

FR-ZRA RELAY OUTPUT UNIT

11. 1 Features

The FR-ZRA relay output unit allows three open collector output signals of the inverter to be selected from among the five standard signals and converted into relay contact (change-over contact) output signals.

11. 2 Structure

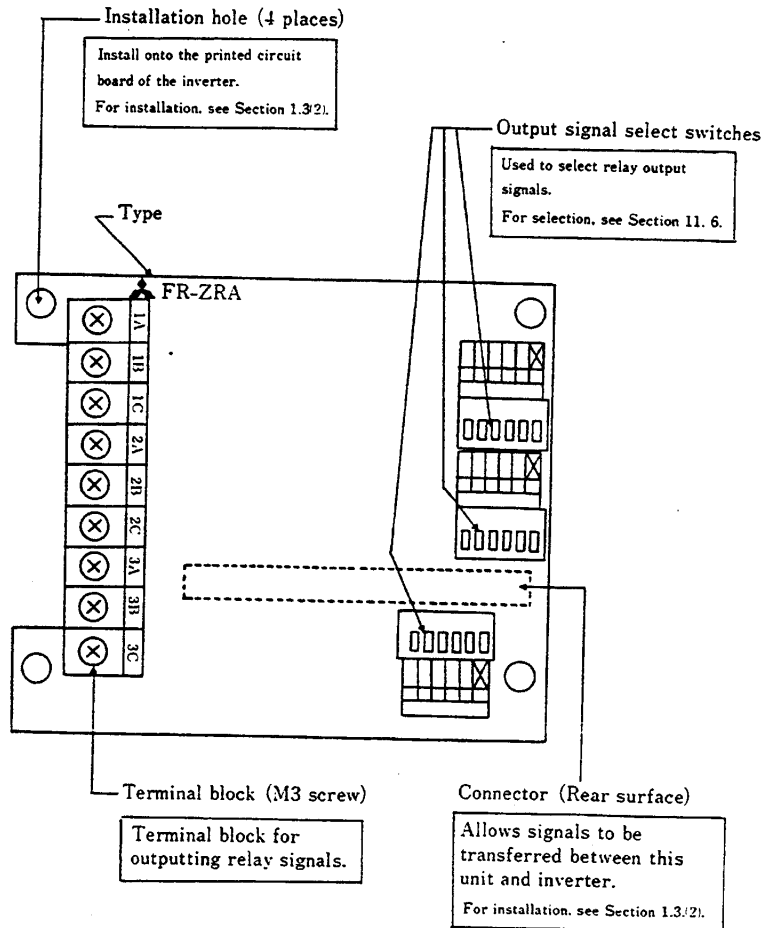


Fig. 11. 1 Structure

11. 3 Specifications

- Output signal type
- Contact capacity

Change-over (three relays used)

230V AC, 0.3A

30V DC, 0.3A

- Output signal
 - Inverter running (RUN)
 - Up-to-frequency (SU)
 - Frequency detection (FU)
 - Overload (OL)
 - Instantaneous power failure (IPF)

Any of the inverter's five output signals can be selected and entered for each relay.

★ "RUN" and "IPF" may only be selected when the FR-ZRA is used with the FR-F400 series.

11. 4 Circuit Diagram

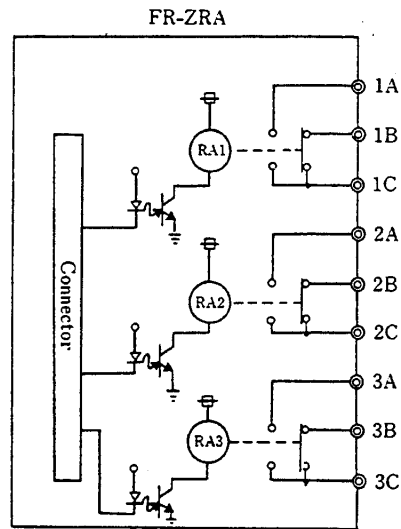


Fig. 11. 2 Circuit Diagram

11. 5 Operation

The circuit mainly consists of three output relays which can provide output to the change-over contacts, three DIP switches for selecting the corresponding input signals, and the connector coupled with the output terminals and inverter printed circuit board.

Three types selected by the DIP switches from among the five types of open collector signals output by the inverter are entered via the connector, converted into relay contact (change-over contact) signals, and output to the terminals.

(1) Signal on/off

① Inverter running (RUN)

Switched on at or above the starting frequency and switched off while the inverter is at a stop or the DC dynamic brake is operating.

② Up-to-frequency (SU)

The up-to-frequency sensitivity * is adjustable between 1 and 100% with respect to the set frequency (f_s). Set the magnitude of sensitivity in the "up-to-frequency sensitivity" parameter.

③ Frequency detection (FU)

Switched on when the output frequency has reached or exceeded the frequency set in "output frequency detection" parameter.

