23 | Scheduling Operations

This chapter explains the basic operations for the time and day scheduling feature and how to turn on the specified bit for scheduling.
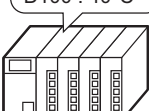
Please start by reading "23.1 Settings Menu" (page 23-2) and then turn to the corresponding page.
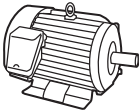
23.1 Settings Menu

Turning ON/OFF a Motor at the Designated Time

When the designated start time is reached...

ON

Start Running

Power turns ON and the motor starts.

OFF

Stop Running

When the designated termination time is reached...

Power turns OFF and the motor stops.

☞ Setup Procedure (page 23-3)

Changing the Temperature at the Designated Time

When the designated start time is reached...

D100 : 100°C

The running mode temperature setting is written.

D100 : 40°C

When the designated termination time is reached...

The standby temperature setting is written.

☞ Setup Procedure (page 23-6)

23.2 Turning ON/OFF a Motor at the Designated Time

23.2.1 Setup Procedure

NOTE
- Please refer to the Settings Guide for details.

The motor power (M100) is run from Monday to Friday, 8:00 to 17:00. Here is the setting procedure for turning ON the bit address M100 at the start time (8:00) and OFF at the end time (17:00).

When the designated start time is reached...

ON

Start Running

Power turns ON and the motor starts.

When the designated termination time is reached...

OFF

Stop Running

Power turns OFF and the motor stops.

1 From the [Common Settings (R)] menu, select [Time Schedule (F)] or click 🔳 from the tool bar. The Time Schedule tab appears.

2 Click the row of the schedule number you want to register (for example, Number 1). The settings dialog box appears.

NOTE
• You can register up to 32 schedules (Number 1 to Number 32) in the schedule function.

3 From [Mode], select [Bit Set].
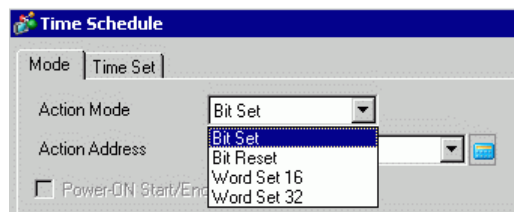
4 In [Action Address], set the target bit address (for example, M100).
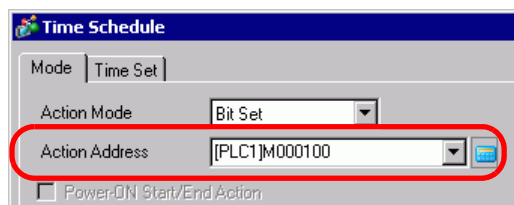
5 Select the [Time Set] tab then select [Constant].
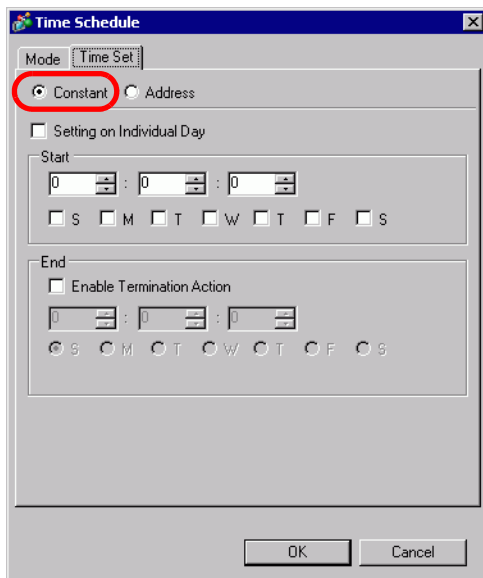
6 Set the Start Time and Day. Set the Start Time as 8:00 and select the Monday to Friday check boxes. Clear the [Setting on Individual Day] check box.
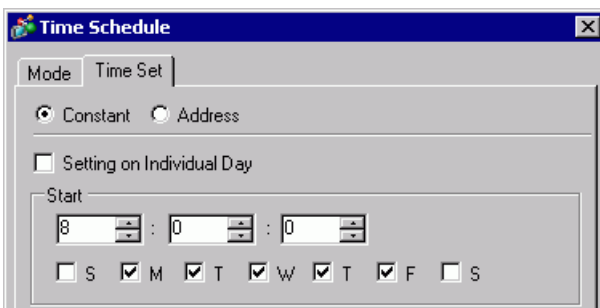
7 Set the end time. Select the [Enable Termination Action] check box and set the end time as 17:00.
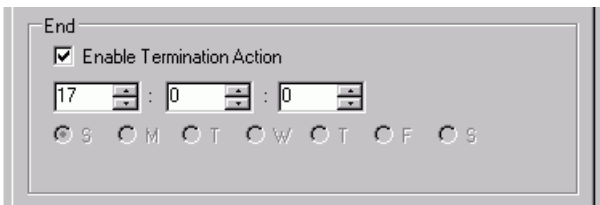
8 Click [OK]. The settings appear in the Schedule Settings tab.

