LESSON 7

SCHEDULE

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15.1. Using Schedule

The schedule function allows the HMI to perform a specified operation at the designated time. For example, the HMI can turn on a motor at the designated stat time and turn off that motor at the designated end time. Another example is that the HMI can set the running mode temperature at the designated start time of a process and reset the temperature to the standby temperature at the designated end time of that process.

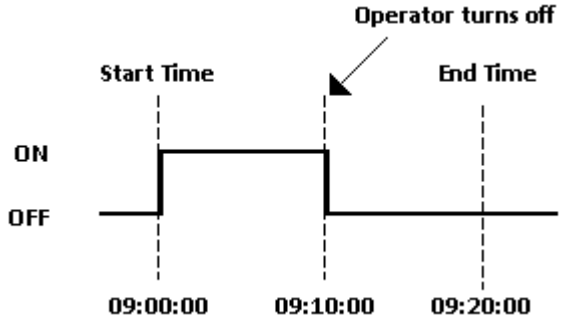
Up to 48 schedules (Number 1 to Number 48) can be registered in a panel application. Each schedule can be programmed to either change the value of a specified PLC location or execute a specified macro at the designated time.

To use schedule in your application, please do the following:

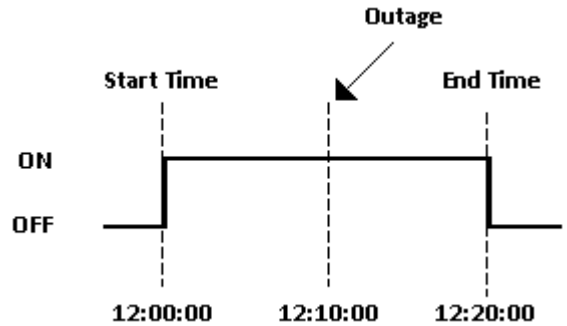
1. Setting up Schedule
   Described in Section 15.2
2. Creating and configuring Schedule Setting Table screen object
   Described in Section 15.3

Notes:

1. 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.



2. The Start Value and the Prohibit Action Bit are read only once at the beginning of the time range. Since regular readout is not possible, there may be a slight data communication delay that causes a slight delay in the Start Time. Due to the same reason, the delay may occur in the End Time.
3. When the time range of a schedule is changed by whatever method and the current time is inside the time range, the start action is performed.
4. When the same Start Times and End Times appear in multiple schedules, they are handled in order, starting from the smallest schedule number.
5. If the Start Action is completed and then a power outage occurs, the End Action will be performed at the End Time after the power is resumed.



15.2. Setting up the Schedule

You can set up the schedule with the Schedule dialog box. To open the Schedule dialog box of a panel application, use one of the following methods:

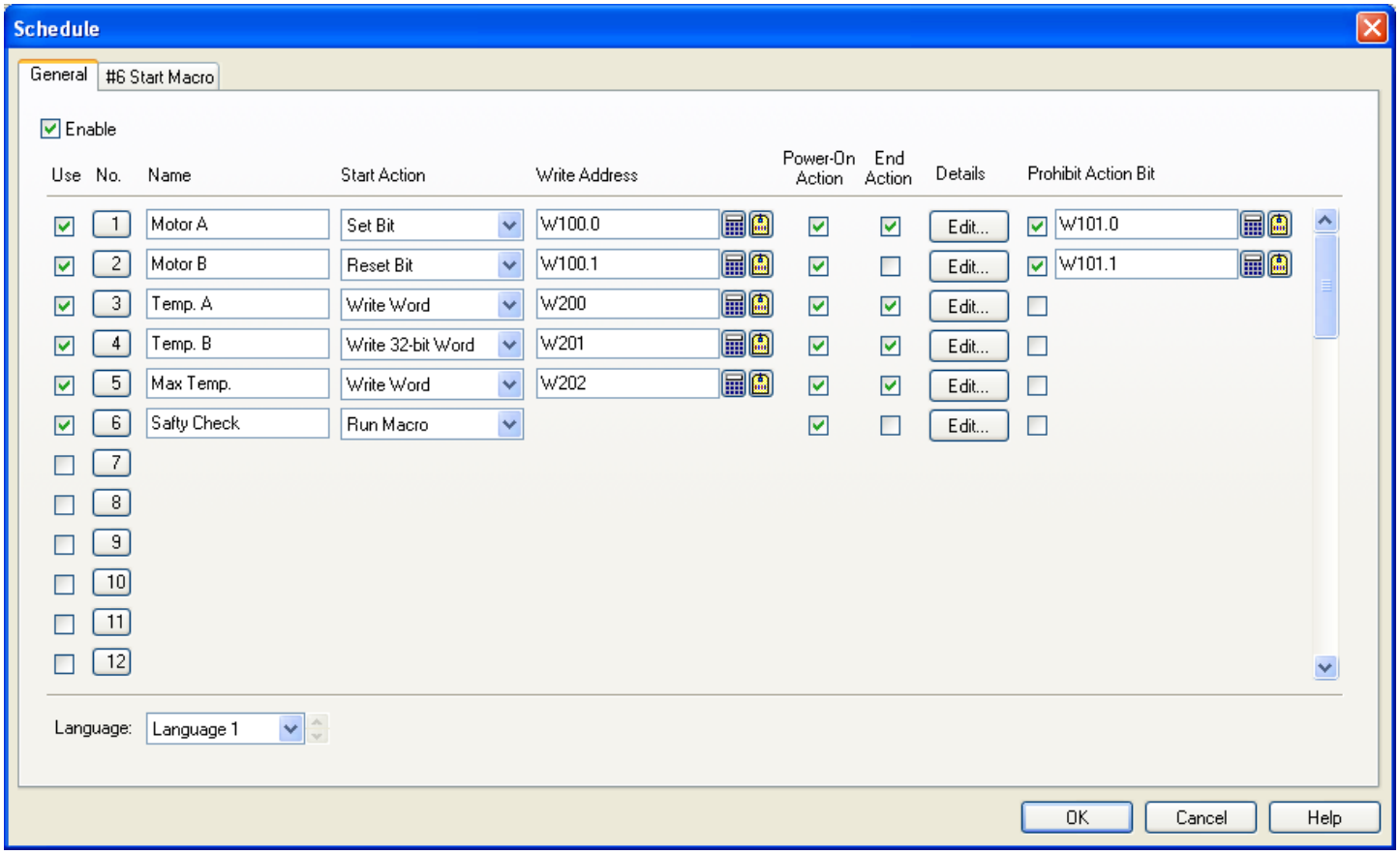
1) In the Project Manager window, double-click the Schedule node ( ) under Setup node of the concerned panel application
2) In the Project Manager window, right-click the Schedule node ( ) under Setup node of the concerned panel application to bring out the pop-up menu and select Properties.
3) In the menu bar, click Panel ->Schedule. Note that the concerned panel application must be the current panel application or you will be working on the current panel application instead of the concerned panel application.

