

# Thermocouple

## Model. DS-3020 Series (Sheath Type)

# DAESHIN

### Sheath 열전대의 개요

Sheath 열전대는 Stainless강, 내열강 등의 극세관 (Sheath)에 열전대 소선과 무기절연물 (산화마그네슘 : MgO)을 견고히 충전한 것으로서 절연성이 우수하고 내열성이 뛰어난것이 특징입니다.

또 적당한 열처리를 함으로서 열전대의 기능을 손상하지 않고 우수한 가열성을 갖고 신뢰성이 높습니다.

### Sheath 열전대의 특징

- ▶ 빠른 응답속도  
: Sheath 열전대는 열전대 소선과 절연재의 보호관이 하나의 구조로 되어 있기 때문에 열 전도율이 높아 형에 따라서 장소, 온도변화에도 빠른 응답성을 가지고 있습니다.
- ▶ 우수한 가소성과 내가역성  
: 고밀도로 성형되어 있기 때문에 기계적 강도가 크고 Sheath의 외경의 2배의 이상 용이하게 구부릴 수가 있습니다.
- ▶ 우수한 내열, 내식성, 내압성  
: 내열동관에 고온도의 절연분말(MgO)이 압축되어 있으므로 기밀성이 우수하고 외부 분위기에 의한 부식의 우려가 없고 최고 50Mpa의 압력에서도 사용이 가능합니다.
- ▶ 극소 외경 장치물의 제작 가능  
: 외경 1.0mm ~ 12.7mm, 길이 30m까지 제작 가능하고 Element는 1식 2식이 가능하다
- ▶ 넓은 측온범위.  
: 극저온 -200°C, 고온 +1600°C까지 측온이 가능하다.

### 열전대의 용도

- ▶ 철강, 비철 금속 산업분야  
: 용선, 용광온도, 고로, 전로, 균열로, THEN로, 전기로, 진공유도로 등 각종 로의 온도, 연속주조, 열처리 고용점 금속의 온도 등
- ▶ 전력, GAS 산업분야  
: 보일러, 과열기, 재열기 등의 관벽온도, 증기 냉각수, 급수, 배수, 기름 등의 유체온도, 화로의 가열온도 등.
- ▶ 전기, 전자 산업분야  
: 모터, 트랜스 발전기, 코일 절연유 등의 온도, 트랜지스터 직접회로, 전자회로 제조공정중의 온도 등.
- ▶ 요업 산업분야  
: 시멘트, 유리, 연와, 도자기 등의 소성로 예열로, 서냉로 등의 온도,
- ▶ 화학 산업분야  
: 기체, 액체의 반응탑 반응부의 온도, 고온 발생로의 온도, 화학기계장치의 부품온도, 유화온도, 플라스틱 압출기, 성형기의 온도, 석유정제 공정중의 분해라인의 온도측정 등.
- ▶ 조선 산업분야  
: LPG, LNG 탱크등의 조벽온도, 열교환기의 온도 등.
- ▶ 외식 산업분야  
: 제빵 제과 양조, 그 외의 식품제조 공정중의 온도 등.



Model. DS-3023W

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

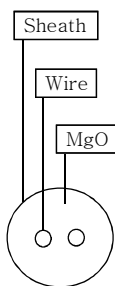
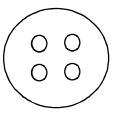
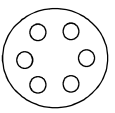
Thermowell

# Thermocouple

Model. DS-3020 Series (Sheath Type)

# DAESHIN

## Type & Size of Sheath

	Nom O.D(mm)	Wire Dia.(mm)	Wall Thick.(mm)	Type	Sheath Material	Max Length(mm)	Weight (g/m)
<b>Single Pair</b> 	0.25	0.04	0.05	K	INCONEL600	5	0.4
	0.5	0.09	0.09	K,E,J	INCONEL600 304SS,321SS,316SS,310SS	50	1.3
	1.0	0.18	0.15	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	100	5
	1.6	0.28	0.23	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	100	13
	2.2	0.40	0.33	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	300	24
	3.2	0.58	0.48	K,E,J,T	INCONEL600,Cupro-Nickel 304SS,321SS,316SS,310SS	200	51
	4.8	0.84	0.71	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	100	115
	6.4	1.12	0.94	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	60	193
	8.0	1.37	1.17	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	35	300
<b>Dual Pair</b> 	1.6	0.23	0.23	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	300	13
	2.2	0.33	0.33	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	300	22
	3.2	0.46	0.48	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	157	45
	4.8	0.71	0.74	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	68	102
	6.4	0.94	1.02	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	38	222
	8.0	1.24	1.24	K,E,J,T	INCONEL600,Cupro-Nickel,HastellyX 304SS,321SS,316SS,310SS	24	350
<b>Triple Pair</b> 	3.2	0.28	0.33	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	157	45
	4.8	0.71	0.71	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	68	102
	6.4	0.94	1.02	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	38	222
	8.0	1.24	1.24	K,E,J,T	INCONEL600 304SS,321SS,316SS,310SS	24	350

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

Thermowell

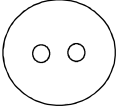
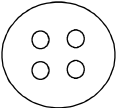
# Thermocouple

Model. DS-3020 Series (Sheath Type)