Number	Action Mode	Action Address	Time Type	Time Setting Address	Start Time	End Time	ay of the We	Write Mode	Write
1	Bit Set	[PLC1]M000100	Constant	-----	08:00:00	17:00:00	M,T,W,T,F	-----	-----
2									
3									

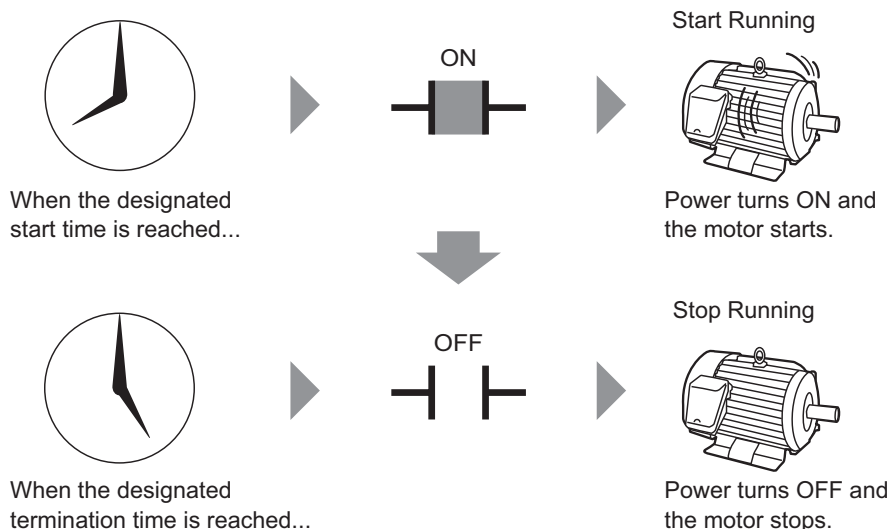# 23.3 Changing the Temperature at the Designated Time

23.3.1 Setup Procedure

NOTE

• Please refer to the Settings Guide for details.
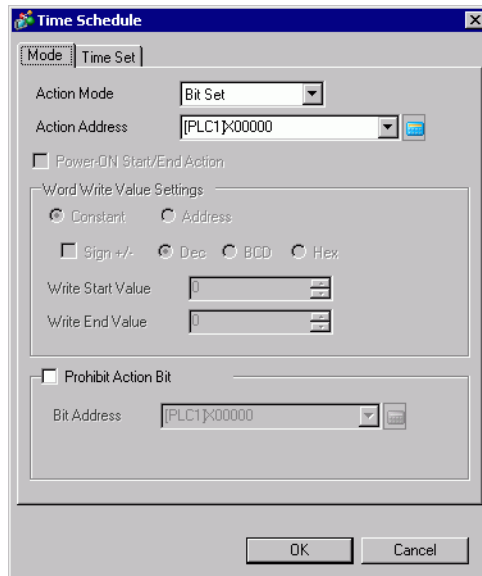☞ "23.4 Common Time Schedule Settings Guide" (page 23-10)

From Monday to Friday, a temperature setting of 100 is written to the word address D100 at the start time (8:00) for the running mode, and a temperature setting of 40 is written at the end time (17:00) for standby mode.

When the designated start time is reached...

The running mode temperature setting is written.

When the designated termination time is reached...

The standby temperature setting is written.