The Schedule dialog box contains the following pages. Some of the pages appear only when they are needed.

- **General**
  Described in Section 15.2.1.
- **Start Macro / End Macro**
  Described in Section 14.2.6.

15.2.1. General Settings

This section describes how to define the general settings for schedule. The following is an example of the General page of the Schedule dialog box.



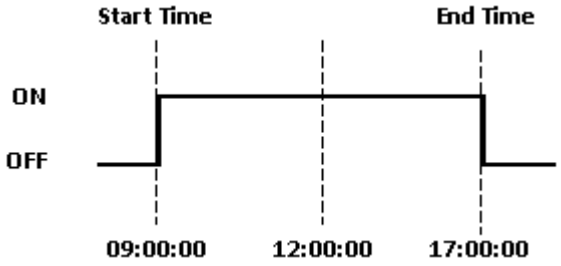
To enable the schedule function for the application, check the Enable box in the dialog box.

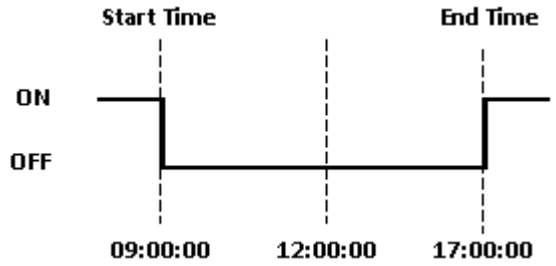
The following describes how to set up a time schedule.

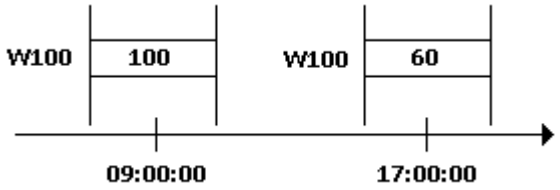
Item	Description
Use	To register the schedule, check the Use box of the schedule first. During project development, you can un-register the schedule temporarily by un-checking the Use box. The entered settings will not be lost after un-checking.
ID	The pre-assigned identifier of the schedule.
Name	Specify the schedule name for each language. The schedule name will be shown on the Schedule Setting Table screen object. The maximum length of a schedule name is 24 characters. To select the language you are working on, use the Language combo box on the bottom of the dialog box.

