

# YAMATAKE

The DialapaK Indicating Controllers accept a thermocouple, mV, mA or resistance thermometer bulb input, performs 2-position to PID control actions, and provides a relay contact, pulse, voltage or current output. The Controllers are compact, easy to operate, highly vibration resistant and very stable. Features of the Controllers can be summarized as follows:

- Clear indication of control state:

The setpoint index is fixed at the scale center (noon position), as setting of the setpoint value is done by turning the scale itself. So far as the control is in a stabilized state, the meter pointer (measured variable pointer) also is at the noon position, thereby clearly indicating the control state.

- High reliability:

The instruments fully employ the solid state electronics of state of the art, such as monolithic IC, etc.

The indicating meter is reasonably resistant against mechanical vibration and shock.

The control circuit and indicator circuit are mutually independent. The control circuit remains intact even when the indicator circuit has failed.

The transformer is externally placed in an external casing, thereby eliminating heat build up in the instrument and ensuring stable operation.

- Wide scale type:

Total scale length including the marginal scale sections is as long as 160mm, which is comparable with those of regular-size instruments.

- Tamper-proof setting:

A lock mechanism is provided for the setting dial, to prevent setpoint shift by accidental touching or by tampering by unauthorized personnel.

- Application of DIN Standard:

The external dimensions and panel cutout dimensions comply with DIN Standard.

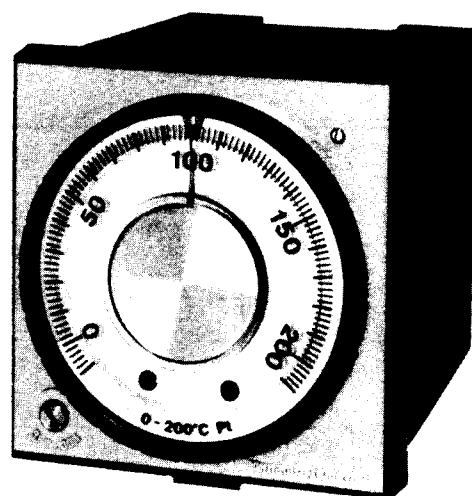
- High input impedance:

Since the input impedance is very high, the same thermocouple used for the DialapaK Controller can be used in common for other instrument, such as a recorder, so far as its input impedance also is high.

- Plug-in system:

The DialapaK Controllers employs a plug-in system, facilitating inspection and maintenance.

## DIALAPAK INDICATING CONTROLLER



### R7650•60 A, B, C, D, E, F R7663A, B

# SPECIFICATIONS

<b>INDICATION:</b>	±18% (R7660, 63)	<b>RATED VOLTAGE AND FREQUENCY:</b>	AC 100V–200V, 50/60Hz or 110, 120–240V 50/60Hz
<b>INDICATING ACCURACY:</b>	±1% F.S.*	<b>ALLOWABLE POWER SUPPLY VOLTAGE:</b>	85 to 110V at 100V rating 180 to 242V at 200V rating 99 to 132V at 110, 120V rating 204 to 264V at 240V rating
<b>SETPOINT ACCURACY:</b>	±1% F.S.*	<b>POWER CONSUMPTION:</b>	5W max. (at rated voltage)
<b>SCALE LENGTH:</b>	Thermocouple (T/C) (R, K, J, E, T) mV, mA (4 to 20 mA DC) Thermodetector (RTD) JIS Pt 100 Ω, Ni	<b>AMBIENT TEMPERATURE:</b>	–10 to 50°C
<b>CONTACT RATING:</b>	3A, 250V AC (Resistive load) second relay is same rating	<b>STORAGE TEMPERATURE:</b>	–20 to 60°C
<b>BURN OUT:</b>	Up Scale	<b>AMBIENT HUMIDITY:</b>	40°C 90% RH max.
<b>INPUT IMPEDANCE:</b>	500 kΩ (T/C)	<b>VIBRATION RESISTIVITY:</b>	4.9 m/s <sup>2</sup> max. (10 to 60Hz)
<b>ALLOWABLE WIRING RESISTANCE:</b>	0 to 100Ω (T/C) 0 to 4Ω (RTD)	<b>MASK COLOR:</b>	Light beige (Munsell 4Y 7.2/1.3)
<b>COLD JUNCTION:</b>	Include	<b>WEIGHT:</b>	700 g
<b>INDUCTION RESISTIVITY:</b>	CRM 120dB (Up to AC 250V) NMR 60dB (Up to twice voltage of input span)	<b>MOUNTING:</b>	Panel mounting
		<b>ACCESSORIES:</b>	Set of mounting bracket