# DAESHIN

## Analysis of Sheath Material

Unit :  $\Omega/m$  at  $^{\circ}C$

	Nom)	Wire Dia.(mm)	K	E	J	T
Single Pair 	1.0	0.18	38.6	48.6	26.4	22.2
	1.6	0.28	15.5	19.6	10.7	9.1
	2.2	0.40	8.1	10.5	5.6	4.7
	3.2	0.58	3.9	5.5	2.7	2.3
	4.8	0.84	1.8	2.3	1.3	1.0
	6.4	1.12	1.1	1.3	-	-
	8.0	1.37	0.7	0.8	0.5	0.4
Dual Pair 	2.2	0.33	10.7	-	7.4	6.3
	3.2	0.46	5.9	7.2	3.8	2.8
	4.8	0.71	2.5	2.9	1.5	1.1
	6.4	0.94	1.6	1.7	1.0	0.7
	8.0	1.24	1.0	1.1	0.6	0.5

## Hot Junctions of Sheath

형상	특징
접지형 (Grounded) 	열전대 소선을 Sheath의 선단부에 직접 용접하여 열접점을 만든 형상, 응답이 빠르고 고온 고압화의 온도 측정에도 적합합니다. 또 소선이 Sheath에 접지되어 있으므로 위험장소나 잡음전압이 있는 장소에서는 사용할 수 없습니다.
비접지형 (Ungrounded) 	열전대의 소선을 Sheath와 완전히 절연시키고 열접점을 만든 형상, 응답속도는 접지형에 떨어지지만 열기전력의 경시 변화가 적고 장시간의 사용에 견디고, 또 잡음 전압에도 영향을 받지 않고 위험장소에도 안전하게 사용할 수 있습니다.
노출형(Exposed) 	열전대 소선을 Sheath에서 노출하여 열접점을 만든 형상, 응답속도는 가장 빠르고 미소한 온도 변화에도 추종합니다. 그러나 기밀성 및 기계적 강도에 떨어지므로 부식성 분위기나 고온 고압하에서는 장기간 사용은 할 수 없습니다.
비접지분리형(Double Ungrounded) 	열전대 소선별로 각각 열접점을 형성하여 2중열접점을 갖는 형상으로 지시 및 기록용으로 분리하여 사용 가능하며, 기타 특성은 비접지형과 동일합니다.

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

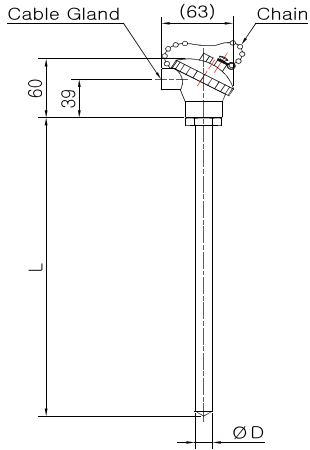
Thermowell

# Thermocouple

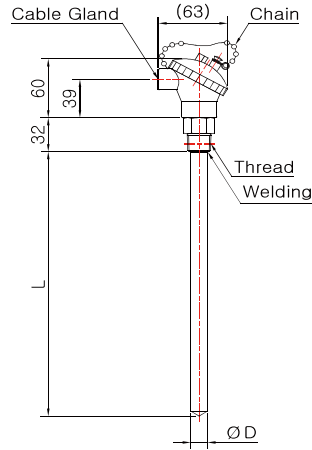
## Model. DS-3020S Series

# DAESHIN

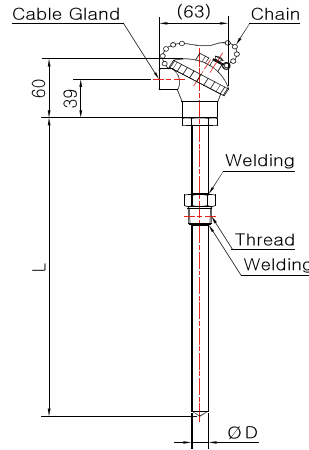
### General Purpose Head Type



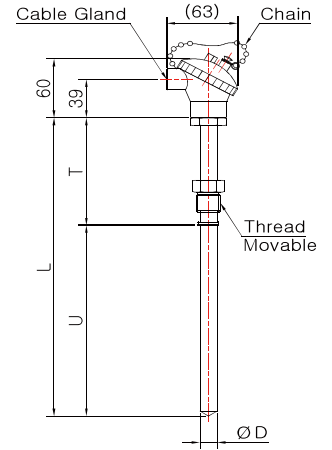
**Model No. DS-3021S**  
(Sheath)



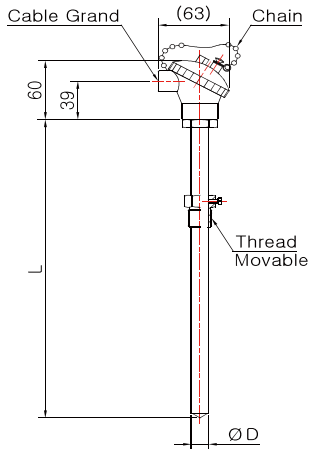
**Model No. DS-3022S**  
(Sheath)



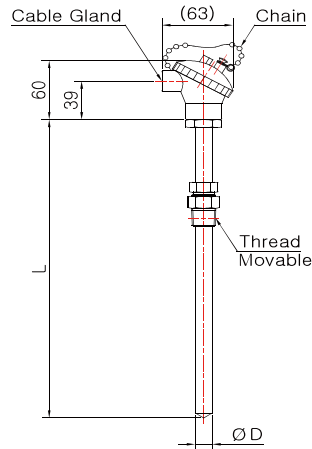
**Model No. DS-3022S-1**  
(Sheath)



