



Thermowell

Features of Protection Tubes / Metallic Protection Tubes

Material	Operating Temp. (°C)	Maximum Temp. (°C)	Features
Plain Steel	800	900	Good resistance to reducing atmosphere but less resistant to oxidation and acids attacks.
304 S.S.	900	1,000	Widely used as common protection tube against heat and corrosion but not recommendable for use in the presence of sulphur or reducing flame.
304L S.S.	900	1,000	Less carbon content (Cn0.03%) than 304S.S. and excellent resistance to grain boundary corrosion.
321 S.S.	900	1,000	Higher corrosion resistance than 304 S.S. because of its Ti content. Excellent resistance to grain boundary corrosion after welding.
316 S.S.	900	1,000	Contains Mo and excellent resistance to heat, acids and alkalis.
316L S.S.	900	1,000	Less carbon content than 316S.S. and has better resistance to grain boundary corrosion.
310S S.S.	950	1,050	High Ni-Cr content and good high temperature strength with resistance to oxidation at high temperatures.
347 S.S.	900	1,000	Because of its Nb-Ta content, higher corrosion resistance than 304 S.S. and excellent resistance to grain boundary corrosion.
446 S.S.	1,050	1,125	Excellent resistance to oxidizing and reducing flames containing sulphur. Best suitable for the use in salt baths, molten metals and other high temperature applications.
50Co-30Cr	1,100	1,200	Excellent resistance to heat, corrosion and abrasion. Also good resistance to sulphurizing atmospheres.
Inconel600	1,180	1,250	Excellent resistance to oxidizing and reducing atmospheres at high But sulphurous atmospheres should be avoided.
Incoloy 800	870	1,000	Excellent to high temperature oxidizing atmospheres and thermal shock. About 10 times longer service life than 304 S.S. against high temperature corrosion.
Kanthal A	Oxi. 1,000 Red. 1,000	-	Good resistance to high temperature oxidation but becomes brittle due to recrystallization.
80Ni.20Cr	1,100	1,250	Good mechanical strength and corrosion resistance at high temperature oxidizing atmospheres but not recommendable for use in sulphurizing atmospheres.
Kurimax*	1,200	1,400	Excellent resistance to molten chemicals and combustion gases. Also good resistance to corrosion by liquid copper.
Hastelloy B	800	1,100	Excellent resistance to heat and corrosion, especially to HCl and H ₂ SO ₄
Hastelloy C	1,000	1,100	Excellent resistance to high temperature oxidizing and reducing atmospheres and also to Cl ₂ gases.
Hastelloy X	1,175	1,260	Excellent resistance to oxidizing and carburizing atmospheres at high temperatures. Better machinability and weldability than other Hastelloy alloys.
Haynes Alloy 25	980	1,100	High resistance to oxidizing and carburizing atmospheres at high temperatures.
Titanium	Oxi. 250 Red. 1,000	-	Superior corrosion resistance in cryogenic temperatures but at high temperatures. easily oxidized and becomes brittle.
Monel	500	600	Excellent resistance to water vapor, high pressure and corrosion.
Tantalum	Oxi. 300 Red. 2,200		Excellent heat-resistant material with high resistance to all acids but apt to severe oxidation and embrittlement in air at high temperatures.

Note : Operating and maximum temperatures vary depending on the atmospheres.
Other special protection tubes are also available upon request.

