TOSHIBA

6F9E0090

INSTRUCTION MANUAL

CURRENT RELAY

RC803A-HP1

TOSHIBA CORPORATION

FCF50001A

CODE RY

CONTENTS

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Please thoroughly read this instruction manual before using the RC803A Current Sensing Relay.

1. General Description

This current relay is designed to detect current in AC circuits with a wide range of applications, e.t., detection of abnoraai current of various electrical equipment due to overloads or broken circuits (e.g., heater circuits), detection of starting current to autoaaticaiiy advance the secondary resistance on induction wound rotor motor controllers.

During starting, excessive current such as inrush current, may exceed rated current flow in motor or transforaer circuits. this current relay has an adjustable delay circuit to prevent it from operating during start-up.

Further, this current relay is fail safe. The relay operates at the same time control Dower is applied. and the relay is de-energized when the input signal exceeds the preset level or control Dower is removed.

2. Check Before Using

Before using this relay. check the following Doints. If any defects are found, contact the dealer from which you purchased this relay.

2.1 External Appearance

Check the relay for any missing Darts and for damage, dirt, rust, and loosened screws caused during transportation.

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2.2 Specifications

ITEM	SPECIFICATIDHS
Rated Current	5A (continuous)
Range of current sensing	0.5 - 5A (For current above this range, use a CT (current transforrer) and connect the relay to its secondary side).
Input circuit voltage	ɔ low voltage circuit (below AC 600V) ɔ To detect current in high voltage circuits, use a CT, and connect the relay to its secondary side.
Type of Current	Overcurrent, Undercurrent
Response delay time-adjustable range	0.1 - 3s
Detection delay tile-adjustable range	0.1 - 30s
Operating volt.	a5 - 132VAC. 170 - 250VAC, 50/60Hz
Accuracv	±10%

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ITEM	SPECIFICATIONS
Ambient temp. range	-10 - +50°C
Temp.error	±10% at ±30°C
Dielectric with-stand voltage	Between terminals and ground 2000VAC for 1 min.
Impulse with-stand voltage	Between terminals and ground 1 X 40μs at 4500V (standard waveform)
Insulation resistance	Between terminals and ground 100M Ohms or more when measured with a 500VDC aegger.
Vibration -Oscillation -Impulse	Amplitude 2.5mm - 20Hz (2G) 15G
Overcurrent intensity	40 times of max. continuous current (5A), for 1 sec., applied twice, in accordance with JEC 174.
Output contact rating (250VAC max.)	Over Current: SPDT Under Current; SPDT

	Inductive load		
	Voltage	Break	Continuous
NEMA AC Rating Designation B300	120 AC	5A (p.f.=0.4)	5A
	240	3A	5A
	24	0.3A	5A
	DC 120	0.15A (L/R=15ms)	5A
	240	0.1A	5A

ITEH	SPECIFICATIONS
Hysteresis	Approx. 10X of operating value.
Power consumption	o Operating Power 3.5VA o Input Circuit 0.1VA (when 5A is applied)
Height	.75kg (1.7 lb)

3. Description of Operation

When the detected current exceeds the detection circuit operating level, the detection delay timer is actuated. If over-current is continuously detected for more then the detection delay time set value, the overcurrent response delay timer is actuated. Then, if overcurrent is detected when the response delay timer has elapsed, the overcurrent relay is actuated.

If current drops below the undercurrent detection set value, the response delay timer is actuated, and after the set tile has expired, the undercurrent detection relay is actuated. In the case of undercurrent detection, the detection delay timer is not actuated.

