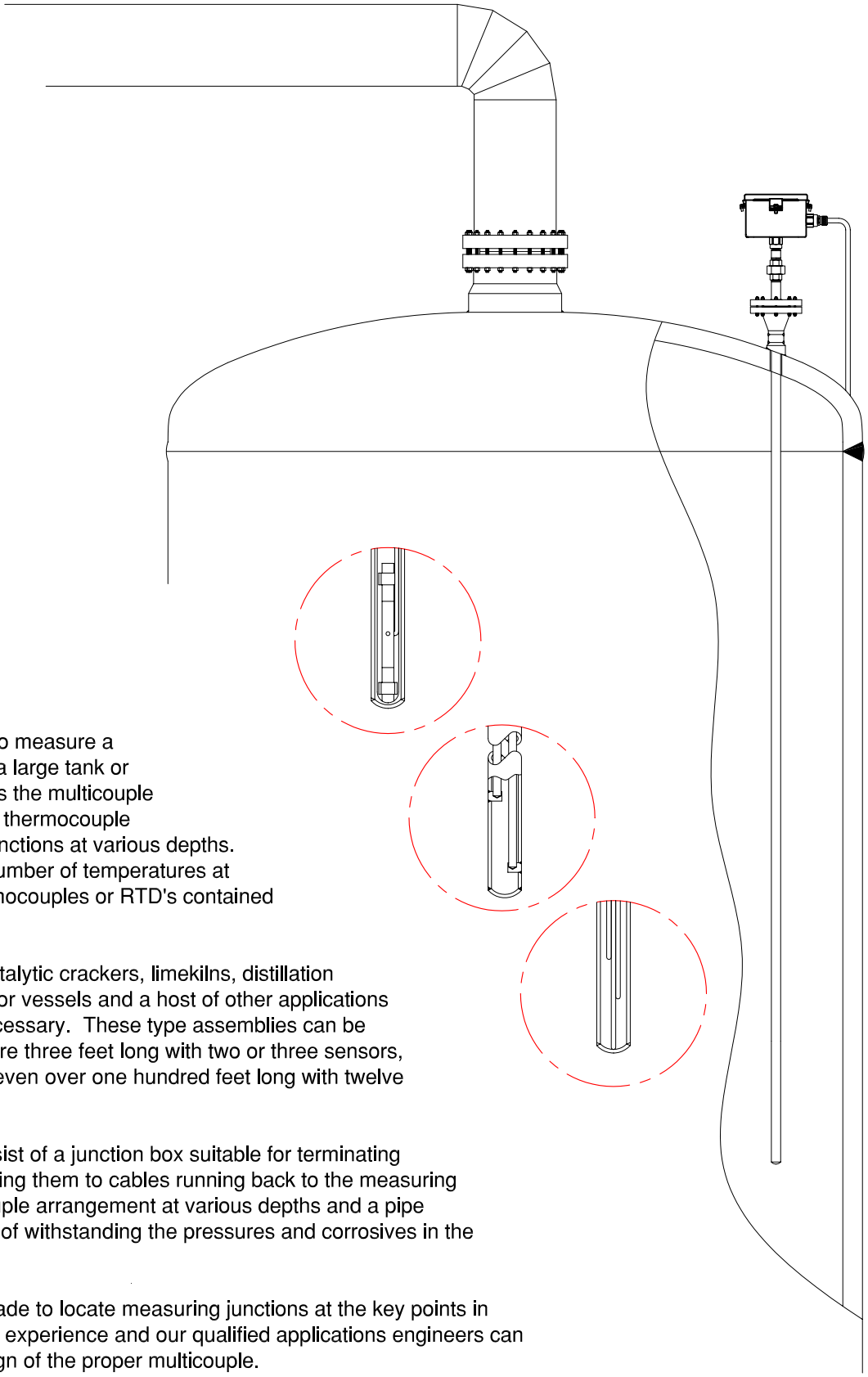
THERMO ELECTRIC

MULTICOUPLES

Section MULT



MULTICOUPLES

Very often there is a need to measure a temperature profile across a large tank or vessel. The method used is the multicouple which is an arrangement of thermocouple positions with measuring junctions at various depths. The intent is to monitor a number of temperatures at various points with all thermocouples or RTD's contained in one assembly.

Multicouples are used in catalytic crackers, limekilns, distillation columns, pressurized reactor vessels and a host of other applications where such profiles are necessary. These type assemblies can be "miniaturized" where they are three feet long with two or three sensors, or they can be any length, even over one hundred feet long with twelve or more sensors.

Multicouples generally consist of a junction box suitable for terminating the thermocouples and joining them to cables running back to the measuring instrument. The thermocouple arrangement at various depths and a pipe protection well are capable of withstanding the pressures and corrosives in the vessel.

Multicouples are custom made to locate measuring junctions at the key points in your process. Our years of experience and our qualified applications engineers can assist you in technical design of the proper multicouple.