Thermowell

Features of Protection Tubes J Non-Metallic Protection Tubes

Material	Code-No.	Operating Temp. (°C)	Maximum Temp. (°C)	Features
Translucent Quartz Transparent Quartz	QT	1,000	1,100	Excellent resistance to thermal shock but fragile. Poor resistance to alkalis but good to acids. Less gas-tightness in hydrogen and reducing gases. High thermal conductivity.
Mullite	PT2	1,400	1,500	High alumina ceramic. Good resistance to thermal shock. Recommendable for use in coal or oil burning and electric furnaces. Sintered alumina. Better than PT2 slightly less thermal shock resistance.
	PT1	1,500	1,600	Recommendable for use in heating furnace and regenerator, impervious.
Recrystallized Alumina	PT0	1,600	1,800	Superior chemical stability and better than PT-1, Recommendable for use in molten steel, slag and molten glass, impervious.
Cermet (Cermotherm)	2040	1,600	2,200	High heat conductivity; good thermal shock resistance and corrosion resistance in molten metals. Recommendable for continuous use in molten steel but not suitable for use in oxidizing atmosphere at high temperatures.
Recrystallized Silicon Carbide	Y3 SiC	1,650	-	Good resistance to acids and alkalis. Recommendable for the use in neutral atmospheres up to 1,500°... and also in molten zinc, aluminum, lead, copper, etc., porous
Self-bonded Silicon Carbide	Y2 SiC	1,650	2,300	Very low porosity. Excellent resistance to thermal shock, corrosion and abrasion at high temperatures. Recommendable for use in oxidizing and reducing atmospheres up to 1,500°....
Clay-bonded Silicon Carbide	Y3 SiC	1,500	1,700	Good heat conductivity. More accurate measurement than oxide-type tube can be expected. Excellent resistance to thermal shock, porous.
Nitride Bonded Silicon Carbide	Y4SiC	1,550	1,750	Excellent performance similar to Y3 SiC but contains Si ₃ N ₄ . Most suitable for use in molten aluminum, porous.
Zirconia	ZR11706	1,900	2,400	Gas-tight and chemically stable against molten metals other than alkalis. Recommendable for use in molten special metals, slag and glass up to 1,900°....

Note : Operating and maximum temperatures vary depending on the atmospheres.
Other non-metallic tubes are also available upon request.

Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

Thermowell

Transmitter

Indicator etc.

Technical data

Ordering Information

SS-5091A x PT1/2(F) x JIS10K 25A RF x 300L x Ø17 x 16SS

Material :

- 304SS : STS304
- 316SS : STS316
- 310SS : STS310
- 321SS : STS321
- 446SS : STS446
- INCONEL600
- HASTELLOY X
- OTHER

Bar & Tube Out DIA. :

- Ø14
- Ø16
- Ø17
- Ø19
- Pipe Size

Insert Length :

- 50 ~ 1200mm : SS-5091, SS-5092 Series
- 50 ~ 6000mm : SS-5093, SS-5094 Series

Process Connection Type :

- PT1/2
- PT3/4
- PT1
- Flange Size

Insert Connection Type :

- PT1/2(F) : PT1/2(Female)
- NPT1/2(F) : NPT1/2(Female)
- PT1/2(M) : PT1/2(Male)
- NPT1/2(M) : NPT1/2(Male)

Model & Mounting Type :

- SS-5091 A : Drilled Bar Type & Welding Type
- SS-5091 C : Drilled Bar Type & Screw Type
- SS-5092A · B · C · D : Drilled Bar Type & Flange Type
- SS-5093A : Ended Close Type & Screw Type
- SS-5094A · D · F · T : Ended Close Type & Flange Type

* Model No. : See Table

Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

Thermowell

Transmitter

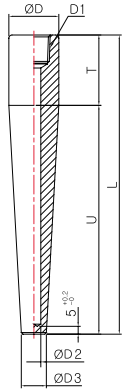
Indicator etc

Technical data

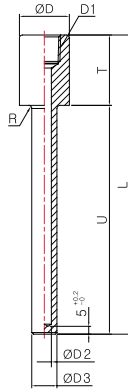
Model No. SS-5091 Series

Drilled Bar Type

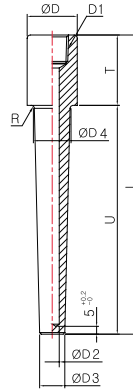
Model No. | SS-5091A



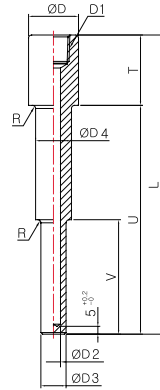
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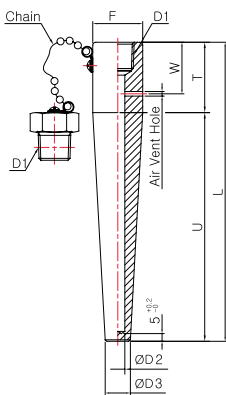
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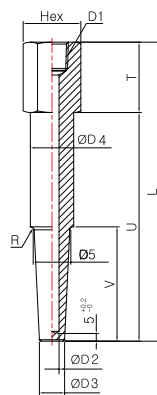
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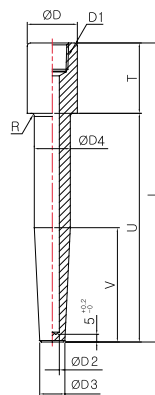
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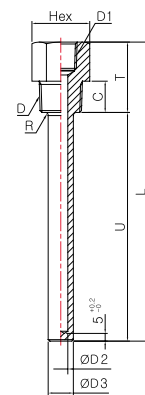
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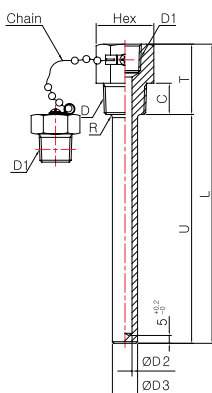
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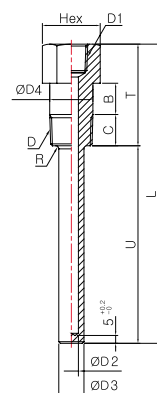
Model No. | SS-5091C