\* under standard condition

	MODEL	INPUT	CONTROL FORM	SPECIFICATION
NON-INDI-CATE	R7650A	T/C, mV, mA	Time proportioning	Proportional band: ±2.5% F.S. Cycle rate: 40 or 20 s (factory set: 40 s) Output: SPDT
	R7650B	RTD		
	R7650C	T/C, mV, mA	ON–OFF	Relay differential: ±0.3% F.S. TYPICAL Output: SPDT
	R7650D	RTD		
PARTIAL (DEV. INDI-CATE)	R7660A	T/C, mV, mA	Time proportioning	Proportional band: ±2.5% F.S. Cycle rate: 40 or 20 s (factory set: 40 s) Output: SPDT
	R7660B	RTD		
	R7660C	T/C, mV, mA	ON–OFF	Relay differential: ±0.3% F.S. TYPICAL Output: SPDT
	R7660D	RTD		
	R7663A	T/C, mV, mA	Time proportioning +ON–OFF	Time proportioning is same spec. of R7660A.B. Relay differential: ±1% F.S. (second stage) Second stage setting range: ±20% F.S.
	R7663B	RTD		
	R7663C	T/C, mV, mA	ON–OFF +ON–OFF	Main setting is same spec. of R7650C.D Relay differential: ±1% F.S. (second stage) Second stage setting range: ±20% F.S. TYPICAL
R7663D	RTD			

