easyRelay Ladder Logic Symbol and Parameter Reference:

How the easy500/700 programming symbols and parameters are displayed on the Programmable Relay’s display verses the easySoft programming software
Application Summary

This application note provides a reference for the terminologies, symbols, and parameters used in the easySoft-Basic/easySoft-Pro ANSI/CSA display type and the display interface of the easy500/700 Programmable Relay.

Products and Revisions

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Product</th>
<th>Applicable Revision</th>
<th>Tested Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton</td>
<td>easySoft-Basic</td>
<td>6</td>
<td>6.90</td>
</tr>
<tr>
<td>Eaton</td>
<td>easySoft-Pro</td>
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<td>6.90</td>
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<tr>
<td>Eaton</td>
<td>EASY512-DC-RC</td>
<td>All</td>
<td>08</td>
</tr>
<tr>
<td>Eaton</td>
<td>EASY719-DC-RC</td>
<td>All</td>
<td>03</td>
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</table>

Supporting Documentation

<table>
<thead>
<tr>
<th>Manual Name</th>
<th>Reference Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Relay easy500, easy700</td>
<td>MN05013003Z-EN</td>
</tr>
</tbody>
</table>

Application Details

On the following page are two tables representing the contact and coil symbols used in the easy Programmable Relay display interface and easySoft-Basic/easySoft-Pro ANSI/CSA display respectively. Each row contains a link to a section of the document that gives a detailed cross-reference for the terminologies, symbols, and parameters used for each method of programming the device. At the bottom of each section is a link that returns to the original table to look up the next contact or coil.
<table>
<thead>
<tr>
<th>Switching contact</th>
<th>N/O</th>
<th>N/C</th>
<th>easy500</th>
<th>easy700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog value comparator function relay</td>
<td>A</td>
<td>A</td>
<td>A1...A16</td>
<td>A1...A16</td>
</tr>
<tr>
<td>Counter function relays</td>
<td>C</td>
<td>C</td>
<td>C1...C16</td>
<td>C1...C16</td>
</tr>
<tr>
<td>Text marker function relay</td>
<td>D</td>
<td>D</td>
<td>D1...D16</td>
<td>D1...D16</td>
</tr>
<tr>
<td>Week time switch function relay</td>
<td>G</td>
<td>G</td>
<td>G1...G8</td>
<td>G1...G8</td>
</tr>
<tr>
<td>easy input terminal</td>
<td>I</td>
<td>I</td>
<td>I1...I12</td>
<td>I1...I12</td>
</tr>
<tr>
<td>0 signal</td>
<td></td>
<td>I13</td>
<td></td>
<td>I13</td>
</tr>
<tr>
<td>Expansion status</td>
<td></td>
<td>I14</td>
<td></td>
<td>I14</td>
</tr>
<tr>
<td>Short-Circuit/Overload</td>
<td>M</td>
<td>M</td>
<td>M1...M16</td>
<td>M1...M16</td>
</tr>
<tr>
<td>Markers, (auxiliary relay)</td>
<td>N</td>
<td>N</td>
<td>N1...N16</td>
<td>N1...N16</td>
</tr>
<tr>
<td>Markers (auxiliary relay)</td>
<td>G</td>
<td>G</td>
<td>G1...G4</td>
<td>G1...G4</td>
</tr>
<tr>
<td>Operating Hours Counter</td>
<td>P</td>
<td>P</td>
<td>P1...P4</td>
<td>P1...P4</td>
</tr>
<tr>
<td>Cursor button</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>easy output</td>
<td>O</td>
<td>O</td>
<td>O1...O4</td>
<td>O1...O4</td>
</tr>
<tr>
<td>Input terminal for expansion unit</td>
<td>R</td>
<td>R</td>
<td>R1...R12</td>
<td>R1...R12</td>
</tr>
<tr>
<td>Short-circuit/overload with expansion</td>
<td>R</td>
<td>R</td>
<td>R15...R16</td>
<td>R15...R16</td>
</tr>
<tr>
<td>easy output (expansion or S auxiliary marker)</td>
<td>S</td>
<td>S</td>
<td>S1...S8</td>
<td>S1...S8</td>
</tr>
<tr>
<td>Timer function relays</td>
<td>T</td>
<td>T</td>
<td>T1...T16</td>
<td>T1...T16</td>
</tr>
<tr>
<td>Jump label</td>
<td>I</td>
<td>I</td>
<td>I1...I18</td>
<td>I1...I18</td>
</tr>
<tr>
<td>Year Time Switch</td>
<td>Y</td>
<td>Y</td>
<td>Y1...Y8</td>
<td>Y1...Y8</td>
</tr>
<tr>
<td>Master reset, (central reset)</td>
<td>Z</td>
<td>Z</td>
<td>Z1...Z3</td>
<td>Z1...Z3</td>
</tr>
</tbody>
</table>