1 From the [Common Settings (R)] menu, select [Time Schedule (F)] or click 🔧 from the tool bar. The Time Schedule tab appears.

2 Click the row of the schedule number you want to register (for example, Number 1). The settings dialog box appears.


NOTE • You can register up to 32 schedules (Number 1 to Number 32) in the schedule function.

3 From [Mode], select [Word Set 16].
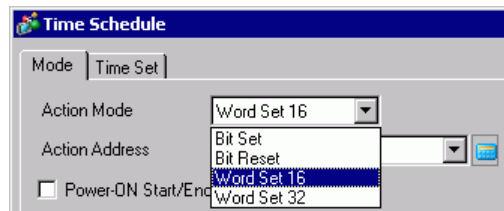
4 In [Action Address], set the target bit address (for example, M100).
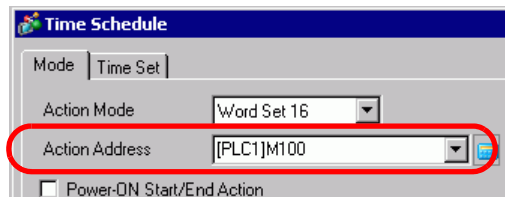
5 Select [Constant] and set the [Write Start Value] to "100".
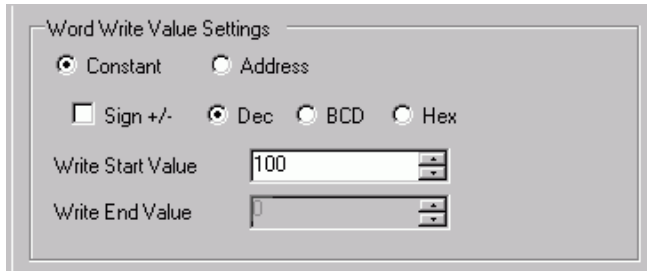
6 Select the [Time Set] tab then select [Constant].
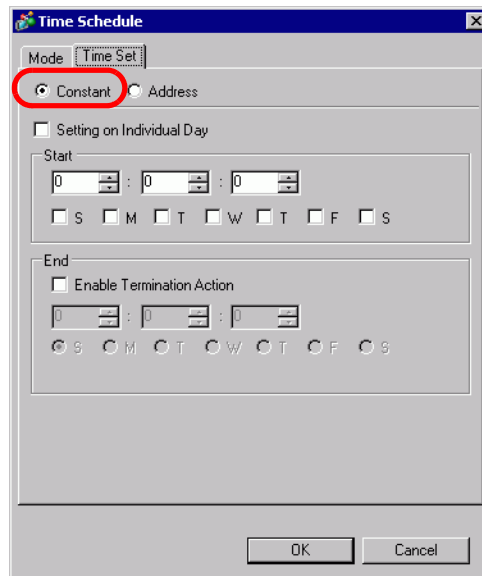
7 Set the Start Time and Day. Set the Start Time as 8:00 and select the Monday to Friday check boxes. Clear the [Setting on Individual Day] check box.

8 Set the end time. Select the [Enable Termination Action] check box and set the end time as 17:00.

```
┌─End──────────────────────────────────┐
│  ☑ Enable Termination Action         │
│                                       │
│  [17   🔼] : [0    🔼] : [0    🔼]    │
│  ⦿ S  ○ M  ○ T  ○ W  ○ T  ○ F  ○ S   │
│                                       │
└───────────────────────────────────────┘
```
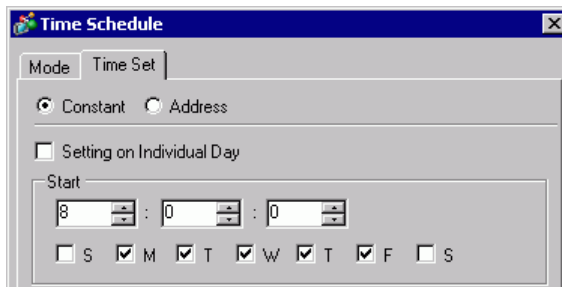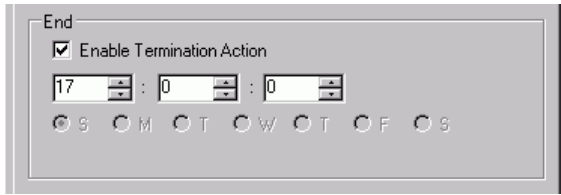
9 Select the [Action] tab and set the [Write End Value] to "40".

```
┌─Word Write Value Settings ──────────────┐
│   ⦿ Constant      ○ Address             │
│                                          │
│     □ Sign +/-   ⦿ Dec  ○ BCD  ○ Hex    │
│                                          │
│   Write Start Value    [100      🔼]    │
│                                          │
│   Write End Value      [40       🔼]    │
│                                          │
└──────────────────────────────────────────┘
```
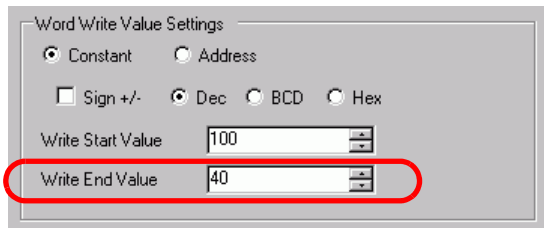
10 Click [OK]. The settings appear in the Schedule Settings tab.