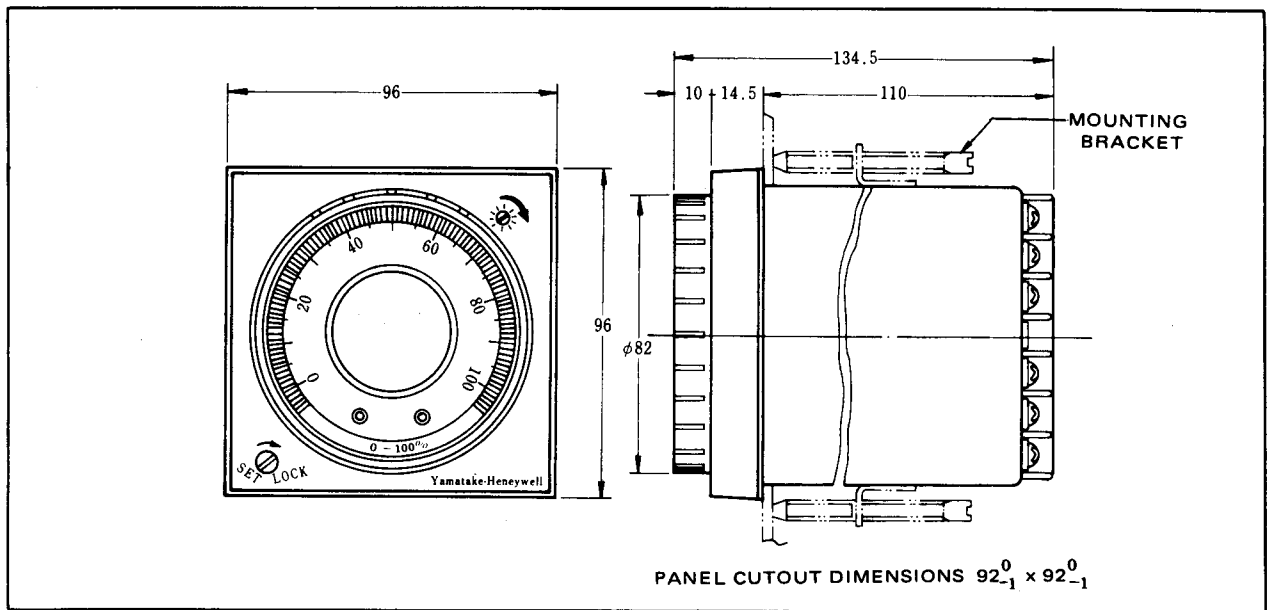


Fig. 1

## INSTALLATION WIRING

### (1) Environments

The instrument must not be exposed to high temperature, high humidity, or dusty or corrosive atmosphere. An ideal place of installation is where the air is clean and dry and temperature does not vary largely. **The ambient temperature must be between -10°C to 50°C and humidity must not exceed 90% R.H.**

The instrument is fairly vibration resistant (0.5g, 3600 r.p.m).

### (2) Installation Method (See Fig. 1.)

The instrument housing put in the hole which cut on a panel from the front and fit by mounting brackets (2 sets) from the back.

The instrument is flush-mounted on a panel with mounting brackets at the top and bottom of the instrument housing.

The customer terminals are located at the rear of the instrument.

### (3) Precautions in wiring

- (1) For wiring, use JIS C 3307 600V vinyl insulated wires of from conductor diameter 0.5mm and finished outer diameter 2.0mm to conductor dia-

meter 1.25mm and finished outer diameter 3.2mm (AWG #22 to #16)

- (2) Make wiring according to the symbols of the customer terminals (See Fig. 2)
- (3) No power switch and fuse are provided in the instrument. If they are required, provide them externally.
- (4)-a Only Thermocouple  
Use compensation wires for connection from the thermocouple to the input terminals ( ⊕ and ⊖ ) of the instrument. When a K thermocouple is used and the distance is within 200 meters (100 ohm), no adjustment is required.
- (4)-b Only RTD  
Regarding the lengths of lead wires from the resistance thermodetector to the instrument, no adjustment is required up to 500 meters (approximately 4 ohms) when 1.6mm conductor diameter wires are used.
- (5) **The wires between detector and instrument must not be run along the line voltage wiring in the same conduit.**
- (6) **The precaution of (5) above also applies for wiring in the instrument panel.**