Continued

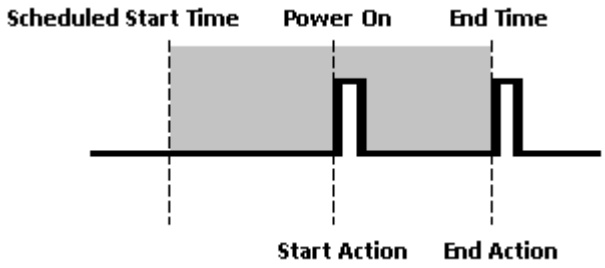
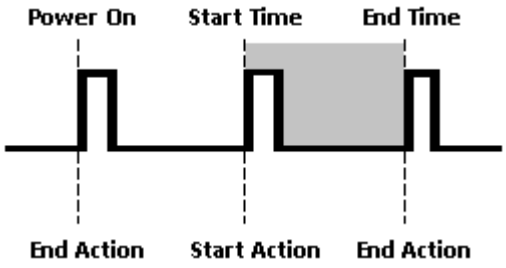
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Start Action</td><td>Specify the action you want the HMI to perform at the Start time and the End time. The following table describes the five options.
<table>
<tr><th>Action</th><th>Description</th></tr>
<tr><td>Set Bit</td><td>Sets the specified bit to On at the Start Time. If the End Action is selected, it resets the specified bit to Off at the End Time.

Example: Start Time: 09:00:00 End Time: 17:00:00
 
</td></tr>
<tr><td>Reset Bit</td><td>Resets the specified bit to Off at the Start Time. If the End Action is selected, it sets the specified bit to On at the End Time.

Example: Start Time: 09:00:00 End Time: 17:00:00
 
</td></tr>
<tr><td>Write Word</td><td>Writes the Start Value to the specified word at the Start Time. If the End Action is selected, it writes the End Value to the specified word at the End Time.

Example: Start Time: 09:00:00 End Time: 17:00:00
Start Value: 100 End Value: 60
Write Address: W100
 
</td></tr>
<tr><td>Write 32-bit Word</td><td>Writes the Start Value to the specified double-word at the Start Time. If the End Action is selected, it writes the End Value to the specified double-word at the End Time.</td></tr>
<tr><td>Run Macro</td><td>Runs the specified Start Macro at the Start Time. If the End Action is selected, it runs the specified End Macro at the End Time.
The corresponding Start Macro tab is added to the dialog box when the Run Macro action is selected. You can edit the Start Macro in the Start Macro tab. When the End Action is selected, the corresponding End Macro tab is added to the dialog box when the End Action is selected. You can edit the End Macro in the End Macro tab.</td></tr>
</table>
Note: The Start Time, End Time, Start Value, and End Value mentioned in the above table are specified in the Schedule Settings dialog box.</td></tr>
</table>

Continued

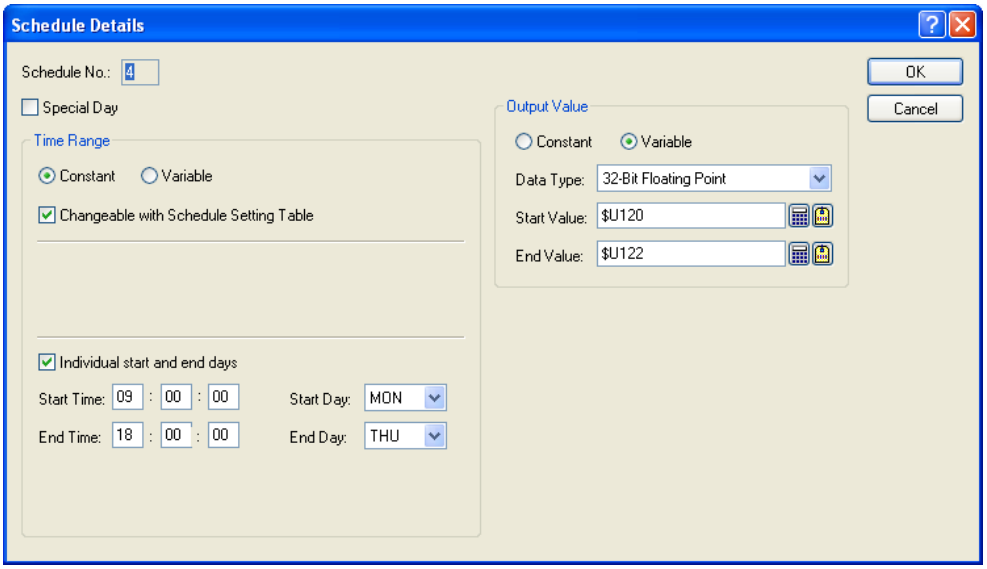
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Write Address</td><td>Specify the target address for the desired action.
<table>
<tr><th>For Action</th><th>Address Type</th></tr>
<tr><td>Set Bit</td><td>Bit address</td></tr>
<tr><td>Reset Bit</td><td>Bit address</td></tr>
<tr><td>Write Word</td><td>An address that can refer to a 16-bit datum</td></tr>
<tr><td>Write 32-bit Word</td><td>An address that can refer to a 32-bit datum</td></tr>
</table></td></tr>
<tr><td>Power-On Action</td><td>Select the action to perform when the power is turned on.
<table>
<tr><th>Power-On Action is Enabled (Checked)</th></tr>
<tr><td>If the HMI is turned on inside of the scheduled range, the Start Action is performed.
 