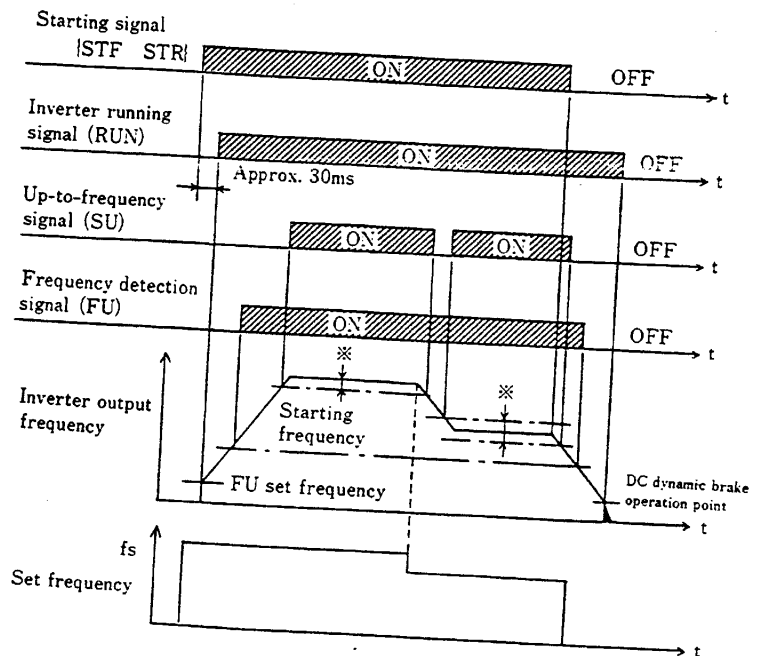


Fig. 11. 3 Typical Signal On/Off Timing Chart

④ Instantaneous power failure (IPF)

★ For full information on the IPF signal, see the inverter catalog, technical information, etc.

⑤ Overload (OL)

Switched on by the stall prevention activated when the output current or regenerative voltage has exceeded its limit. Switched off when the stall prevention is canceled below the specified value of output current or regenerative voltage.

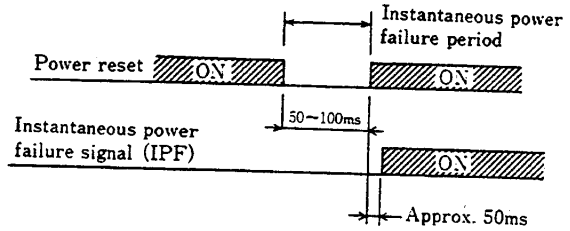


Fig. 11.4 Typical Instantaneous Power Failure (IPF) Signal On/Off Timing Chart

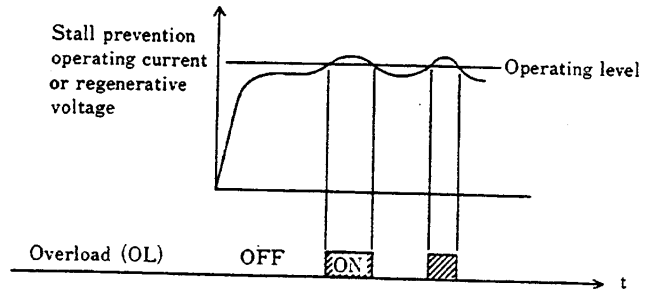


Fig. 11.5 Typical Overload (OL) Signal On/Off Timing Chart

11.6 Adjustment

- (1) The toutpu signal facilities of the three output relays can be selected with knobs 1 to 5 of the three DIP switches (SW1 to SW3).

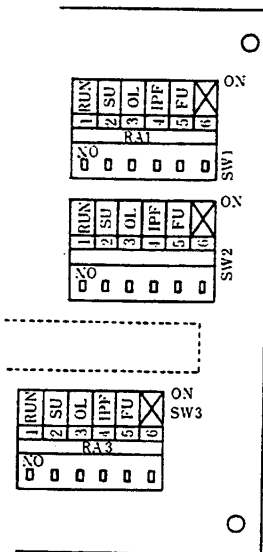


Fig. 11.6
DIP Switch Setting

Set the corresponding DIP switch (SW1 to SW3) knob to ON (upper position) to select the required output facility of the relay.

Note 1 : Only one function may be selected for one relay. (The output is switched off if two or more functions are selected.)

Note 2 : Any output signal must be selected while the inverter is at a stop. any setting change made during run is invalid during run and made valid after the inverter has stopped.

Note 3 : Knob 6 of each DIP switch is invalid.

Terminal Block	Relay	DIP Switch
⊗ 1A	RA1	SW1
⊗ 1B		
⊗ 1C		
⊗ 2A	RA2	SW2
⊗ 2B		
⊗ 2C		
⊗ 3A	RA3	SW3
⊗ 3B		
⊗ 3C		

Note : Terminal screw size = M3 screw

Fig. 11.7 Correspondence between Relays, DIP Switches and Output Terminals

11. 7 Typical Application

(1) Parallel use of contacts

The reliability of the contacts can be increased by selecting the same function for two or more relays (DIP switches) and connecting the output contacts in parallel.

(2) Series use of contacts

The capacity of the contacts can be increased by selecting the same function for two or more relays (DIP switches) and connecting the output contacts in series. This connection is effective for contacts used in a DC circuit.

(3) Installation of two FR-ZRA units allows a total of six contacts to be combined as appropriate.

11. 8 Precautions

(1) When the FR-ZRA is used with the FR-F400 series, note that the "RUN" and "IPF" signals are only valid and the other output signals (SU, FU and OL) are invalid. Relay RA1 provides the "RUN" output signal and relay RA2 provides the "IPF" output signal, independently of the DIP switch setting.

(2) See the corresponding inverter instruction manual for full information on the output signal on/off timings, parameter numbers, etc. which differ according to the inverter model.