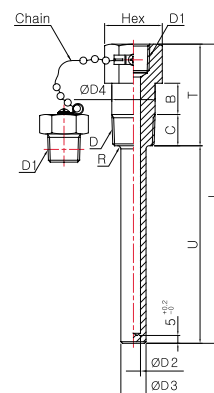
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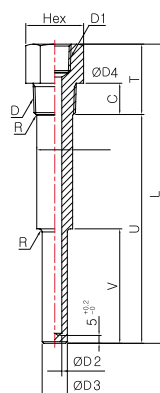
Model No. | SS-5091C-2



Model No. | SS-5091C-3



Model No. | SS-5091C-4



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

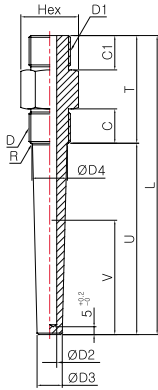
Thermowell

Transmitter

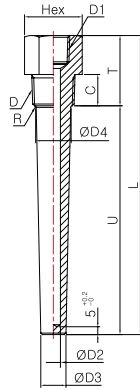
Indicator etc.

Technical data

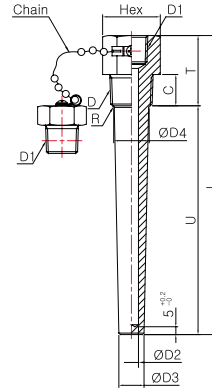
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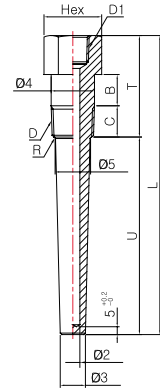
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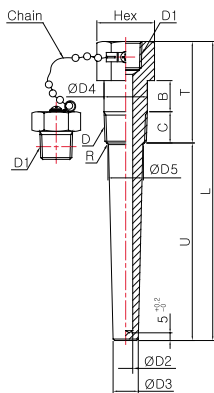
Model No. | SS-5091D-1