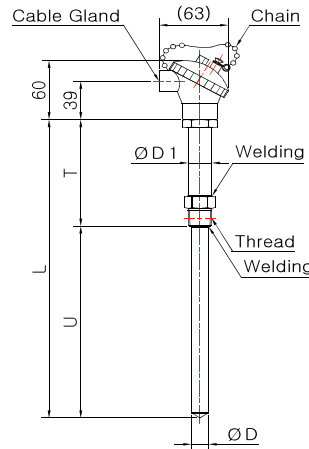
**Model No. DS-3022S-2**  
(Sheath)



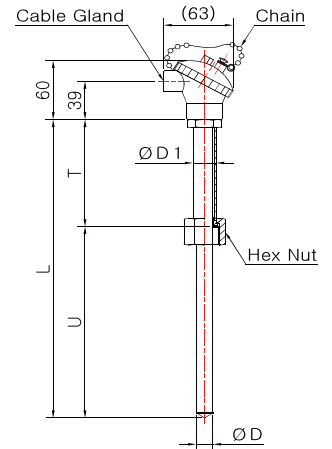
**Model No. DS-3022S-3**  
(Sheath)



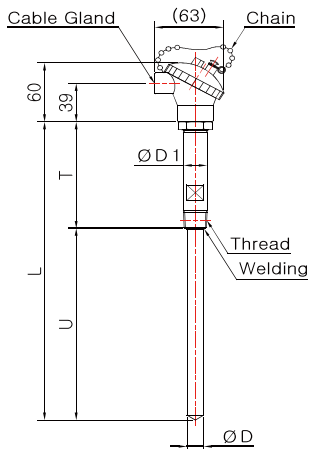
**Model No. DS-3022S-4**  
(Sheath)



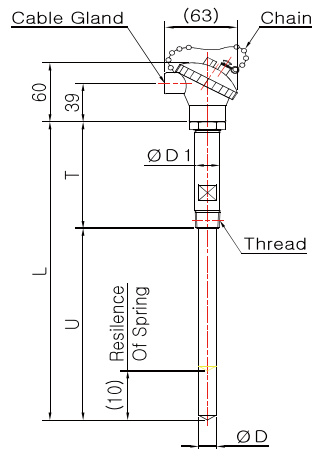
**Model No. DS-3023S**  
(Sheath)



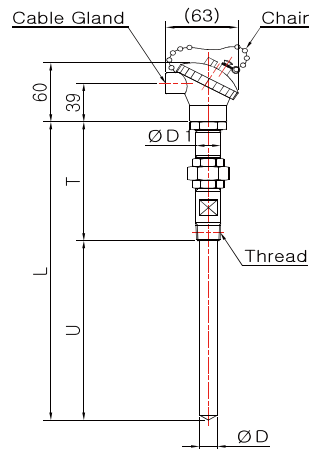
**Model No. DS-3023S-1**  
(Sheath)



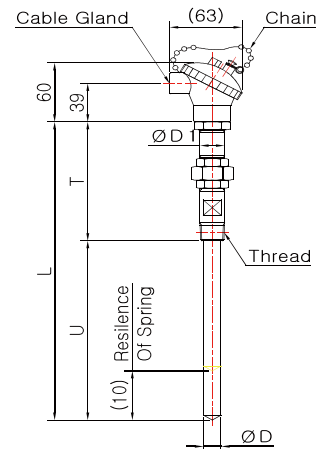
**Model No. DS-3024S-1**  
(Sheath)



**Model No. DS-3024S-1-1**  
(Sheath Spring Load)



**Model No. DS-3024S-2**  
(Sheath)



**Model No. DS-3024S-2-1**  
(Sheath Spring Load)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

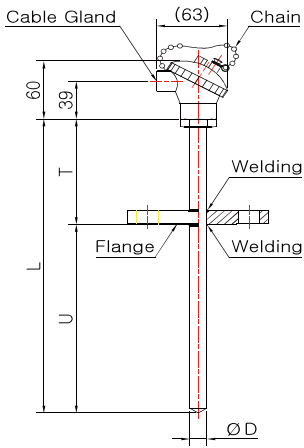
Thermowell

# Thermocouple

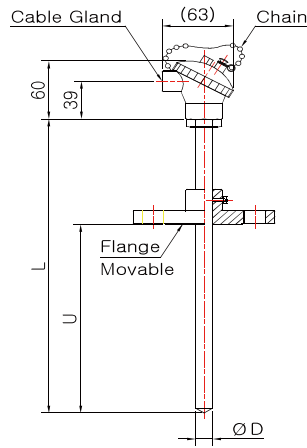
## Model. DS-3020S Series

# DAESHIN

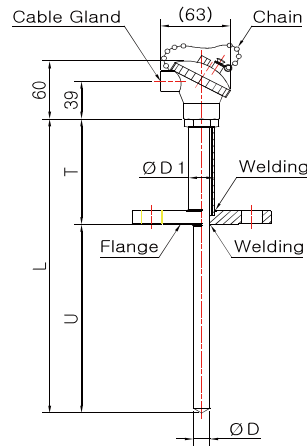
### General Purpose Head Type



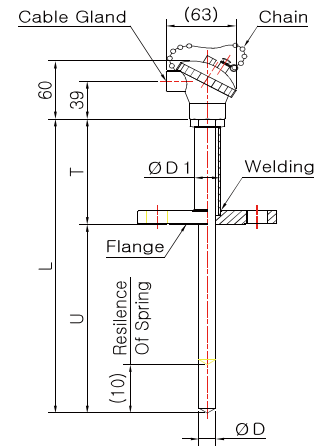
**Model No. DS-3025S**  
(Sheath)



