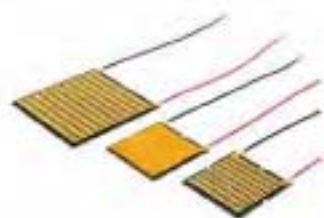# Peltier Device

TAISEI Co.,Ltd.

Peltier Device in the 21st Century

Uni-Thermo

Long-life.
High reliability

Features of Uni-Thermo

* Succession in making a single crystal of this element.
* Skeleton Structure.
   (Flexible Structure - relief of thermal distortion.-)
* Precise Processing Technology Accumulated by
   Watch Precise Technique.

Under these technologies, we provide an ideal electronic peltier cooling
which has an excellent performance, reliability,
environmental, compact, and superior in everything belonging to this device.

1. **Superior cooling efficiency.**
   (Max. temperature gap, Endothermic quantity.)
2. **High-speed respons.**
3. **High reliability, long-life.**
4. **High precision thickness control.**
5. **Utilization of large-sized (70x70 mm square) module.**
6. **Electric insulation can be selected according to application.**
7. **Made with Pb-free.**

Comparison with a Conventional Peltier Device

Ordinary Peltier Device

History

1834: Discovery of Peltier effect.

1954: Discovery of BiTe solid solution.

— Since 45 years, the forecast for the mass usage looks very hard.

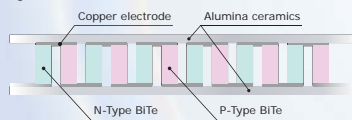### Features of Materials

Polycrystal in Ingot Configuration

Diameter 30 mm   Length 250 mm

Sintering Body in Disk Configuration

Diameter 60 mm   Height 30 mm

Shape of Materials

Rigid Body Structure

Copper electrode   Alumina ceramics

N-Type BiTe   P-Type BiTe

Feature of Manufacturing Method and Device

1) 3 times cutting process. It waste much of materials.
2) It is easy to be broken due to rigid body structure.
3) On-Off control (quick cooling) can not be operated.
4) The thermo transfer is slow due to the polycrystal and sintering body.
5) Coefficient of performance (COP) is not changed for 20 to 30 years due to the polycrystal and rigid body structure.

Uni-Thermo

History

1994: Invention of monocrystal in needle configuration method.

1998: Development of Skeleton type devices.
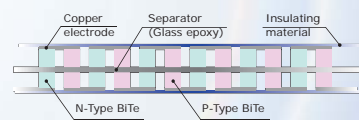
— Since 2000: Mass usage can be expected.

Features of Materials

Monocrystal in needle configuration

Diameter 1.8 mm
Length 120 mm

Shape of Materials

Flexible Structure

Copper electrode   Separator (Glass epoxy)   Insulating material

N-Type BiTe   P-Type BiTe

Feature of Manufacturing Method and Device

1) Only 1 cutting processes, material is utilized in the maximum.
2) The high reliability due to Relaxing flexible structure.
3) ON - OFF control is possible.
4) Quick response. (rapid cooling and heating performance.)
5) Coefficient of performance (COP) is improved 25% max superior than conventional peltier devices.

40 Kapton Peltier Module The Result of Operating Reliability Test

1 : Method of Testing

Sample : 40 type Thermoelectric module with insulating cover by kapton film. (Kapton^{TM} is polyimide film manufactured by)

Test Equipment : Endurance Test Equipment

Method of Testing : Divert an electric current to an order direction, a reverse direction to an element in turn, and cooling side temperature and radiation of heat side temperature go to a state of 25 °C, 80 °C and return. A drive electric current is a rating electric current.
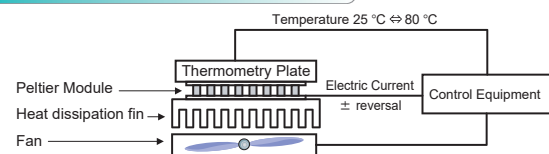
Figure-1. A Figure Of Principle For Testing

Temperature 25 °C ⇔ 80 °C

Peltier Module
Thermometry Plate
Heat dissipation fin
Fan
Electric Current ± reversal
Control Equipment

Figure-2 A Temperature Profile Of Thermometry Plate

1 Cycle

80°C

25°C

Current + Current − Current + Current − Current + Current −

Time
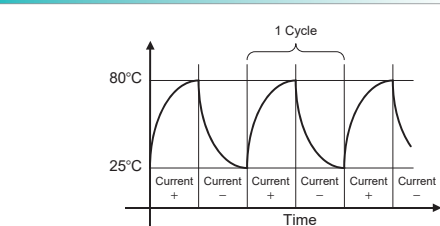
2 : Test Criterion

Internal Resistance ± max.10%

3 : Reliability Test Result

At 478,000, cycles there is no resistance abnormality.
Testing cycle frequency and resistance change are shown in the figure 3.
For comparing, the Endurance test result of the other companies item of the same module size is shown in the figure 4.
This item was broken in 2,900 cycles.

Figure -3. TAISEI 40 Kapton Item Endurance Test Result

Module resistance [Ω]
2.20 2.15 2.10 2.05 2.00 1.95 1.90 1.85 1.80
0 100,000 200,000 300,000 400,000 500,000 600,000
The number of testing cycles [Cycles]
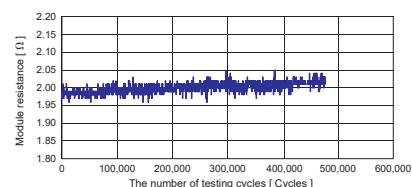
Figure -4. Other Companies Item 40 Endurance Test Result

Module resistance [Ω]
2.00 1.95 1.90 1.85 1.80 1.75 1.70 1.65 1.60 1.55 1.50
0 500 1,000 1,500 2,000 2,500 3,000
The number of testing cycles [Cycles]

UNITHERMO™ 70 SERIES

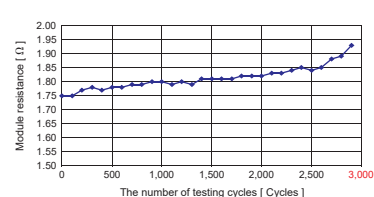| Module Type	UT-7070KA-M	UT-7070AL-M	UT-7070CE-M	
1. I max.	7.5 A	7.5 A	7.5 A	Occurs at Q max. (Th=50 °C)
2. V max.	30.0 V (DC)	30.0 V (DC)	30.0 V (DC)	"
3. Δt max.	74.0 °C (typ.)	72.0 °C (typ.)	75.0 °C (typ.)	"
4. Q max.	125.0 W (typ.)	132.0 W (typ.)	140.0 W (typ.)	"
5. Internal Resistance	2.90 Ω ± 10 %	2.90 Ω ± 10 %	2.90 Ω ± 10 %	Th=25 °C
6. Dimension	71.0 mm × 72.0 mm	72.0 mm × 73.0 mm	76.2 mm × 76.2 mm	
Thickness	3.05 ± 0.10 mm	5.04 ± 0.2 mm	4.20 ± 0.10 mm	
7. Number of Thermocouple	241	241	241	P/N Pair
8. Wire Length	215 ± 2 mm	215 ± 2 mm	215 ± 2 mm	From Edge of Separator
9. Weight	80.0 g ± 10 %	90.0 g ± 10 %	85.0 g ± 10 %	
10. Bolting Torque	4~6 kgf (apply torque in alternating between screw)	4~6 kgf (apply torque in alternating between screw)	4~6 kgf (apply torque in alternating between screw)	Commendable Condition
11. Usable Temperature	120 °C max.	120 °C max.	120 °C max.	
12. Moisture Protection	–	Silicone Resin	Silicone Resin	
13. Insulating Method	Elastomer & Polyimide Film	Elastomer	Ceramics	
14. Insulating Resistance	DC500 V, 500 MΩ min.	DC100 V, 50 MΩ min.	–	
15. Appearance				