Number	Action Mode	Action Address	Time Type	Time Setting Address	Start Time	End Time	Day of the We	Write Mode	Write S
1	Word Set 16	[PLC1]D00100	Constant	-----	08:00:00	17:00:00	M,T,W,T,F	Dec	100
2									
3									

Schedule ✖ — Time Schedule

23.4   Common Time Schedule Settings Guide

23.4.1   Time Schedule Tab

In the Schedule tab, you can view the schedule settings. Up to 32 schedules can be registered in each project.
Open the Time Schedule dialog box by selecting one of the rows in the Schedule tab.
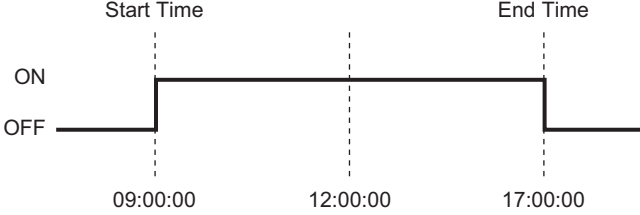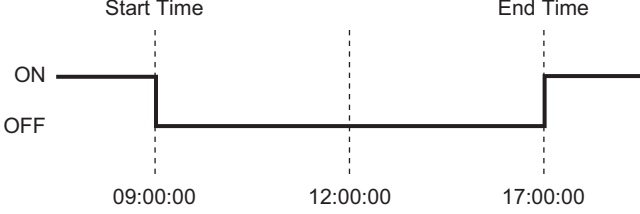
23.4.2 [Time Schedule] Dialog Box Settings Guide

■ Mode
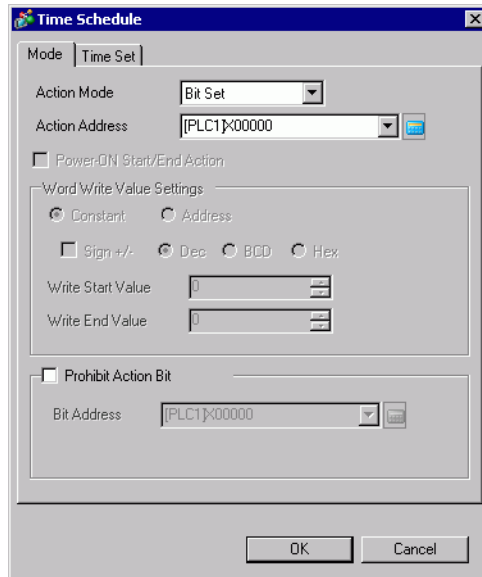
Setting		Description
Action Mode		Specify the type of operation that triggers the action. You can select: [Bit Set], [Bit Reset], [Word Set 16], or [Word Set 32].