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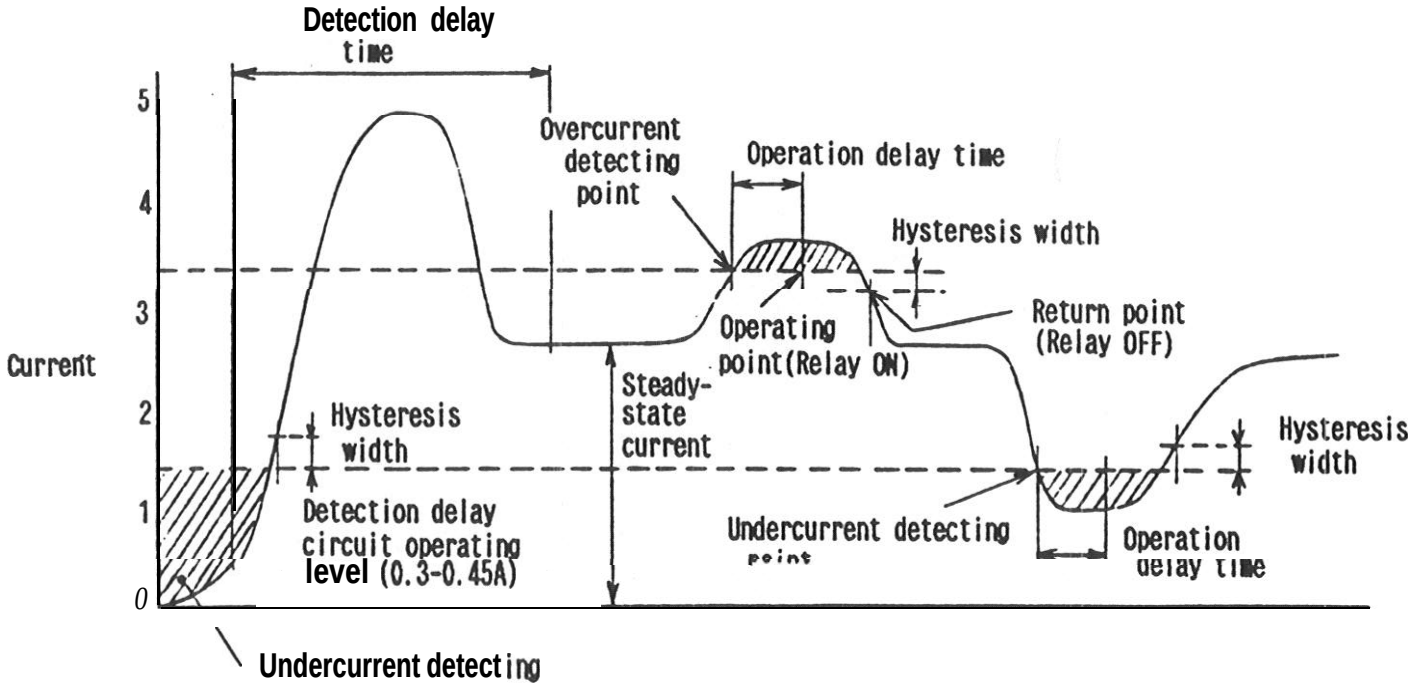

Fig. 1 Characteristics

4. Application

4.1 Overcurrent Detection on Motors

An application example Is shown in Fig. 2. In this circuit, an excessive load is detected by detecting the overcurrent of a motor and the main circuit is opend to Protect

