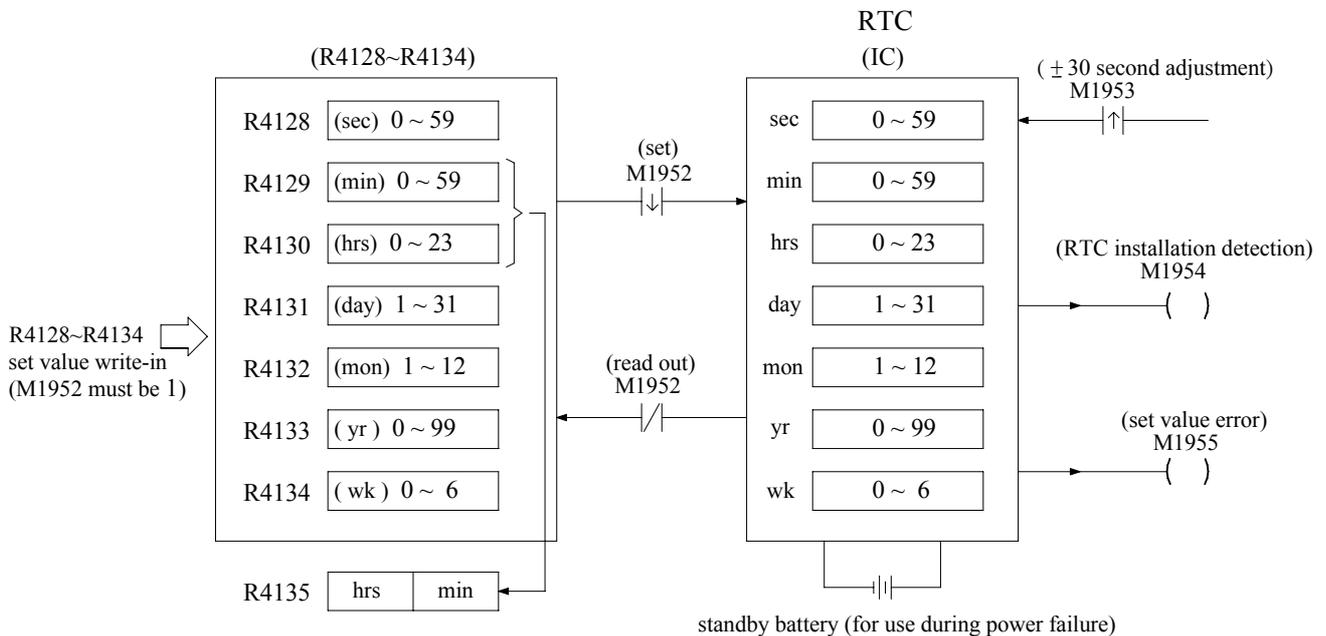


Chapter 16 Real Time Clock (RTC)

A real time clock (RTC) is optional to be attached to the FB-PLC's CPU unit. No matter whether the PLC is switched on or off, the RTC will always keep accurate time. It provides 7 kinds of time value data-week, year, month, day, hour, minute and second. Users can take advantage of the real time clock to do 24 hour controls throughout the year (for example, businesses or factories can switch lights on and off at set times each day, control gate access, and do pre-cooling and pre-heating before business or operations begin). It can enable your control system to automatically coordinate with people's living schedules, and not only will it raise the level of automatic control, it will improve efficiency.

16.1 Correspondence between RTC and the RTCR within PLC

Within PLC, there are special purpose registers (RTCR) for storing the time values of the RTC. There are 8 RTCR registers in all, going from R4128 to R4135. R4128 to R4134 are used to store the 7 kinds of time values mentioned above, from weeks to seconds. Because in practical daily application, certain hour and minute time data is often used, we have specially merged the time values of the hour register (R4130) and minute register (R4129) within RTCR, and put them in R4135 high byte and low byte, so they can be accessed by the user. The diagram below shows the correspondence between RTC and the RTCR within PLC, as well as the control switch and status flag (M1952-M1955) related to RTC accessing.

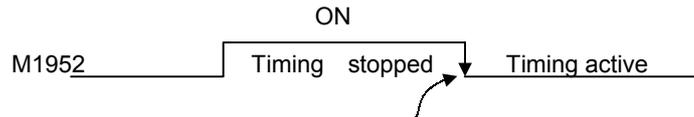


16.2 RTC Access Control and Setting

Within PLC, the RTCR registers have been allocated to store the time values of RTC, and this is of great convenience to the user. However, if you want to load the set values of RTCR into RTC or read out what is in RTC onto RTCR, and tune the time value etc, then the setting must be done using the special relays (M1952 and M1953) for RTC access. Below is an explanation of the access and adjustment procedures, and the status flag relays.

1. RTC setting:

The (RTCR→RTC) setting action is only executed once at the moment that relay M1952 goes from 1→0 (falling edge).



At the moment when M1952 goes from 1 to 0, the set values of R4128 to R4134 within RTCR will be written into the corresponding hardware registers within RTC. After M1952 has returned to 0 the timing action will start. Also, with each scan, CPU will retrieve time values from RTC in the opposite direction and write them onto RTCR.

Note: If you want to load the set values into RTC, you must first make M1952 as 1 and then load the set values into RTCR. The loading of the set values into RTCR can be done via MOVE instruction. However, you must first halt the RTC read out (make M1952 as 1), otherwise the data that you just wrote into RTCR will immediately be overridden by the time data being read back from RTC in the opposite direction.

2. RTC read out (RTC→RTCR):

whenever the M1952 relay is 0 (RTC timing active). With every scan, CPU will take the time value data within RTC and move it to RTCR. When it is 1, it will not read out. In this case RTCR can load in the set values and they won't be overridden.

3. ± 30 second adjustment:

At the moment that the status of relay M1953 goes from 0→1, CPU will check the value of the second register (R4128) within RTC. If its value is between 0 and 29 seconds then it will be cleared to 0. If its value is between 30 and 59 seconds then besides being cleared to 0, the minute register (R4129) will be increased by 1 (ie, one minute will be added). This can be used to adjust your RTC time value.

4. M1954 RTC installation detecting flag:

When RTC is fitted to the PLC, relay M1954 will be set as 1; otherwise it will be 0.

5. M1955 set value error flag:

When the time value which is set to RTC's IC is illegal, then the error flag relay M1955 will be set as 1, and the setting action will not be executed.