- **I** - Input basic unit
- **R** - Input expansion device
- **Q** - Output basic unit
- **S** - Output expansion device
- **M** - Marker
- **N** - Marker
- **P** - P buttons
- **J** - Jump
- **A** - Analog comparator/threshold value switch
- **C** - Counter relay
- **D** - Text display
- **H** - 7-day time switch
- **O** - Operating hours counter
- **T** - Timing relay
- **Y** - Year time switch
- **Z** - Master reset
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Analog comparator/threshold value switch</td>
<td>Analog value</td>
</tr>
</tbody>
</table>

Table 12: Parameter display and parameter set for analog value comparator:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Analog value comparator function relay 1</td>
</tr>
</tbody>
</table>
| EQ   | Equal mode  
The function relay has the following modes:  
• LT: less than  
• LE: less than/equal to  
• EQ: equal to  
• GE: greater than/equal to  
• GT: greater than |
| I1   | Comparison value 1 (positive value 7, 8, 11, 12, actual value T1 to T16, C1 to C16) |
| F1   | Gain factor for I1 (F1 x actual value at I1); F1 = positive value from 0 to 9999 |
| I2   | Comparison value 2 (positive value 7, 8, 11, 12, actual value T1 to T16, C1 to C16) |
| F2   | Gain factor for I2 (F2 x actual value at I2); F2 = positive value from 0 to 9999 |
| O9   | Offset for the value of I1 (O1 = O9 + actual value at I1; O9 = positive value from 0 to 9999) |
| H*   | Switching hysteresis for value I2  
Value H* applies both to positive and negative hysteresis:  
• I1* = Actual value at I2 + H*;  
• I1* = Actual value at I2 - H*;  
• H* = positive value from 0 to 9999 |
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C – Counter relay</td>
<td>Counter function relays</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
</tbody>
</table>

**C2 N**

+ 00000

**N**

- Mode N: up/down counter
- Mode H: high-speed up/down counter
- Mode F: frequency counter

**S**

- Setpoint, constant from 00000 to 32000

[Back to top]
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text display</td>
<td>Text marker function relays</td>
</tr>
<tr>
<td><img src="image1" alt="D01" /></td>
<td><img src="image2" alt="D1" /></td>
</tr>
<tr>
<td><img src="image3" alt="D01" /></td>
<td><img src="image4" alt="D1" /></td>
</tr>
<tr>
<td><img src="image5" alt="D01" /></td>
<td><img src="image6" alt="D1" /></td>
</tr>
<tr>
<td><img src="image7" alt="D01" /></td>
<td><img src="image8" alt="D1" /></td>
</tr>
<tr>
<td><img src="image9" alt="D01" /></td>
<td><img src="image10" alt="D1" /></td>
</tr>
<tr>
<td><img src="image11" alt="D01" /></td>
<td><img src="image12" alt="D1" /></td>
</tr>
<tr>
<td><img src="image13" alt="D01" /></td>
<td><img src="image14" alt="D1" /></td>
</tr>
<tr>
<td><img src="image15" alt="D01" /></td>
<td><img src="image16" alt="D1" /></td>
</tr>
<tr>
<td>easySoft-Basic Representation</td>
<td>easyRelay Display Representation</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>H – 7-day time switch</td>
<td>Week time switch function relay</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>H01</th>
</tr>
</thead>
</table>

| 01 A  +                      |
| D  SO                        |
| ON  --:--                    |
| OFF  --:--                   |

