

# SPECIAL RELAYS

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# APPENDIX D

## In This Appendix...

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### 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 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

#	Function	Status Description
<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 ensure 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>	100ms clock	ON for 50ms and OFF for 50ms.
<b>SP6</b>	50ms clock	ON for 25ms and OFF for 25ms.
<b>SP7</b>	Alternate scan	ON every other scan.

#### CPU Status Relays

#	Function	Status Description
<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

#	Function	Status Description
<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

#	Function	Status Description
<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.

### Equal Relays for HSIO Mode 10 Counter Presets

#	Function	Status Description	Location
SP540	Current = target value	ON when the counter current value equals the value in:	V2320
SP541			V2322
SP542			V2324
SP543			V2326
SP544			V2330
SP545			V2332
SP546			V2334
SP547			V2336
SP550			V2340
SP551			V2342
SP552			V2344
SP553			V2346
SP554			V2350
SP555			V2352
SP556			V2354
SP557			V2356
SP560			V2360
SP561			V2362
SP562			V2364
SP563			V2366
SP564			V2370
SP565	V2372		
SP566	V2374		
SP567	V2376		