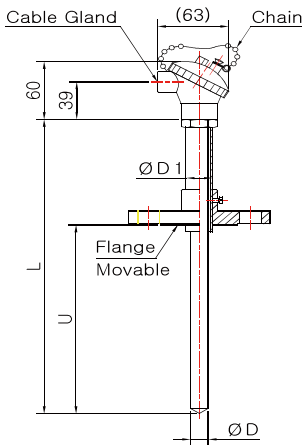
**Model No. DS-3025S-1**  
(Sheath)



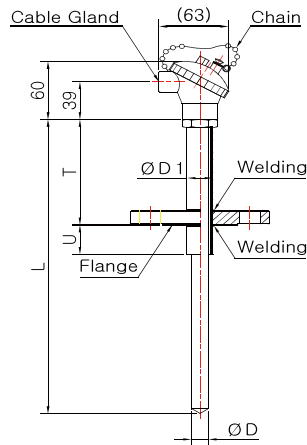
**Model No. DS-3026S-1**  
(Sheath)



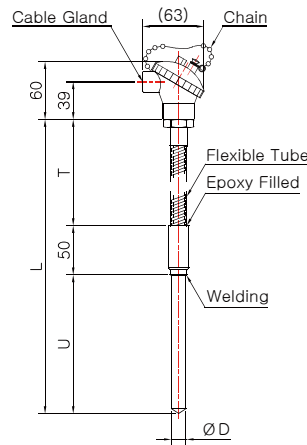
**Model No. DS-3026S-1-1**  
(Sheath Spring Load)



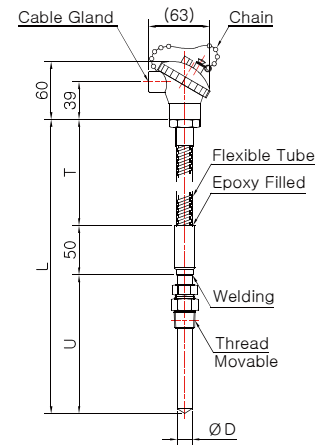
**Model No. DS-3026S-2**  
(Sheath)



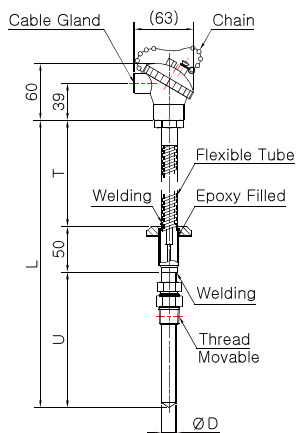
**Model No. DS-3026S-3**  
(Sheath)



**Model No. DS-3029S**  
(Sheath)



**Model No. DS-3029S-1**  
(Sheath)



**Model No. DS-3029S-3**  
(Sheath)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

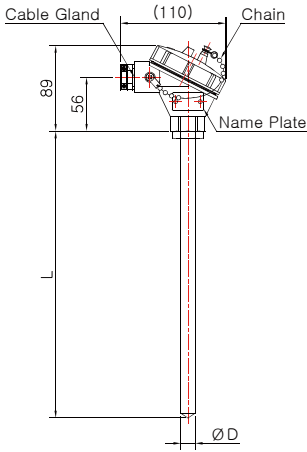
Thermowell

# Thermocouple

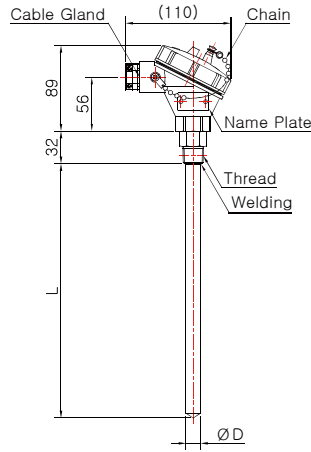
## Model. DS-3020W Series

# DAESHIN

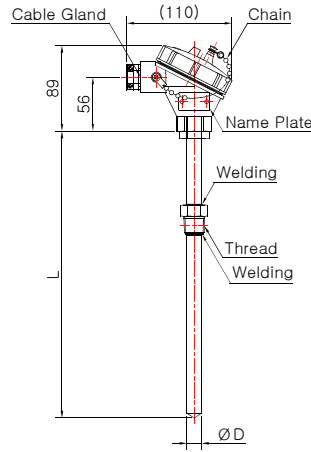
### Weather Proof Head Type



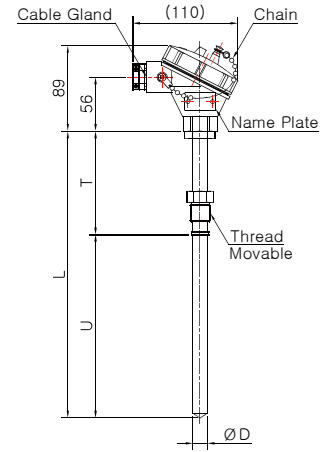
**Model No. DS-3021W**  
(Sheath)