</td></tr>
<tr><td>If the HMI is turned on outside of the scheduled range and the End Action is enabled, the End Action is performed.
 
</td></tr>
</table>
<table>
<tr><th>Power-On Action is Disabled (Unchecked)</th></tr>
<tr><td>If the End Action is enabled, the End Action is performed when the HMI is turned on.</td></tr>
</table></td></tr>
<tr><td>End Action</td><td>Check the item to enable the End Action. If the End Action is enabled, the HMI will do one of the following operations at the designated End Time according to the selected Start Action.
<table>
<tr><th>Start Action</th><th>End Action</th></tr>
<tr><td>Set Bit</td><td>Resets the specified bit to Off at the End Time.</td></tr>
<tr><td>Reset Bit</td><td>Sets the specified bit to On at the End Time.</td></tr>
<tr><td>Write Word</td><td>Writes the End Value to the specified word at the End Time.</td></tr>
<tr><td>Write 32-bit Word</td><td>Writes the End Value to the specified double-word at the End Time.</td></tr>
<tr><td>Run Macro</td><td>Runs the specified End Macro.</td></tr>
</table></td></tr>
<tr><td>Details</td><td>Click the Edit button to open the Schedule Details dialog box. You can specify the Start Time, End Time, Start Value, and End Value of the schedule in the Schedule Details dialog box. See Section 15.2.2 for details.</td></tr>
<tr><td>Prohibit Action Bit</td><td>Select to prohibit the schedule function by using the specified Prohibit Action Bit. At the Start Time, the value of the Prohibit Action Bit is read before the start action is performed. If the value is on, the schedule action is not performed for the current cycle.</td></tr>
</table>

15.2.2. Schedule Details Dialog Box

In the Schedule Details dialog box, you can specify the Start Time/Date, End Time/Date, Start Value, and End Value of a schedule. To open the Schedule Details dialog box of a schedule, click the Edit button of the schedule in the Schedule dialog box.

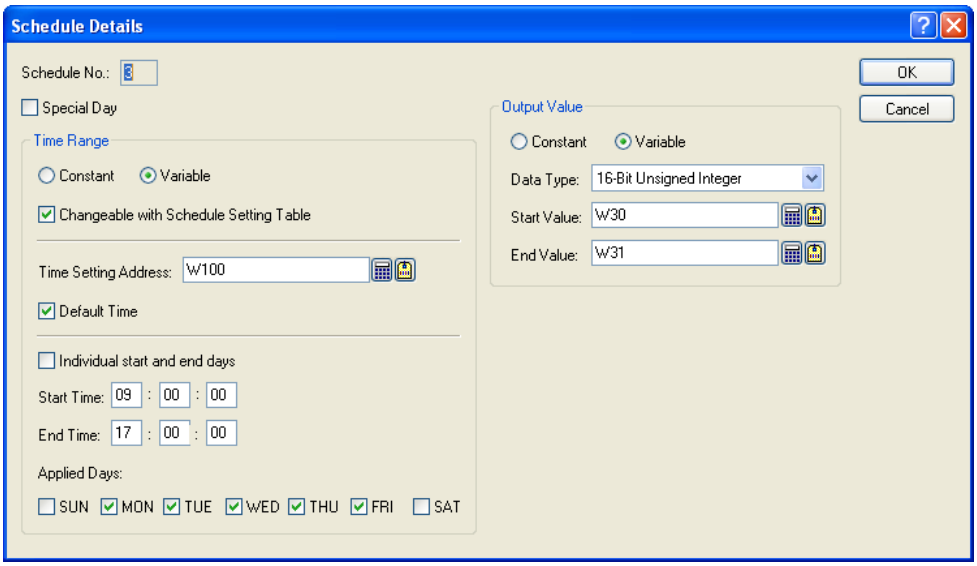
Example 1

1) The time range starts at 09:00:00 on Monday and ends at 18:00:00 on Thursday.
2) The operators are allowed to modify the time range by using the Schedule Setting Table at runtime.
3) The Start Value and End Value are floating point numbers. When the schedule starts, the HMI outputs the Start Value read from the internal words $U120 and $U121 to the specified Write Address. When the schedule ends, the HMI outputs the End Value read from the internal words $U122 and $U123 to the specified Write Address.



