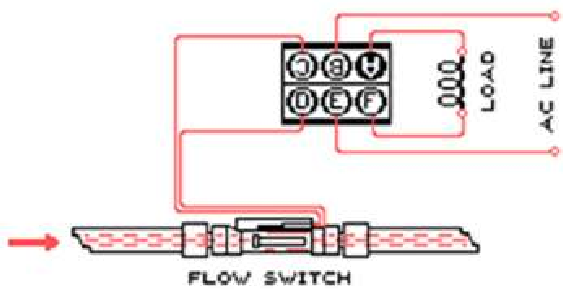
ANGLE OR STRAIGHT BODY?

Aside from the difference in flow path, the **5-20, 21, and 21H flow switches** feature identical internal components. Key factors include **pressure drop, sensitivity, and cleaning ease**, making selection dependent on application needs.

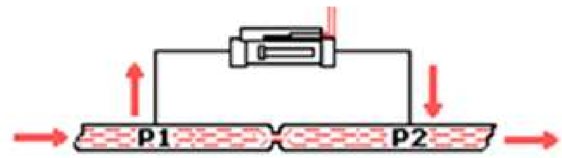
DIRECT FLOW SENSING

Liquids or gases passing through the **flow switch** within its **differential pressure sensitivity and flow rate capacity** trigger detection. **Direct flow sensing** applies when flow rates range between **0.1 to 3 GPM**. The switch is shown connected to a **Button Pack SS Relay** for **higher load capacity**.



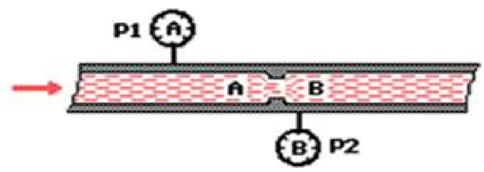
INDIRECT FLOW SENSING

Installing the switch in a **bypass line** enables detection while allowing only a portion of the system's flow to pass through, **broadening application versatility**. Any **flow rate within the unit's pressure range** can be detected **when the required pressure differential is present**.



VENTURI METER SENSING METHOD

The **Venturi meter method** offers a **simple, reliable way** to detect **flow presence or absence** in a pipe. By utilizing **differential velocity-driven suction**, this method measures **flow rate via pressure variations** between two points (A & B). The equation **flow rate = pipe area × velocity** applies.

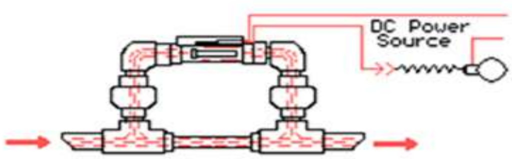


ERECTA SWITCH™

BYPASS FLOW SENSING

The diagram illustrates how a **small percentage** of the system's **flow stream** is redirected through an **unobstructed, close-coupled bypass**. Using a **0.1 GPM set-point switch**, bypass flow as low as **1 pint per minute at 3 ounces of pressure** will **trigger switch actuation**—approximately **1% of a 10 GPM system**.

To introduce fluid into the **bypass**, a **constriction** in the line must create a **differential pressure** sufficient to activate the switch. This constriction can be part of the system's **plumbing, a clogged filter, or a restricted pipe**. Given the **high sensitivity** of our switch, the required constriction is **minimal and localized**, causing **insignificant pressure drop** in the main flow. The **switch is shown connected to a current-limited incandescent bulb**.



The chart demonstrates **expected flow behavior** when sensing **bypass flow in a 1/2" Schedule 40 pipe**. Even a **7% constriction** in the **flow stream** ensures **effective bypass sensing**.

5-21 Set For 0.1 GPM Trip (Water)	Diameter Of Constriction in 1/2" Sch 40 Pipe							
	.187	.250	.312	.375	.437	.500	.562	.602
GPM Pull-in	1.05	1.75	2.55	3.5	4.75	6.0	7.5	—
GPM Drop-out	1.00	1.70	2.5	3.3	4.5	5.75	7.25	—

LOW FLOW TRIM

The **5-20 switch** can be **modified** with a **special trim set** to enhance **small flow detection**. Sold as **5-20-LF**, this **trim upgrade** replaces the standard **clean-out cap and poppet** with an **LF trim (clean-out cap, poppet, and orifice)** for **improved low-flow sensitivity**.

The **performance table** details flow detection with and **without the return spring**. In a **"poppet-up" vertical position**, operating **without the spring** increases **detection sensitivity**, ideal for **pulsating flow applications**.

