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|---------------------|---|
| <b>ZXLN<br/>008</b> | <b>Teach 1-point High Threshold: _ZXLN008_Teach1HighThreshold</b> |
|---------------------|---|

|                                     |   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
|-------------------------------------|---|---------------|-----------|----------|--|------------------------------------|--|-----------------------------------|-----------------------|-------|--------|--------|----|-------|--------|------------|----|
| <b>Basic function</b>               | Uses one point to teach the high threshold.   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Symbol</b>                       | <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;"><b>_ZXLN008_Teach1HighThreshold</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">(BOOL)</td> <td style="width: 50%;">(BOOL)</td> </tr> <tr> <td>EN</td> <td>ENO</td> </tr> <tr> <td>(INT)</td> <td>(BOOL)</td> </tr> <tr> <td>UnitSelect</td> <td>BUSY</td> </tr> <tr> <td>(INT)</td> <td>(BOOL)</td> </tr> <tr> <td>PortNo</td> <td>OK</td> </tr> <tr> <td>(INT)</td> <td>(BOOL)</td> </tr> <tr> <td>SensorChNo</td> <td>NG</td> </tr> </table> </div>  | (BOOL)        | (BOOL)    | EN       | ENO  | (INT)                              | (BOOL)   | UnitSelect                        | BUSY                  | (INT) | (BOOL) | PortNo | OK | (INT) | (BOOL) | SensorChNo | NG |
| (BOOL)                              | (BOOL)  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| EN                                  | ENO   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| (INT)                               | (BOOL)  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| UnitSelect                          | BUSY  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| (INT)                               | (BOOL)  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| PortNo                              | OK  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| (INT)                               | (BOOL)  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| SensorChNo                          | NG  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>File name</b>                    | Lib\FBL\omronlib\LaserSensor\ZXLN\_ZXLN008_Teach1HighThreshold10.cxf  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Applicable models</b>            | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Smart Sensor</td> <td>ZX-LDA-N</td> </tr> <tr> <td>CPU Unit</td> <td>CS1*-CPU**H Unit version 3.0 or higher<br/>CJ1*-CPU**H Unit version 3.0 or higher<br/>CJ1M-CPU** Unit version 3.0 or higher<br/>CP1H<br/>CP1L (except 10 points CPU)</td> </tr> <tr> <td>Serial Communications Units/Boards</td> <td>CS1W-SCU21-V1, CJ1W-SCU21-V1, CJ1W-SCU41-V1 Unit Version 1.2 or higher<br/>CS1W-SCB21-V1 and CS1W-SCB41-V1 Unit Version 1.2 or higher</td> </tr> <tr> <td>CX-Programmer</td> <td>Version 5.0 or higher</td> </tr> </table>  | Smart Sensor  | ZX-LDA-N  | CPU Unit | CS1*-CPU**H Unit version 3.0 or higher<br>CJ1*-CPU**H Unit version 3.0 or higher<br>CJ1M-CPU** Unit version 3.0 or higher<br>CP1H<br>CP1L (except 10 points CPU) | Serial Communications Units/Boards | CS1W-SCU21-V1, CJ1W-SCU21-V1, CJ1W-SCU41-V1 Unit Version 1.2 or higher<br>CS1W-SCB21-V1 and CS1W-SCB41-V1 Unit Version 1.2 or higher | CX-Programmer                     | Version 5.0 or higher |       |        |        |    |       |        |            |    |
| Smart Sensor                        | ZX-LDA-N  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| CPU Unit                            | CS1*-CPU**H Unit version 3.0 or higher<br>CJ1*-CPU**H Unit version 3.0 or higher<br>CJ1M-CPU** Unit version 3.0 or higher<br>CP1H<br>CP1L (except 10 points CPU)  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| Serial Communications Units/Boards  | CS1W-SCU21-V1, CJ1W-SCU21-V1, CJ1W-SCU41-V1 Unit Version 1.2 or higher<br>CS1W-SCB21-V1 and CS1W-SCB41-V1 Unit Version 1.2 or higher  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| CX-Programmer                       | Version 5.0 or higher   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Conditions for usage</b>         | <ul style="list-style-type: none"> <li>■ External Connections <ul style="list-style-type: none"> <li>• Can be used for 1:N connections in the controller configuration of the sensor side.</li> <li>• Communications must be within one network and cannot cross to another network.</li> </ul> </li> <li>■ Communication Settings <p>The communication settings of the serial port (Serial Gateway) must be the same as those of the Smart Sensor.</p> <ul style="list-style-type: none"> <li>• The communications settings of the specified serial port can be set to the default Smart Sensor settings (the factory shipment value) using the <i>Set Communications Port</i> (_ZXL600_SetComm) function block, and the other Smart Sensor settings using the <i>Set Serial Gateway Mode</i> (_SCx604_SetPortGATEWAY) function block.</li> </ul> </li> <li>■ CPU Unit Settings <p>PC System Setup: <i>Shared Settings for Communications Instructions in FBs.</i></p> <ul style="list-style-type: none"> <li>• Communications Instruction Response Timeout Time (default: 2 s), 5 s or more is recommended.</li> <li>• Number of retries (default: 0)</li> </ul> </li> <li>■ Shared Resources <ul style="list-style-type: none"> <li>• Communications ports (Internal logical ports)</li> </ul> </li> </ul> |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Function description</b>         | <p>When the <i>Start Trigger</i> turns ON, the high threshold is taught using 1 point for the Smart Sensor connected to the Serial Port specified by the <i>Connection unit</i>, <i>Serial port No</i> and <i>Sensor CH No</i>. This FB sets the intermediate value between the current value of the main digital display and the current low threshold value as the low threshold. An execution error will occur if the display value is not being held or if the low threshold is higher than the high threshold.</p>   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>FB precautions</b>               | <ul style="list-style-type: none"> <li>• This FB is processed over multiple cycles. The BUSY output variable can be used to check whether the FB is being processed.</li> <li>• OK or NG will be turned ON only for one cycle after processing is completed. Use these flags to detect the end of the FB processing.</li> </ul> <p><b>Time Chart</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Start Trigger</td> <td style="width: 10%;">ON<br/>OFF</td> <td style="width: 70%; text-align: center;"> </td> </tr> <tr> <td>Busy Flag</td> <td>ON<br/>OFF</td> <td style="text-align: center;"> </td> </tr> <tr> <td>Normal End (OK) or Error End (NG)</td> <td>ON<br/>OFF</td> <td style="text-align: center;"> </td> </tr> </table> <p style="text-align: center;">↑ FB execution completed.</p>   | Start Trigger | ON<br>OFF |          | Busy Flag  | ON<br>OFF                          |  | Normal End (OK) or Error End (NG) | ON<br>OFF             |       |        |        |    |       |        |            |    |
| Start Trigger                       | ON<br>OFF   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| Busy Flag                           | ON<br>OFF   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| Normal End (OK) or Error End (NG)   | ON<br>OFF   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>EN input condition</b>           | Connect EN to an OR between an upwardly differentiated condition for the <i>Start Trigger</i> and the BUSY output from the FB as above.   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Restrictions Input variables</b> | <ul style="list-style-type: none"> <li>• Always use an upwardly differentiated condition for EN.</li> <li>• If the input variables are out of range, the ENO Flag will turn OFF and the FB will not be processed.</li> </ul>  |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |
| <b>Output variables</b>             | <ul style="list-style-type: none"> <li>• This FB requires multiple cycles to process. Always connect an OR including the BUSY output variable to the EN input variable to ensure that the FB is processed to a completion (see <i>Symbol</i>).</li> <li>• Do not turn the BUSY output variable ON or OFF outside the FB.</li> </ul>   |               |           |          |  |                                    |  |                                   |                       |       |        |        |    |       |        |            |    |