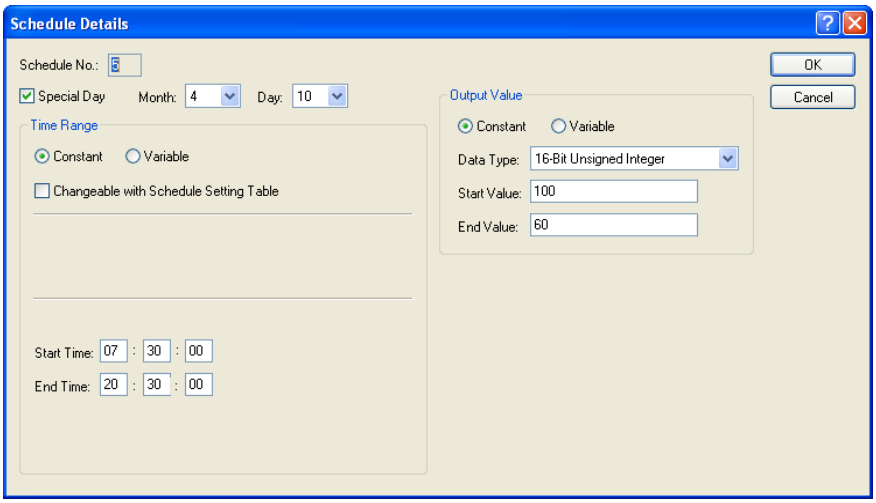
Example 2

1) The time range can be set by a device/PLC. The memory block starts at W100 of the PLC will be used for setting the time range.
2) Before a valid time range is set at runtime, the default time range specified in the dialog box will be used. The default time range starts at 09:00:00 and ends at on every weekday.
3) The operators are allowed to modify the time range by using the Schedule Setting Table at runtime.
4) The Start Value and End Value are 16-bit unsigned integers. When the schedule starts, the HMI outputs the Start Value read from the PLC word location W30 to the specified Write Address. When the schedule ends, the HMI outputs the End Value read from the PLC word location W31 to the specified Write Address.



Example 3

1) The time range starts at 07:30:00 and ends at 20:30:00 on April 10.
2) It is not allowed to modify the time range in the Schedule Setting Table at runtime.
3) The Start Value and End Value are 16-bit unsigned integers. When the schedule starts, the HMI writes 100 to the specified Write Address. When the schedule ends, the HMI writes 60 to the specified Write Address.



The following describes the items in the Schedule Details dialog box.

Item		Description
Schedule No.		The number of the concerned schedule. The field is read only.
Special Day		Select to make the schedule valid only for the specified day.
Month		The month of the Special Day.
Day		The day of the Special Day.
Time Range	Constant	Select to make the time range non-settable by a device/PLC.
	Variable	Select to make the time range settable by a device/PLC.
Changeable with Schedule Setting Table		Select to allow the operators to change the time range by using the Schedule Setting Table at runtime.
Time Setting Address		Specify the starting address of the Time Setting Block that the device/PLC will use to set the time range of the schedule. See section 15.2.3 for the details of the Time Setting Block.
Default Time		Select to allow the schedule to have a default time range. This item is visible only when the Variable is selected for the Time Range. The HMI will use the default time range for the schedule if there is no valid time range set by the PLC or by the operator yet.
Individual start and end days		Select to indicate that the start day and end day of the schedule are different.
Start Time		The start time of the schedule.
Start Day		The start day of the schedule. The item is visible when the “Individual start and end days” is selected.
End Time		The end time of the schedule.
End Day		The end day of the schedule. The item is visible when the “Individual start and end days” is selected.
Applied Days		Select the day or days in a week that the schedule will apply.
Output Value	Constant	Select this item to indicate that the start value and the end value are constants.
	Variable	Select this item to indicate that the start value and the end value are to be read from the specified addresses.
Data Type		Specify the data type of the start and end values.
Start Value		Specify the start value or the address to get the start value.
End Value		Specify the end value or the address to get the end value.

15.2.3. Time Setting Block

The following table shows the word arrangement of the Time Setting Block.

Word No.	Usage	Description
0	Time Setting Control Word	See section 15.2.3.1 for the details
1	Time Setting Status Word	See section 15.2.3.2 for the details
2	Action Mode	See section 15.2.3.3 for the details
3	Start Day or the month of the Special Day	See section 15.2.3.4 for the details
4	Start Time (Hour)	Hour: 0-23
5	Start Time (Min.)	Minute: 0-59
6	Start Time (Sec.)	Second: 0-59
7	End Day or the day of the Special Day	See section 15.2.3.4 for the details
8	End Time (Hour)	Hour: 0-23
9	End Time (Min.)	Minute: 0-59
10	End Time (Sec.)	Second: 0-59

15.2.3.1. Time Setting Control Word (Word 0 of Time Setting Block)

Bit	15 ... 1	0
	Reserved (Must be 0)	0

Bit 0: Time Acquisition Request Bit

When the HMI detects that the Time Acquisition Request Bit turns on (from 0 to 1), it reads out from word 2 to word 10 of the Time Setting Block to get the Action Mode, the Start Time, and the End Time for the schedule.