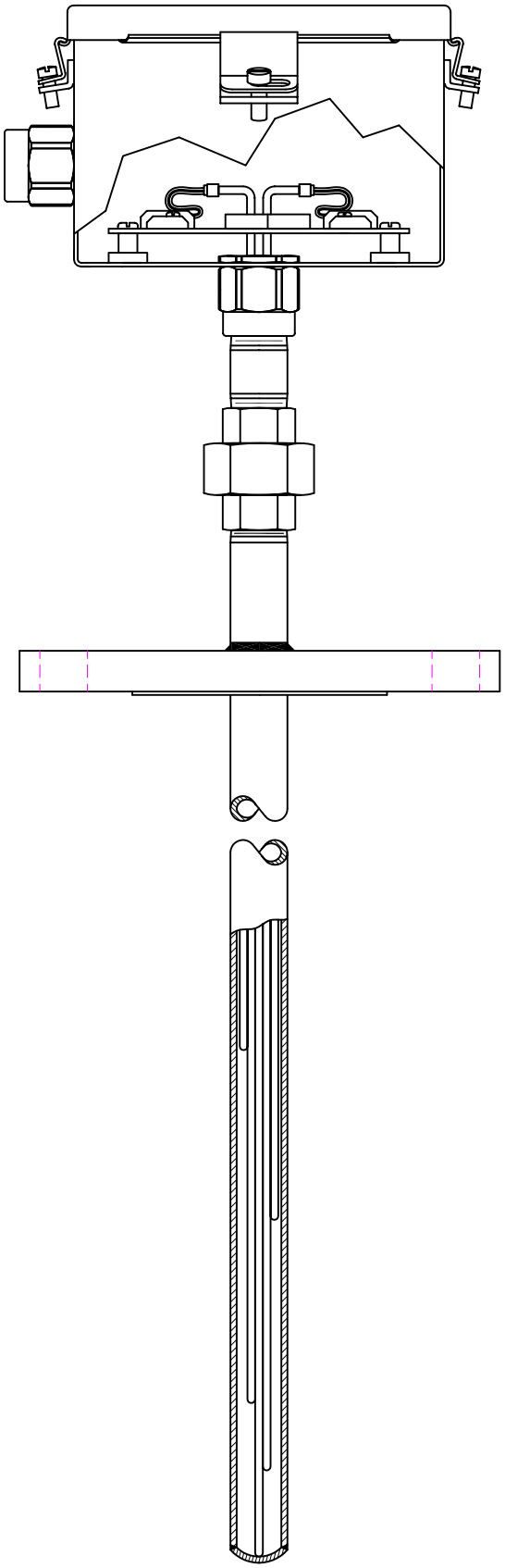
MULTICOUPLES

FREE HANGING MULTICOUPLES are the least expensive and provide for the largest number of thermocouples or RTD's contained in one protection tube. Each sensor is factory set at the desired length for accurate gradient temperature measurement by responding to the transfer temperature from the surface of the protection tube. Elements are bundled and may be held with stainless steel straps for ease of installation and removal. Bundle is secured inside the junction box with a custom made clamp to prevent movement. Each element is terminated inside the junction box with an epoxy filled transition and stranded lead wire connected to a terminal strip. Terminal strips are numbered to identify each element location.

Protection tubes are fabricated from pipe in a number of sizes and can be welded together for lengths of greater than twenty feet. Process connection can be flanged or a threaded bushing. Protection tubes are usually connected to a union and nipple extension allowing the junction box to be located away from excess heat or other obstacles. The union allows rotation of the box for conduit positioning. Protection tubes can also be fabricated by others on site.

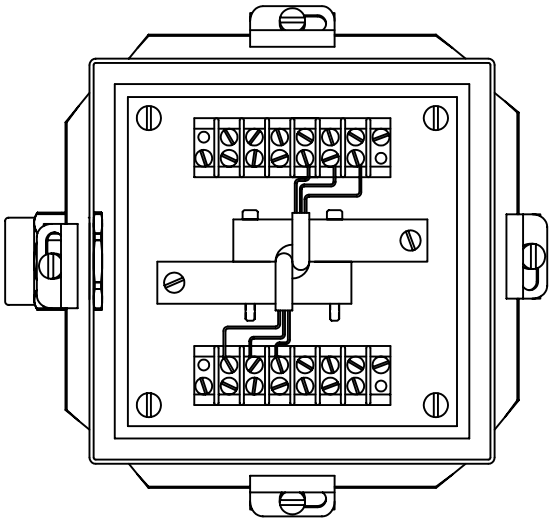
Junction boxes are available in sheet steel, stainless steel, fiberglass, cast iron, cast aluminum for indoor, outdoor or hazardous locations. Tube and conduit openings can be located to suit site installation.

Terminal strips are available in thermocouple alloy or modular type. Factory set and installed rail mounted transmitters or averaging circuitry can be installed in place of terminal strips.



