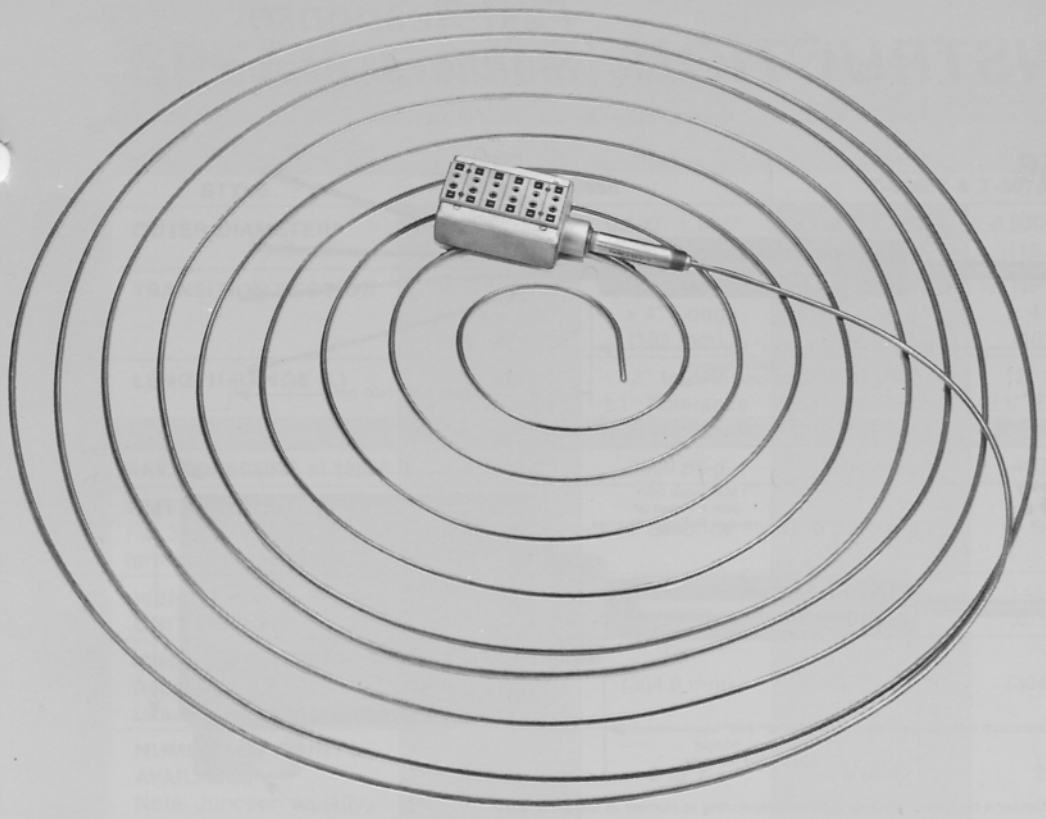


Multilevel Temperature Profiling Assembly

US Patents 3,280,627; 3,302,458; 3,144,507; others pending

made with AerOpak® Thermocouple Cable

- ARi® can now offer multiple element assemblies small enough to replace single point thermocouples. Also, large multiple element assemblies to replace expensive thermowells. It is now possible to insert a multicouple assembly directly into a pressurized process chamber with minimum flow restriction and a response time that is measured in seconds. This fast response time will allow detection of abnormal process temperature conditions — before damage can occur.

- Multiple level temperature sensor. Measuring junctions spaced to provide continuous temperature profiles under extreme process applications.
- Sensing end on fast response sensor may be formed or snaked around offsets.
- Withstands external pressures: ⅛" — 3000 psig, ½" — 4000 psig
- Sheath may be welded or brazed in place, or installed with a single compression fitting.
- Available with: Type "J" Iron Constantan for -300 to 1,000°F (-184 to 540°C)
  Type "K" Chromel/Alumel* for 32 to 1,800°F (0 to 980°C)
  Type "E" Chromel*/Constantan for -400 to 1,800°F (-240 to 980°C)
- Individual thermocouple circuits may either be fully insulated from each other or with junctions grounded to inner sheaths for faster response.
- Can be installed into existing thermowells or into fast response protection tubes.
- Ultra-fast time responses for critical process protection. Time constant of 3 seconds at 3 m/s water velocity can be attained with miniature .125 in. (3.18 mm) diameter assembly.
- Multiple element thermocouple assemblies are used to obtain continuous temperature data at preselected points. Previous approaches required installation of a number of thermocouples into rather large thermowells.
- Can be moved through an offset in instrument guide tubes to obtain temperature profile of vessel.