15.2.3.2. Time Setting Status Word (Word 1 of Time Setting Block)

Bit	15 ... 2	1	0
	Reserved (Must be 0)	0	0

Bit 0: Time Acquisition Completion Bit

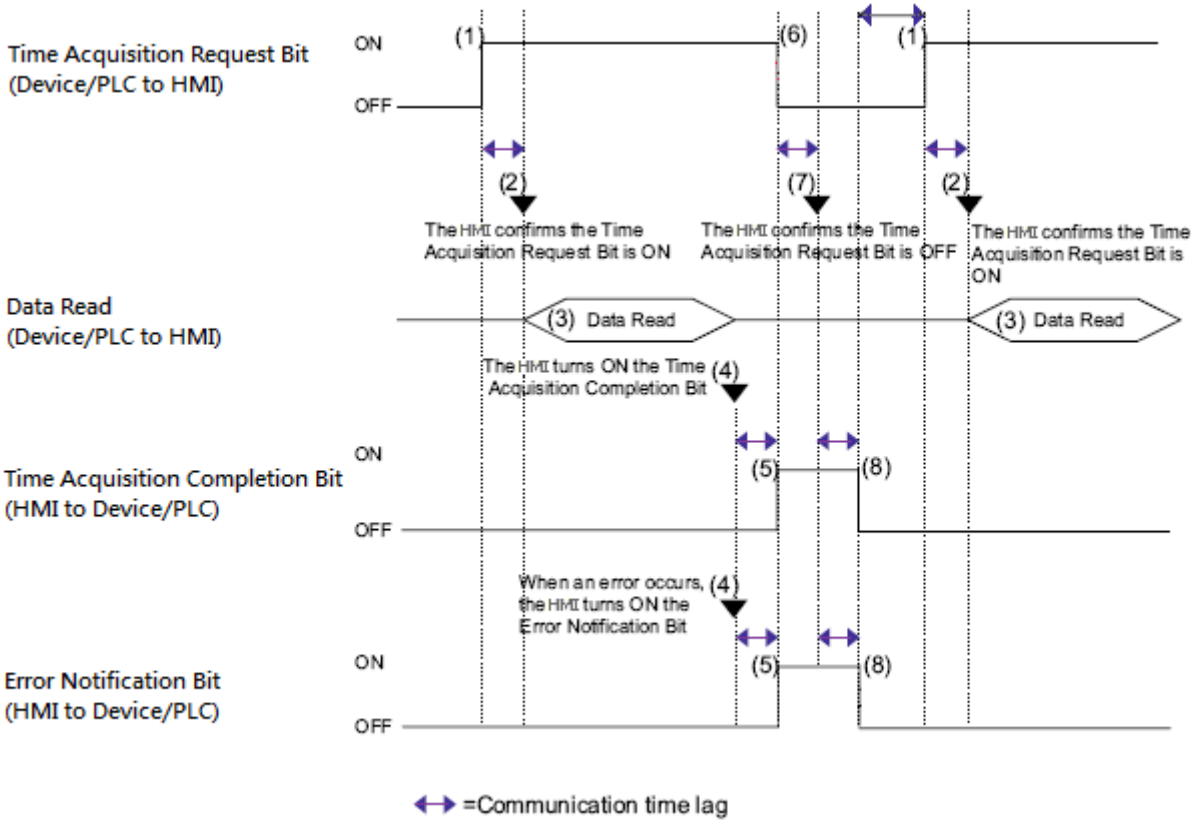
- 0: Either Time Acquisition is being performed or have not been performed
- 1: Time Acquisition completed

Bit 1: Error Notification Bit

- 0: Time data is being replaced with correct data
- 1: Time data contains an error

Note:

1) The device/PLC must turn the Time Acquisition Request Bit off (1 to 0) when recognizes that the Time Acquisition Completion Bit turns on (0 to 1)
2) When the HMI detects that the Time Acquisition Request Bit is turned off (1 to 0), it turns off the Time Acquisition Completion Bit and Error Notification Bit immediately.



15.2.3.3. Action Mode (Word 2 of Time Setting Block)

Bit	15 ... 2	1	0
	Reserved (Must be 0)	0	0

Bit 0: End Action Bit

- 0: Disable the End Action of the schedule
- 1: Enable the End Action of the schedule

Bit 1: Individual Day Specification Bit

- 0: The Start Day and End Day of the schedule are the same.
- 1: The Start Day and End Day of the schedule are different.

Note:

If Individual Day Specification Bit is 1 and two or more of the Start/End Day bits turn on simultaneously, an error occurs.

15.2.3.4. Start Day (Word 3 of Time Setting Block), End Day (Word 7 of Time Setting Block)

Designate the day used as a trigger for the Start/End Action.

Bit	15 ... 07	06	05	04	03	02	01	00
	Reserved (Must be 0)	Sat.	Fri.	Thu.	Wed.	Tue.	Mon.	Sun.

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)

If the schedule is configured for the Special Day, the high byte of word 3 (Start Day) should contain the month (1-12) of the Special Day and the low byte of word 3 should contain the day (1-31) of the Special Day. The content of word 7 (End Day) should be 0.