UNITHERMO™ 40 SERIES
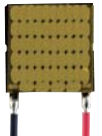
Module Type	UT-4040KA-M	UT-4040AL-M	UT-4040CE-M	
1. I max.	7 A	7.0 A	7.0 A	Occurs at Q max. (Th=50 °C)
2. V max.	19.0 V (DC)	19.0 V (DC)	19.0 V (DC)	"
3. Δt max.	74.0 °C (typ.)	72.0 °C (typ.)	75.0 °C (typ.)	"
4. Q max.	59.0 W (typ.)	62.0 W (typ.)	64.0 W (typ.)	"
5. Internal Resistance	1.90 Ω ± 10 %	1.90 Ω ± 10 %	1.90 Ω ± 10 %	Th=25 °C
6. Dimension	45.0 mm × 46.0 mm	47.0 mm × 48.0 mm	50.8 mm × 50.8 mm	
Thickness	2.58 ± 0.10 mm	3.52 ± 0.16 mm	3.73 ± 0.10 mm	
7. Number of Thermocouple	127	127	127	P/N Pair
8. Wire Length	135 ± 2 mm	135 ± 2 mm	215 ± 2 mm	From Edge of Separator
9. Weight	19.5 g ± 10 %	26.0 g ± 10 %	32.0 g ± 10 %	
10. Bolting Torque	4~6 kgf (apply torque in alternating between screw)	4~6 kgf (apply torque in alternating between screw)	4~6 kgf (apply torque in alternating between screw)	Commendable Condition
11. Usable Temperature	120 °C max.	120 °C max.	120 °C max.	
12. Moisture Protection	–	Silicone Resin	Silicone Resin	
13. Insulating Method	Elastomer & Polyimide Film	Elastomer	Ceramics	
14. Insulating Resistance	DC500 V, 500 MΩ min.	DC100 V, 50 MΩ min.	–	
15. Appearance				

UNITHERMO™ 30 SERIES

Module Type	UT-3030KA-M	UT-3030AL-M	UT-3030CE-M	
1. I max.	3.5 A	3.5 A	3.5 A	Occurs at Q max. (Th=50 °C)
2. V max.	15.0 V (DC)	15.0 V (DC)	15.0 V (DC)	"
3. Δt max.	72.0 °C (typ.)	72.0 °C (typ.)	75.0 °C (typ.)	"
4. Q max.	25.0 W (typ.)	25.0 W (typ.)	27.0 W (typ.)	"
5. Internal Resistance	2.75 Ω ± 10 %	2.75 Ω ± 10 %	2.75 Ω ± 10 %	Th=25 °C
6. Dimension	28.0 mm × 29.0 mm	30.0 mm × 30.0 mm	30.0 mm × 30.0 mm	
Thickness	2.58 ± 0.10 mm	3.52 ± 0.16 mm	3.82 ± 0.10 mm	
7. Number of Thermocouple	97	97	97	P/N Pair
8. Wire Length	130 ± 2 mm	130 ± 2 mm	130 ± 2 mm	From Edge of Separator
9. Weight	8.6 g ± 10 %	11.9 g ± 10 %	9.0 g ± 10 %	
10. Bolting Torque	2~4 kgf (apply torque in alternating between screw)	2~4 kgf (apply torque in alternating between screw)	2~4 kgf (apply torque in alternating between screw)	Commendable Condition
11. Usable Temperature	120 °C max.	120 °C max.	120 °C max.	
12. Moisture Protection	–	Silicone Resin	Silicone Resin	
13. Insulating Method	Elastomer & Polyimide Film	Elastomer	Ceramics	
14. Insulating Resistance	DC500 V, 500 MΩ min.	DC100 V, 50 MΩ min.	–	
15. Appearance				

UNITHERMO™ 20 SERIES

Module Type	UT-2020KA-M	UT-2020AL-M	UT-2020CE-M	
1. I max.	3.2 A	3.2 A	3.2 A	Occurs at Q max. (Th=50 °C)
2. V max.	6.2 V (DC)	6.2 V (DC)	6.2 V (DC)	"
3. Δt max.	67.0 °C (typ.)	67.0 °C (typ.)	70.0 °C (typ.)	"
4. Q max.	13.0 W (typ.)	13.0 W (typ.)	13.0 W (typ.)	"
5. Internal Resistance	1.40 Ω ± 10 %	1.40 Ω ± 10 %	1.40 Ω ± 10 %	Th=25 °C
6. Dimension	21.0 mm × 21.0 mm	22.0 mm × 22.0 mm	22.0 mm × 22.0 mm	
Thickness	2.58 ± 0.10 mm	3.52 ± 0.16 mm	3.82 ± 0.10 mm	
7. Number of Thermocouple	49	49	49	P/N Pair
8. Wire Length	130 ± 2 mm	130 ± 2 mm	130 ± 2 mm	From Edge of Separator
9. Weight	5.6 g ± 10 %	7.3 g ± 10 %	8.0 g ± 10 %	
10. Bolting Torque	2~4 kgf (apply torque in alternating between screw)	2~4 kgf (apply torque in alternating between screw)	2~4 kgf (apply torque in alternating between screw)	Commendable Condition
11. Usable Temperature	120 °C max.	120 °C max.	120 °C max.	
12. Moisture Protection	–	Silicone Resin	Silicone Resin	
13. Insulating Method	Elastomer & Polyimide Film	Elastomer	Ceramics	
14. Insulating Resistance	DC500 V, 500 MΩ min.	DC100 V, 50 MΩ min.	–	
15. Appearance				

Dimensional Outlines

Unit : mm

22.0

22.0

⊕

⊖

130

(The edge of separator to the tip)

3.82

Cooling Side

Ceramic Plate
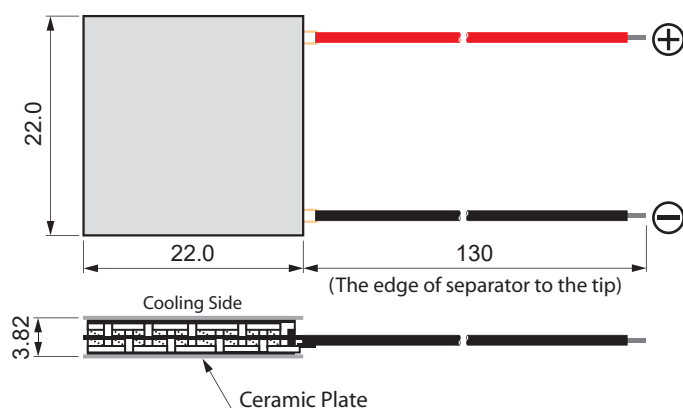
Specifications

Requirements	Specifications	Remarks
Max. Current	3.2 A	
Max. Working V.	6.2 V (DC)	
Max. Temperature Difference	70.0 °C (typ.)	Max. Endothermic Quantity at 50 °C
Max. Endothermic Quantity	13.0 W (typ.)	
Internal Resistance	1.40 Ω ± 10 %	Th=25 °C
Electrode Terminal	Lead Wire (Red : ＋, Black : －)	
Size	$22.0 \times 22.0 \times 3.82 \pm 0.10$ [mm]	
Number of Elements	P / N Pair 49 Elements	
Lead Wire Length	130 ± 2 mm	From Edge of Separator
Weight	8.0 g ± 10 %	
Tightening Strength (Recommend)	2 ~ 4 kgf Equal Load	Commendable Condition
Working Temp. Range	120 °C max.	
Moisture Protection	Silicone Resin	
Insulation Method	Ceramics	
Insulation Resistance	—	

Typical Performance

Electric Current vs Endothermic Quantity (Th=50°C)

Endothermic Quantity (Parameter Tg)

Tg [°C]

—	0
—	− 5
—	− 10
—	− 15
—	− 20
—	− 25
—	− 30
—	− 35
—	− 40
—	− 45
—	− 50
—	− 55
—	− 60
—	− 65
—	− 70
—	− 75

Endothermic Quantity [W]

Current [A]

Note: The upper data shows the characteristics up to 4.0A.

⚠ * Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.

Dimensional Outlines

Unit : mm

30.0

30.0

⊕

⊖

130

(The edge of separator to the tip)

3.82

Cooling Side

Ceramic Plate

Specifications

Requirements	Specifications	Remarks
Max. Current	3.5 A	Max. Endothermic Quantity at 50 °C
Max. Working V.	15.0 V (DC)	
Max. Temperature Difference	75.0 °C (typ.)	
Max. Endothermic Quantity	27.0 W (typ.)	
Internal Resistance	2.75 Ω ± 10 %	Th=25 °C
Electrode Terminal	Lead Wire (Red : ＋ , Black : －)	
Size	30.0 × 30.0 × 3.82 ± 0.10 [mm]	
Number of Elements	P / N Pair 97 Elements	
Lead Wire Length	130 ± 2 mm	From Edge of Separator
Weight	9.0 g ± 10 %	
Tightening Strength (Recommend)	2 ~ 4 kgf Equal Load	Commendable Condition
Working Temp. Range	120 °C max.	
Moisture Protection	Silicone Resin	
Insulation Method	Ceramics	
Insulation Resistance	—	

Typical Performance

Electric Current vs Endothermic Quantity (Th=50℃)

Endothermic Quantity (Parameter Tg)

Endothermic Quantity [W]

Current [A]

Tg [°C]
- 0
- −5
- −10
- −15
- −20
- −25
- −30
- −35
- −40
- −45
- −50
- −55
- −60
- −65
- −70
- −75

Note: The upper data shows the characteristics up to 4.0A.