	Bit Set	At Start Time, the specified bit turns ON. At the End Time, the bit turns OFF.
		For example:
		  Start Time: 09:00:00
		  End Time: 17:00:00

	Bit Reset	At the Start Time, the specified bit turns OFF. At the End Time, the bit turns ON.
		For example:
		  Start Time: 09:00:00
		  End Time: 17:00:00

Continued

Setting		Description
Action Mode	Word Set 16	At the Start Time, the specified [Write Start Value] is written to the word address. At the End Time, the [Write End Value] is written. (Example): Device Address: D0100 Start Value:10 End Value: 0 Start Time: 09:00:00 End Time: 17:00:00
	Word Set 32	
Action Address		Designate the address used to control the schedule.
Power-ON Start/End Action		Select the action to perform when power is turned on. • Enabled If the GP unit power is turned ON outside of the scheduled range, the termination action is performed. <Inside the scheduled range> <Outside the scheduled range> • Disabled If power is turned ON but the time is later than the Start Time, the action is not automatically performed. However, the termination action is automatically performed. Also, if the termination action is not set, the schedule range is not recognized and the action is not performed.

Continued

Setting		Description
Word Write Value Settings		These settings are active only when the Mode is set to [Word Set 16] or [Word Set 32].

	Constant/ Address	Select the method to set the [Write Start Value] and [Write End Value].
		• Constant
		  Write and designate a set constant.
		• Address
		  Set the address that stores the value. You can change the [Write Start Value] and [Write End Value] by changing the value to store.

	Sign +/−	When [Constant] is selected, specify how to handle negative values.
	Dec/BCD/Hex	When [Constant] is selected, select the data format of [Write Start Value] and [Write End Value].

	Write Start Value	• For [Constant]
		  Designates the value of the start time.
		• For [Address]
		  Designates the address used to store the start time value.

	Write End Value	• For [Constant]
		  Designates the value of the end time.
		• For [Address]
		  Designates the address used to store the end time value.
		
		 NOTE
		• You can use this option if the [Enable Termination Action] is selected on the [Time Set] tab.

Prohibit Action Bit		Select to prohibit the schedule function.At the beginning of the schedule, the designated value is read out from the [Prohibit Action Bit] address. If the [Prohibit Action Bit] is ON, the schedule action is not performed.
	Bit Address	Choose an address for the [Prohibit Action Bit].

The settings range for [Write Start Value] and [Write End Value] differs depending on the specified data format and Sign +/-.

Action Mode	Data Type	Sign +/−	Setting Range
Word Set 16	Dec	Disable	0 to 65535
		Enable	−32768 to 32767
	BCD	-	0 to 9999
	Hex	-	0 to FFFF
Word Set 32	Dec	Disable	0 to 4294967295
		Enable	−2147483648 to 2147483647
	BCD	-	0 to 99999999
	Hex	-	0 to FFFFFFFF

■ Time Set (Constant Mode)

Setting	Description
Constant/Address	Select the method to set the Start Time and End Time. • Constant Specifies a fixed time and day. • Address Specifies the address which stores the data for the time and day. You can change the time and day by changing the data to store.
Setting on Individual Day	• Enabled Can be set if the Time Schedule spans 2 or more days. Only one Start Day and End Day can be set. **NOTE** • You must enter settings for the Start Time and End Time. • You cannot set the Start Time and End Time to the exact same day and time.

Continued

Setting	Description
Setting on Individual Day	• Disabled A schedule that is 1 day (Start and End times are within 24 hours) can be entered. Multiple Start and End days can be selected. You can perform actions at the same time on multiple days. When specifying an End Time, enable [Enable Termination Action]. Start Action 900 Termination Action 1700 Monday Tuesday NOTE • You cannot set the Start Time and End Time to the exact same day and time. • The Time Schedule is for one day only, so if the End Time is entered as being before the Start Time, the End Time is performed on the next day. For example: Start Day: Monday Start Time:22:00:00 End Time:01:00:00 Monday Tuesday 22:00:00 0 01:00:00
Start	Choose the start time and day. When [Setting on Individual Day] is disabled, you must specify more than one day.
Exit	When [Enable Termination Action] is enabled, the End time can be specified. The day settings can only be set when [Setting on Individual Day] is enabled.