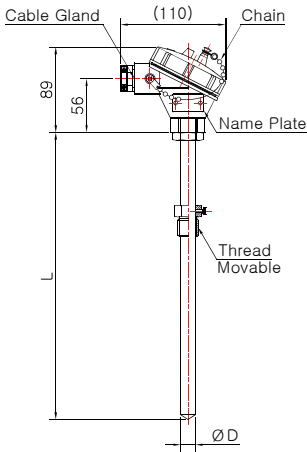
**Model No. DS-3022W**  
(Sheath)



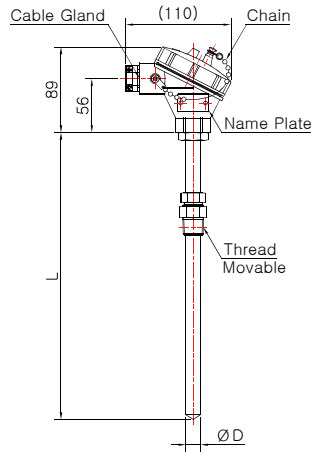
**Model No. DS-3022W-1**  
(Sheath)



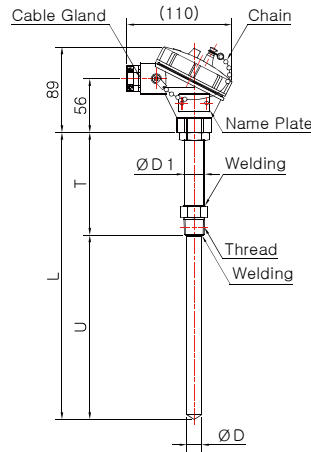
**Model No. DS-3022W-2**  
(Sheath)



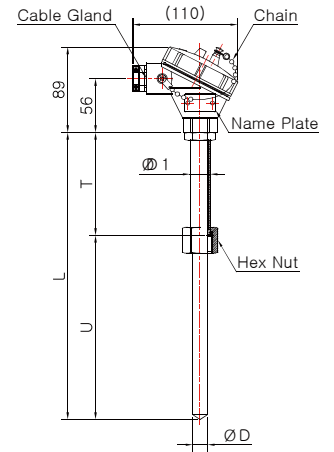
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(Sheath)



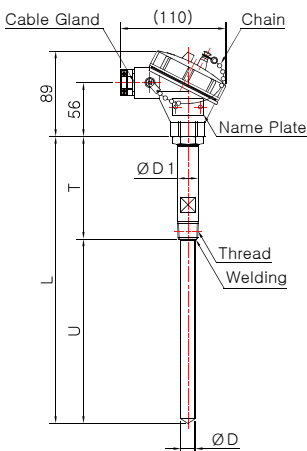
**Model No. DS-3022W-4**  
(Sheath)



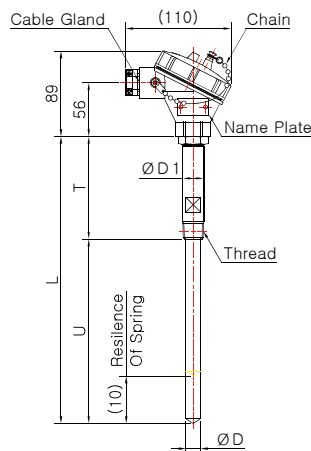
**Model No. DS-3023W**  
(Sheath)



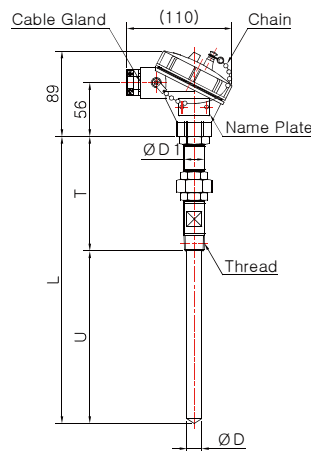
**Model No. DS-3023W-1**  
(Sheath)



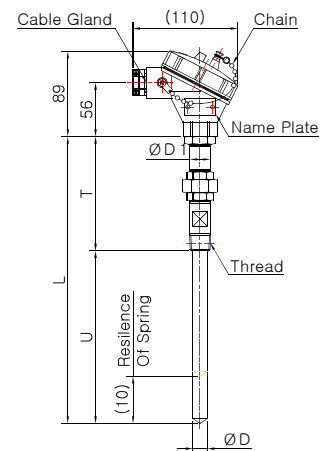
**Model No. DS-3024W-1**  
(Sheath)