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* The values are subject to the measurement results available in our internal measurement instrument and equipment.

Dimensional Outlines

Unit : mm

50.8

50.8

215
(The edge of separator to the tip)

⊕

⊖

Cooling Side

3.73

Ceramic Plate

Specifications

Requirements	Specifications	Remarks
Max. Current	7.0 A	Max. Endothermic Quantity at 50 °C
Max. Working V.	19.0 V (DC)	
Max. Temperature Difference	75.0 °C (typ.)	
Max. Endothermic Quantity	64.0 W (typ.)	
Internal Resistance	1.90 Ω ± 10 %	Th=25 °C
Electrode Terminal	Lead Wire (Red : +, Black : −)	
Size	50.8 × 50.8 × 3.73 ± 0.10 [mm]	
Number of Elements	P / N Pair 127 Elements	
Lead Wire Length	215 ± 2 mm	From Edge of Separator
Weight	32.0 g ± 10 %	
Tightening Strength (Recommend)	4 ~ 6 kgf Equal Load	Commendable Condition
Working Temp. Range	120 °C max.	
Moisture Protection	Silicone Resin	
Insulation Method	Ceramics	
Insulation Resistance	—	

Typical Performance

Electric Current vs Endothermic Quantity(Th=50°C)

Endothermic Quantity (Parameter Tg)

Tg [°C]
0
− 5
− 10
− 15
− 20
− 25
− 30
− 35
− 40
− 45
− 50
− 55
− 60
− 65
− 70
− 75

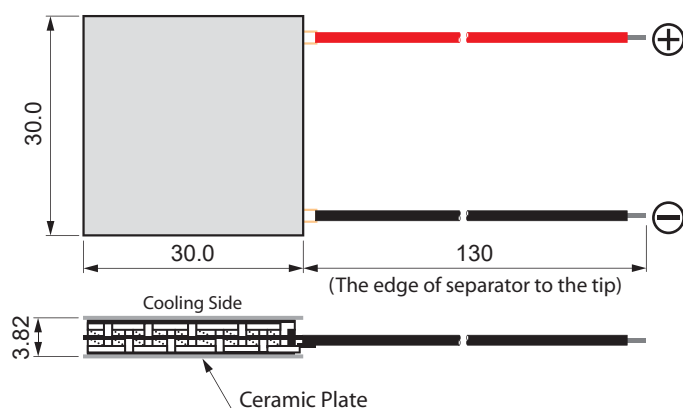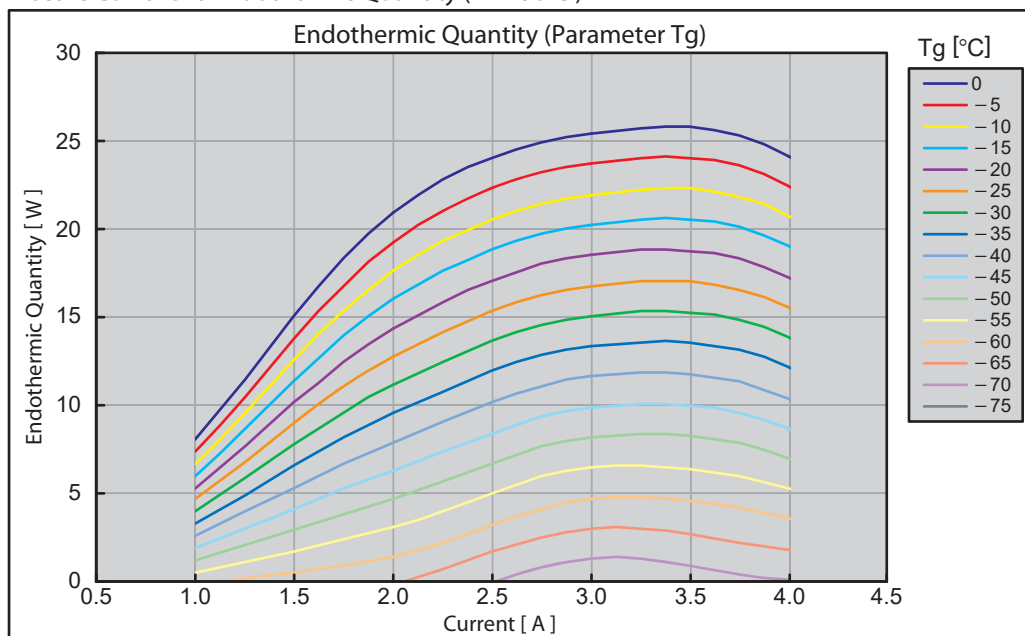Note: The upper data shows the characteristics up to 6.0A.

⚠ * Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.

Peltier Device Uni-Thermo
Style **UT-7070CE-M** RoHS

Dimensional Outlines

Unit : mm

76.2

76.2

215
(The edge of separator to the tip)

⊕

⊖

4.20

Cooling Side

Ceramic Plate

Specifications

Requirements	Specifications	Remarks
Max. Current	7.5 A	Max. Endothermic Quantity at 50 °C
Max. Working V.	30.0 V (DC)	
Max. Temperature Difference	75.0 °C (typ.)	
Max. Endothermic Quantity	140.0 W (typ.)	
Internal Resistance	2.90 Ω ± 10 %	Th=25 °C
Electrode Terminal	Lead Wire (Red : +, Black : −)	
Size	$76.2 \times 76.2 \times 4.20 \pm 0.10$ [mm]	
Number of Elements	P / N Pair 241 Elements	
Lead Wire Length	215 ± 2 mm	From Edge of Separator
Weight	85.0 g ± 10 %	
Tightening Strength (Recommend)	4 ~ 6 kgf Equal Load	Commendable Condition
Working Temp. Range	120 °C max.	
Moisture Protection	Silicone Resin	
Insulation Method	Ceramics	
Insulation Resistance	—	

Typical Performance

Electric Current vs Endothermic Quantity(Th=50°C)

Endothermic Quantity (Parameter Tg)

Tg [°C]
- 0
- −5
- −10
- −15
- −20
- −25
- −30
- −35
- −40
- −45
- −50
- −55
- −60
- −65
- −70
- −75
- −80

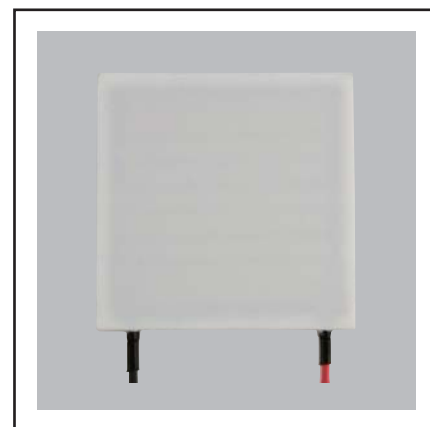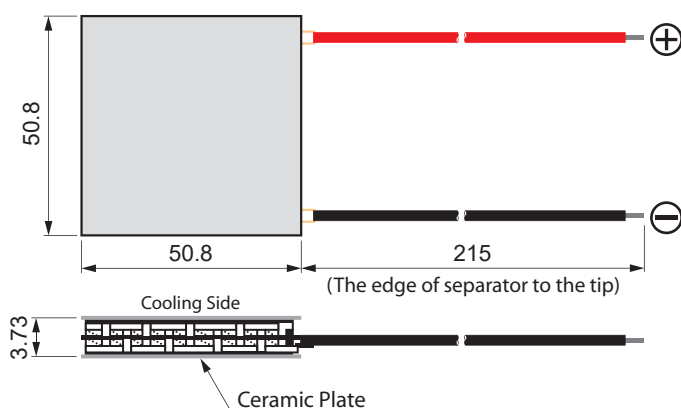Note: The upper data shows the characteristics up to 8.0A.