■ **Time Set (Address Mode)**

Setting	Description
Time Setting Address	Designates the top address used to store time settings data read out from a device/PLC. The 10 word addresses are automatically allotted.
Control	Reads out the Mode, Start Time, and End Time.)" ◆ Control: Address (Time Setting Address +0)" (page 23-17)
Status	Turns a bit ON after the [Control] time data readout is completed or if the time data entered is incorrect.)" ◆ Status (Time Setting Address+1)" (page 23-17)
Action Mode	Designates [Enable Termination Action] and [Setting on Individual Day].)" ■ Time Set (Constant Mode)" (page 23-14))" ◆ Mode (Time Setting Address+2)" (page 23-18)
Start Time (Day)	Designates the start day.)" ◆ Start/End Day (Start Day: Time Setting Address +3, End Day: Time Setting Address +7)" (page 23-19)
Start Time (Hour) Start Time (Min) Start Time (Seconds)	Designates the start time.)" ◆ Start/End Time: (Start Time: Time Setting Address +4 to +6, End Time: Time Setting Address +8 to +10)" (page 23-19)
End Time (Day)	Designates the end day.)" ◆ Start/End Day (Start Day: Time Setting Address +3, End Day: Time Setting Address +7)" (page 23-19)
End Time (Hour) End Time (Min) End Time (Seconds)	Designates the end time.)" ◆ Start/End Time: (Start Time: Time Setting Address +4 to +6, End Time: Time Setting Address +8 to +10)" (page 23-19)

◆ Control: Address (Time Setting Address +0)

When the Time Acquisition Request bit's ON (0 to 1) is detected, the Mode, Start Time, and End Time are read out.

15	01	00	Bit
Reserved (0 Fixed)		0	
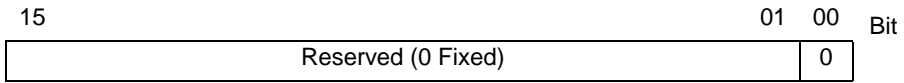
Bit 00:　　　Time Acquisition Request Bit
　　　　　　　(0: No action, 1: Perform Time Read)

| NOTE	• Data is not read out regularly from the Time Setting Address mode (address +2) to the End Time (Seconds) (address +10). When reflecting Time Settings data changes in the GP unit, be sure to turn ON (01) the Control (address +0) Time Acquisition Request Bit.

◆ Status (Time Setting Address+1)

After the Control time data readout is completed, the GP unit will turn the Time Acquisition Completion Bit ON (0 to 1). Also, if the entered time data is incorrect, the Error Notification Bit will simultaneously turn ON (0 to 1).

15	02	01	00	Bit
Reserved (0 Fixed)		0	0	
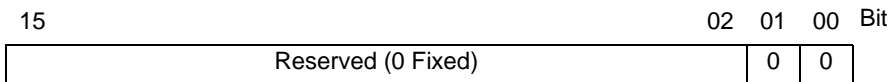
Bit 00　　　　Time Acquisition Completion Bit (0: Either Time Acquisition is being performed or had not yet been performed, 1: Time Data Acquisition Completed)

Bit 01:　　　Error Notification Bit (0: Time data is being replaced with correct data.Time data contains an error.)