<table>
<thead>
<tr>
<th>B1</th>
<th>weekly timer function relay 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B,</td>
<td>Time switch channels</td>
</tr>
<tr>
<td>C,D</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>• + appears in the PARAMETER menu,</td>
</tr>
<tr>
<td></td>
<td>• – does not appear in the PARAMETER menu</td>
</tr>
<tr>
<td>D</td>
<td>Day setting, from -- to --</td>
</tr>
<tr>
<td>ON</td>
<td>Closing delay</td>
</tr>
<tr>
<td>OFF</td>
<td>Off time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input basic unit</td>
<td>easy input terminal</td>
</tr>
</tbody>
</table>

| I01                           |

| 1                             |

| I01                           |

| 1                             |

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<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>M - Marker</td>
<td>Markers (auxiliary relay)</td>
</tr>
<tr>
<td><img src="image" alt="M01" /></td>
<td><img src="image" alt="M1" /></td>
</tr>
<tr>
<td><img src="image" alt="M01" /></td>
<td><img src="image" alt="M1" /></td>
</tr>
<tr>
<td><img src="image" alt="M01" /></td>
<td><img src="image" alt="M1" /></td>
</tr>
<tr>
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</tr>
<tr>
<td><img src="image" alt="M01" /></td>
<td><img src="image" alt="M1" /></td>
</tr>
<tr>
<td><img src="image" alt="M01" /></td>
<td><img src="image" alt="M1" /></td>
</tr>
<tr>
<td><img src="image" alt="S M01" /></td>
<td><img src="image" alt="SM1" /></td>
</tr>
<tr>
<td><img src="image" alt="R M01" /></td>
<td><img src="image" alt="RM1" /></td>
</tr>
<tr>
<td>easySoft-Basic Representation</td>
<td>easyRelay Display Representation</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>N - Marker</td>
<td>Markers (auxiliary relay)</td>
</tr>
</tbody>
</table>

![Diagram](image)

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### Operating hours counter

<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>O – Operating hours counter</td>
<td>Operating hours counter</td>
</tr>
</tbody>
</table>

![O01](image1.png)

![O01](image2.png)

![O01](image3.png)

![RO1](image4.png)

#### Parameter display and parameter set for the operating hours counter function block:

<table>
<thead>
<tr>
<th>04</th>
<th>Operating hours counter number 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>• appears in the parameter display</td>
</tr>
<tr>
<td>-</td>
<td>• appears in the parameter display</td>
</tr>
<tr>
<td>S</td>
<td>Setpoint in hours</td>
</tr>
<tr>
<td>0</td>
<td>Actual value of the operating hours counter (h)</td>
</tr>
</tbody>
</table>

### P - P buttons

<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P - P buttons</td>
<td>Cursor button</td>
</tr>
</tbody>
</table>

![P01](image5.png)

![P01](image6.png)

![P1](image7.png)

![P1](image8.png)

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<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q – Output basic unit</td>
<td>Q1</td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image15" alt="Diagram" /></td>
<td><img src="image16" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image17" alt="Diagram" /></td>
<td><img src="image18" alt="Diagram" /></td>
</tr>
</tbody>
</table>

Back to top
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>R – Input expansion device</td>
<td>Input terminal for expansion unit</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R01</td>
</tr>
<tr>
<td></td>
<td>R1</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R01</td>
</tr>
<tr>
<td></td>
<td>R̅1</td>
</tr>
<tr>
<td>easySoft-Basic Representation</td>
<td>easyRelay Display Representation</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>S – Output expansion device</td>
<td>easy output (expansion or S auxiliary marker)</td>
</tr>
</tbody>
</table>

