



Technical Notes

Description of Mechanical & Steam Stops

MECHANICAL STOPS

Every ForceMeter™ incorporates a mechanical stop that protects the meter from flows greater than an application's given full-scale flow rate. See **Figure 1A INLINE MECHANICAL STOP** and **Figure 1B INSERTION MECHANICAL STOP** shows the location of the mechanical stops. Mechanical stops protect the meter in both the forward and reverse direction from being bent or damaged from excessive force. The meter will not continue to produce an output beyond the point at which a mechanical stop is set. Typically, the mechanical stop is set to produce an output beyond the point at which a mechanical stop is set. Typically, the mechanical stop is set approximately 25% above the maximum rated full-scale flow rate per the application requirements. Mechanical stops are not to be confused with an additional protection option known as "steam" stops.

Figure 1A
Inline Mechanical Stop

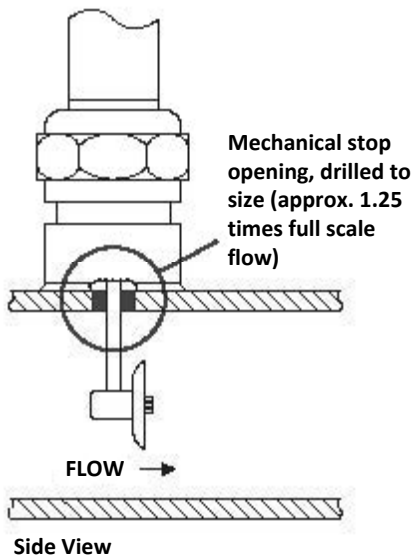
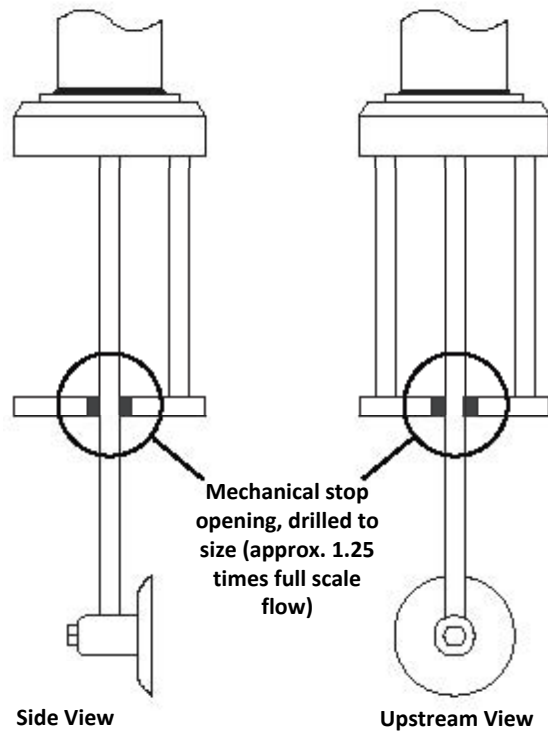


Figure 1B
Insertion Mechanical Stop



Some applications require additional protection beyond the mechanical stop due to the nature of the application. A steam stop is the additional protection for the meter. Even though the name implies the use in steam applications alone, there are also other applications where a “steam” stop would be used. Steam stops are provided for all applications where the target rod length reaches 2” and greater for both steam applications and non-steam applications where the rod will be subjected to extreme force. This is why it is imperative that an application data form be filled out thoroughly so the factory can determine the appropriate protection for the meter. Meters where the rod length is 2” or less do not require a steam stop as the mechanical stop is sufficient to protect the rod.

STEAM STOPS

Steam stops are a unique stop designed for added protection to the meter in a variety of applications. Examples where steam stops are required for additional protection include: steam applications, start-ups or saturated steam applications, or any application where steam cleaning exists. Please see the descriptions below for the explanation of the use of a steam stop for the given application.