NOTE	• Once the Time Acquisition Completion bit's rise (trigger) is recognized by the Device/PLC, be sure to turn the control Time Acquisition Request bit OFF (1 –> 0).Once this bit is turned OFF (1 –> 0), the Status Time Acquisition Completion bit and the Error Notification are simultaneously turned OFF (1 –> 0).
	• When the [Power-on Start/End Action] is set up, even if the Request Time bit is not ON, gets the time and only the status turns ON. In that condition, if you want to clear the status, you can directly update the status address value.
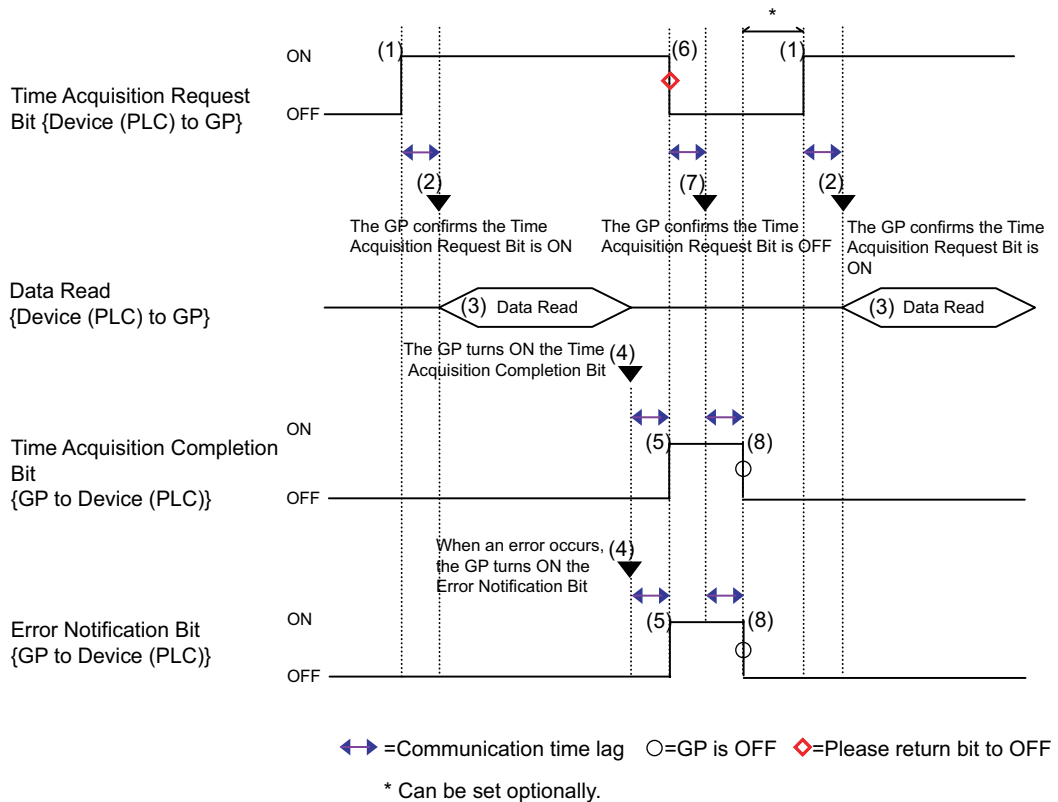
◆ **Mode (Time Setting Address+2)**

Enable and disable the Termination Time Action and the Individual Day settings. Regardless of the Termination Time Action status, the indirectly designated time data (11 word addresses in the Time Setting Address) are read out.

15		02	01	00	Bit
Reserved (0 Fixed)			0	0	

Bit 00:   Termination Time Action Setting (0: None, 1: Used)
Bit 01:   Individual Day Specification Mode (0:None, 1: Used)

NOTE
- If a [0] (Not Used) is entered in the Individual Day Specification mode, the End Time data are read but ignored.
- If a [1] (Used) is entered in the Individual Day Specification mode, be sure to enter all Start and End time information. If 2 or more of the Start/End Day bits turn ON simultaneously, an error occurs.

◆ **Start/End Day (Start Day: Time Setting Address +3, End Day: Time Setting Address +7)**

Designates the day used as a trigger for the Start/Termination Action.

15		07	06	05	04	03	02	01	00	Bit
Reserved (0 Fixed)		Sat.	Fri.	Thurs.	Wed.	Tues.	Month	Day		
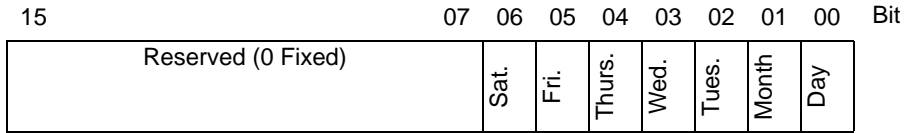
Bit 00:   Sunday (0: None, 1: Designate)
Bit 01:   Monday (0: None, 1: Designate)
Bit 02:   Tuesday (0: None, 1: Designate)
Bit 03:   Wednesday (0: None, 1: Designate)
Bit 04:   Thursday (0: None, 1: Designate)
Bit 05:   Friday (0: None, 1: Designate)
Bit 06:   Saturday (0: None, 1: Designate)

◆ **Start/End Time: (Start Time: Time Setting Address +4 to +6, End Time: Time Setting Address +8 to +10)**

(Start Time: Time Setting Address +4 to +6, End Time: Time Setting Address +8 to +10) Set the time values used for the Start/Termination Actions in the following ranges.