Model No. | SS-5091D-2



Model No. | SS-5091D-3



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

Thermowell

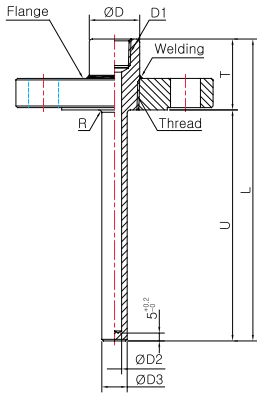
Transmitter

Indicator etc

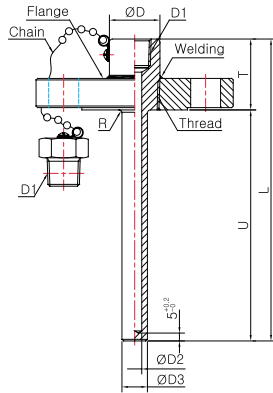
Technical data

Flange Connect Type

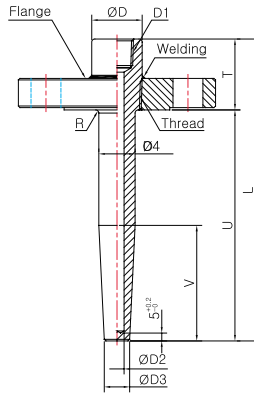
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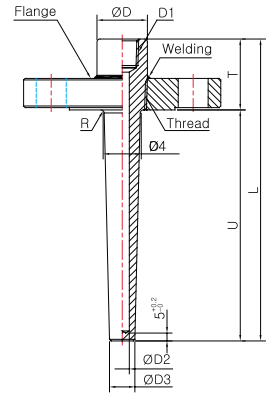
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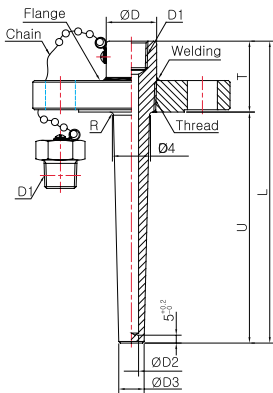
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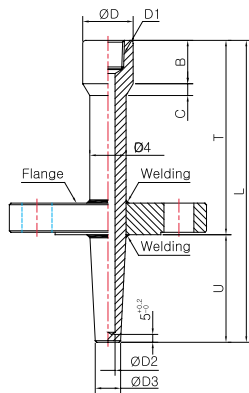
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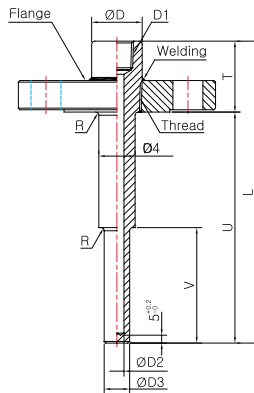
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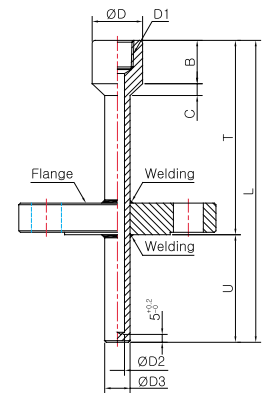
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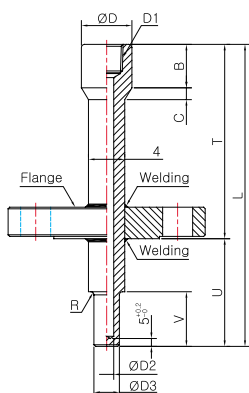
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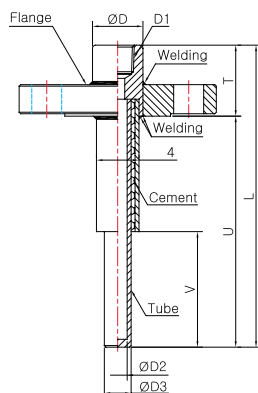
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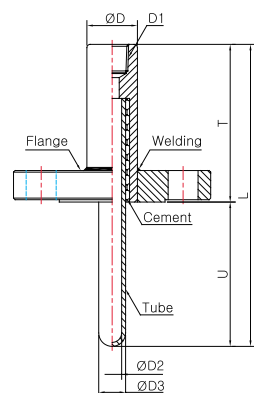
Model No. | SS-5092C-2



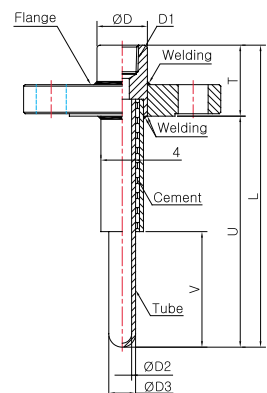
Model No. | SS-5091D



Model No. | SS-5091D-1



Model No. | SS-5091D-2



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

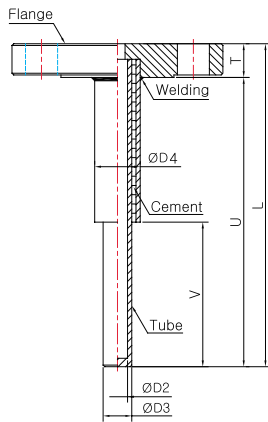
Thermowell

Transmitter

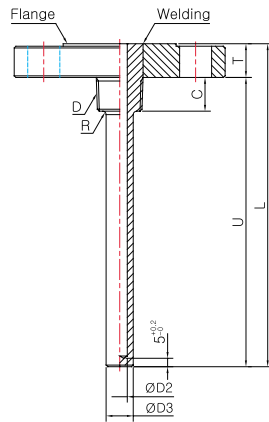
Indicator etc.