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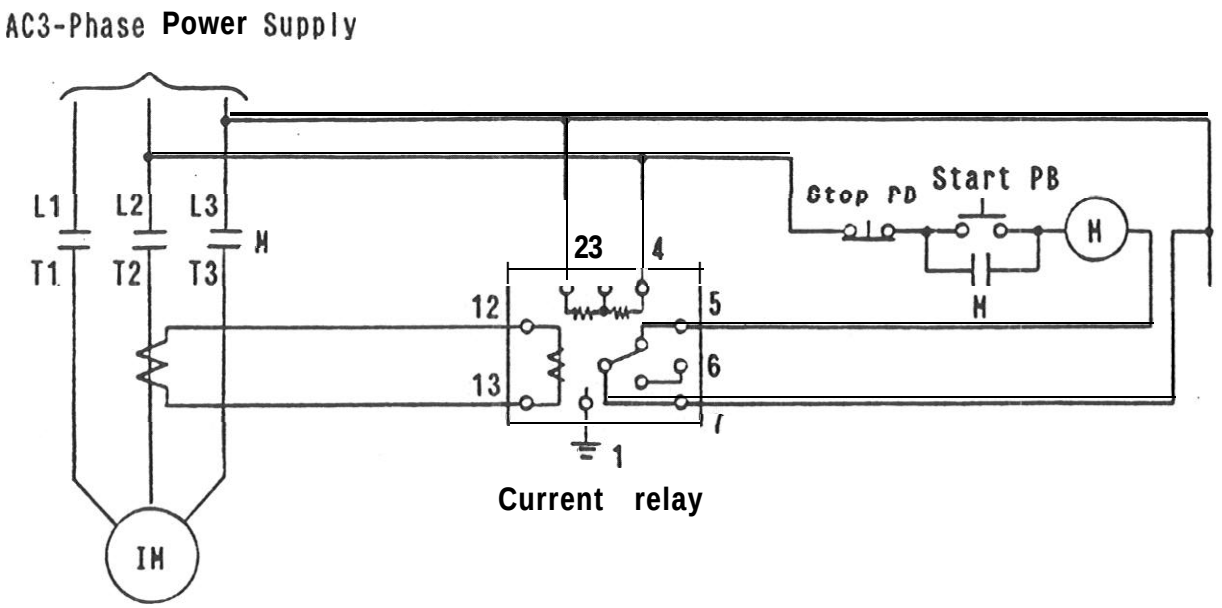
the motor from being damaged. If the detected current is above 5A, and in case of a high voltage circuit, use an external CT and connect the secondary side of CT to the relay as shown in the following figure:



Note: The RC803's output contacts are shown with Dower source applied.

Fig. 2 Application Example using An External CT

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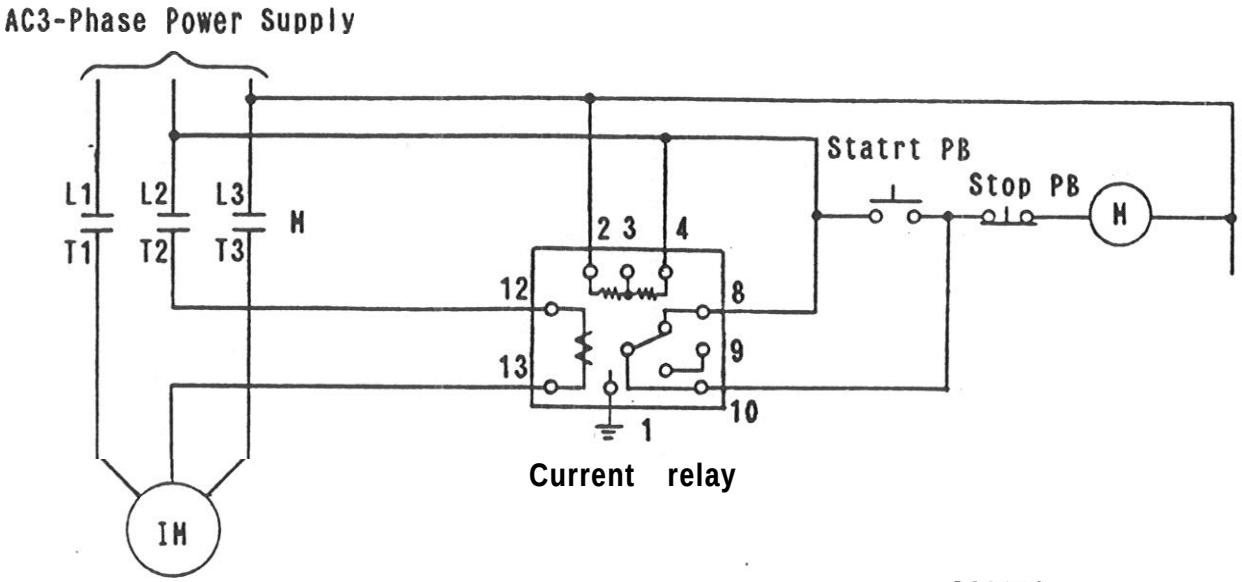
further, when this relay is used in a motor circuit, the detection delay timer should be set longer than the startinv time (about 120%) so that this relay is not actuated by inrush current. If current flowinp in the main circuit becomes abnormal after the time Deriod of the detection delay timer has elapsed, the relay is actuated when the set time of the response delay timer is over.