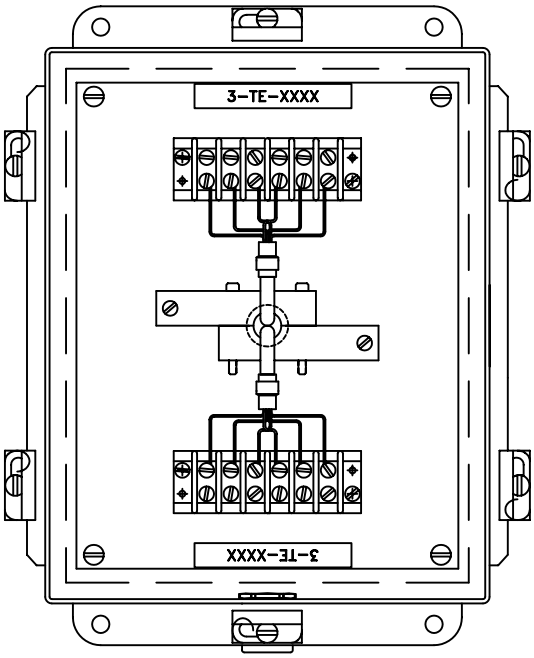
MAXIMUM NUMBER OF SENSORS

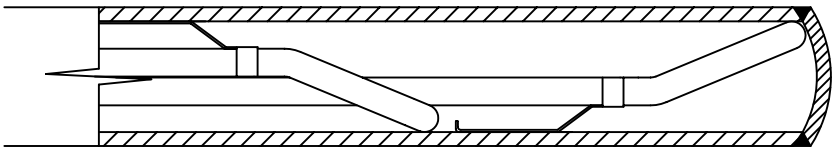
PIPE SIZE	3/16" DIAMETER SENSORS			1/4" DIAMETER SENSORS		
	Sch.-40	Sch.-80	Sch.-160	Sch.-40	Sch.-80	Sch.-160
1/2"NPS	7	4	3	3	2	N/A
3/4"NPS	10	8	6	7	5	3
1"NPS	20	16	10	10	8	7
1 1/2"NPS	39	36	31	26	22	19

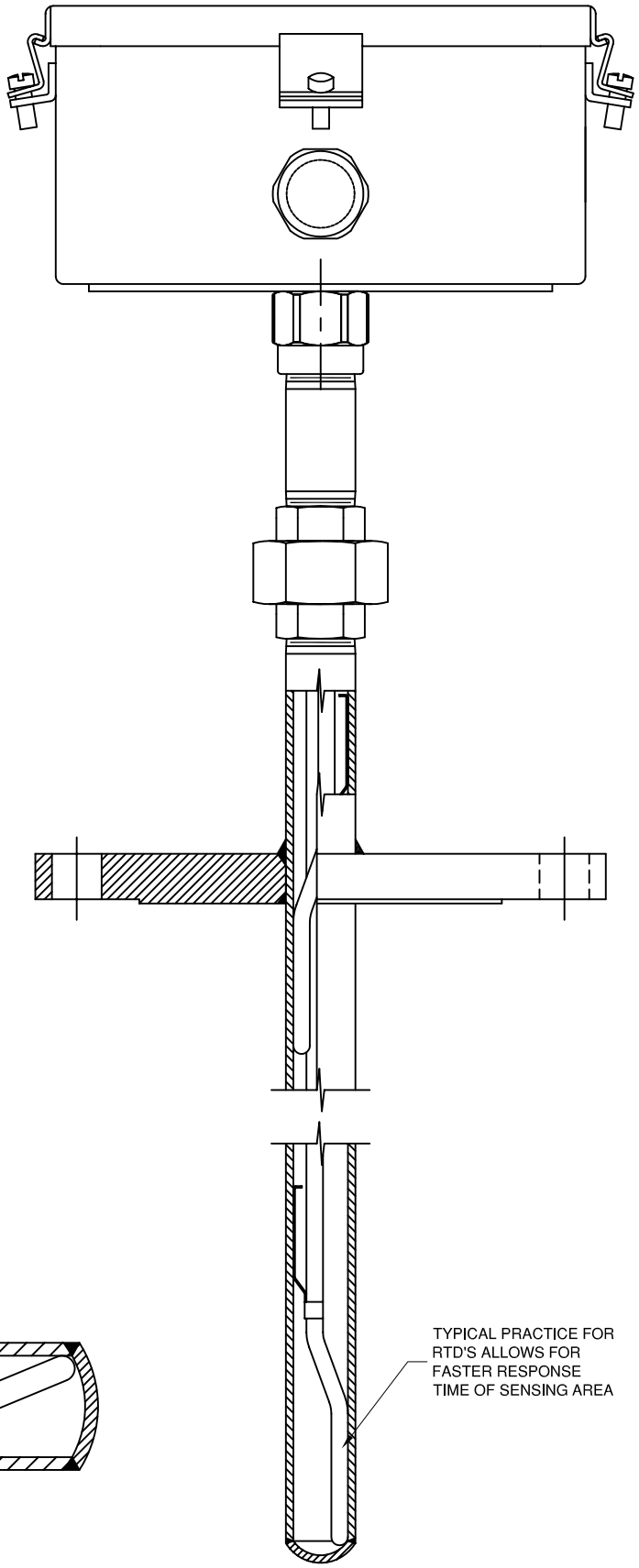


MULTICOUPLES

SPRING LOADED MULTICOUPLES assure constant contact of the sensor tip to the inside wall of the protection tube thereby improving the response time of the measured location over the free hanging design. The spring is shaped from a inconel strip and tempered for stiffness at high temperatures The spring is attached to the sheath of the sensor opposite side of the tip which is set at an angle and pushed against the wall of the protection tube. RTD's are bent to assure the entire stem sensing area sets against to the tube wall. Each sensor is factory set at the desired length. Bundle is secured inside the junction box with a custom made clamp to prevent movement. Each element is terminated inside the junction box with an epoxy filled transition and stranded lead wire connected to a terminal strip. Terminal strips are numbered to identify each element location. Protection tubes are fabricated from pipe in a number of sizes and can be welded together for lengths of greater then twenty feet. Process connection can be flanged or threaded bushing. Protection tubes are usually connected to a union and nipple extension allowing the junction box to be located away from excess heat or other obstacles. The union allows rotation of the box for conduit positioning. Protection tubes can also be fabricated by others on site.
Junction boxes are available in sheet steel, stainless steel, fiberglass, cast iron, cast aluminum for indoor, outdoor or hazardous locations. Tube and conduit openings can be located to suit site installation.
Terminal strips are available in thermocouple alloy or modular type. Factory set and installed rail mounted transmitters or averaging circuitry can be installed in place of terminal strips.