Technical data

Model No. | SS-5091D-3



Model No. | SS-5092E



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

Thermowell

Transmitter

Indicator etc

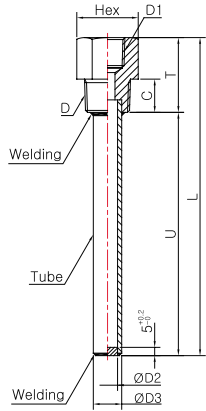
Technical data

Thermowell

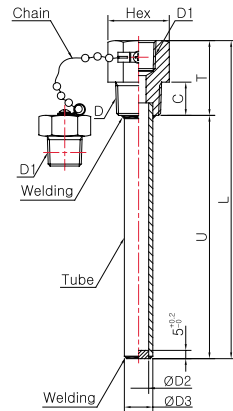
Model No. SS-5093 Series

End Close Tube Type

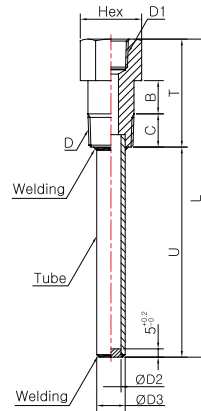
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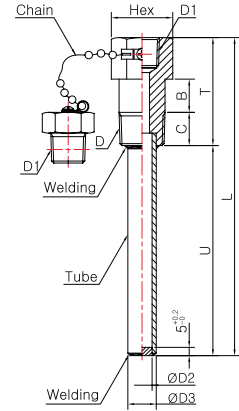
Model No. | SS-5093A-1



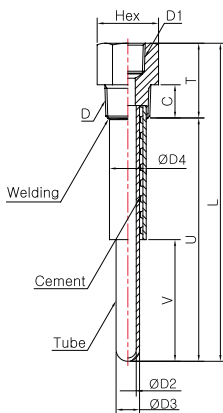
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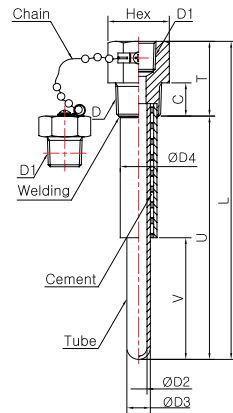
Model No. | SS-5093B-1



Model No. | SS-5093C



Model No. | SS-5093C-1



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

Thermocouple & R.T.D

Thermowell

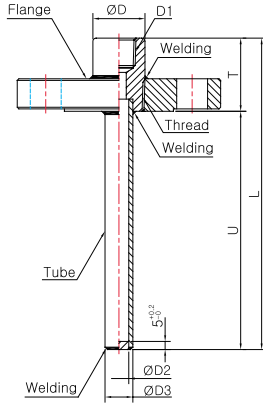
Transmitter

Indicator etc.

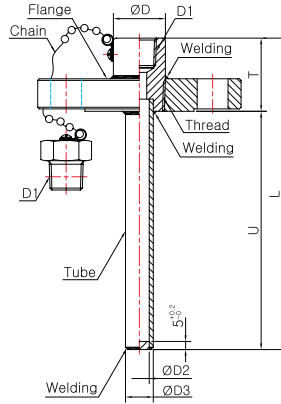
Technical data

End Close Tube Flange Type

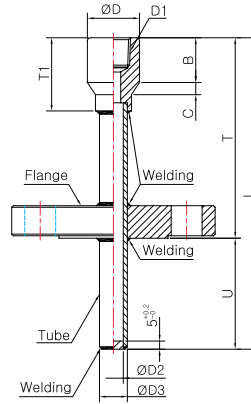
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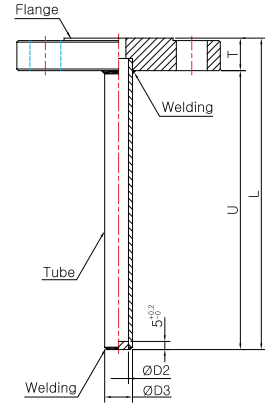
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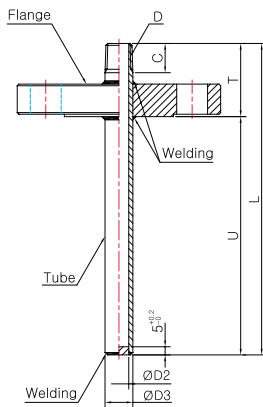
Model No. | SS-5094D



Model No. | SS-5094F



Model No. | SS-5094T



Pressure Gauge

Differential Pressure Gauge & Switch

Accessories of Pressure Gauge

Thermometer & Thermometer Switch

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