⚠ * Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.
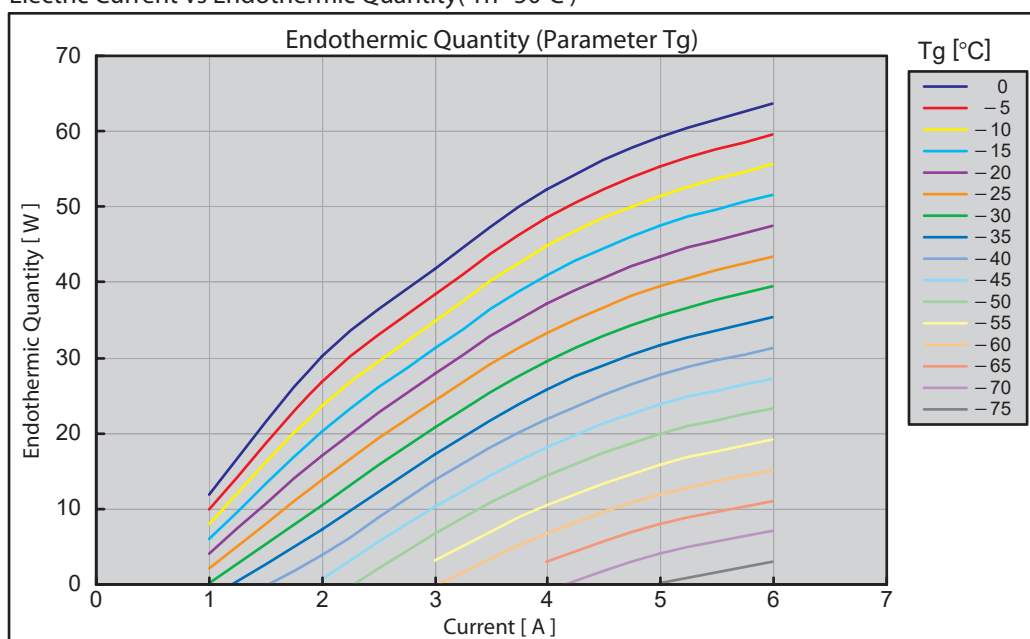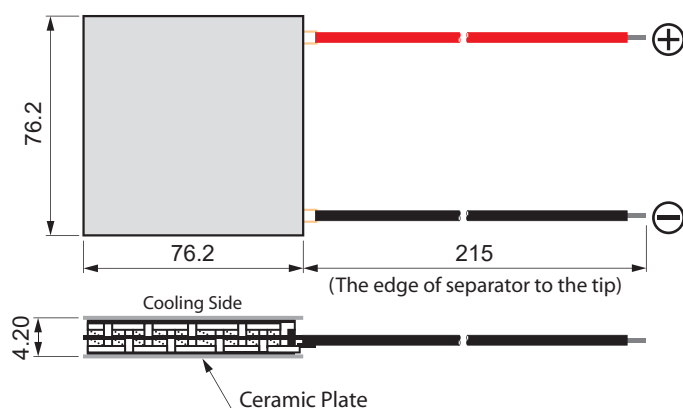
Air-Cooled Cooling Unit

It is possible to comply with the unit composition, peltier device, heat-sink and fan.
In the table below. it shows the module or jacket*1 matching with heat sink and fan and it shows the reach temp to the cooling face. It raises up the max. efficiency ratio in the limited dimension that our customer has designed.

*1 Please refer to the jacket types available.
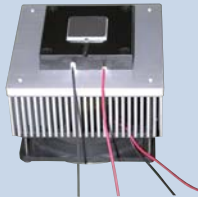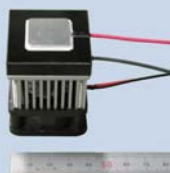
Module Type		UT-7070J-HS	UT-7040WJ-HS100	UT-6045WJ-HS60(B)24V	UT-6030TRJ-HS60(W)
Cooling Capacity (at 25 °C)	Endothermic Quantity [W]	80 (Typ.)	35 (Typ.)	34 (Typ.)	14 (Typ.)
	Temperature Difference [°C]	50 (Typ.)	60 (Typ.)	60 (Typ.)	77 (Typ.)
Rated Voltage	Peltier	DC24 V	DC24 V	DC24 V	DC24 V
	Fan	DC24 V	DC24 V	DC24 V	DC24 V
Rated Current (at 25 °C)	DC [A]	6.5	4.0	6.9	6.5
Starting Current (at 25 °C)	DC [A] max.	9.0	5.5	9.5	8.6
Dimension of Cooling Plate	[mm]	74 × 74	55 × 55	44 × 44	32 × 32
Working Temp. Range		− 20 ~ + 70 °C	− 20 ~ + 70 °C	− 20 ~ + 70 °C	− 20 ~ + 70 °C
Working Humidity Range		85 %Rh max.	85 %Rh max.	85 %Rh max.	85 %Rh max.
Max. Allowable Working Temp. of Cooling Plate		120 °C	120 °C	125 °C	125 °C
Noise	[dB]	49	37	49	49
Overall Size	[mm]	128 × 172 × (135)	100 × 100 × (88)	60 × 60 × (77)	60 × 60 × (84.2)
Weight	[g]	2,200	850	350	380
Corresponding Controller		TA-151 TA-PB-1 TA-150C TA-150 TA-300	TA-151 TA-PB-1 TA-150C TA-150 TA-300	TA-151 TA-PB-1 TA-300	TA-151 TA-PB-1 TA-300
Appearance					

* Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.
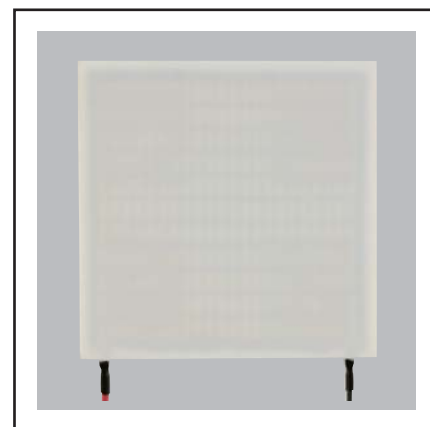
TAISEI Co.,Ltd.

UT-4040J-HS100	UT-4040TJ-HS	UT-4030WJ-HS60(B)12V	UT-3030J-HS80	UT-3020WJ-HS100	UT-2020J-HS40
35 (Typ.)	65 (Typ.)	16 (Typ.)	18 (Typ.)	8 (Typ.)	8 (Typ.)
48 (Typ.)	45 (Typ.)	60 (Typ.)	48 (Typ.)	60 (Typ.)	43 (Typ.)
DC12 V	DC24 V	DC12 V	DC12 V	DC12 V	DC5 V
DC12 V	DC24 V	DC12 V	DC12 V	DC12 V	DC5 V
6.0	5.5	7.6	3.5	2.5	2.0
7.0	7.0	10	4.0	3.5	4.0
55 × 55	85 × 60	32 × 32	30 × 30	25 × 25	20 × 20
−20 ~ +70 ℃	−20 ~ +70 ℃	−20 ~ +70 ℃	−20 ~ +70 ℃	−20 ~ +70 ℃	−20 ~ +70 ℃
85 %Rh max.	85 %Rh max.	85 %Rh max.	85 %Rh max.	85 %Rh max.	85 %Rh max.
120 ℃	120 ℃	125 ℃	120 ℃	120 ℃	120 ℃
37	37	39	35	37	33
100 × 100 × (82)	100 × 100 × (82)	60 × 60 × (77.9)	80 × 80 × (82)	100 × 100 × (84)	40 × 40 × (60.5)
680	800	350	400	630	100
TA-151	TA-151	TA-PB-1	TA-151	TA-151	TA-20
TA-PB-1	TA-PB-1	TA-300	TA-30	TA-30	TA-PB-1
TA-150C	TA-150C		TA-PB-1	TA-PB-1	
TA-150	TA-150		TA-150C	TA-150C	
TA-300	TA-300		TA-150	TA-150	
			TA-300	TA-300	

* Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.
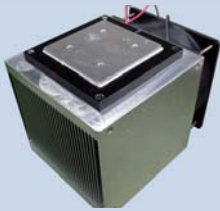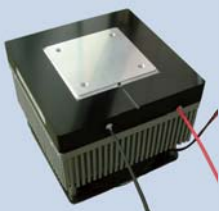
Water-Cooled Cooling Unit

It is possible to comply with the unit composition, peltier device, heat-sink and fan.
In the table below. it shows the module or jacket*[1] matching with heat sink and fan and it shows the reach temp to the cooling face. It raises up the max. efficiency ratio in the limited dimension that our customer has designed.