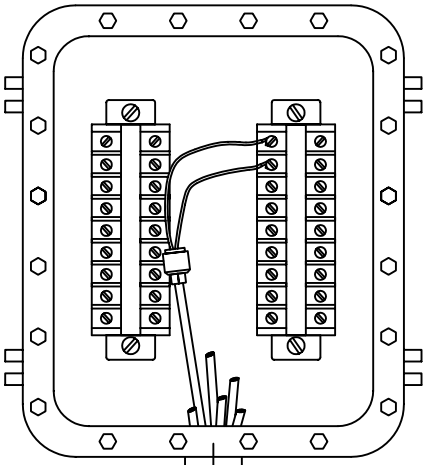
MULTICOUPLES

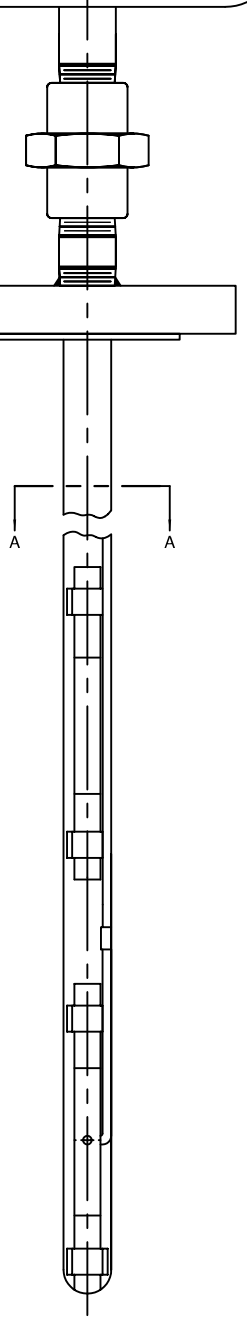
SPRING LOADED MULTICOUPLES with SUPPORT STRAP The flexibility or coiling capability of this design simplifies installation and shipping. These multicouples are simply uncoiled and guided into a protection tube thereby eliminating complex and costly installation methods usually present in long assemblies. The support strap consists of a stainless steel strip which runs the length of the protection tube. It terminates inside a union fitted with a collar attached to the strap to prevent movement. The sensors are bent and attached to the spring located on the strap. Springs compress for installation and release for constant contact to the inside wall. The spring is made of tempered Inconel for high temperature service. All retaining hardware is stainless steel designed for flexing. Each sensor is factory set at the desired length. Each element is terminated inside the junction box with an epoxy filled transition and stranded lead wire connected to a terminal strip. Terminal strips are numbered to identify each element location.

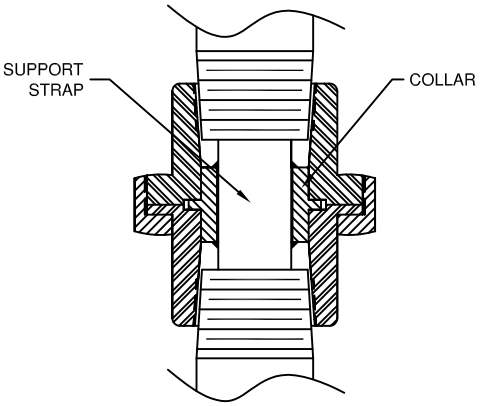
Protection tubes are fabricated from pipe in a number of sizes and can be welded together for lengths of greater then twenty feet. These multicouples can be supplied with protection tubes or with any threaded or flange connection for mating to vessel fabricators design.

Junction boxes are available in sheet steel, stainless steel, fiberglass, cast iron, cast aluminum for indoor, outdoor or hazardous locations. Tube and conduit openings can be located to suit site installation.

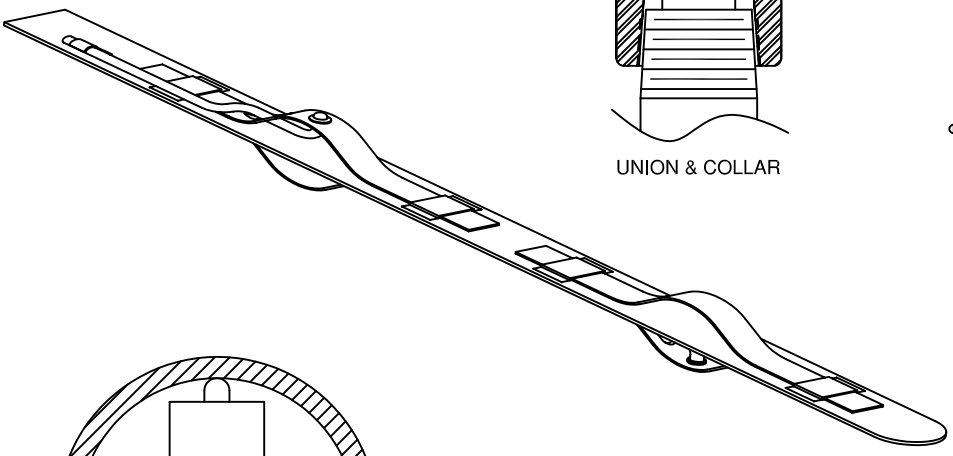
Terminal strips are available in thermocouple alloy or modular type. Factory set and installed rail mounted transmitters or averaging circuitry can be installed in place of terminal strips.

