

# Special Relays

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In This Appendix. . . .

- DL105 PLC Special Relays

## DL105 PLC Special Relays

“Special Relays” are just contacts that are set by the CPU operating system to indicate a particular system event has occurred. These contacts are available for use in your ladder program. Knowing just the right special relay contact to use for a particular situation can save lot of programming time. Since the CPU operating system sets and clears special relay contacts, the ladder program only has to use them as inputs in ladder logic.

### Startup and Real-Time Relays

|            |                |                                                                                                                                                                                                         |
|------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SP0</b> | First scan     | on for the first scan after a power cycle or program to run transition only. The relay is reset to off on the second scan. It is useful where a function needs to be performed only on program startup. |
| <b>SP1</b> | Always ON      | provides a contact to insure an instruction is executed every scan.                                                                                                                                     |
| <b>SP3</b> | 1 minute clock | on for 30 seconds and off for 30 seconds.                                                                                                                                                               |
| <b>SP4</b> | 1 second clock | on for 0.5 second and off for 0.5 second.                                                                                                                                                               |
| <b>SP5</b> | 100 ms clock   | on for 50 ms. and off for 50 ms.                                                                                                                                                                        |
| <b>SP6</b> | 50 ms clock    | on for 25 ms. and off for 25 ms.                                                                                                                                                                        |
| <b>SP7</b> | Alternate scan | on every other scan.                                                                                                                                                                                    |

### CPU Status Relays

|             |                       |                                                                 |
|-------------|-----------------------|-----------------------------------------------------------------|
| <b>SP12</b> | Terminal run mode     | on when the CPU is in the run mode.                             |
| <b>SP16</b> | Terminal program mode | on when the CPU is in the program mode.                         |
| <b>SP20</b> | Forced stop mode      | on when the STOP instruction is executed.                       |
| <b>SP22</b> | Interrupt enabled     | on when interrupts have been enabled using the ENI instruction. |

### System Monitoring

|             |                      |                                                                                                                                             |
|-------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SP40</b> | Critical error       | on when a critical error such as I/O communication loss has occurred.                                                                       |
| <b>SP41</b> | Warning              | on when a non critical error such as a low battery has occurred.                                                                            |
| <b>SP44</b> | Program memory error | on when a memory error such as a memory parity error has occurred.                                                                          |
| <b>SP50</b> | Fault instruction    | on when a Fault Instruction is executed.                                                                                                    |
| <b>SP51</b> | Watch Dog timeout    | on if the CPU Watch Dog timer times out.                                                                                                    |
| <b>SP52</b> | Grammatical error    | on if a grammatical error has occurred either while the CPU is running or if the syntax check is run. V7755 will hold the exact error code. |
| <b>SP53</b> | Solve logic error    | on if CPU cannot solve the logic.                                                                                                           |

**Accumulator  
Status**

|             |                      |                                                                                                                          |
|-------------|----------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>SP60</b> | Value less than      | on when the accumulator value is less than the instruction value.                                                        |
| <b>SP61</b> | Value equal to       | on when the accumulator value is equal to the instruction value.                                                         |
| <b>SP62</b> | Greater than         | on when the accumulator value is greater than the instruction value.                                                     |
| <b>SP63</b> | Zero                 | on when the result of the instruction is zero (in the accumulator.)                                                      |
| <b>SP64</b> | Half borrow          | on when the 16 bit subtraction instruction results in a borrow.                                                          |
| <b>SP65</b> | Borrow               | on when the 32 bit subtraction instruction results in a borrow.                                                          |
| <b>SP66</b> | Half carry           | on when the 16 bit addition instruction results in a carry.                                                              |
| <b>SP67</b> | Carry                | when the 32 bit addition instruction results in a carry.                                                                 |
| <b>SP70</b> | Sign                 | on anytime the value in the accumulator is negative.                                                                     |
| <b>SP71</b> | Invalid octal number | on when an Invalid octal number was entered. This also occurs when the V-memory specified by a pointer (P) is not valid. |
| <b>SP73</b> | Overflow             | on if overflow occurs in the accumulator when a signed addition or subtraction results in an incorrect sign bit.         |
| <b>SP75</b> | Data error           | on if a BCD number is expected and a non-BCD number is encountered.                                                      |
| <b>SP76</b> | Load zero            | on when any instruction loads a value of zero into the accumulator.                                                      |

**HSIO Pulse  
Catch Relay**

|              |          |                                                |
|--------------|----------|------------------------------------------------|
| <b>SP100</b> | X0 is on | X0 – on for 1 scan after a pulse on X0 occurs. |
|--------------|----------|------------------------------------------------|

**Equal Relays for  
HSIO Mode 10  
Counter Presets**

|              |                        |                                                              |
|--------------|------------------------|--------------------------------------------------------------|
| <b>SP540</b> | Current = target value | on when the counter current value equals the value in V2320. |
| <b>SP541</b> | Current = target value | on when the counter current value equals the value in V2322. |
| <b>SP542</b> | Current = target value | on when the counter current value equals the value in V2324. |
| <b>SP543</b> | Current = target value | on when the counter current value equals the value in V2326. |
| <b>SP544</b> | Current = target value | on when the counter current value equals the value in V2330. |
| <b>SP545</b> | Current = target value | on when the counter current value equals the value in V2332. |
| <b>SP546</b> | Current = target value | on when the counter current value equals the value in V2334. |
| <b>SP547</b> | Current = target value | on when the counter current value equals the value in V2336. |
| <b>SP550</b> | Current = target value | on when the counter current value equals the value in V2340. |
| <b>SP551</b> | Current = target value | on when the counter current value equals the value in V2342. |
| <b>SP552</b> | Current = target value | on when the counter current value equals the value in V2344. |
| <b>SP553</b> | Current = target value | on when the counter current value equals the value in V2346. |
| <b>SP554</b> | Current = target value | on when the counter current value equals the value in V2350. |
| <b>SP555</b> | Current = target value | on when the counter current value equals the value in V2352. |
| <b>SP556</b> | Current = target value | on when the counter current value equals the value in V2354. |
| <b>SP557</b> | Current = target value | on when the counter current value equals the value in V2356. |
| <b>SP560</b> | Current = target value | on when the counter current value equals the value in V2360. |
| <b>SP561</b> | Current = target value | on when the counter current value equals the value in V2362. |
| <b>SP562</b> | Current = target value | on when the counter current value equals the value in V2364. |
| <b>SP563</b> | Current = target value | on when the counter current value equals the value in V2366. |
| <b>SP564</b> | Current = target value | on when the counter current value equals the value in V2370. |
| <b>SP565</b> | Current = target value | on when the counter current value equals the value in V2372. |
| <b>SP566</b> | Current = target value | on when the counter current value equals the value in V2374. |
| <b>SP567</b> | Current = target value | on when the counter current value equals the value in V2376. |