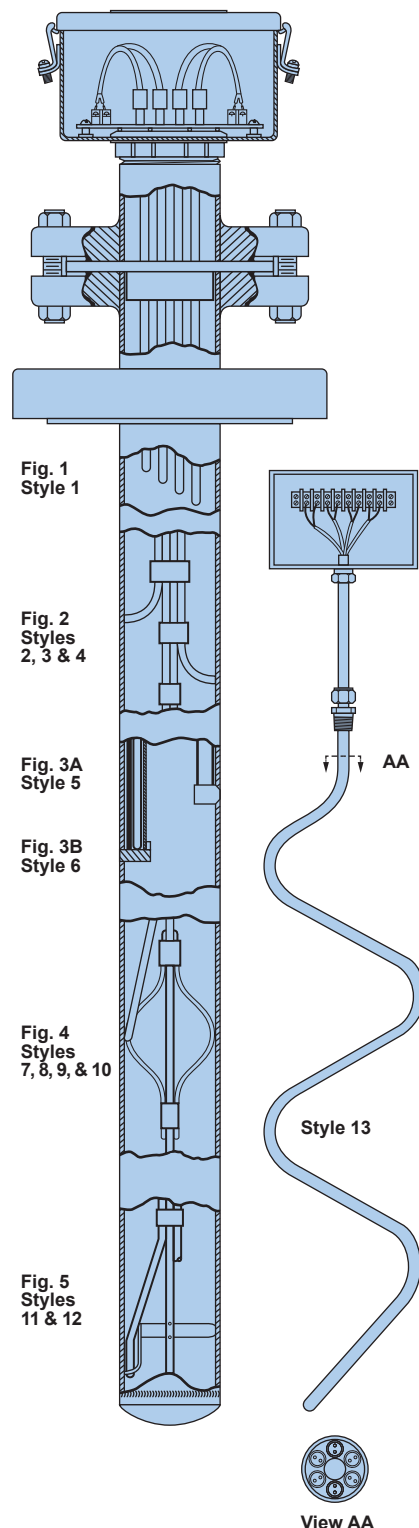


# SANDELIUS MULTI-POINT ASSEMBLIES

Any thermocouple assembly with measuring junctions located at more than a single immersion depth is commonly referred to as a multi-point. As the number of variations possible in multi-point assemblies is virtually limitless, they are generally designed and manufactured to meet the requirements of individual applications. As different multi-point designs vary tremendously, careful consideration should be given to such variables as the positive location of measuring junctions and the ease/cost of replacement should a failure ever occur. Some designs allow for replacement of individual elements while others require replacement of the entire assembly whenever individual elements fail. In either case, complete shut-down of the process line may not be required depending on important design considerations. For easy reference, we have assigned style numbers to the most commonly used types of multi-point designs. Other designs can be furnished on request. If you have any questions about multi-point designs or would like assistance in preparing a multi-point specification, please feel free to contact us at your convenience.

The sketch below illustrates how multi-point assemblies which appear identical from outside, can be vastly different on the inside where it counts.



## Terminations

Multi-point assemblies are usually terminated in junction boxes as shown here. Available in a variety of styles, materials and classifications junction boxes provide a convenient means of wiring multi-point assemblies in the field. They can be equipped with standard or compensating terminal strips. Swamping resistor networks used to provide average readings are also available.

In other cases, multi-point assemblies can be terminated with flexible leadwire which is routed in the field to a remote mounted junction box or instrument panel. Multi-pin connectors are a more rarely used option but one well worth considering in some applications. Whatever termination style you prefer, Sandelius will gladly produce it for you.

## Optional Secondary Seals

When requested secondary seals can be built into multi-point assemblies. A secondary seal prevents the escape of process fluids or gases in the event the portion of the multi-point assembly in the process should develop a leak. Any of several different types of seals are available. They are occasionally used in combination for even greater safety in hazardous applications.

## Process Mounting Fittings

Large multi-point assemblies almost always use a flange to connect to the vessel. Smaller assemblies sometimes use threaded bushings, compression type fittings or other means of mounting. Whatever your application requires we will gladly produce it for you.

## Sandelius Style 1

Individual Free Hanging Type. Figure 1. Individual sheathed thermocouples are inserted into a common outer protecting tube. This style is commonly used in small diameter tubes where the thermocouples fill the majority of the inside of the outer tube.

## Sandelius Style 2

Permanently Bundled Free Hanging Type. Figure 2. The individual thermocouples use a common transition piece and are attached together at regular intervals along their entire length. Individual thermocouples cannot be replaced. This design may be used with or without an outer protecting tube.

## Sandelius Style 3

Bundled Free Hanging Type. Similar to Figure 2. The individual thermocouples are independently transitioned and bundled together using removable tie wires or clamps. Individual thermocouples may be replaced only after removing the entire multi-point assembly from the vessel. This design may be used with or without a protecting tube.

## Sandelius Style 4

Individually Replaceable Bundled Free Hanging Type. Similar to Figure 2. In this design, individual guide tubes are permanently bundled together and independent thermocouples are fed into them. Individual thermocouples may be replaced without removing the entire assembly from the vessel. Note the guide tubes may be open ended allowing the thermocouples to protrude directly into the process or their ends may be welded closed. This design may be used with or without an outer protecting tube.

## Sandelius Style 5

Positive Contact Type. Figure 3A. In this design the thermocouples are attached to the protecting tube wall through the use of welded plugs. Exact positioning of each measuring junction is assured. Replacement requires a completely new assembly including the protecting tube. Please note this design requires an outer protecting tube.

## Sandelius Style 6

Replaceable Positive Contact Type. Figure 3B. In this design, individual guide tubes are attached to the protecting tube through the use of welded plugs. Individual thermocouples are then fed into the guide tubes assuring correct positioning of the measuring junctions. Individual thermocouples may be replaced without shutting down the process. This design requires the use of an outer protecting tube.

## Sandelius Style 7

Full Leaf Spring Type. Figure 4. In this design the thermocouples are assembled around a center support strip. Each measuring junction is attached to the top of one side of a pair of opposing full leaf springs. The springs hold the hot junctions to the wall of the protecting tube. Individual thermocouples cannot be replaced.

## Sandelius Style 8

Same as style 7 with the addition of individual guide tubes allowing for the replacement of individual thermocouples.

## Sandelius Style 9

Cantilever Spring Type. Similar to Figure 4. In this design the thermocouples are assembled around a center support strip. Each measuring junction is attached to the top of one side of a pair of opposing cantilever springs. The springs hold the hot junctions to the wall of the protecting tube. Individual thermocouples cannot be replaced.

## Sandelius Style 10

Same as style 9 with the addition of individual guide tubes allowing for the replacement of individual thermocouples.

## Sandelius Style 11

Bimetallic Strip Type. Figure 5. This design is similar to Style 9 with the exception that temperature activated bimetallic strips are used in place of the springs.

## Sandelius Style 12

Same as style 11 with the addition of individual guide tubes allowing for the replacement of individual thermocouples.

## Sandelius Style 13

Drawn or swaged multipoints are constructed by drawing or swaging an outer sheath over a thermocouple bundle. The resulting assembly is small (usually 0.25" or less O.D.) tightly packed and flexible. The flexible nature of this design allows the assembly to be snaked around off-sets to measure points which cannot be reached by more traditional straight line designs.