TABLE 4

Thermocouple / Instrumentation Extension Wire

GAUGE	ANSI TYPE	FIG.	INSULATION TEMPERATURE	CAT. NUMBER
16	JX	11	PVC 105ºC	OJS162P
20	JX	11	"	OJS203P
16	KX	11	"	OKS164P
20	KX	11	"	OKS205P
16	KX	12	G-GLAS, 510ºC	OKS166G
20	KX	12	FIBERGLASS	OKS207F

WHEN ORDERING, PLEASE SPECIFY: Quantity, catalogue number, and extra features.

JUNCTIONS

Various junction constructions measurements can be done according to the application.

Grounded junction

- Made by welding in an inert atmosphere to allow the two thermocouple wires to be incorporated to the sheath weld closure.
- Wires are grounded to the sheath.
- Features:
  - Slower response than exposed wire.
  - Pressure tight above 100,000 psi.
  - Wires are protected from mechanical damage.
  - Wires are not exposed to environment and will last longer.
  - Coefficient of expansion wire must be similar to that of sheath in order to avoid pulling part of hot junction.

Ungrounded junction

- Similar construction as grounded junction except that the thermocouple wires are first made into a junction, then insulated from the sheath and the sheath closure.
- The closure is shaped by welding without the themocouple wires.
- The thermocouple is "ungrounded" in relation to the sheath material.
- Features:
  - Slower response than exposed wire.
  - Pressure tight above 100,000 psi.
  - Wires are protected from mechanical damage.
  - Wires are not exposed to environment and will last longer.
  - Differential expansion between wires and sheath.

Weld pad junction

- Used as a fastening means for thermocouples to surfaces (plates and tubes) to provide efficient surface temperature measurement.
- Standard alloy pad: 1" x 1" x 1/8".
- Same composition as the sheath.
- Available skins: parallel, perpendicular and tube.

THERMOCOUPLE WIRE

FIG. 11

FIG. 12

FIG. 13

Exposed junction

- Thermocouple wires are exposed due to the removal of the sheath and the insulating material.
- Wires are joined to make a measuring junction.
- The junction is of a but-weld type.
- Features:
  - Faster response.
  - Exposed magnesium will be affected by moisture.
  - Not pressure tight.
  - Wires are subjected to mechanical damage.
  - Wires are exposed to environment and will have shorter service life.
  - Useful life shortened resulting from rapid calibration.

THE TRANSITION

WATTCO™ transition protects the splice between the extension wires and thermocouple wires from:

- Moisture
- Vibration
- Mechanical damage

Standard transitions can be used in the following temperature ranges: -185°C – 250°C (-300°F – 500°F).

Standard potting adaptor: 5/16 diameter X 1" long.

CALIBRATION TYPE				
ANSI TYPE	**FEATURES**	**TEMPERATURE RANGE °C**	**TOLERANCE GRADE**	
			STANDARD	SPECIAL
K (Chromel + vs. Alumel)	» The most popular industrial model » Reliable and accurate to 1260°C » Can be used in oxidizing, inert and reducing atmospheres » Must be protected from sulfurous or "green-rot" corrosio atmospheres as it can result in negative calibration errors	0 – 277 277 – 1260	± 2.2°C ± 0.75%	± 1.1°C ± 0.4%
J (Iron + vs. Constantan)	» Used for reducing, inert, oxidizing or vacuum atmospheres up to 750°C » Not to be used in sulfurous atmospheres above 538°C	0 – 277 277 – 760	± 2.2°C ± 0.75%	± 1.1°C ± 0.38%
T (Copper + vs. Constantan)	» Corrosion resistant in moist atmospheres » Ideal for temperatures measurements under zero » Can be used in vacuum and in oxidizing, reducing or inert atmospheres up to 400°C » Commonly used in laboratories due to its stable and precise EMF characteristics	-184 – -59 -101 – -59 -59 – 93 93 – 371	— ± 2% ± 1% ± 0.75%	± 1% ± 0.5°C ± 0.38%
E (Chromel + vs. Constantan	» Has the highest EMF characteristics » For practical applications, refer to precautions listed in type K thermocouple » Can be used up to 750°C continuously » Commonly used in large scale thermal and nuclear power plants	0 – 315 315 – 871	± 1.7°C ± 0.5%	± 1°C ± 0.38%
R S	» Available upon request	0 – 538 538 – 1482	± 2.8°C ± 0.5%	± 1.4°C ± 0.25%
B	» Available upon request	871 – 1704	± 0.5%	—
N	» Available upon request	N/A	N/A	N/A

SHEATH MATERIAL			
304 STAINLESS STEEL	**310 STAINLESS STEEL**	**316 STAINLESS STEEL**	**800 INCONEL®**
» General purpose » Economical » Readily available » Good corrosion resistant to organic and inorganic chemicals » Subjected to carbide precipitation in the 480°C to 870°C range » Maximum operating temperature: 900°C (1680°F)	» Superior to 304 stainless steel in high temperature applications » The best corrosion resistant sheath material to oxidation of the "300" series » Maximum operating temperature: 1150°C (2100°F)	» Superior corrosion resistant material than type 304 and 310 stainless steel » Mostly used in food processing industry » Ideal for sulfuric acid compounds » Maximum operating temperature: 900°C (1650°F)	» Composed of high nickel, high chromium content for resistance to oxidizing and reducing environments and for highly corrosive environments at high temperatures » Used in furnaces, chemical and food processing equipment » Maximum operating temperature: 1150°C (2100°F)

Note: Other types of sheath materials are available upon request.