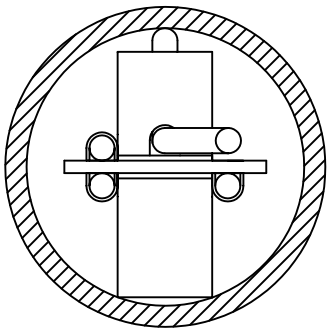




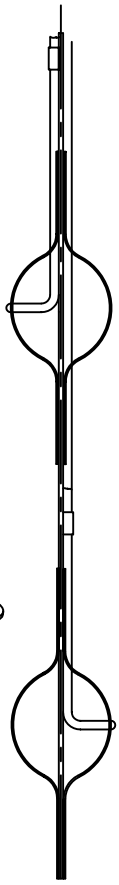


UNION & COLLAR





SECTION A-A



THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION MULT

SPRING LOADED
with SUPPORT STRAP

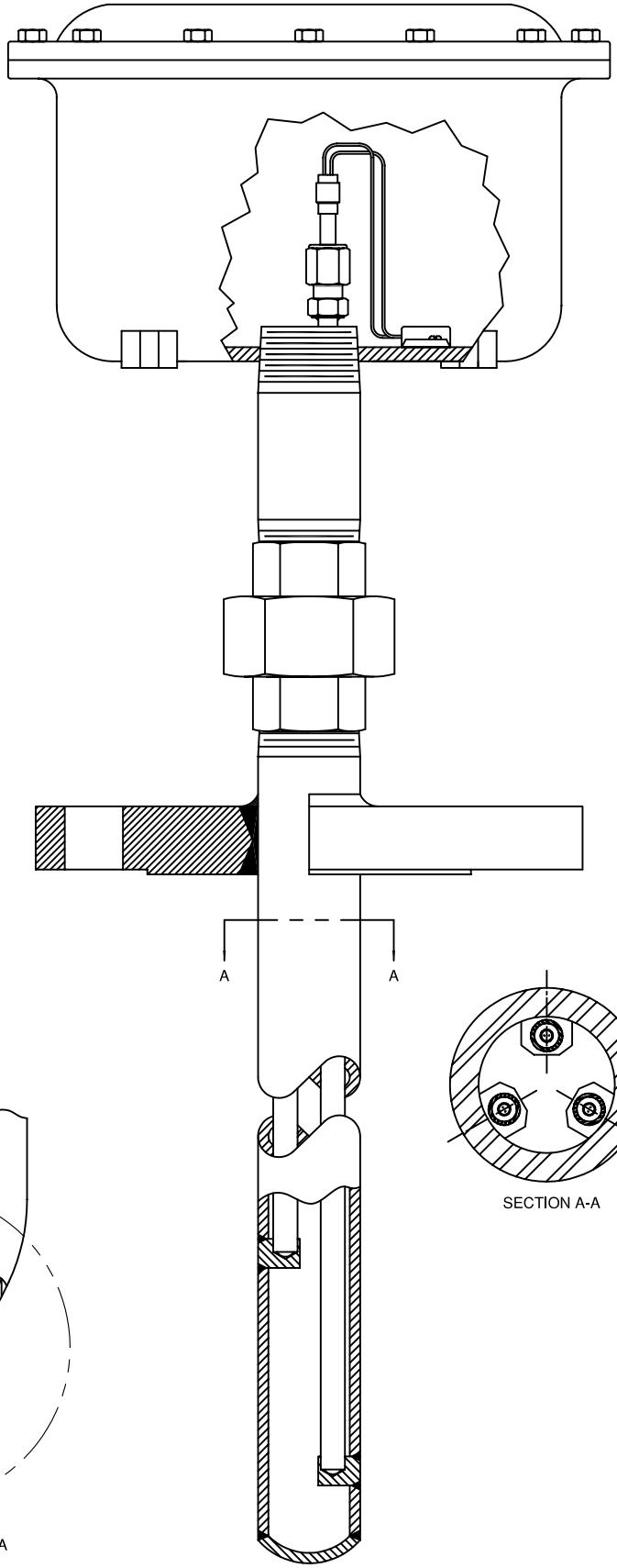
Doc. No.: TE-CO010109-MULT-030

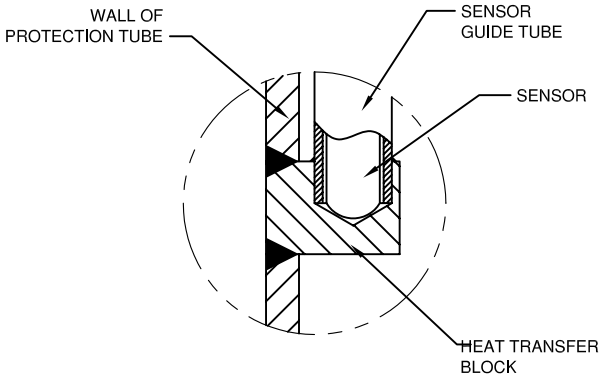
MULTICOUPLES

MULTITUBE MULTICOUPLES The multitube offers two distinct advantages. A heat transfer block welded into the surface of the protection tube provides the fastest response time to the thermocouple tip. Attached to each block is a guide tube extending into the junction box allowing for quick and individual replacement of thermocouples. The guide tubes are equipped with a compression fitting to hold the element in place. Thermocouples can also be supplied spring loaded. Each element is terminated inside the junction box with an epoxy filled transition and stranded lead