**Model No. DS-3024W-1-1**  
(Sheath Spring Load)



**Model No. DS-3024W-2**  
(Sheath)



**Model No. DS-3024W-2-1**  
(Sheath Spring Load)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

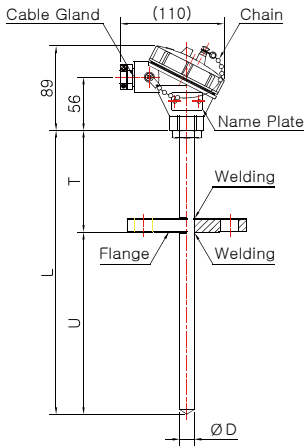
Thermowell

# Thermocouple

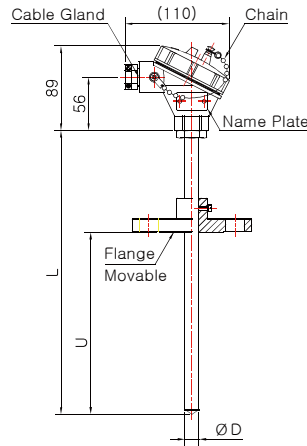
## Model. DS-3020W Series

# DAESHIN

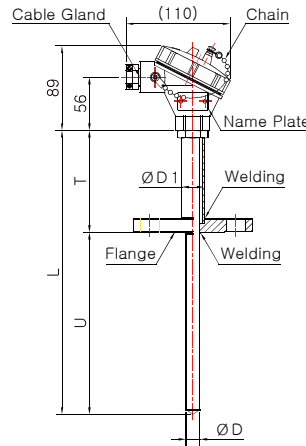
### Weather Proof Head Type



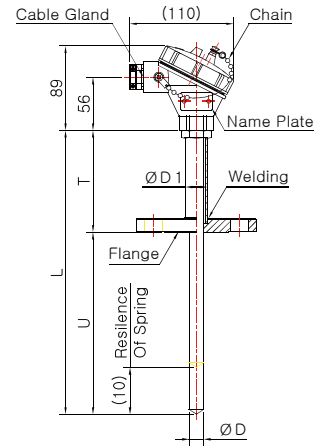
**Model No. DS-3025W**  
(Sheath)



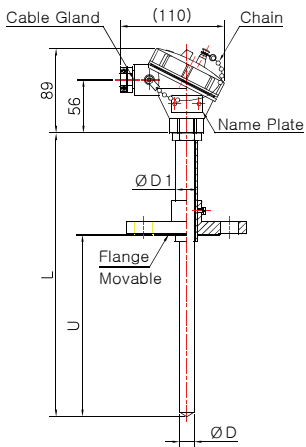
**Model No. DS-3025W-1**  
(Sheath)



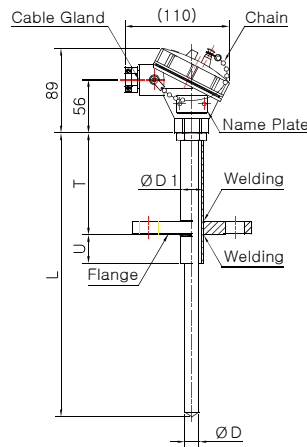
**Model No. DS-3026W-1**  
(Sheath)



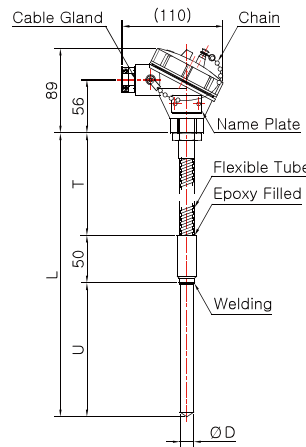
**Model No. DS-3026W-1-1**  
(Sheath Spring Load)



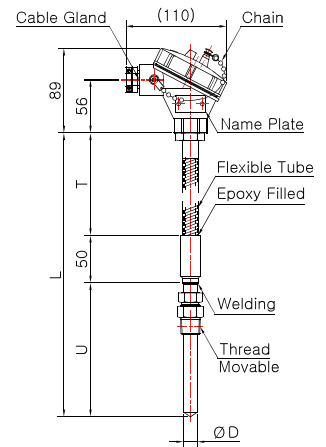
**Model No. DS-3026W-2**  
(Sheath)



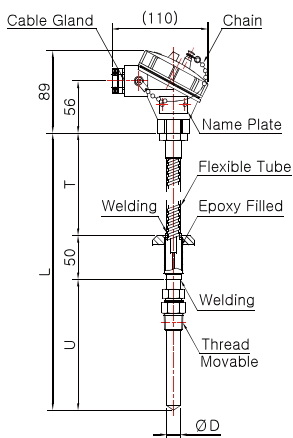
**Model No. DS-3026W-3**  
(Sheath)