	High byte (Bit 15-8)	Low byte (Bit 7-0)
Start Day	Month of the Special Day (1-12)	Day of the Special Day (1-31)

End Day:	0

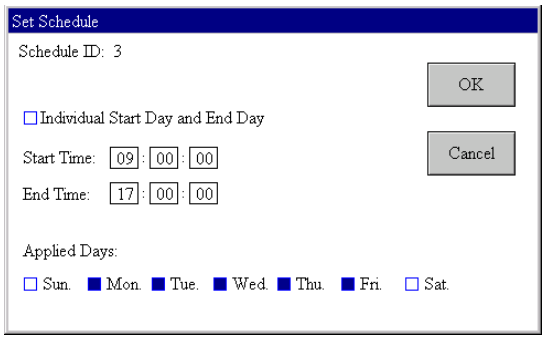
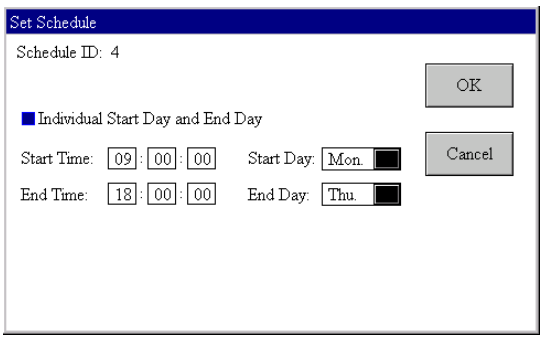
15.3. Setting up Schedule Setting Table

15.3.1. Basic Operations

You can display a list of schedules by using the schedule setting table. And the operators are allowed to change the time range of a schedule with the Schedule Setting Table at runtime.

ID	Name	Status	Set	Start Time	End Time	Applied Days
1	Motor A			00:00:00	23:00:00	MON
2	Motor B			MON 05:00:00	FRI 20:00:00	
3	Temp. A			09:00:00	17:00:00	MON/TUE/WED/THU/FRI
4	Temp. B			MON 09:00:00	THU 18:00:00	
5	Max Temp.			07:30:00	20:30:00	04/10
6	Safty Check			08:00:00	23:00:00	01/01

The above is an example of the schedule setting table. The first row is the title row. It displays the title of each column. The other rows display one schedule per row. You can create scroll button groups or scroll bars to scroll the contents. A schedule setting table can have seven columns. The following table describes the content of each column for a schedule setting table.

Column	Description
Schedule No.	The number of the associated schedule. This column is optional.
Schedule Name	The name of the associated schedule.
Status	The current status of the associated schedule. The status includes: Active, Inactive, Prohibited, Error.
Set	If the associated schedule is changeable, there is a button shown in the column. Click the button, you will see the following sample Set Schedule dialog that allows the operator to change the time range of the associated schedule.   To set the dialog, please see Section 15.2.2 for details.
Start Time	The start time of the schedule.
End Time	The end time of the schedule.
Applied Days	The day or days in a week that the schedule will apply.

The text color and font of a row are determined by the settings in the General Page.

15.3.2. Operation Options

The following operation option can be added to a schedule setting table. Select and set the option in the Schedule Setting Table dialog box.

Options	Description
Visibility Control	You can show and hide a schedule setting table with a specified bit or the current user level. Select and set this option in the Visibility page.

15.3.3. Settings

You can complete all the settings of a schedule setting table in the Schedule Setting Table dialog box. This dialog box contains the following three pages.

- **General**

Described in Section 15.3.4.

