

Heater disconnection warning machine

F A L - 2 1 - 1

F A L - 2 1 - 3

Specifications

Manual

[Goods for RoHS]



Head Office
Shimouma 4-14-15, Setagaya-ku, Tokyo 154-0002, Japan
Telephone : +81 3 3421 5141
Fax : +81 3 3421 5145
Yamanashi Fuji Plant
Shibokusa, Oshino-mura, Minami-Tsuru, Yamanashi
401-0511, Japan
Telephone : +81 555 84 2503
Fax : +81 555 84 3157



homepage <http://www.forest-ele.co.jp/>

Heater disconnection warning machine

Model F A L - 2 1 - 1 For single phase
F A L - 2 1 - 3 For three-phase circuit

•Specification

Meter power supply : AC105V/210V ±15% 50/60Hz For single phase
: AC210V ±15% 50/60Hz For three-phase

Heater capacity : For AC100V 0.5KW } The future connecting directly
: For AC200V 1.0KW } (5A or less in load current)

* Please put external C.T for 5A or more in load current and the three-phase circuit specification.

Range of load setting : 1~5A (Special specification 0.5~2A)

Range of warning setting : 3~50%

Load setting accuracy : ±3%

Warning setting accuracy : 5~3A ±3%

: 3~1A ±5%

: 1~0.5A ±10%

Detection method : Load current and load voltage

Alarm output : Ratings AC240V0.1A resistance load of relay point of contact 1C

Shape : Installation type plug-in type in board (for DIN rail installation) ※Socket: Sales according to 11PFA equivalent goods

Withstand voltage : AC1500V/1 minute between each I/O

Insulation resistance : 20MΩ or more between each I/O (DC500V megohmmeter)

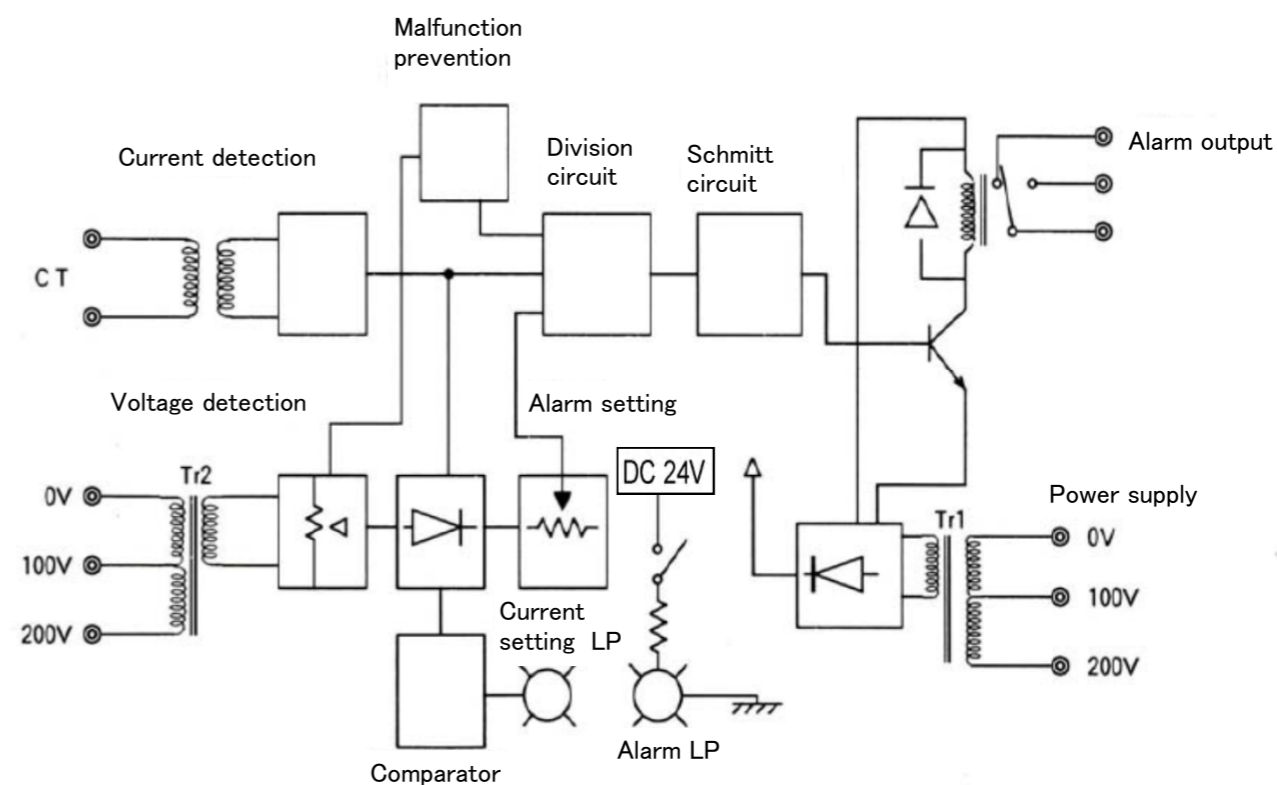
Meter surrounding condition : 0~50°C 90% or less (No dew.)