#### (4) Wiring

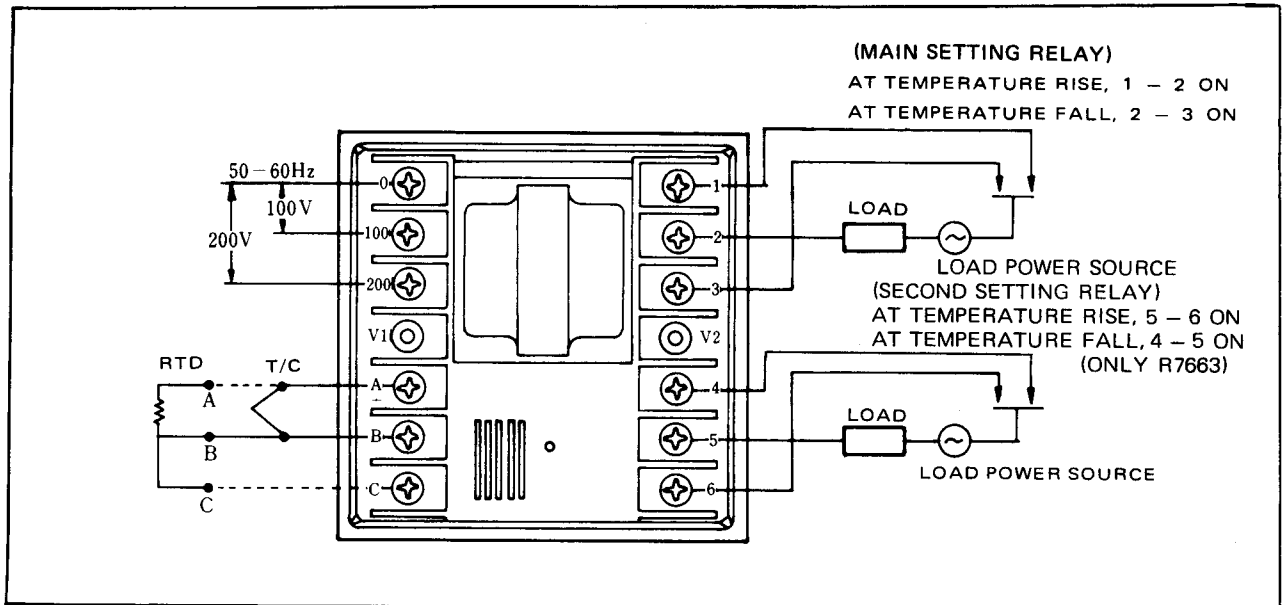


Fig. 2

## OPERATION

### 1. Preparations

- (1) Check the line voltage and ensure that the power line wires are connected to the correct terminals.
- (2) Be sure that the thermocouple and RTD wires are connected to the (+), (-) or (A), (B) and (C) terminals in the correct polarity.
- (3) After ensuring (1) and (2) above, turn on the instrument power.

### 2. Temperature Setting (See Photo. 1.)

For temperature setting, rotate the setting dial until the desired temperature is aligned with the red ▼ on the scale plate. If the set point is required to be fixed, tighten the SET LOCK screw by turning it clockwise with a screwdriver. To change the fixed set point, loosen at first the SET LOCK screw.

#### Caution

Tighten SETLOCK screw with 0.8 N·m. Excessive tightening may cause destruction of this screw.

### 3. How to Second Stage Setting (R7663)

The instrument is prepared another setting mechanism using by limit or second control besides main setting (See Photo. 1) Setting range is main set-point  $\pm 20\%$  F.S.

#### A. At High Limit

- (ex.) Scale: 0 to 200°C
- Setting temperature: 100°C
- High limit temperature: 115°C
- 1) Set the main setting at 200°C
  - 2) From a table of millivolt equivalents, obtain the millivolt value at 115°C
  - 3) Set the second stage at the point where red lamp change turn off to turn on. (See Fig. 5)

#### B. At Low Limit

Do as same as the High Limit except setting the second stage at the point where red lamp change turn on to turn off. (See Fig. 5)

### 4. Relay Action

See Fig. 4 and Fig. 5.

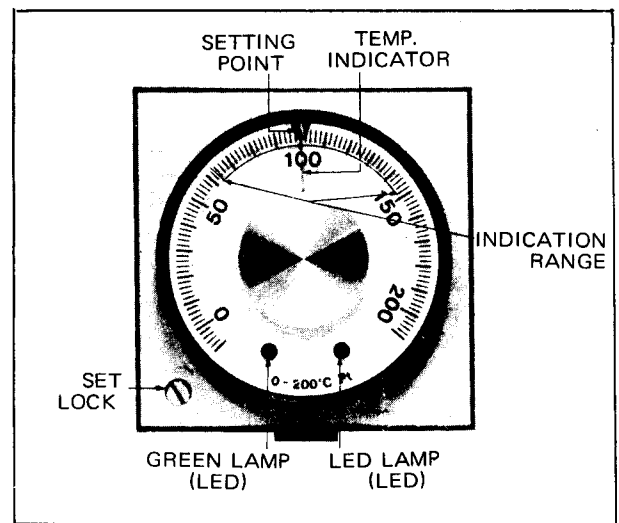


PHOTO 1.