Hour: 0-23
Min.: 0-59
Seconds: 0-59

NOTE

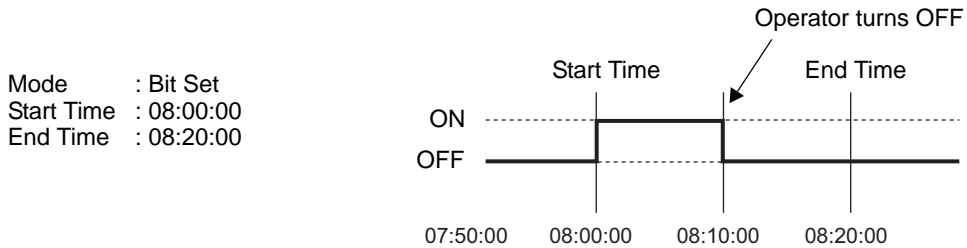• Time data are specified with binary input. They cannot be specified with BCD input.
• The End Time depend on the Mode (address +2) setting. Also, the Termination Time Action setting (bit 00) available depends on the Individual Day Specification mode (bit 01) used.
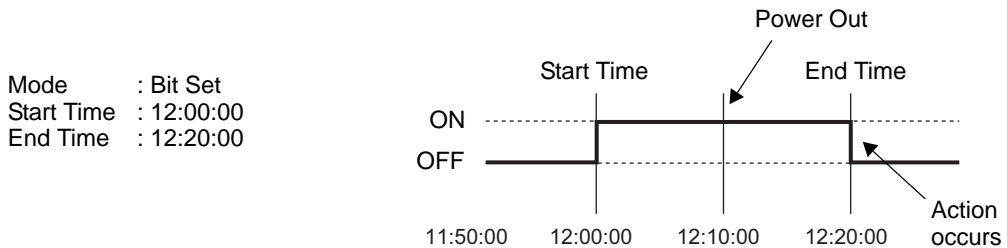
Individual Day Specification	Used	Not Used	
Termination Time Action Setting	Used	Used	Not Used

23.5   Restrictions

- You can register a maximum of 32 time schedules.
- The Time Schedule features are one time actions. When the Start Time is reached, the designated device address is written to just once. The write action is not repeated.

Mode   : Bit Set
Start Time : 08:00:00
End Time   : 08:20:00

Operator turns OFF

Start Time   End Time

ON

OFF

07:50:00   08:00:00   08:10:00   08:20:00

- Write Start/End Value (for the address setting), and the Prohibit Action Bit monitoring are read only once, at the beginning of the Time Schedule. Since regular readout is not possible, there may be a slight data communication delay that causes a slight delay in the Start Time.
- When changing GP Time Settings, the range of the schedule's Start and End Times is recognized. If the edited item is inside the scheduled range, the start action is performed. If the termination action is not set, the range cannot be confirmed and this action is not performed.
- If the Start Time Action is completed and then a power out rage occurs, the range is recognized and the Termination Action is performed at the End Time.

Mode   : Bit Set
Start Time : 12:00:00
End Time   : 12:20:00

Power Out

Start Time   End Time

ON

OFF

11:50:00   12:00:00   12:10:00   12:20:00

Action occurs

- When the same Start Times and End Times appear in multiple schedules, they are handled in order, starting from the smallest schedule number.
- When the Time Set are specified as Address, only the control address's data is read regularly. When there are multiple schedules with Time Set specified as Address, there may be an effect on the GP actions because each schedule's control address is read regularly.
- When the Time Set are specified as Address, control address' readout speed is once every 500ms. When the Control Address bit 00 (Time Acquisition Request Bit) turns ON, a delay of up to 500ms may occur before the Status Address and onwards data is read out space. Also, when multiple schedules are set, if multiple control address' bit 00 (Time Acquisition Request Bits) simultaneously turn ON, delay may occur before an action is performed.
- When the Time Set are specified as Address and you specify a Start Time or End Time that is outside the value range, the times may not function properly. Also, BCD input cannot be used.