Weight : 350g (single phase), 430g (three-phase circuit)

•Principle of operation

- (1) The line current of the load is detected with current detector (CT), it converts into the voltage, and it exists in the division circuit.
- (2) The voltage between lines of the load is detected with voltage detector (Tr2), and it exists in the division circuit through the current setting machine and the alarm set station.
- (3) Both input is compared, divided with the division circuit, the relay is driven through Schmitt circuit, and the alarm output is put out.
- (4) Both increase and decrease at the same rate even if the load voltage changes because it has detected the voltage and the current. Warning doesn't come out even if the current decreases by this change. Therefore, this container can be applied even if it uses it for the power-supply unit by the thyristor phase control etc.
- (5) The malfunction prevention circuit operates and the alarm output doesn't go out when the voltage of the load is about 15% (15V in case of ratings 100V, 30V in case of ratings 200V) or less.

● Block chart



● Chart of terminal connecting wires

- (1) AC100V 1φ 0.5kW or less
AC200V 1φ 1.0kW or less

- (2) AC100V 1φ 0.5kW or more
AC200V 1φ 1.0kW or more

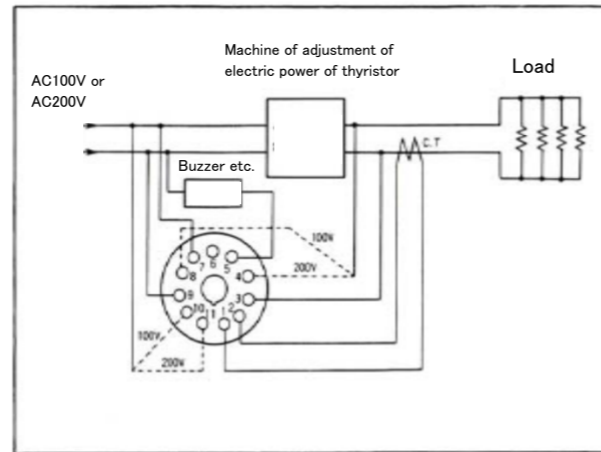
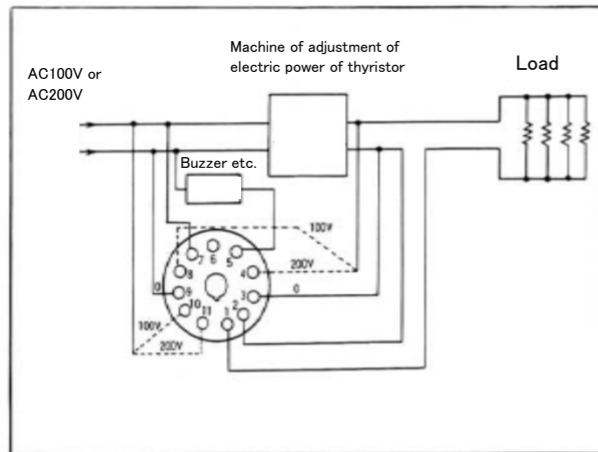
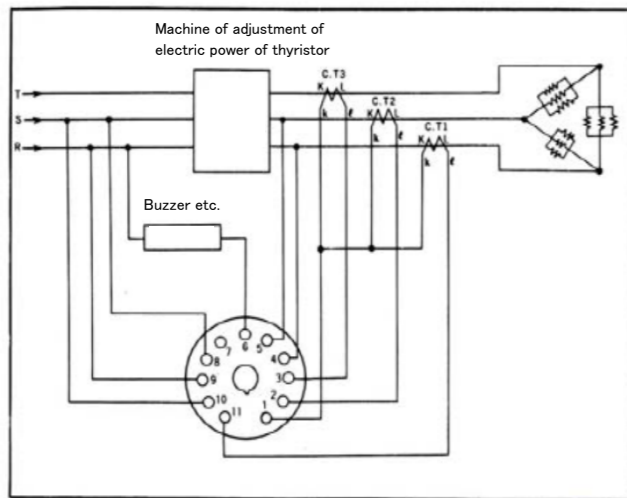


Chart of socket connecting wires

The table below shows the current change rate when one either of the heater is disconnected when plural in the average load and parallel

Method of connecting wires	n = 1	n = 2	n = 3
1φ	The current doesn't flow.	0.5	0.67
3φ Star connecting wires	Current of disconnection	The current doesn't flow.	0.6
	Other currents of two phase	0.87	0.92
3φ Δ connecting wires	Current of two phase connected with	0.58	0.77
	Current of other phase	1	1

(3) For the three-phase circuit



FAL-21-3 Chart of socket connecting wires

③ In addition, the position in which a set lamp and the alarm lamp light is found.

④ The current setting ends above.

(3) Alarm setting

Deterioration in the heating load and the degree of the disconnection number are set.

Example 1) To put out an alert when the degree of the deterioration of the heater is downed by 20% by one heater use, the warning setting volume is matched to 20%.

Example 2) To detect one disconnection by nine heater use and to output the disconnection warning, the warning setting volume is matched to 10% or less.

(At the time of three parallel Δ connecting wires.)

• Setting method

- (1) After a regulated connecting wires etc. are completed, meter power supply and the heating load are usually driven, and the setting installs and sets while it stabilizes (3 minutes or more).
- (2) Current setting
 - ① The warning setting volume is matched to 0% of the scale.
 - ② The load setting volume is found and the position in which doing and a set lamp light right and left is found.

• Externals dimensional drawing