**Model No. DS-3029W**  
(Sheath)



**Model No. DS-3029W-1**  
(Sheath)



**Model No. DS-3029W-3**  
(Sheath)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

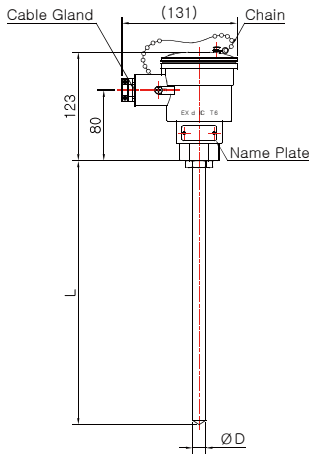
Thermowell

# Thermocouple

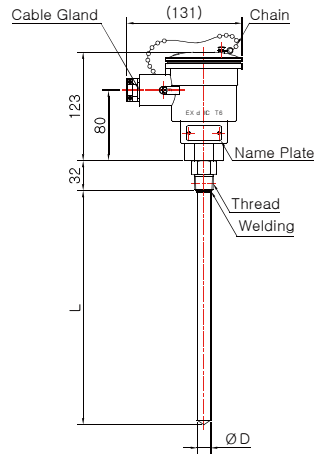
## Model. DS-3020E Series

# DAESHIN

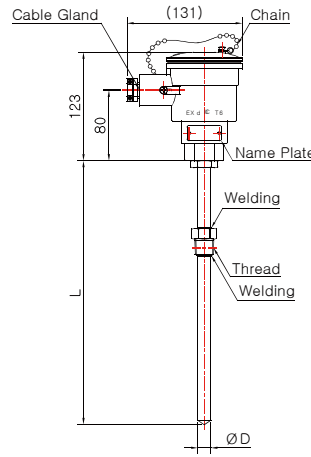
### Explosion Proof Head Type



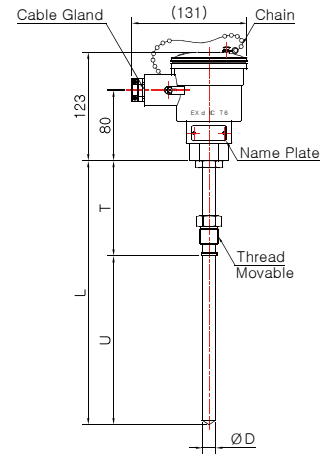
**Model No. DS-3021E**  
(Sheath)



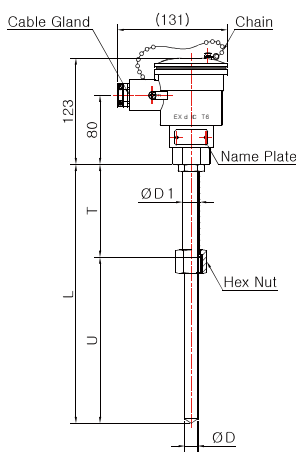
**Model No. DS-3022E**  
(Sheath)



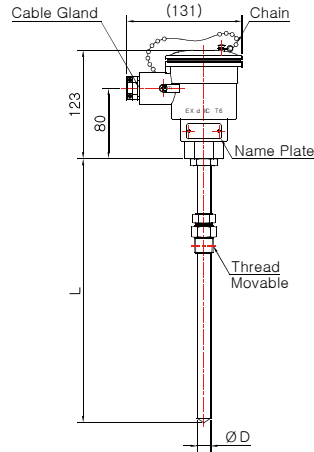
**Model No. DS-3022E-1**  
(Sheath)



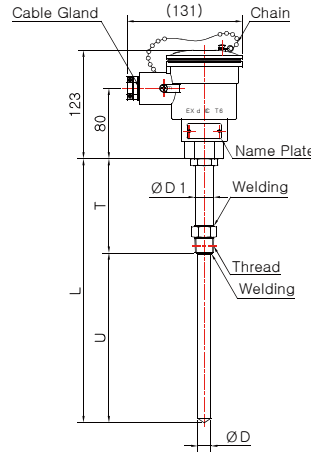
**Model No. DS-3022E-2**  
(Sheath)



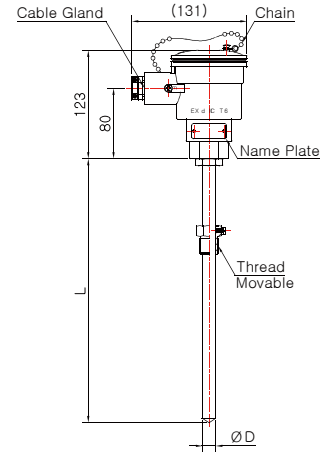
**Model No. DS-3022E-3**  
(Sheath)



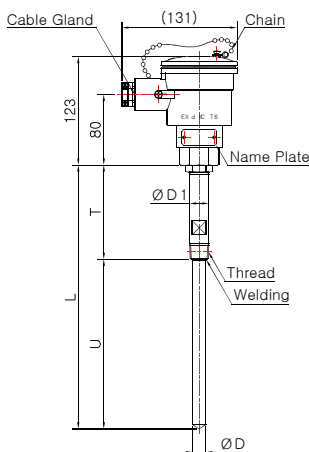
**Model No. DS-3022E-4**  
(Sheath)



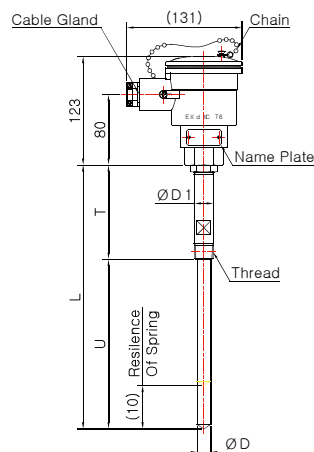
**Model No. DS-3023E**  
(Sheath)



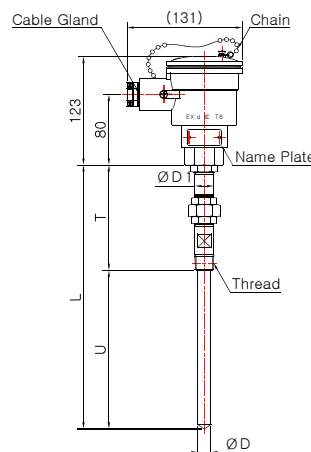
**Model No. DS-3023E-1**  
(Sheath)



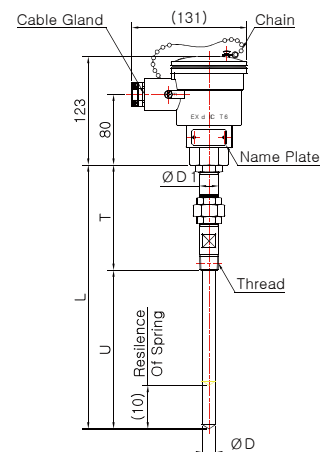
**Model No. DS-3024E-1**  
(Sheath)