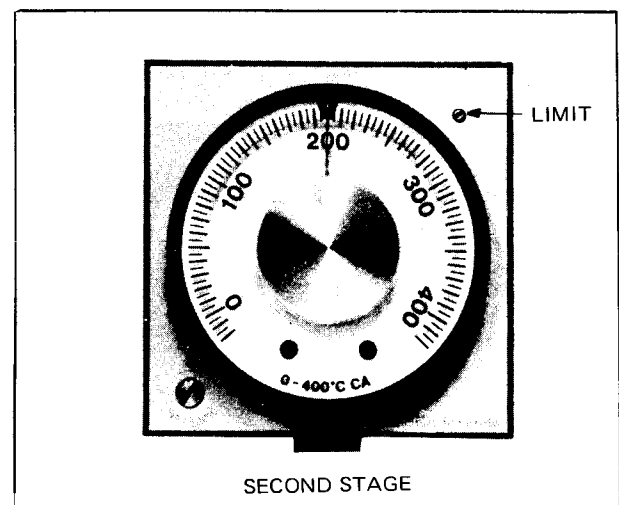


PHOTO 2.

(1) TIME PROPORTIONING TYPE

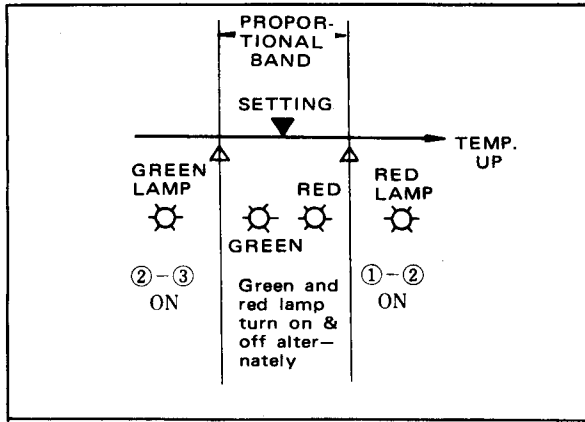


Fig. 3

(2) ON-OFF TYPE

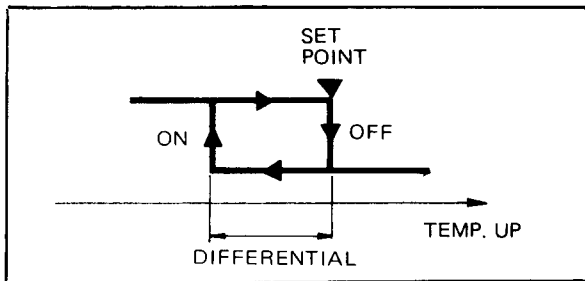


Fig. 4

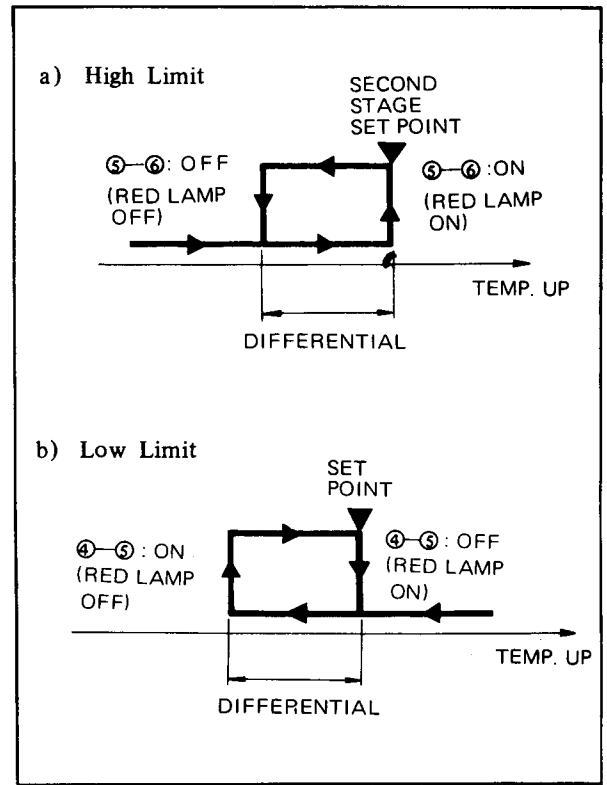


Fig. 5 Limit relay action

# TROUBLESHOOTING

When the system has failed, check the line voltage, detector, and load circuit as below.

**Normal operation**

When the instrument operation is normal, the measured temperature indicator, (Red) remains close to the set point (the red ▼ mark) and the green and red lamps turn on and off alternately in accordance with the control relay operation.

**During starting operation:**

Sympton	Probable cause of trouble	Check point line
Indicator lamps do not turn on	Incorrect line voltage	Check the line wire connection and line voltage
Green lamp turns on and indicator downscale	Wires connected in the reverse polarity	Check connection of the detector wires.
Red lamp turns on and indicator upscale	Open detector	Check the detector (Refer to Note 1 for the check method)
Temperature does not rise despite green lamp turns on	Incorrect connection in external load circuit	Check that the output terminals are correctly connected to external load

**During running operation:**

Sympton	Probable cause of trouble	Check point
Red lamp turns on and indicator upscale	Open detector	Check the detector (Refer to Note 1 for the check method)
Temperature does not rise despite green lamp turns on	1) Defective external load circuit	Check the external circuit