wire connected to a terminal strip. Terminal strips are numbered to identify each element location. Protection tubes are fabricated from pipe in a number of sizes and can be welded together for lengths of greater then twenty feet. These multicouples can be supplied with protection tubes and any threaded or flange connection for mating to vessel fabricators design.

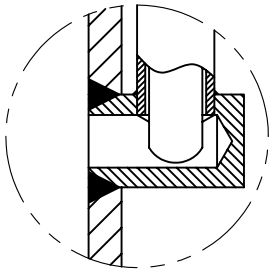
Junction boxes are available in sheet steel, stainless steel, fiberglass, cast iron, cast aluminum for indoor, outdoor or hazardous locations. Tube and conduit openings can be located to suit site installation.

Terminal strips are available in thermocouple alloy or modular type. Factory set and installed rail mounted transmitters or averaging circuitry can be installed in place of terminal strips.

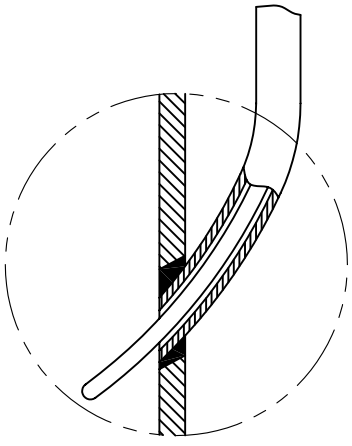




SECTION A-A



WITH SENSOR
EXPOSED TO MEDIA
(FASTER RESPONSE TIME)