**Model No. DS-3024E-1-1**  
(Sheath Spring Load)



**Model No. DS-3024E-2**  
(Sheath)



**Model No. DS-3024E-2-1**  
(Sheath Spring Load)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

Thermowell

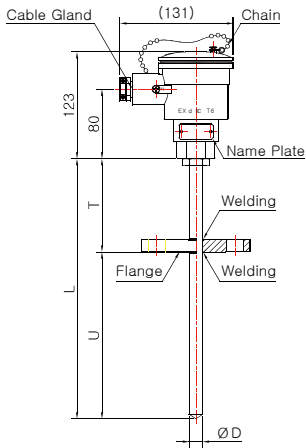


# Thermocouple

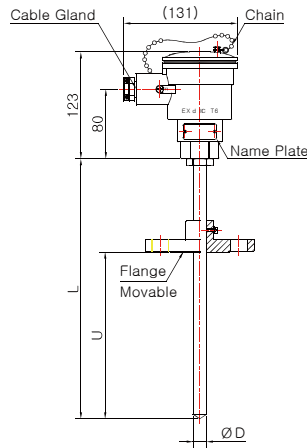
## Model. DS-3020 Series

# DAESHIN

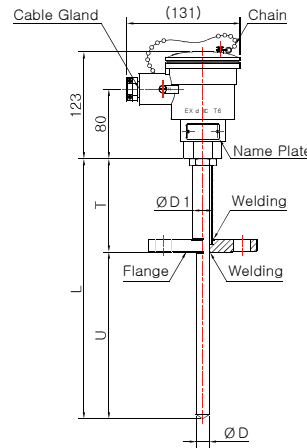
### Explosion Proof Head Type



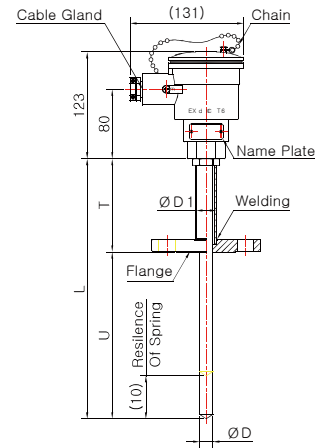
**Model No. DS-3025E**  
(Sheath)



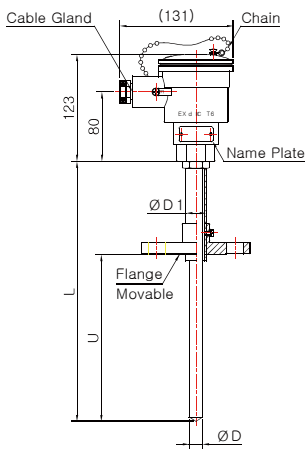
**Model No. DS-3025E-1**  
(Sheath)



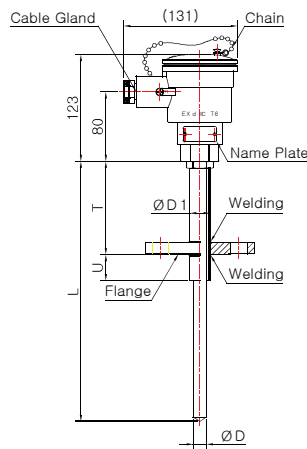
**Model No. DS-3026E-1**  
(Sheath)



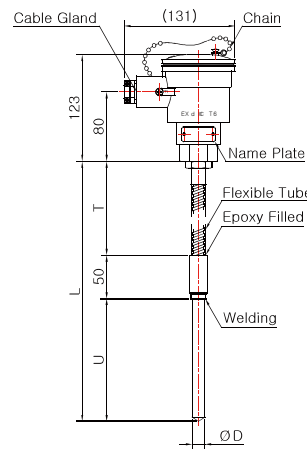
**Model No. DS-3026E-1-1**  
(Sheath Spring Load)



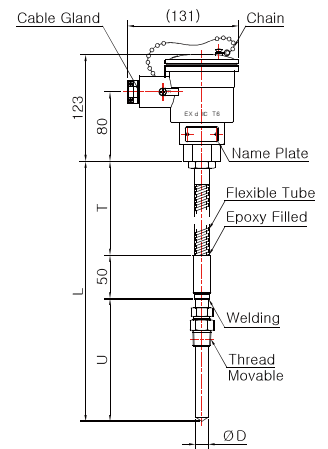
**Model No. DS-3026E-2**  
(Sheath)



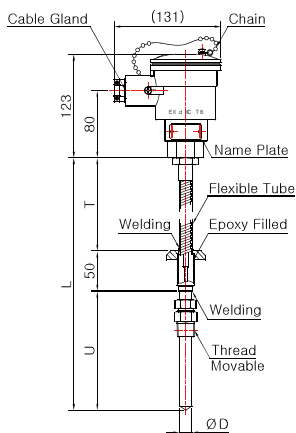
**Model No. DS-3026E-3**  
(Sheath)



**Model No. DS-3029E**  
(Sheath)



**Model No. DS-3029E-1**  
(Sheath)



**Model No. DS-3029E-3**  
(Sheath)

Pressure Gauge

Accessories

Thermometer

Thermocouple & R.T.D

Thermowell