**Note 1-a: Thermocouple test**

The thermocouple is open circuited if the indicator indicates the room temperature and the green lamp alternately turns on and off indicating that the control operation is normally performed when the instrument input terminals “+” and “-” are shorted and the set point is made at the room temperature. In such a case, replace the defective thermocouple.

**Note 1-b: Resistance Thermodetector test**

To check for open-circuiting, disconnect the resistance thermodetector wires from the input terminals of the instrument and measure the resistances of the resistance thermodetector circuit using a multimeter. The normal resistance between terminals (A) and (B) for a JIS Pt 100 ohm bulb is 100 to 110 ohm and that for a Ni 508 ohm bulb is 508 to 570 ohm. The resistance between terminals (B) and (C) should be almost zero ohms. If the resistance between terminals (A) and (B) is infinitive or zero ohms or that between terminals (B) and (C) is infinitive, the resistance thermodetector is defective and must be replace.

# MAINTENANCE

To replace the instrument, pull out the old instrument while pushing up the stopper located at the bottom of the instrument front. The new instrument can be readily inserted in the casing.

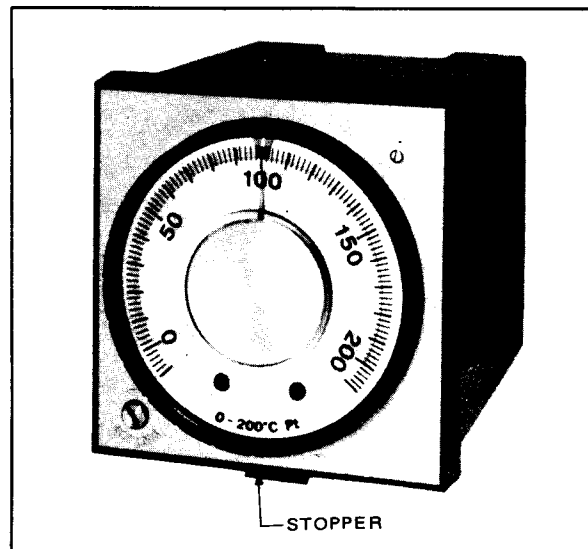


PHOTO 3.

*Specifications are subject to change without notice.*

**YAMATAKE**

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