- ![Diagram](image1.png)
- ![Diagram](image2.png)
- ![Diagram](image3.png)
- ![Diagram](image4.png)
- ![Diagram](image5.png)
- ![Diagram](image6.png)
- ![Diagram](image7.png)
- ![Diagram](image8.png)
- ![Diagram](image9.png)
- ![Diagram](image10.png)
- ![Diagram](image11.png)
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>T - Timing relay</td>
<td>Timer function relays</td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Time range and setpoint time</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>S 00.999</td>
<td>Seconds: 0.00 to 99.990 s</td>
<td>10 ms</td>
</tr>
<tr>
<td>M: S 00:00</td>
<td>Minutes: Seconds 00:00 to 99:59</td>
<td>1 s</td>
</tr>
<tr>
<td>H:M 00:00</td>
<td>Hours: Minutes, 00:00 to 99:59</td>
<td>1 min.</td>
</tr>
</tbody>
</table>

### Description

- **T1**: Timing relay number 1
- **X**: On-time mode
- **S**: Time range in seconds
- **+**: + appears in the PARAMETER menu
- **-**: - does not appear in the PARAMETER menu
- **I1**: Time setpoint 1:
  - Positive value via constant or variable from I7, I8, I11, I12 (analog inputs).
  - Variable via actual value T1 to T16, C1 to C16.
- **I2**: Time setpoint 2 (with timing relay with 2 setpoints):
  - Positive value via constant or variable from I7, I8, I11, I12 (analog inputs).
  - Variable via actual value T1 to T16, C1 to C16.
- **T1**: Display of actual value in RUN mode
### Parameters & Switch Function

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Switch function</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>On-delayed switching</td>
</tr>
<tr>
<td>?X</td>
<td>On-delayed switching with random time range</td>
</tr>
<tr>
<td></td>
<td>Off-delayed switching</td>
</tr>
<tr>
<td>?■</td>
<td>Off-delayed switching with random time range</td>
</tr>
<tr>
<td>X■</td>
<td>On- and off-delayed, two time setpoints</td>
</tr>
<tr>
<td>?X■</td>
<td>On- and off-delayed switching with random time, 2 time setpoints</td>
</tr>
<tr>
<td>□</td>
<td>Single pulse switching</td>
</tr>
<tr>
<td>▪</td>
<td>Flash switching, mark-to-space ratio = 1:1, 2 time setpoints</td>
</tr>
<tr>
<td>▨</td>
<td>Flash switching, mark-to-space ratio = 1:1, 2 time setpoints</td>
</tr>
</tbody>
</table>

### easySoft-Basic Representation vs. easyRelay Display Representation

<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>: - Jump</td>
<td>easy input terminal</td>
</tr>
</tbody>
</table>

![easySoft-Basic Representation Diagram](image1)

![easyRelay Display Representation Diagram](image2)
<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Y</strong> – Year time switch</td>
<td><strong>Y1</strong></td>
</tr>
<tr>
<td>![Y01 Diagram]</td>
<td>![Y1 Diagram]</td>
</tr>
</tbody>
</table>

**Y1** | Year time switch function relay 1  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a,b, c,d</td>
<td>Time switch channels</td>
</tr>
</tbody>
</table>
| + | • + appears in the PARAMETER menu.  
| | • – does not appear in the PARAMETER menu |
| ON | On date: day, month, year (two-digit 2010 = 10) |
| OFF | Off date: day, month, year (two-digit 2011 = 11) |

<table>
<thead>
<tr>
<th>easySoft-Basic Representation</th>
<th>easyRelay Display Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Z</strong> – Master reset</td>
<td><strong>Z1</strong></td>
</tr>
<tr>
<td>![Z01 Diagram]</td>
<td>![Z1 Diagram]</td>
</tr>
</tbody>
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**Z1** | Master reset, (central reset)  
|-------|--------------------------------|

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Additional Help

In the event additional help is needed:
In the US or Canada: please contact the Technical Resource Center at 1-877-ETN-CARE or 1-877-326-2273.

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All other supporting documentation is located on the Eaton web site at www.eaton.com.