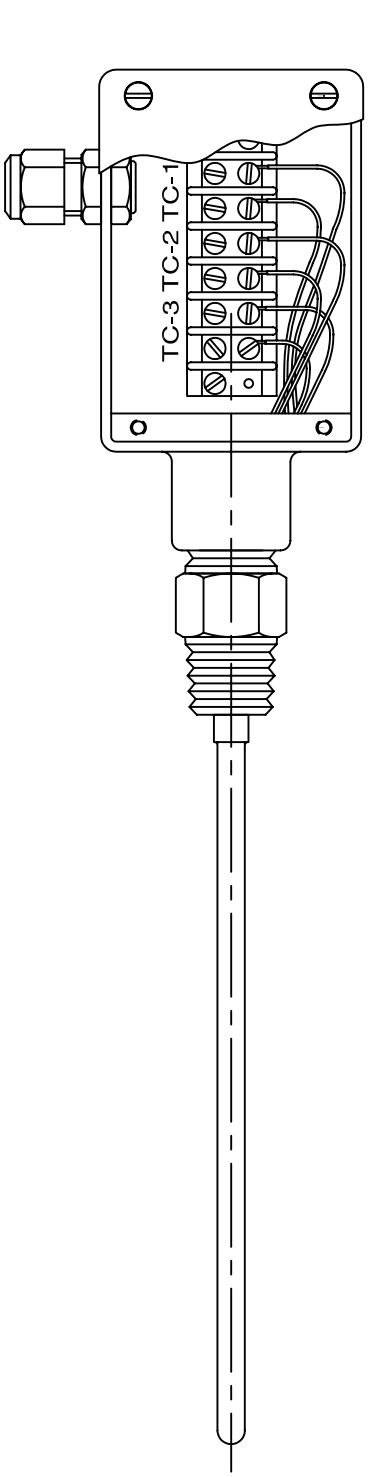


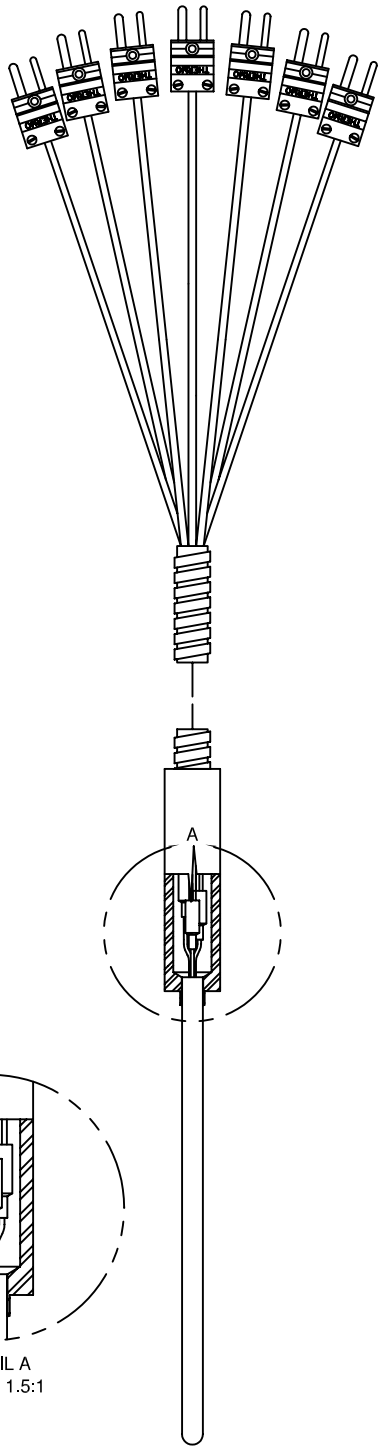
WITH SENSOR
PROTRUDING INTO MEDIA

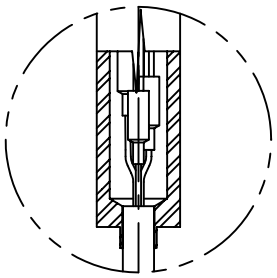
MULTICOUPLES

MINIATURE MULTICOUPLES consist of numerous individual thermocouple elements contained in a single tube. Measuring junctions can be spaced along the length of the sensor to achieve a profile of process environment. Miniature multicouples can be used in situations where a number of individual thermocouples have been used to achieve profiling but when space is at a premium. Typical applications include pilot plant operations and pressurized process chambers where a minimum interruption of flow and a maximum response time is desirable.

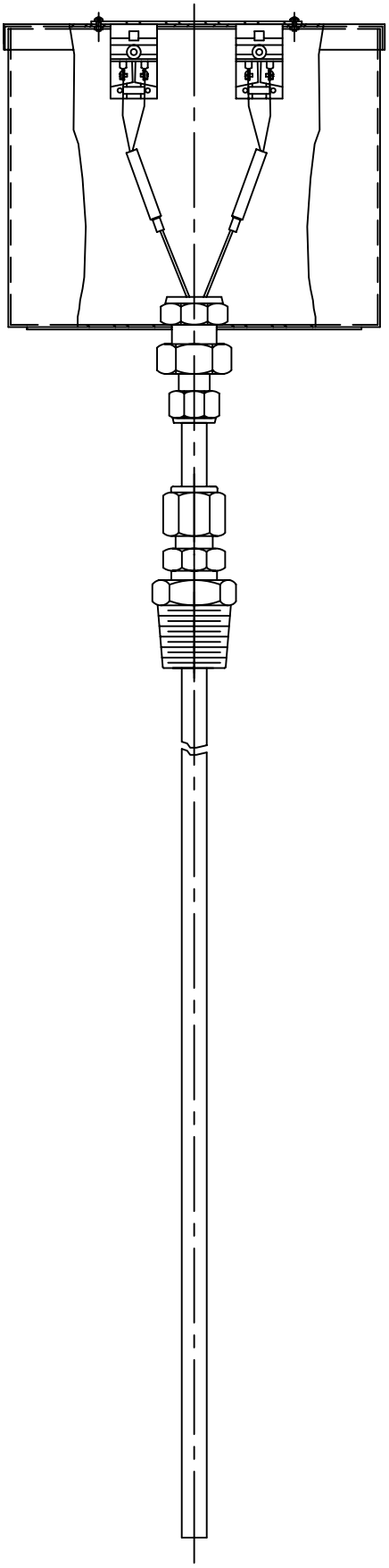
Thermo Electric offers a complete line of miniature multicouple assemblies for this purpose. Assemblies are manufactured to the specific requirement of the system. They are usually supplied with a compression fitting and terminated to a jack panel, terminal box or lead wire and connectors.