1. STEAM APPLICATIONS

Steam stops should be used in steam applications due to drops of condensate, or water, that gather together, and then are carried downstream by the steam flow at the velocity of the steam and strike the target with excessive force. The steam stop design provides the added protection required to withstand these forces.

2. START-UPS OR SATURATED

Steam stops protect the meter from condensate slugs that are common in steam start-ups and saturated steam applications. The most common form of damage in steam applications is caused by slugs of condensate in saturated steam lines. These slugs can hit the target at velocities in excess of twice the rated flow. If the meter might be subjected to high velocity slugs of any nature, then a steam stop should be used.

3. STEAM CLEANING

A steam stop should be used when steam cleaning is required even for non-steam applications. This information should be included as part of the application process.

ForceMeter™ is offered in two basic types: inline and insertion meters. Each type has its own steam stop design.

INLINE

For inline meters with line size of 4" to 6", a steam stop design is added as shown in **Figure 2A INLINE STEAM STOP**. As mentioned, inline meters with line sizes that are 3" or less have enough rod strength due to the shorter rod length (which is 2" or less), to stand up to the high forces created by slugs, condensate, etc. The inline steam stop offers protection both in the forward and reverse direction. The inline steam stop is created by extending the length of the target rod all the way down through the bottom of the housing into a fitting that seals and prevents the process fluid from escaping. The opening through which the target rod passes is sized, such that the signal output is approximately 25% over the application's full-scale flow rate.

INSERTION

All insertion meters require the use of a steam stop as shown in **Figure 2B INSERTION STEAM STOP** due to the extension of the rod. The insertion meter steam stop is created by placing the post, with a special stop disk behind the target in the direction of flow. This post adds support to the target rod. A steam stop for an insertion meter may only be installed in a unidirectional flow stream. A steam stop for bidirectional flow is not available, therefore an insertion meter used for bi-directional flow applications will only be protected in one direction.

Figure 2A
Inline Steam Stop

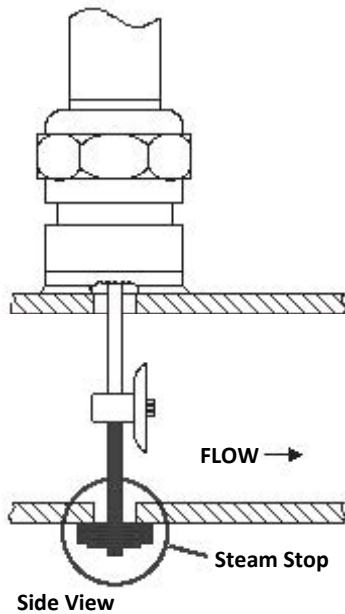
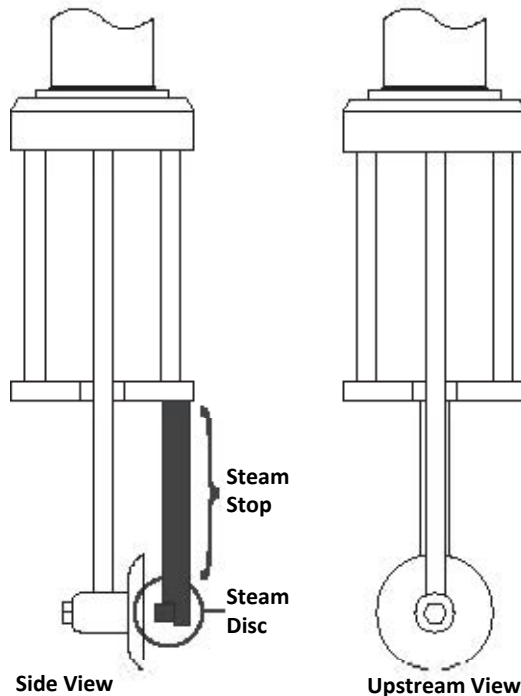


Figure 2B
Insertion Steam Stop



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