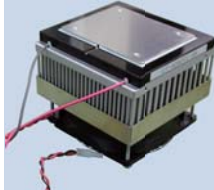*[1] Please refer to the jacket types available.

Module Type		UT-6030TRJ-CL60(W)	UT-6045WJ-CL60(W)	UT-4030WJ-CL55(W)01	UT-4030WJ-CL55(W)02
Cooling Characteristics (Water Temp. 5℃)	Endothermic Quantity [W]	10.5 (Typ.)	25.0 (Typ.)	13.0 (Typ.)	13.0 (Typ.)
Rated Voltage	Peltier	DC20 V	DC20 V	DC10 ~ 12 V	DC10 ~ 12 V
Rated Current	DC [A]	6.4	7.0	8.0 ~ 9.0	8.0 ~ 9.0
Starting Current	DC [A] max.	7.5	8.2	10.0	10.0
Cooling Reach Temp.		− 66 ~ − 70 ℃	− 56 ~ − 60 ℃	− 58 ~ − 61 ℃	− 58 ~ − 61 ℃
Cooling Characteristics (at 25 ℃)	Endothermic Quantity [W]	12.5 (Typ.)	30.0 (Typ.)	16.0 (Typ.)	16.0 (Typ.)
Rated Voltage	Peltier	DC24 V	DC24 V	DC12 V	DC12 V
Rated Current	DC [A]	7.3	7.9	8.5	8.5
Starting Current	DC [A] max.	8.6	9.0	10.0	10.0
Cooling Reach Temp.		− 60 ~ − 64 ℃	− 50 ~ − 53 ℃	− 50 ~ − 52 ℃	− 50 ~ − 52 ℃
Dimension of Cooling Plate	[mm]	32 × 32	44 × 44	32 × 32	32 × 32
Working Temp. Range		− 20 ~ + 70 ℃	− 20 ~ + 70 ℃	− 20 ~ + 70 ℃	− 20 ~ + 70 ℃
Plate Surface Set Temp. Range		− 70 ~ + 125 ℃	− 70 ~ + 125 ℃	− 70 ~ + 125 ℃	− 70 ~ + 125 ℃
Overall Size	[mm]	78 × 60 × (43.35)	78 × 60 × (36.9)	55 × 55 × (37.9)	55 × 60 × (42.9)
Weight	[g]	325	295	250	250
Corresponding Controller		TA-151 TA-PB-1 TA-300	TA-PB-1 TA-300	TA-PB-1 TA-300	TA-PB-1 TA-300
Appearance					

* Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.

TAISEI Co.,Ltd.

Jacket Types

It is easy to be installed to the heat sink and to be provided with a jacket specs to increase the life strength of a peltier. It is possible to be installed a cooling unit.

Approx. Dimensions

Types	Size [mm]	Remarks
70 standard	120 × 120 × (17.3)	Thickness is changed by dielectric form.
40 standard	100 × 100 × (15.8)	
30 standard	80 × 80 × (15.8)	
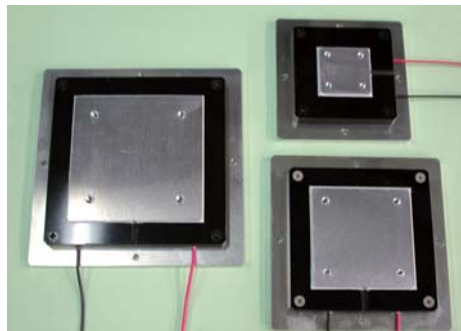
Special shape element

Will correspond to the custom shape.

Example From the left

UT-2211CE-M

UT-4813CE-M

UT-2020CE-11CHM

UT-4040CE-CHM19R40

References for Installed Basic Module

In the cooling unit or jacket, the module in a skeleton type for both sides (ref. right photo.) is provided and it performs high cooling efficiency and superior reliability.
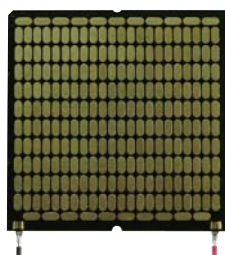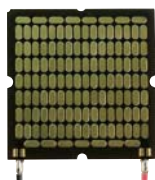
Use for 70	Use for 40	Use for 30	Use for 20

* Specifications of products are subject to change without notice.
* The values are subject to the measurement results available in our internal measurement instrument and equipment.

THERMO ELECTRIC PELTIER CONTROLLER
Model TA-20

◆ Features ◆

Downsizing High Precision Peltier Controller

Temperature Control ◆ ±1 ℃
External Dimension ◆ W 100 × D 65 × H 35 mm
(Except for the protrusions)

High Cost Performance by Simple Basic Function

Input Volt ◆ 5 V
Output Current ◆ 5 A max.
Temp. Control Range ◆ −20 ℃ ~ +110 ℃

Simple Method of Handling

The method of Temperature and parameters are
very simple and easy.

PC Communication function loaded

Temperature setting and supervision are possible
from PC by communication function.

Please consult for needs of a substrate.

Specifications

Temperature Range	−20 ℃ ~ +110 ℃
Temperature Setting	Possible in increments of 1 ℃
Temperature Indication	Possible in increments of 1 ℃
Indicator, Function	Red LED in heating, Green LED in cooling
Control Method	PI control
P Range	0.1 to 99.9 ℃
I Range	1 to 1999 sec.
Peltier Drive Method	PWM drive
Temp. Sensor	Thermistor
Safety Function	At braking a sensor, the power is off.
Input / Output Connector	2P connector for Power Supplies, 4P connector for Peltier, FAN 2P connector for thermistor, 3P terminal for RS-232C
Recommended Sensor	thermistor : 10 kΩ at25 ℃ tolerance: ±1 %, B constant:3435 K ±1 % (Temperature precision depends on sensor precision.If you use a sensor other than the above standard, Accurate display and control are impossible.)
Power Supplies	Supplied from outside (DC 5 V)
Electric Current	DC5 V 0.08 A (Controller Unit)
Peltier Drive Capability	DC5 V 5 A (at Maximum)
Communication	RS-232C
Working Environment	Inside area
Working Temp. Range	+10 ℃ ~ +40 ℃
Working Humidity Range	85 % max. (No evidence of dew)
Outer Dimensions	W 100 × D 65 × H 35 mm (Except projection)
Weight	100 g (for the main unit only)

⚠ * Specifications of products are subject to change without notice.

TAISEI Co.,Ltd.

Connect Diagram

Power Supplies DC5 V

CN 1. for Power Supplies：2P

CN 2. for Peltier：4P

CN 2. for FAN：4P

CN 3. for Sensor (Thermistor)：2P

PC, Sequencer CN4：3P

RS-232C

TA-20

Caution 1) Please use DC 5 V power supply.Power supply is supplied to this unit, Peltier, DC fan.
　　　　　Please use power supply and electric wire with sufficient power capacity.
　　　　　If you add a voltage outside the specified range, it will be damaged.
　　　　2) Please use the same power supply for Peltier element and DC fan.

● Matching Connector Housing and Contact

For RS-232C	H3P-SHF-AA	JST Mfg.Co.,Ltd.	For Peltier,FAN	VHR-4N	JST Mfg.Co.,Ltd.
For Thermistor	H2P-SHF-AA	JST Mfg.Co.,Ltd.	For Power Supplies	VHR-2N	JST Mfg.Co.,Ltd.
(Matching Contact	SHF-001T-0.8BS	JST Mfg.Co.,Ltd.)	(Matching Contact	SVH-21T-P1.1	JST Mfg.Co.,Ltd.)

● External connection connector and pin assign

CN 4. for RS-232C:3P

pin	1	TXD
	2	RXD
	3	GND

CN 2. for Peltier, DC FAN

pin	1	Peltier +V
	2	Peltier –V
	3	FAN +V
	4	FAN –V

CN 1. for Power Supplies

pin	1	+V
	2	0V

CN 3.(TH) for Thermistor：2P

Thermistor

1
2

(Please refer to the recommended sensor in the specification column for recommended Thermistor.)

● Connection between CN 4 and RS-232C

(Please use a cross cable for the RS-232C cable.)

Connect the VPE-20-5V and PC with the following cables.