DETAIL A
SCALE 1.5:1



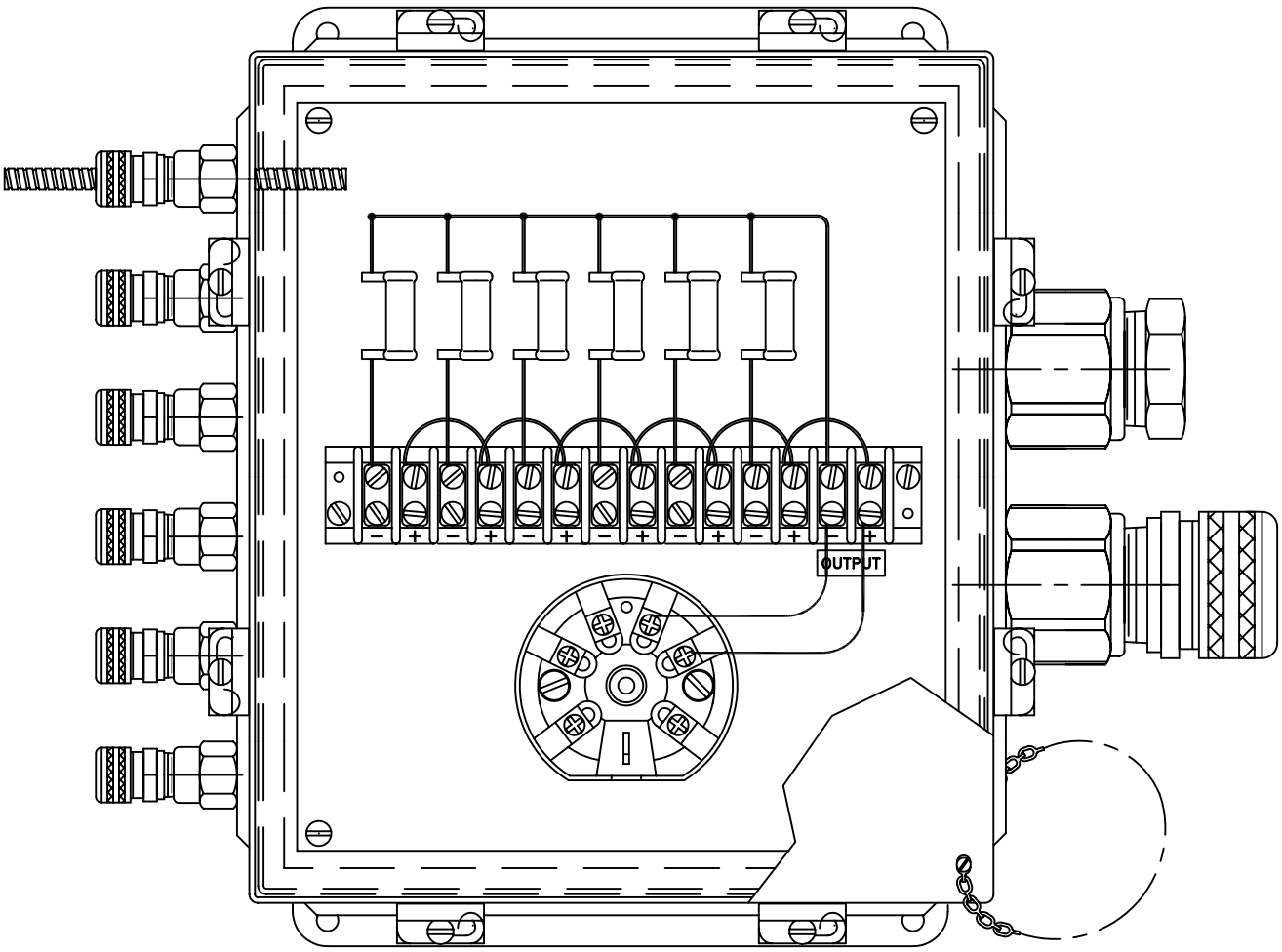
THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION MULT

MINIATURE MULTICOUPLES
for TEMPERATURE PROFILING

Doc. No.: TE-CO010109-MULT-050



THERMOCOUPLE AVERAGING SWAMPING BOXES

In many applications the average temperature of a process is measured rather than a number of individual points measurements. For example, a harness assembly consisting of a group of thermocouples placed in a ring around the exhaust outlet and connected to a single indicator. Another example is high temperature alarm indication on a storage tank or process vat, or air ducts. To average thermocouples, three conditions are required. Thermocouples must be connected in parallel to produce an EMF signal of a singular thermocouple. Measuring junctions must be ungrounded or isolated from each other to prevent an EMF signal from becoming additive. All thermocouples must have the same nominal resistance. Since the length and individual construction of each thermocouple may differ, obtaining all couples of the same resistance is impossible. To solve this, a swamping (or averaging) box with a 500 ohm resistor attached in series to the negative leg will reduce the differences to insignificant fraction of the total resistance. All swamping boxes are supplied completely wired using actual thermocouple wires and terminal blocks.

THERMO ELECTRIC COMPANY INC.

CORPORATE OFFICES
1193 McDermott Drive
WEST CHESTER, PENNSYLVANIA 19380
Phone:1-610-692-7990
Toll Free Number: 1-800-766-4020
Fax:1-610-430-1325
E-Mail:tepasales@te-direct.com

THERMO ELECTRIC
THERMO ELECTRIC COMPANY INDIA PVT. LTD.
No. 362, SECTOR-7
IMT MANESAR - 122050 GURGAON
HARYANA
Phone: 91-124-400-6371
GSM: 91-9654305463 & 91-9871903246
Fax: 91-124-400-6372
E-Mail: teinsales@te-direct.com

THERMO ELECTRIC
THERMO ELECTRIC COMPANY UK LTD.
Building 1000
KENT SCIENCE PARK
SITTINGBOURNE
ME9 8PS
UNITED KINGDOM
Phone: 0044-1795-410414
Fax: 0044-1795-410415
E-Mail: teuksales@te-direct,com

THERMO ELECTRIC
THERMO ELECTRIC (CANADA) LTD.
12-4580 EASTGATE PKWY
MISSISSAUGA, ON L4W4K4 - CANADA
Phone: 1-905-451-0813
Toll Free Number: 1-800-663-3278
Fax: 905-451-4606
E-Mail: tecasales@te-direct.com

THERMO ELECTRIC
THERMO ELECTRIC COMPANY BVBA
Rijsberdijk 57
2490 BALEN, BELGIUM
Phone: 0032-14/81.52.47
Fax: 0032-14/81.52.49
E-Mail: sales@thermo-electric.be

Temperature Measurement and Sensor Solutions from The Global Leader in Manufacture & Design

THERMO ELECTRIC