4.2 Undercurrent Detection on Motors

To utilize the undercurrent detection function, the relay is used in a motor circuit with a fixed load, to detect livht or no load conditions. For example, in the case of a pump motor, this relay is used to detect undercurrent when the volume Of water supplied in a water pipe is low, or in case of a thread winding rachine, when the tension of the thread drops.



Note: The RC803's output contacts are shown with Dower source applied.

Fig. 3 Application Example

4.3 Limiting Startino current of Motors

Many motors of medium and large capacity use a method to start by limiting starting current. By detectino the main circuit current, this relay can automatically advance the starting resistance on the secondary side of the motor (in this case, the knob of the detection delay timar and that of the response delay timer should be kept at the minimum settings).

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4.4 Transformers

To use this current relay for detecting overcurrent on transformers, it is necessary to set the detection delay timer with the inrush current of transformer taken into consideration.

4.5 Heaters, Lamps and other Circuits

This relay can be used to detect the disconnection of circuits by sensing the existence of current flow. In other words, if disconnection occurs, current does not flow and an undercurrent condition is detected by the relay. For example, this relay can be used to detect the disconnection of heater circuits on constant temperature ovens or heatar circuits for insulators on transmission and distribution facilities In extremely cold regions.

5. Hount ing

See Fig. 4 for uounting dieensions. Be careful not to use this relay in the following conditions:

(1) Locations in aebient temperatures outside -10 ▪ +50 °C,
(2) Locations subject to high temperature, steam or dripping water,
(3) Dusty/dirty locations,
(4) Locations subject to vibration (total amplitude 2.5mm or more, 20 times/sec. or more) and shock (above 15G in 3 directions).

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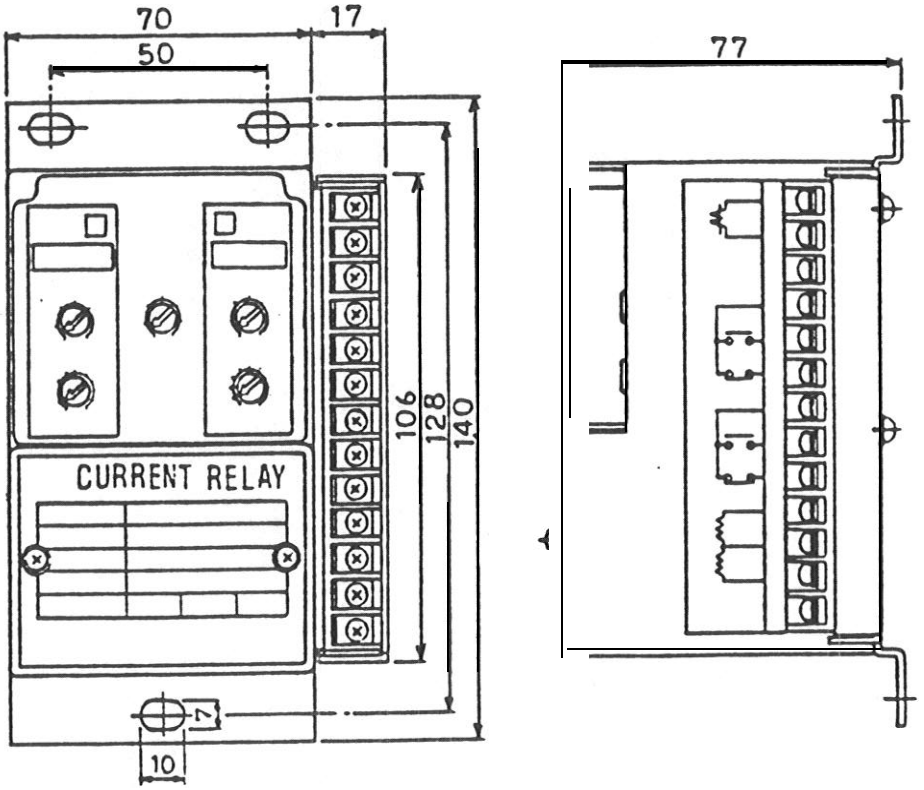