*REG. T.M. of HOSKINS MFG. CO

ARi is a Registered U.S. Trademark

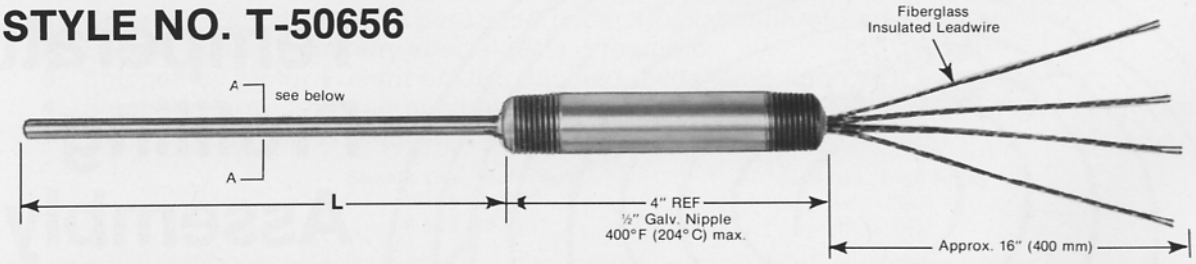
ARi Industries Inc

BULLETIN 7.3
August 1997

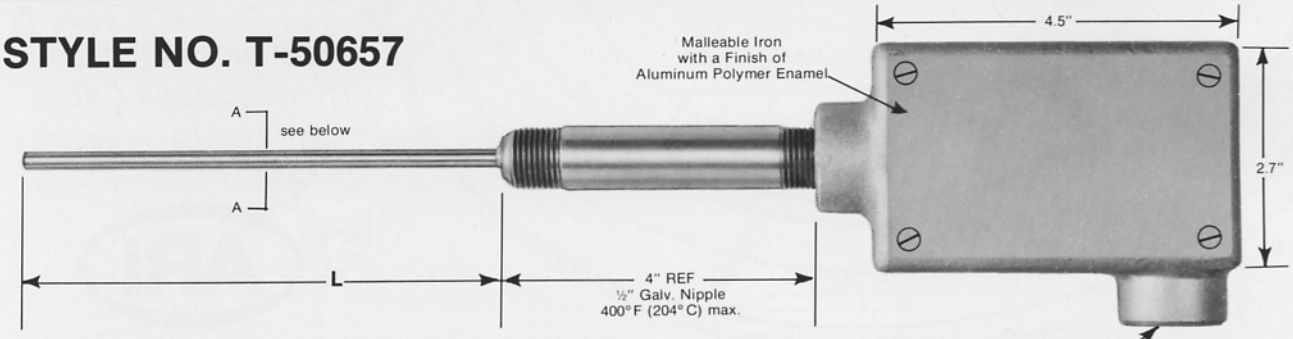
TYPICAL CONSTRUCTION

Fast Response Multilevel Probe

STYLE NO. T-50656

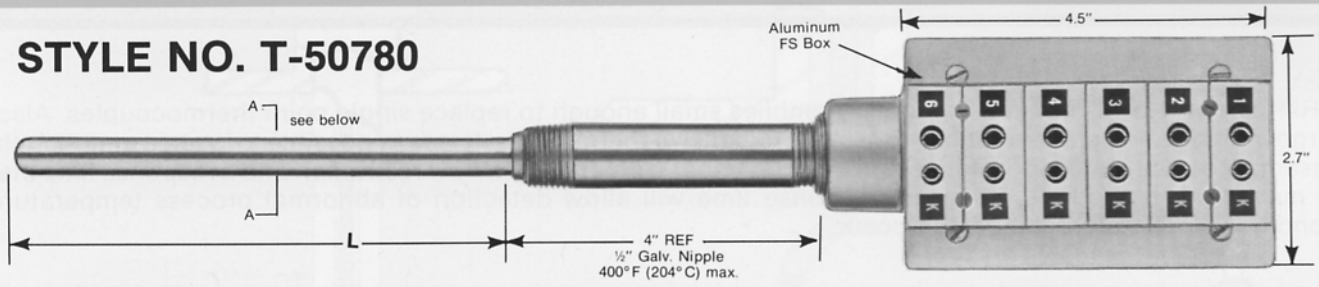


STYLE NO. T-50657

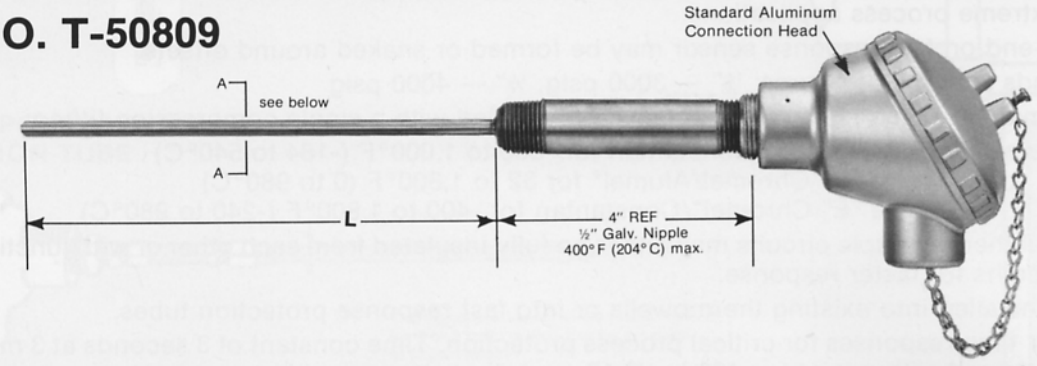


*J-Box with removable cover held by four screws. Contains numbered binding posts corresponding to number of thermocouples.

STYLE NO. T-50780

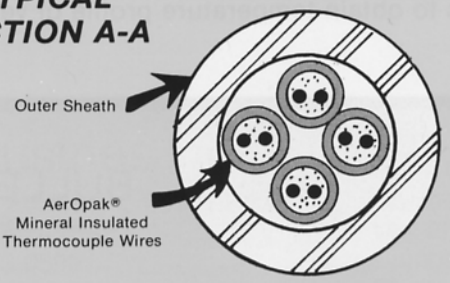


STYLE NO. T-50809

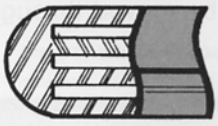
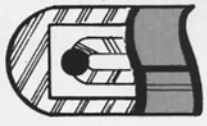


Note: Other Termination Designs are available per your requirement.

TYPICAL SECTION A-A



JUNCTIONS

#8	GROUNDED HOT JUNCTION	
#9	INSULATED HOT JUNCTION	

SPECIFICATIONS:

STYLE	T-50656		T-50657 & T-50780		T-50809	
OUTER DIAMETER*	0.125" ±.002" (3.18 mm)	0.500" ±.005" (12.7 mm)	0.125" ±.002" (3.18 mm)	0.500" ±.005" (12.7 mm)	0.125" ±.002" (3.18 mm)	0.500" ±.005" (12.7 mm)
TRANSITION SECTION	½" NPT NIPPLE x 4" Long (102 mm)	½" NPT NIPPLE x 4" Long (102 mm)	½" NPT NIPPLE x 4" Long (102 mm)	½" NPT NIPPLE x 4" Long (102 mm)	½" NPT NIPPLE x 4" Long (102 mm)	½" NPT NIPPLE x 4" Long (102 mm)
LENGTH RANGE (L)	6" to 240" ±1" Tolerance (152-6096 mm)	12" to 240" ±1" Tolerance (305-6096 mm)	6" to 240" ±1" Tolerance (152-6096 mm)	12" to 240" ±1" Tolerance (305-6096 mm)	6" to 240" ±1" Tolerance (152-6096 mm)	12" to 240" ±1" Tolerance (305-6096 mm)
MAX. PRESSURE at 100° F	3000 psig	4000 psig	3000 psig	4000 psig	3000 psig	4000 psig
TIME CONSTANT τ at 3 MPS Water velocity (grounded junction)	3 Seconds	10 Seconds	3 Seconds	10 Seconds	3 Seconds	10 Seconds
WEIGHT per UNIT LENGTH	.03 Lb./Ft. .045 Kg/M	0.45 Lb./Ft. .675 Kg/M	.03 Lb./Ft. .045 Kg/M	0.45 Lb./Ft. .675 Kg/M	.03 Lb./Ft. .045 Kg/M	0.45 Lb./Ft. .675 Kg/M
MINIMUM BENDING Radius for (L) Section to avoid a Permanent Set	0.5" (12.7 mm)	12" (304.8 mm)	0.5" (12.7 mm)	12" (304.8 mm)	0.5" (12.7 mm)	12" (304.8 mm)
NUMBER OF POINTS AVAILABLE Note: Junction equally spaced or provided with locations per customer requirements.	**2 to 4**	**2 to 7**	**2 to 4**	**2 to 6**	**2 to 3**	**2 to 3**

*Available in intermediate sizes on special order. Consult factory.

MAXIMUM OPERATING TEMPERATURES

MAXIMUM TEMPERATURE		°F	1000	1600	1800
		°C	540	871	980
THERMOCOUPLE CALIBRATION Per ASTM E-230-81 (standard limits of error)			J (Iron/Constantan)	K (Chromel/Alumel)* E (Chromel*/Constantan)	K (Chromel/Alumel)* E (Chromel*/Constantan)
OUTER SHEATH MATERIAL	ARi Symbol				
	"A" (304 ST/ST)		304 ST/ST	304 ST/ST	INCONEL 600**
	"B" (Inconel 600)**		INCONEL 600**		
	"C" (316 ST/ST)		316 ST/ST	316 ST/ST	
	"F" (347 ST/ST)		347 ST/ST	347 ST/ST	

The effect of corrosion on outer sheath should be considered as a modifying factor for this table.

*Reg. T.M. of Hoskins Mfg. Co. **Reg. T.M. International Nickel Co.

EXPLANATION OF PART NUMBER:

(example) **T-50656.4-120 D K 8 B 12, 14, 20-16**

- Design Number
- Number of Thermocouples
- Probe Length
- Probe O.D. Size (D 1/8" O.D., K 1/2" O.D.)
- Calibration
- Type of Hot Junction
- Sheath Material *(ARi Symbol)*
- Junction Spacing* (in inches from tip)
- Lead Wire Length (in inches)

