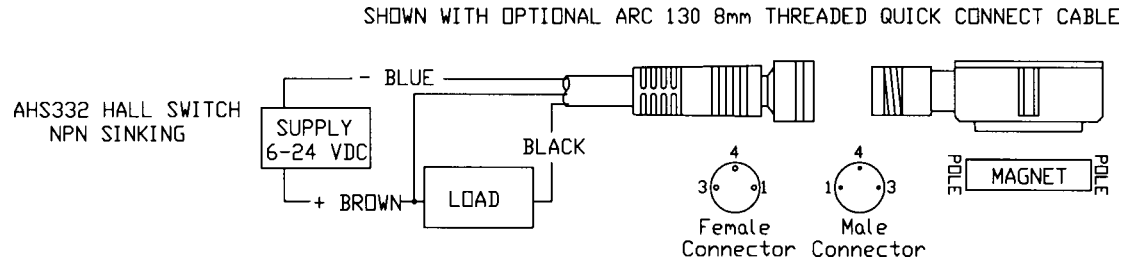
2. WHEN SHOULD HALL SENSORS BE USED

Hall sensors are for 6 – 24 VDC service only in a normally open configuration.
If longevity is the major concern, Hall switches should be used whenever they fit within the operating parameters specified for a given application. They should receive particular attention when high cycle rates are required since they contain no moving parts. If Hall sensors are used within their operating range they will always outlast reed sensors.
Hall switches are highly resistant to shock and vibration.

3. APPLICATION NOTES







Part Number	Description	Function	Switching Voltage	Switching Current	Switching Power	Switching Speed	Voltage Drop
AHS031 AHS331	Electronic Sensor, LED, Sourcing	Normally Open PNP output	6 - 24 VDC	0.5 Amp Max.	12 Watts Max.	1.5 Ms operate 0.5 Ms release	1.0 Volts
AHS032 AHS332	Electronic Sensor, LED, Sinking	Normally Open NPN output	6 - 24 VDC	0.5 Amp Max.	12 Watts Max.	1.5 Ms operate 0.5 Ms release	1.0 Volts

Current and voltage demands of the load must NOT exceed the current and voltage ratings of the switch (shown in the diagram above). Failure to do so will ruin the switch. Voltage must be 6 – 24 VDC and current must be 0.5 amp maximum. There is no minimum current requirement.

There are three types of loads: Resistive (PC or PLC), Capacitive (long wire runs), and Inductive (solenoids).

When using a switch to actuate a solenoid or other Inductive load that may produce large spikes use a surge suppression version of device and/or surge suppression connectors.

Always keep the area around the switch clean and free from potentially magnetic field carrying debris. The switches actuate on magnetic fields produced from the magnet on the cylinder piston. Stray magnetism can give unwanted switch actuation or change the switch activation point.

Use the switch to signal end of stroke only. Do not rely on the switch alone to stop the piston in mid stroke.

All switches include an indicator light which illuminates when the switch is activated. No minimum current rating is required to light the LED.

Hall switches are NEMA 4 rated.

4. TROUBLESHOOTING COMMON PROBLEMS

PROBLEM: LED lights but no output

Cause – Piston speed is too quick for PLC to respond quickly enough to detect sensor output.
Solution – Slow down cylinder speed if possible.

Cause – Bad connection, loose wiring.
Solution – Check wiring connections.

Cause – Improper hookup (sinking vs. sourcing) which could damage the output transistor.
Solution – Refer to diagram for proper hookup.

PROBLEM: Inconsistent switching.

Cause – Weak or damaged magnet.
Solution – Replace the magnet.

Cause – Piston speed is too quick for PLC to respond quickly enough to detect sensor output.
Solution – Slow down cylinder speed if possible.

Cause – Stray signals from other devices.
Solution – Do not locate switch cable near wires from high current devices.