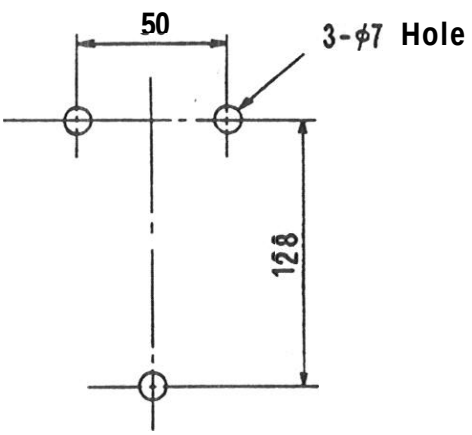

Hountino holes

Fig. 4 Dimensions

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6. Adjustments

6.1 Current setting

(1) When detected current is in a range of 0.5 - 5A:
After confirming that the current value under normal load condition is in a range of 0.5 - 5A, set the current adjusting knob to the desired detecting value.

(2) When detected current is above 5A:
Using an external CT (current transformer), properly suited for the detected Current value, connect the secondary side of the CT to the input terminal of the relay. Calculate the secondary current corresponding to the detected current value, based on the CT ratio. Then set the current adjusting Knob to this calculated value.

6.2 Setting the detection delay time

Setting time varies depending upon each individual application. Adjust the detection delay time according to the following:

(1) Motor load
TO avoid detection during start-up, set the delay tire to approximately 120% of starting time.

(2) Transformer load
If the inrush current (inrush time varies depending upon capacity) is large, set the delay time to approximately 120% of this inrush time. Genenrally, 1f the capacity is small, inrush time is short and therefore, even when the adjusting knob is set at the minimum position. there should not be any nuisance tripping.

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6.3 Setting the Response delay time

Adjust the set time according to the purpose of detection (I.e. overcurrent or undercurrent). The set tire for the response delay varies ger application. Host applications may not need any delay time. It is mainly used to prevent nuisance tripping (ride through) by ignoring momentary load gliches.

7. Operational Test

(1) Check both the control and detection circuits to confirm there is no mis-wiring.

(2) Check if the current dedtction time delay, and response time delay settings are correct.

(3) If the wiring ard settings are correct, energize the control circuit and check if it is the proper voltage.

(4) When the Dower source is applied, the relay is excited and the output contact's states are reversed. The relationship between the input signal end the output contacts are shown in Table 2. Check this relationship during the test.

Input		Output Contact Statis			
Power source	signal operating level	Overcurrent		Undercurrent	
		Between 5 and 7	Between 6 and 7	Between 8 and 10	Between 9 and 10
OFF	Zero	Open	Close	Open	Close
ON	Less	Close	Open	Close	Open
	Above	Open	Close	Open	Close

Table 2

(5) If no problem is found when the Dower source is applied, turn the rain circuit switch ON and perform the following checks:

(a) In the case of a motor load

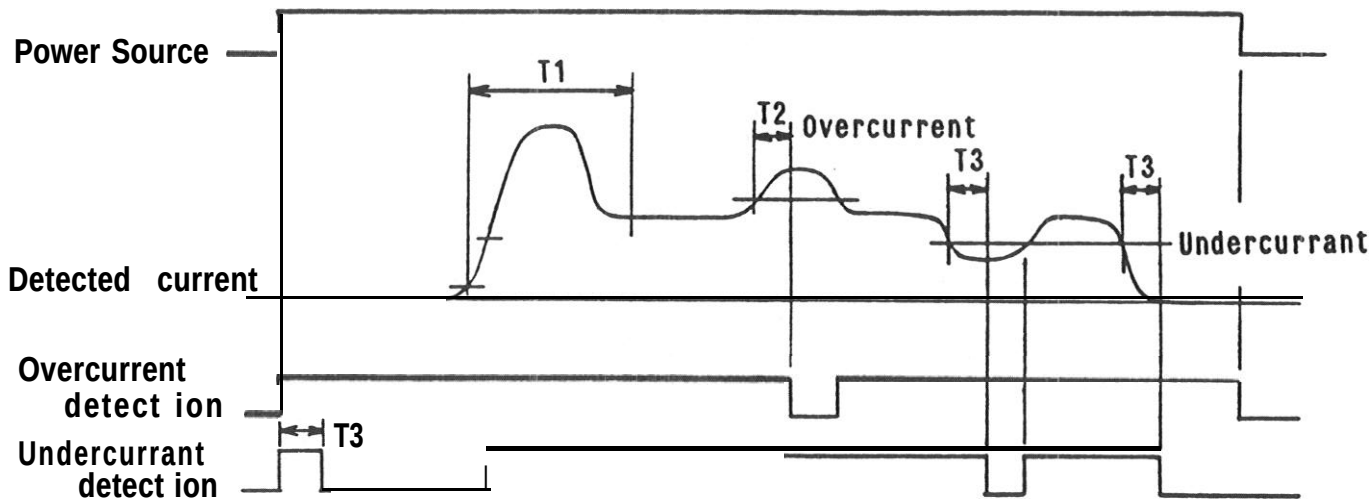
If the set start-up time delay is too short, the relay may be actuated. In such a case, reset the detection delay time adjusting knob accordingly. After the start-up time delay has expired, apply current above the set detection value to confirm that the relay functions (after the response delay time). In addition, check that the detection indicating lamp lights at the same time the relay operates.

(b) When undercurrent or disconnection is detected

At the same time the main circuit switch is turned ON, the starting current and rated current flows, and the relay is picked UP. If current drops below the undercurrent set point, the undercurrent State is detected and the relay drops out. (Refer to Fig. 5)

Caution: If input signal to this current relay is zero (When stopped), it is not possible to judge if it is undercurrent or in a disconnected state. In this case, it is recommended to have a circuit connecting a normally open auxiliary contact of the main circuit switch in series with the alarm or lamp circuit. this will Drevent the relay fror signalling a fault condition during a normal shutdown.

(6) If the relay does not operate in the above test, check if the current setting is correct or if the input signal is above the set detection value. If the input signal is correct, check the operation of the relay by gradually reducing the setting of the current adjusting knob. If the relay still does not operate, it is defective. In this case, please contact the dealer from which you purchased the relay or Toshiba.



T1: Detection delay tire

T2: Overcurrent detecting resgonse delay timer

T3: Undercurrent detecting resgonse delay timer

Fig. 5 Relay Operation

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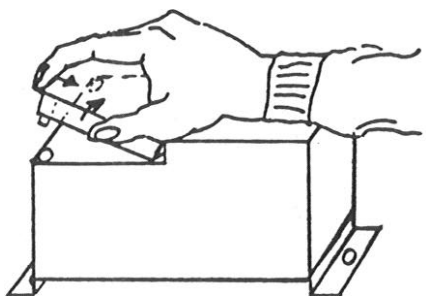
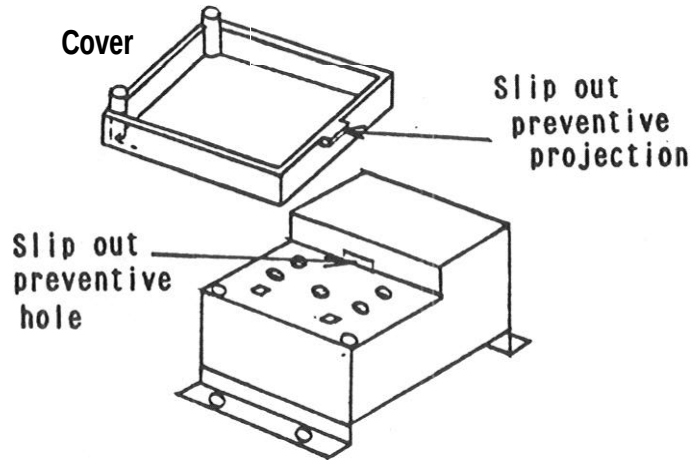
8. Cover Removal

To adjust the current and time settings the cover must be raaoved. Remove the cover by applying a force in the direction of the arrow as shown below. To replace the cover, place the projection of the cover in the slip out oreventive hole and then insert the bosses of the cover into the 2 holes at the upper left and right.





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