***Note when Junctions are to be equally spaced, indicate First Number (in inches) from Tip.**

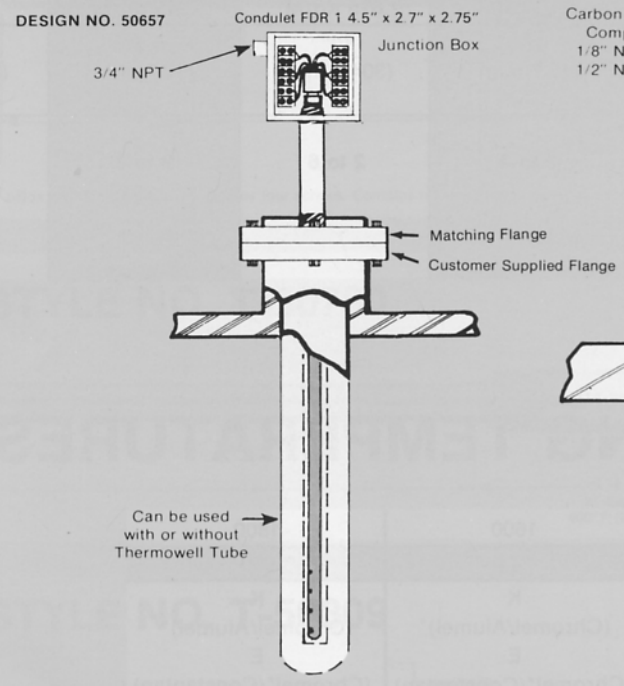
HOW TO ORDER

1. Generate Part Number as described under "Explanation of Part Number."
2. Specify quantity and any special tests if required.
3. Shipped by Motor Freight or UPS, insured, depending upon size and weight.
4. Shipping form. Shipped straight for lengths of 120 inch (3050mm). Longer lengths will be shipped coil (unless requested otherwise) as follows:

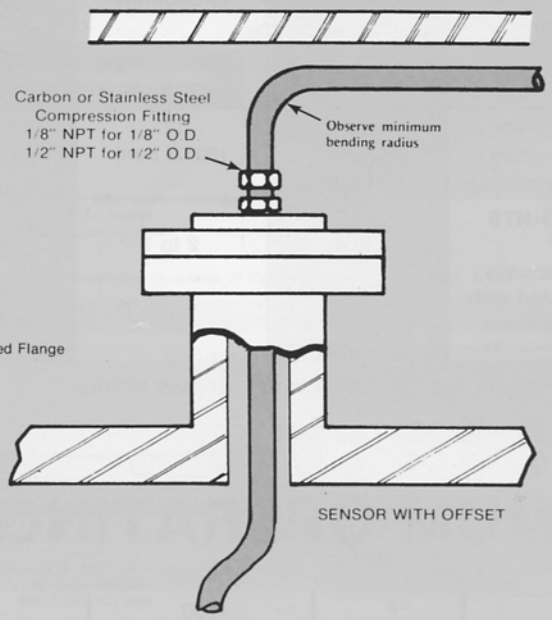
Sheath Dia., inch (mm)	Coil Dia., inch (mm)
0.125 (3.18)	48 (1,220)
0.500 (12.7)	96 (2,440)

Application Notes:

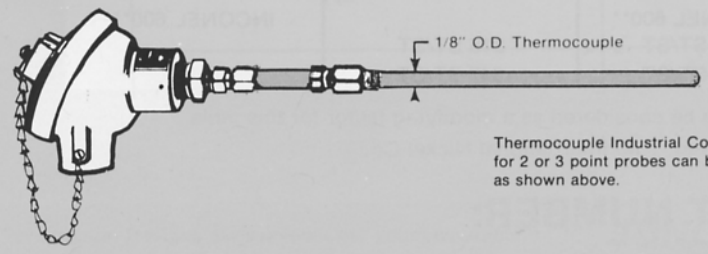
1. TO REPLACE SINGLE POINT SENSORS IN EXISTING THERMOWELLS



2. INSTALLED IN A LOW CLEARANCE LOCATION

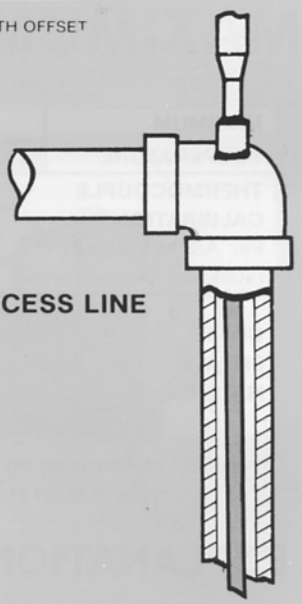


3. FAST RESPONSE UNIT PROTECTION TUBE



Thermocouple Industrial Connection Head for 2 or 3 point probes can be provided as shown above.

4. BRAZED INTO PROCESS LINE



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