- **Advanced**

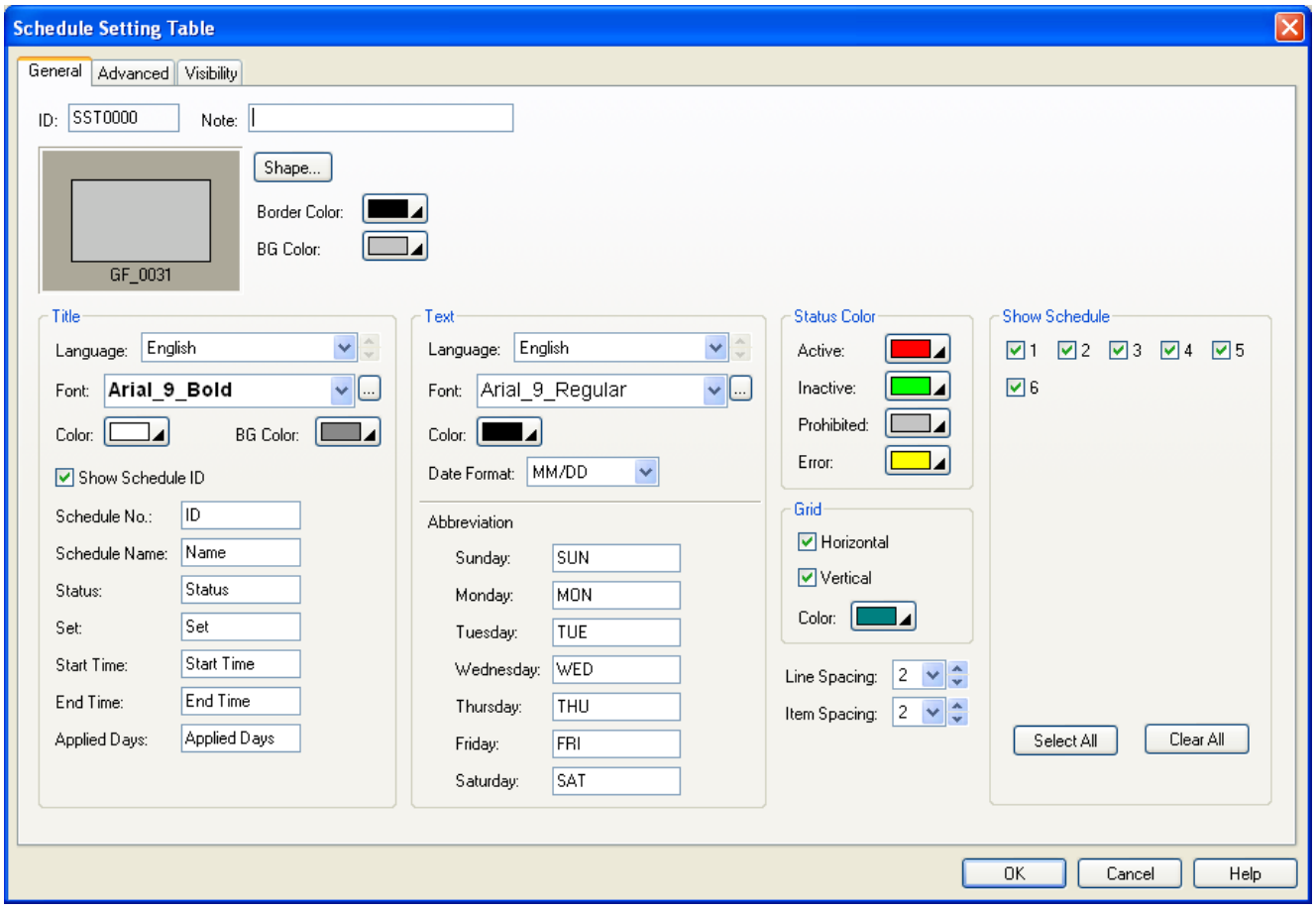
Described in Section 4.4.5.

- **Visibility**

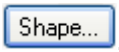
Described in Section 4.4.6.

15.3.4. General Settings

This section describes how to define the general settings for a schedule setting table. The following is an example of the General page of the Schedule Setting Table dialog box.



The following table describes each property in the General page.

Property		Description
ID		The object's identifier. It is generated when the object is created. The identifier is unique within the screen where the object is located and is unchangeable. The format of the IDs for the schedule setting table is SSTnnnn.
Note		You can type a note for the object.
Shape settings		For details about the following properties, see Section 4.3.4 Setting up the Shape of an Object..  , Border Color, BG Color
Title	Language	Select a language so you can view and edit the language dependent settings in the Title group for that language. The language dependent properties in the Title group include Font and Title Name.
	Font	Select a font for the title text.
	Color	Select a color for the text.
	BG Color	Select a color for the title row.
	Show Schedule ID	Check this option if you want the schedule setting table to have the ID column.
	Schedule No.	Specifies the title for the Schedule No. column. This field is available when Show Schedule ID is selected
	Schedule Name/ Status/Set/ Start Time/ End Time/ Applied Days	Specifies the title for the Schedule Name/ Status/Set/ Start Time/ End Time/ Applied Days column.
Text	Language	Select a language so you can view and edit the language dependent settings in the Text group for that language. The language dependent properties in the Text group include Font and Abbreviation.
	Font	Select a font for the text.
	Color	Select a color for the text.
	Data Format	Select a format for displaying the date.
	Abbreviation	Specifies the abbreviation text for the Sunday/ Monday/Tuesday/ Wednesday/ Thursday/ Friday/Saturday.
Status Color	Active	Select a color that will be shown in Status column when the schedule starts.
	Inactive	Select a color that will be shown in Status column when the schedule ends.
	Prohibited	Select a color that will be shown in Status column when the schedule is prohibited.
	Error	Select a color that will be shown in Status column when the schedule has an error.
Grid	Horizontal	Select this option if you want the schedule setting table to have horizontal grids.
	Vertical	Select this option if you want the schedule setting table to have vertical grids.
	Color	Select a color for the grids.
Line Spacing		Specifies the extra space in pixels for two adjacent rows of the schedule setting table.
Item Spacing		Specifies the extra space for every column of the schedule setting table.
Show Schedule	<Check Box>	All the schedules will be listed. Check the schedule No. if you want the schedule setting table to show the associated schedule.
	Select All	Click the button to select all schedules.
	Clear All	Click the button to clear all the selections.