1
2
3

To CN 4
(H3P-SHF-AA+SHF Contact)

D-sub 9 pin male

■D-sub 9 pin Cross Cable

D-sub 9 pin female

D-sub 9 pin female

To PC

THERMO ELECTRIC PELTIER CONTROLLER
Model TA-30

◆ Features ◆

Downsizing High Precision Peltier Controller

Temperature Control ◆ ± 1 °C
External Dimension ◆ W 100 × D 65 × H 35 mm
(Except for the protrusions)

High Cost Performance by Simple Basic Function

Input Volt ◆ 8 V ~ 12 V
Output Current ◆ 5 A max.
Temp. Control Range ◆ − 20 °C ~ + 110 °C

Simple Method of Handling

The method of Temperature and parameters are
very simple and easy.

PC Communication function loaded

Temperature setting and supervision are possible
from PC by communication function.

Please consult for needs of a substrate.

Specifications

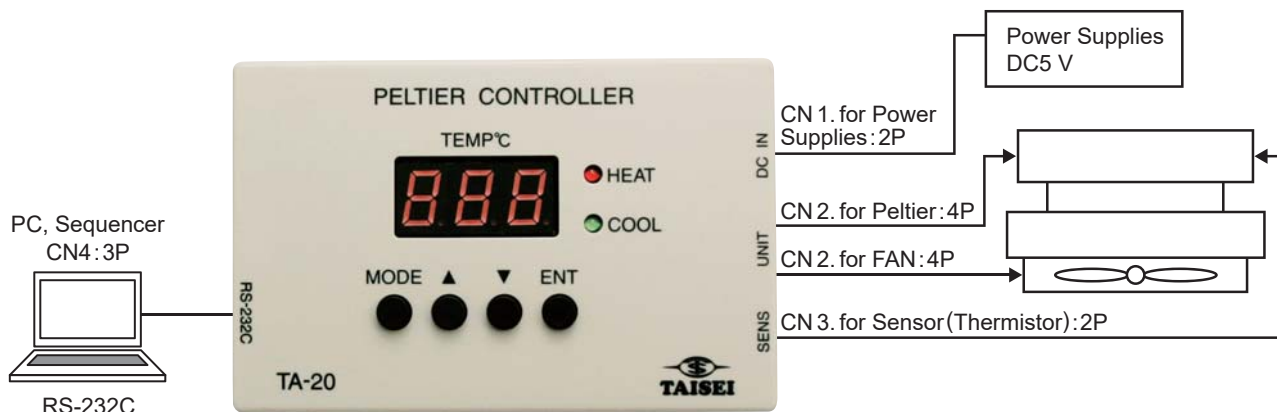|	
Temperature Range	− 20 °C ~ + 110 °C
Temperature Setting	Possible in increments of 1 °C
Temperature Indication	Possible in increments of 1 °C
Indicator, Function	Red LED in heating, Green LED in cooling
Control Method	PI control
P Range	0.1 to 99.9 °C
I Range	1 to 1999 sec.
Peltier Drive Method	PWM drive
Temp. Sensor	Thermistor
Safety Function	At braking a sensor, the power is off.
Input / Output Connector	2P connector for Power Supplies, 4P connector for Peltier, FAN 2P connector for thermistor, 3P terminal for RS-232C
Recommended Sensor	thermistor : 10 kΩ at25 °C tolerance: ± 1 %, B constant:3435 K ± 1 % (Temperature precision depends on sensor precision.If you use a sensor other than the above standard, Accurate display and control are impossible.)
Power Supplies	Supplied from outside (DC 8 V ~ 12 V)
Electric Current	DC12 V 0.05 A (Controller Unit)
Peltier Drive Capability	DC12 V 5 A (at Maximum)
Communication	RS-232C
Working Environment	Inside area
Working Temp. Range	+ 10 °C ~ + 40 °C
Working Humidity Range	85 % max. (No evidence of dew)
Outer Dimensions	W 100 × D 65 × H 35 mm (Except projection)
Weight	100 g (for the main unit only)

⚠ * Specifications of products are subject to change without notice.

TAISEI Co.,Ltd.

Connect Diagram

PC, Sequencer
CN4：3P

RS-232C

PELTIER CONTROLLER

TEMP℃

● HEAT
● COOL

MODE ▲ ▼ ENT

TA-30

Power Supplies
DC8 V ~ 12 V

CN 1. for Power Supplies：2P

CN 2. for Peltier：4P

CN 2. for FAN：4P

CN 3. for Sensor(Thermistor)：2P

Caution 1) Please use DC 8 V ~ 12 V power supply.Power supply is supplied to this unit, Peltier, DC fan.
Please use power supply and electric wire with sufficient power capacity.
If you add a voltage outside the specified range, it will be damaged.
2) Please use the same power supply for Peltier element and DC fan.

●Matching Connector Housing and Contact

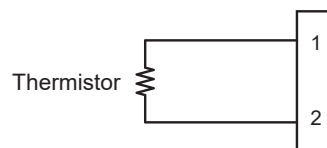| For RS-232C	H3P-SHF-AA	JST Mfg.Co.,Ltd.	For Peltier,FAN	VHR-4N	JST Mfg.Co.,Ltd.
For Thermistor	H2P-SHF-AA	JST Mfg.Co.,Ltd.	For Power Supplies	VHR-2N	JST Mfg.Co.,Ltd.
(Matching Contact	SHF-001T-0.8BS	JST Mfg.Co.,Ltd.)	(Matching Contact	SVH-21T-P1.1	JST Mfg.Co.,Ltd.)

●External connection connector and pin assign

CN 4. for RS-232C:3P

pin	1	TXD
	2	RXD
	3	GND

CN 2. for Peltier, DC FAN

pin	1	Peltier +V
	2	Peltier –V
	3	FAN +V
	4	FAN –V

CN 1. for Power Supplies

pin	1	+V
	2	0V

CN 3.(TH) for Thermistor：2P

Thermistor

1
2
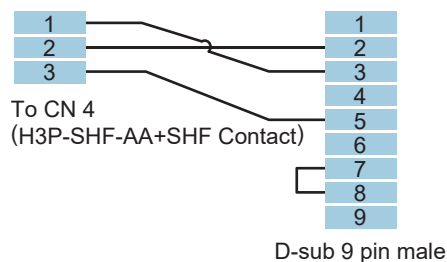
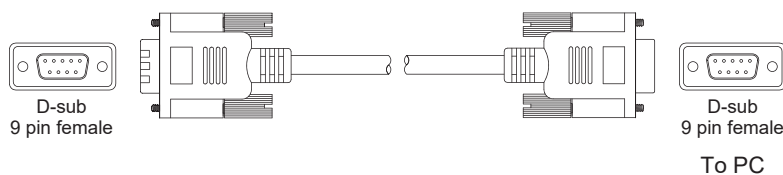(Please refer to the recommended sensor in the specification column for recommended Thermistor.)

●Connection between CN 4 and RS-232C

(Please use a cross cable for the RS-232C cable.)

Connect the VPE-20 and PC with the following cables.

1
2
3

To CN 4
(H3P-SHF-AA+SHF Contact)

1
2
3
4
5
6
7
8
9

D-sub 9 pin male

■D-sub 9 pin Cross Cable

D-sub
9 pin female

D-sub
9 pin female

To PC

THERMO ELECTRIC PELTIER CONTROLLER
Model TA-151

◆ Features ◆

Downsizing High Precision Peltier Controller

Temperature Control ◆ ± 0.1 ℃
External Dimension ◆ W 120 × D 100 × H 44 mm
(Except for the protrusions)

High Cost Performance by Simple Basic Function

Input Volt ◆ 8 V ~ 24 V
Output Current ◆ 8 A max.
Temp. Control Range ◆ − 80 ℃ ~ + 150 ℃

Simple Method of Handling

The method of Temperature and parameters are very simple and easy.

PC Communication function loaded

Temperature setting and supervision are possible from PC by communication function.

Please consult for needs of a substrate.