|                                   |   |
|-----------------------------------|---|
| <p><b>Other</b></p>               | <ul style="list-style-type: none"> <li>• 3 seconds or more may be required for this FB to be completed (i.e., from EN turning ON until the OK or NG Flag turns ON).</li> </ul>  |
| <p><b>Application example</b></p> | <p>Smart Sensor is connected 1:N to the Serial Port 1 on the Serial Communications Board (SCB). When bit A turns ON, the high threshold is taught using one point.</p> <p>The diagram illustrates the hardware and logic for the <code>_ZXLN008_Teach1HighThreshold</code> function block. The PLC rack consists of SCB, CPU, and SCU. The Smart Sensor CH1 is connected to the SCB via a 1:N connection. The ladder logic shows Bit A (normally open) and Bit B (normally closed) connected to the Unit Selection #BBBB input. Bit C (normally open) is connected to the Processing for Operation Commands input. The function block outputs are ENO (Busy Flag), BUSY (Bit B), OK (Normal End), and NG (Error End/Bit D).</p> |
| <p><b>Related manuals</b></p>     | <p><i>ZX-L-N Series Smart Sensor Laser Type User's Manual (SCHE-703)</i><br/> <i>ZX Series Smart Sensor Operation Manual (SCEA-801)</i></p>   |
| <p><b>Related FBs</b></p>         | <p><i>Teach 2-point High Threshold (<code>_ZXLN010_Teach2HighThreshold</code>)</i><br/> <i>Teach 1-point Low Threshold (<code>_ZXLN009_Teach1LowThreshold</code>)</i><br/> <i>Teach 2-point Low Threshold (<code>_ZXLN011_Teach2LowThreshold</code>)</i></p>  |