△P PSI LIQUID	5-20-LF GPM (Water 20 °C)							
	.008	.016	.042	.05	.083	.116	.13	.15
Spring	—	—	2.0	3.0	5.0	10	15	20
No Spring	.5	1.0	2.0	3.0	5.0	10	15	20

△P PSI GAS	5-20-LF SCFM (Air 20 °C)							
	6	9	12	15	18	21	24	27
Spring	—	—	2.4	3.2	4.5	5.8	7.0	8.6
No Spring	.5	1.0	2.0	3.0	4.0	5.5	6.8	8.6

Outlined PSI is △P at switch actuation threshold.

INDICATOR TRIM

The **5-20 switch** can be **upgraded** with a **visual flow indication feature**, sold as **5-19 Indicator Flow Switch Set**. The upgrade consists of replacing the standard **clean-out cap and poppet** with an **indicator window and flag poppet**, providing **real-time flow visibility**.

ACCESSORY FITTINGS

Fittings **protect the switch body** from **torque stress** applied by **pipe threads** while also **providing thread size adaptability**. For **optimal function**, the **5-21 straight body switch** must include **fittings at the outlet boss**. See **5-XX accessory fittings** for compatibility.

ERECTA SWITCH ™

SERIES 5 FLOW SWITCH – SET POINT CLARIFICATION AND FIELD VARIABILITY

Flow Switch Set Point Clarification and Technical Response

At Compac Engineering, we appreciate the importance of flow set point consistency in OEM applications and acknowledge the expertise of our customer base, especially those engaged in magnetic reed switch technology. This letter outlines how we determine flow set points, the variables influencing actuation behavior, and the limitations of comparing test results from differing fixtures.

Variables That Influence Flow Switch Actuation

Actuation set point in Compac's Series 5 flow switches is primarily governed by:

1. Internal Diameter (ID) of the Molded Body

- Held to a ±0.005" tolerance, tightly controlled via proprietary tooling.
- Standardized across all flow switch bodies to prevent compounding variability.

2. Spring Characteristics

- Same precision titanium spring used across all models.
- Purchased to strict specs covering length, diameter, wire gauge, coil count, and tension.

3. Poppet Head Diameter

- The only adjustable variable.
- Precisely machined to ±0.005" to control actuation flow rate.

Empirical Method for Establishing Set Points

We determine flow actuation thresholds using a controlled test:
- The switch is mounted horizontally with an open outlet to atmosphere.
- A water source fills a calibrated vessel.
- The minimum continuous flow that actuates the switch is recorded as the set point.

This approach eliminates downstream resistance, focusing solely on hydraulic force overcoming spring tension.

Current empirical mapping:

- 0.483" → 0.10 GPM
- 0.476" → 0.25 GPM
- 0.460" → 0.50 GPM
- 0.445" → 0.75 GPM
- 0.440" → 1.00 GPM

Note: These values are not flow meter derived or NIST-traceable. They reflect repeatable mechanical actuation under standardized internal test conditions.

Why Customer Test Fixture Results May Differ

Variation is expected when testing is performed in a different system. Factors include:
- Downstream flow restrictions
- Vertical vs. horizontal mounting
- Upstream/downstream pressure changes
- Pipe diameter/material
- Sensor resolution
- Bypass vs. direct flow configurations

Such differences may cause actuation to occur at a different flow rate than our declared set point.

Supporting Application Methods

- Bypass Flow Sensing: Diverts part of system flow for low-pressure sensing.
- Low Flow Trim (5-20-LF): Enhances sensitivity for small or pulsed flows.
- Visual Indicator Trim (5-19): Provides real-time flow visibility.

Conclusion and Recommended Actions

If the observed actuation behavior in your test fixture does not align with the designated set point, we recommend the following steps:

• Measure the poppet head diameter of a representative sample to verify that the correct part was received and confirm alignment with our internal specifications.
• Evaluate switching to a different set point model—preferably a lower set point—to compensate for the system resistance or flow dynamics present in your test environment.
• For precise actuation requirements, consider implementing a needle-valve bypass configuration. This approach allows you to direct a controlled portion of flow through the switch and fine-tune actuation behavior without modifying internal switch components.

We stand behind the consistency and repeatability of our manufacturing and calibration process. However, it remains the responsibility of each OEM to evaluate whether the installed behavior of a given switch model aligns with their system-specific conditions, constraints, and performance requirements.

ERECTA SWITCH™