Specifications

Temperature Range	− 80 ℃ ~ + 150 ℃
Temperature Setting	Possible in increments of 0.1 ℃
Temperature Indication	Possible in increments of 0.1 ℃
Indicator, Function	Red LED in heating, Green LED in cooling, Red LED in alarming
Control Method	PI control
P Range	0.1 to 99.9 ℃
I Range	1 to 1999 sec.
Peltier Drive Method	PWM drive
Temp. Sensor	Pt100 Ω
Safety Function	At braking a sensor, the power is off. At alarm a Heatsink, the power is off.
Auxiliary Input / Output Signal	Temperature control start input, Spare input: 3, Alarm contact output (B contact), Setting temperature reaching contact output (A contact)
Input / Output Connector	2P connector for Power Supplies, 4P connector for Peltier, FAN 3P connector for Pt100 Ω Sensor, 2P connector for Heatsink Sensor, USB connector, connector for RS-485
Recommended Sensor	Pt100 Ω : in conformity with New JIS standard C-1604-1989 (Temperature precision depends on sensor precision.If you use a sensor other than the above standard, Accurate display and control are impossible.)
Peltier Power Supply	The same voltage as the input power supply.
Peltier Drive Capability	DC 24 V 8 A (at Maximum)
Input Power Supply	DC 8 V ~ 24 V ± 5 %
Electric Current	0.2 A (Controller Unit)
Communication	USB(micro B), RS-485
Working Environment	Inside area
Working Temp. Range	+ 10 ℃ ~ + 40 ℃
Working Humidity Range	85 % max. (No evidence of dew)
Outer Dimensions	W 120 × D 100 × H 44 mm (Except projection)
Weight	285 g (for the main unit only)

⚠ * Specifications of products are subject to change without notice.

TAISEI Co.,Ltd.

Connect Diagram

2 : Temperature reached output
1 : Alarm output

External input
2 ~ 4 : option
1 : External control start

PC, Sequencer

USB, RS-485

PELTIER CONTROLLER

HEAT COOL

MODE ▲ ▼ ENT RUN

TA-151

Power Supplies DC8 V ~ 24 V

Peltier

FAN

Sensor

For Heatsink alarm

For spare thermistor

Caution 1) Please use DC8 V ~ 24 V power supply. Power supply is supplied to this unit, Peltier, DC fan.
Please use power supply and electric wire with sufficient power capacity.
If you add a voltage outside the specified range, it will be damaged.
2) Please use the same power supply for Peltier element and DC fan.

●Matching Connector Housing and Contact

For Power Supplies	VHR-2N	JST Mfg.Co.,Ltd.
For Peltier,FAN	VHR-4N	JST Mfg.Co.,Ltd.
(Matching Contact	SVH-21T-P1.1	JST Mfg.Co.,Ltd.)

For Sensor	H3P-SHF-AA	JST Mfg.Co.,Ltd.
For HeatsinkALM	H2P-SHF-AA	JST Mfg.Co.,Ltd.
For Spare Thermistor	H2P-SHF-AA	JST Mfg.Co.,Ltd.
(Matching Contact	SHF-001T-0.8BS	JST Mfg.Co.,Ltd.)

●Left side external connection connector and pin assign

■Communication with PC / Sequencer
You can communicate with either USB or RS-485.

USB connector
Please use the micro B connector on the controller side.

RS-485
pin	1	A(+)
	2	B(–)
	3	G

Terminating resistance ON / OFF SW
On termination, please turn it on.

■External control input / output

External input
pin	1	IN1
	2	IN2
	3	IN3
	4	IN4
	5	COM

IN1 : External control ON / OFF
IN2 : spare
IN3 : spare
IN4 : spare
COM : ＋or－
*The input power source polarity can be either ＋or－.

External contact output
pin	1	[1]
	2	
	3	[2]
	4	

[1] : Alarm contact output
[2] : Setting temperature arrival output
(within ± 3 ℃)
Use relay : G6K-2P (OMRON made)
Maximum opening and closing ability（Resistive load）:
AC125 V 0.3 A, DC30 V 1 A, No exchange
Used terminal block :
XW4B Socket (OMRON made)
The wiring material is AWG 28 to AWG 16,
The peeling length of the wire is about 7 mm.

●Right side external connection connector and pin assign

DCIN : for Power Supplies
pin	1	+V
	2	0V

UNIT : for Peltier, DC FAN
pin	1	Peltier +V
	2	Peltier –V
	3	FAN +V
	4	FAN –V

SENS : For sensor input
pin	1	A
	2	B
	3	B
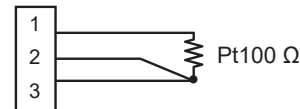
Pt100 Ω

HEATSINK : For HeatsinkALM
pin	1	TH
	2	TH
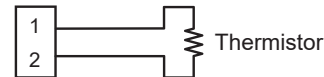
Thermistor

TH1 : For spare thermistor
pin	1	TH
	2	TH

Thermistor
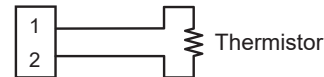
(Please refer to the recommended sensor in the specification column for recommended Pt100 Ω.)

THERMO ELECTRIC PELTIER CONTROLLER
Model TA-PB-2

Patented *1

◆ Features ◆

Compact High Precision Peltier (Uni-Thermo recommended) Controller

Temperature Control ◆ ±0.1 °C
External Dimensions ◆ W 178×D 93(D110*)×H 44.5 mm
(*: When connectors are installed, excluding jumpers)
Weight ◆ approx. 415 g

Multifunctional, high performance and high cost performance

Peltier Drive voltage ◆ Standard 1 V ~ 50 V 12 A max.
Standard Temp. Control Range ◆ −100 °C ~ +150 °C (Settings can be changed)

Simple Method of Operation

Easy to adjust temperature setting parameters
(TFT touch screen, free PC application, Auto PID Tuning)

Equipped with communication function for external devices

External setting, control and monitoring is possible from a PC or
PLC via USB-C and 3-wire RS232.
Free PC app compatible with Windows included
(can check temperature graphs,display TX and RX messages and record logs)

Compatible with Various Sensor Types

Supports Pt100, thermistors, and thermocouples with
DIP switch hardware configuration and easy software operation.
Look-up table settings are available for all sensors, so the thermocouple
inputs are compatible with almost all thermocouples for
which a table can be provided, including not only K but also T.
External temperature information can be used as the control temperature.

Easy Automatic Operation

The simple program ADF (AUTO-DRIVE FILE) is easily created
from the log. Not only can the controller be automatically controlled with
the free PC app, but the program can also be uploaded to the main unit and
used autonomously. The startup ADF setting can also be used to
automatically operate immediately after startup.

CAUTION : Sensor, Peltier product, power supply,
connectable equipment etc. are all sold separately.
*1: Acquired patent: Patent No. 6627951

Connect Diagram and Extensibility (Semi Custom, Full Custom Correspondence)

Provides power to drive the controller's control circuitry. Power supply is mandatory. A power supply of 5 to 24V is required. If it is within this range, it can be shared with the Peltier, AUX/DCO terminals using the jumper plug provided free of charge.
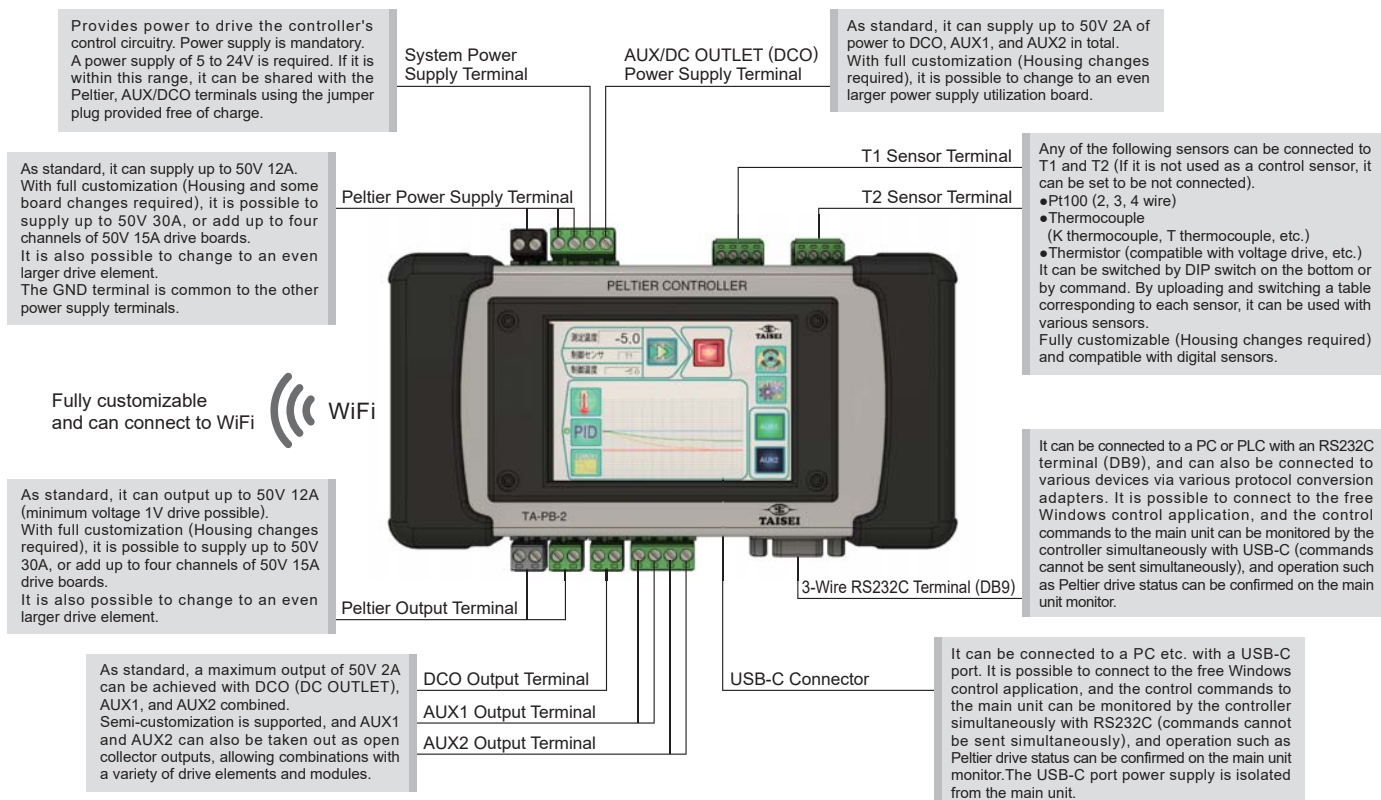
System Power Supply Terminal