■ Variable Tables

Input Variables

| Name                              | Variable name   | Data type  | Default  | Range                | Description   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
|-----------------------------------|---|------------|----------|----------------------|---|----------------|-------|-----------------|---|----------------|-------|-----------------|--|----------------|--------------------------|-----------------|--|
| EN                                | EN  | BOOL       |          |                      | 1 (ON): FB started.<br>0 (OFF): FB not started.   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Unit selection<br>Serial Port No. | UnitSelect<br>PortNo  | INT<br>INT | &0<br>&1 | As right<br>&1 to &2 | Specify the Unit and the serial port.<br>Only serial port 2 of CP1H/CP1L M-type CPU unit is possible to use this FB.<br><ul style="list-style-type: none"> <li>■ Connected to CPU Unit                             <table style="margin-left: 20px;"> <tr> <td>Unit selection</td> <td>#FFFF</td> </tr> <tr> <td>Serial port No.</td> <td>Not accessed.<br/>(CP1H/CP1L-M: Serial Port2<br/>CP1L-L14/20: Serial Port1)</td> </tr> </table> </li> <li>■ Connected to Serial Communication Board(SCB)                             <table style="margin-left: 20px;"> <tr> <td>Unit selection</td> <td>#BBBB</td> </tr> <tr> <td>Serial port No.</td> <td>&amp;1: Serial Port 1<br/>&amp;2: Serial Port 2</td> </tr> </table> </li> <li>■ Connected to Serial Communication Unit(SCU)                             <table style="margin-left: 20px;"> <tr> <td>Unit selection</td> <td>SCU Unit No. (&amp;0 to &amp;15)</td> </tr> <tr> <td>Serial port No.</td> <td>&amp;1: Serial Port 1<br/>&amp;2: Serial Port 2</td> </tr> </table> </li> </ul> | Unit selection | #FFFF | Serial port No. | Not accessed.<br>(CP1H/CP1L-M: Serial Port2<br>CP1L-L14/20: Serial Port1) | Unit selection | #BBBB | Serial port No. | &1: Serial Port 1<br>&2: Serial Port 2 | Unit selection | SCU Unit No. (&0 to &15) | Serial port No. | &1: Serial Port 1<br>&2: Serial Port 2 |
| Unit selection                    | #FFFF   |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Serial port No.                   | Not accessed.<br>(CP1H/CP1L-M: Serial Port2<br>CP1L-L14/20: Serial Port1) |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Unit selection                    | #BBBB   |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Serial port No.                   | &1: Serial Port 1<br>&2: Serial Port 2                                    |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Unit selection                    | SCU Unit No. (&0 to &15)  |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Serial port No.                   | &1: Serial Port 1<br>&2: Serial Port 2                                    |            |          |                      |   |                |       |                 |   |                |       |                 |  |                |                          |                 |  |
| Sensor CH No.                     | SensorChNo  | INT        | &1       | &1 to &5             | Specify the CH No. of the connecting sensor.<br>e.g.: &2 in the case of CH2.  |                |       |                 |   |                |       |                 |  |                |                          |                 |  |

Output Variables

| Name                     | Variable name | Data type | Range | Description   |
|--------------------------|---------------|-----------|-------|---|
| ENO<br>(May be omitted.) | ENO           | BOOL      |       | 1 (ON): FB processed normally.<br>0 (OFF): FB not processed or ended in an error. |
| Busy Flag                | BUSY          | BOOL      |       | Automatically turns OFF when processing is completed.                             |
| Normal end               | OK            | BOOL      |       | Turns ON for one cycle when processing ends normally.                             |
| Error end                | NG            | BOOL      |       | Turns ON for one cycle when processing ends in an error.                          |

Internal Variables

Internal variables are not output from the FB.

If the NG Flag from the FB turns ON, the following internal variables can be monitored to obtain information on the error.

| Name       | Variable name | Data type | Range | Description  |
|------------|---------------|-----------|-------|--|
| Error code | ErrorCode     | WORD      |       | The results information from the Smart Sensor is output to the Error Code. |

Error Code Details

| Code  | Contents        | Meaning  |
|-------|-----------------|--|
| #0000 | Normal end      |  |
| #2203 | Operation error | The setting is incorrect. Refer to the <i>ZX Series Smart Sensor Operation Manual</i> for the setting error conditions of teaching or the zero reset function. |
| #2204 | Operation error | The sensor's operation mode is not in the RUN mode.  |

Version History

| Version | Date     | Contents            |
|---------|----------|---------------------|
| 1.00    | 2005.12. | Original production |

Note

This manual is a reference that explains the function block functions.

It does not explain the operational limitations of Units, components, or combinations of Units and components. Always read and understand the Operation Manuals for the system's Units and other components before using them.