AUX/DC OUTLET (DCO) Power Supply Terminal

As standard, it can supply up to 50V 2A of power to DCO, AUX1, and AUX2 in total. With full customization (Housing changes required), it is possible to change to an even larger power supply utilization board.

As standard, it can supply up to 50V 12A. With full customization (Housing and some board changes required), it is possible to supply up to 50V 30A, or add up to four channels of 50V 15A drive boards. It is also possible to change to an even larger drive element. The GND terminal is common to the other power supply terminals.

Peltier Power Supply Terminal

T1 Sensor Terminal

T2 Sensor Terminal

Any of the following sensors can be connected to T1 and T2 (If it is not used as a control sensor, it can be set to be not connected).
●Pt100 (2, 3, 4 wire)
●Thermocouple
  (K thermocouple, T thermocouple, etc.)
●Thermistor (compatible with voltage drive, etc.)
It can be switched by DIP switch on the bottom or by command. By uploading and switching a table corresponding to each sensor, it can be used with various sensors.
Fully customizable (Housing changes required) and compatible with digital sensors.

Fully customizable and can connect to WiFi   ))) **WiFi**

As standard, it can output up to 50V 12A (minimum voltage 1V drive possible). With full customization (Housing changes required), it is possible to supply up to 50V 30A, or add up to four channels of 50V 15A drive boards. It is also possible to change to an even larger drive element.

PELTIER CONTROLLER

TA-PB-2

It can be connected to a PC or PLC with an RS232C terminal (DB9), and can also be connected to various devices via various protocol conversion adapters. It is possible to connect to the free Windows control application, and the control commands to the main unit can be monitored by the controller simultaneously with USB-C (commands cannot be sent simultaneously), and operation such as Peltier drive status can be confirmed on the main unit monitor.

Peltier Output Terminal

3-Wire RS232C Terminal (DB9)

As standard, a maximum output of 50V 2A can be achieved with DCO (DC OUTLET), AUX1, and AUX2 combined. Semi-customization is supported, and AUX1 and AUX2 can also be taken out as open collector outputs, allowing combinations with a variety of drive elements and modules.

DCO Output Terminal

AUX1 Output Terminal

AUX2 Output Terminal

USB-C Connector

It can be connected to a PC etc. with a USB-C port. It is possible to connect to the free Windows control application, and the control commands to the main unit can be monitored by the controller simultaneously with RS232C (commands cannot be sent simultaneously), and operation such as Peltier drive status can be confirmed on the main unit monitor.The USB-C port power supply is isolated from the main unit.

TAISEI Co.,Ltd.

Specifications

Temperature Range	$-100\ ℃ \sim +150\ ℃$
Temperature Setting	Possible in increments of 0.1 ℃
Temperature Indication	Possible in increments of 0.1 ℃
Indicator, Function, Display Language	●Temperature display, graph display, device control and setting input with 3.5 inch TFT touch screen. ●Various operations are possible using the free app (compatible with Windows 7/10/11). ●(Fully customizable) Connect via WiFi using the built-in WiFi server, controllable from a PC with a browser (Win, Mac, Linux), tablet (including iPad) or smartphone (iOS and Android), and can be linked to the cloud. ●Display language can be switched between Japanese and English.
Control Method	●Supports PID control, P control (Ki, Kd values are set to 0), and PI control (Kd value is set to 0). ●ON/OFF control (using the app or the built-in AUTO-DRIVE). ●Open loop drive by direct input of PWM value (using the app or the built-in AUTO-DRIVE). ●Supports high frequency temperature setting change control (using the app or the built-in AUTO-DRIVE).
PID Parameter	Kp, Ki, and Kd can be entered in 0.001 increments.
AUTO Tuning	AUTO tuning support Automatic input for Kp, Ki or Kp, Ki, Kd. In addition, various parameters for AUTO tuning can be changed.
Peltier Drive Method	PWM drive or ON/OFF drive
Temp. Sensor	Supports Pt100 (2, 3, 4 wire), thermocouple (K), and thermistor (supports Ref. voltage and ratiometric measurement, reference resistor connection is required for all thermistors) as standard. Also, by assigning a sensor table to each sensor, high accuracy measurement is possible. Using the sensor table, it supports thermocouples other than K and various thermistors other than 10k. All settings can be made by the user. Fully customizable, it supports digital sensors via I2C connection. External temperature information can be used as the control temperature. "No sensor" setting is possible regardless of whether a channel other than the control channel is connected. Control is possible using Tcalc, which is calculated based on temperature information from two channels (VCP: Virtual Control Point).
Safety Function	Equipped with multiple features such as measures to prevent runaway due to disconnection of a sensor. Also, with full customization, additional safety measures such as detection of abnormal temperature rise of Peltier units using thermistor temperature measurement are possible.
Safety Operation Function	Operation management of the main unit setting screen with PIN is possible.
Automatic Control	Equipped with Auto-Drive File (ADF), a proprietary macro automatic control method, it supports all commands available on TA-PB-2, as well as branching when temperature threholds are reached and repeated operations. Logs created using the free PC app can be edited with a text editor or spreadsheet software. They are then loaded the PC app for verification, and then uploaded almost as is to the main unit with the push of a button, enabling automatic operation on the main unit. It is also possible to set the ADF to run automatically with the start-up of the main unit. With this function, programming knowledge is almost unnecessary for automatic operation.
Log Function	Short and long logs can be created using the PC application, and TX, RX, or both TX/RX logs can be created. Command list type and table format logs can also be created.
Input / Output Connector	Input: System power, Peltier power, AUX power, DCO power, Sensor 1, Sensor 2 Output: Peltier output, AUX output 1, AUX output 2, DCO output Uses terminal blocks made by Phoenix which can be plugged and unplagged for all signals except USB-C and D-sub 9. Special connectors etc. are unnecessary.
Power Supplies	Peltier power supply: Max. 50 V/12 A (Max. 50 V/30 A with full customization) System power supply: 5 ~ 24 V DCO, AUX1, AUX2 power supply: Channel total 50 V/2 A GND is common to all power supply terminals. If the system power supply voltage range is 5 ~ 24 V, a single voltage can be provided to all power supply terminals using the free three-terminal jumper plug.
Communication	Input/Output: 3-wire RS232 (Tx, Rx, GND), USB-C Fully customizable, providing I2C port and TTL serial signal port input/output ports.
Working Environment	Clean inside area environment
Working Temp. Range	$-10\ ℃ \sim +50\ ℃$, $+20\ ℃ \sim +25\ ℃$ recommended (No evidence of dew in any case)
Storage Temp. Range	$-30\ ℃ \sim +85\ ℃$, $+20\ ℃ \sim +25\ ℃$ recommended (No evidence of dew in any case)
Working Humidity Range	85 % max. (No evidence of dew)
Outer Dimensions	W 178 × D 93 (D110 mm*) × H 44.5 mm (*: When connectors are installed, excluding jumpers)
weight	approx. 415 g

⚠ * Specifications of products are subject to change without notice.

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