

# SPECIAL RELAYS

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## DL06 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 a 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

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<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>SP2</b>	Always OFF	Provides a contact that is always off
<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>SP11</b>	Forced run mode	On when the mode switch is in the run position and the CPU is running.
<b>SP12</b>	Terminal run mode	On when the mode switch is in the TERM position and the CPU is in the run mode.
<b>SP13</b>	Test run mode	On when the CPU is in the test run mode.
<b>SP15</b>	Test stop mode	On when the CPU is in the test stop mode.
<b>SP16</b>	Terminal PGM mode	On when the mode switch is in the TERM position and the CPU is in program mode.
<b>SP17</b>	Forced stop	On when the mode switch is in the STOP position.
<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>SP36</b>	Override setup relay	On when the override function is used.
<b>SP37</b>	Scan controller	On when the actual scan time runs over the prescribed scan time.
<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 has occurred.
<b>SP42</b>	Diagnostics error	On when a diagnostics error or a system error occurs.
<b>SP43</b>	Low battery error	On when the CPU battery voltage is low.
<b>SP44</b>	Program memory error	On when a memory error such as a memory parity error has occurred.
<b>SP45</b>	I/O error	On when an I/O error such as a blown fuse occurs.
<b>SP46</b>	Communications error	On when a communication error occurs on any of the CPU ports.
<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.
<b>SP54</b>	Communication error	On when RX, WX, instructions are executed with the wrong parameters.
<b>SP56</b>	Table instruction overrun	On if a table instruction with a pointer is executed and the pointer value is outside the table boundary.

## 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	On 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>	Pointer reference error	On when the V-memory specified by a pointer (P) is not valid.
<b>SP72</b>	Floating point number	On anytime the value in the accumulator is a valid floating point number.
<b>SP73</b>	Overflow	On if overflow occurs in the accumulator when a signed addition or subtraction results in an incorrect sign bit.
<b>SP74</b>	Underflow	On anytime a floating point math operation results in an underflow error.
<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 Input Status

<b>SP100</b>	X0 status	On when X0 is on
<b>SP101</b>	X1 status	On when X1 is on

### HSIO Pulse Output Relay

<b>SP104</b>	Profile Complete	On when the pulse output profile is completed. (Mode 30)
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### Communication Monitoring Relay

<b>SP116</b>	CPU port busy Port 2	On when port 2 is the master and sending data.
<b>SP117</b>	Communications error Port 2	On when port 2 is the master and has a communication error.

### Option Slot Communication Monitoring Relay

<b>SP120</b>	Slot 1 busy	H0-ECOM/D0-DCM Port2
<b>SP121</b>	Slot 1 error	H0-ECOM/D0-DCM Port2
<b>SP122</b>	Slot 2 busy	H0-ECOM/D0-DCM Port2
<b>SP123</b>	Slot 2 error	H0-ECOM/D0-DCM Port2
<b>SP124</b>	Slot 3 busy	H0-ECOM/D0-DCM Port2
<b>SP125</b>	Slot 3 error	H0-ECOM/D0-DCM Port2
<b>SP126</b>	Slot 4 busy	H0-ECOM/D0-DCM Port2
<b>SP127</b>	Slot 4 error	H0-ECOM/D0-DCM Port2

### Option Slot Special Relay

<b>SP140-237</b>	Slot 1	SP relay for option card
<b>SP240-337</b>	Slot 2	SP relay for option card
<b>SP340-437</b>	Slot 3	SP relay for option card
<b>SP430-537</b>	Slot 4	SP relay for option card

## Counter 1 Mode 10 Equal Relays

<b>SP540</b>	Current = target value	On when the counter current value equals the value in V3631/3630
<b>SP541</b>	Current = target value	On when the counter current value equals the value in V3633/3632
<b>SP542</b>	Current = target value	On when the counter current value equals the value in V3635/3634
<b>SP543</b>	Current = target value	On when the counter current value equals the value in V3637/3636
<b>SP544</b>	Current = target value	On when the counter current value equals the value in V3641/3640
<b>SP545</b>	Current = target value	On when the counter current value equals the value in V3643/3642
<b>SP546</b>	Current = target value	On when the counter current value equals the value in V3645/3644
<b>SP547</b>	Current = target value	On when the counter current value equals the value in V3647/3646
<b>SP550</b>	Current = target value	On when the counter current value equals the value in V3651/3650
<b>SP551</b>	Current = target value	On when the counter current value equals the value in V3653/3652
<b>SP552</b>	Current = target value	On when the counter current value equals the value in V3655/3654
<b>SP553</b>	Current = target value	On when the counter current value equals the value in V3657/3656
<b>SP554</b>	Current = target value	On when the counter current value equals the value in V3661/3660
<b>SP555</b>	Current = target value	On when the counter current value equals the value in V3663/3662
<b>SP556</b>	Current = target value	On when the counter current value equals the value in V3665/3664
<b>SP557</b>	Current = target value	On when the counter current value equals the value in V3667/3666
<b>SP560</b>	Current = target value	On when the counter current value equals the value in V3671/3670
<b>SP561</b>	Current = target value	On when the counter current value equals the value in V3673/3672
<b>SP562</b>	Current = target value	On when the counter current value equals the value in V3675/3674
<b>SP563</b>	Current = target value	On when the counter current value equals the value in V3677/3676
<b>SP564</b>	Current = target value	On when the counter current value equals the value in V3771/3770
<b>SP565</b>	Current = target value	On when the counter current value equals the value in V3703/3702
<b>SP566</b>	Current = target value	On when the counter current value equals the value in V3705/3704
<b>SP567</b>	Current = target value	On when the counter current value equals the value in V3707/3706

### Counter 2 Mode 10 Equal Relays

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<b>SP570</b>	Current = target value	On when the counter current value equals the value in V3711/3710
<b>SP571</b>	Current = target value	On when the counter current value equals the value in V3713/3712
<b>SP572</b>	Current = target value	On when the counter current value equals the value in V3715/3714
<b>SP573</b>	Current = target value	On when the counter current value equals the value in V3717/3716
<b>SP574</b>	Current = target value	On when the counter current value equals the value in V3721/3720
<b>SP575</b>	Current = target value	On when the counter current value equals the value in V3723/3722
<b>SP576</b>	Current = target value	On when the counter current value equals the value in V3725/3724
<b>SP577</b>	Current = target value	On when the counter current value equals the value in V3727/3726
<b>SP600</b>	Current = target value	On when the counter current value equals the value in V3731/3730
<b>SP601</b>	Current = target value	On when the counter current value equals the value in V3733/3732
<b>SP602</b>	Current = target value	On when the counter current value equals the value in V3735/3734
<b>SP603</b>	Current = target value	On when the counter current value equals the value in V3737/3736
<b>SP604</b>	Current = target value	On when the counter current value equals the value in V3741/3740
<b>SP605</b>	Current = target value	On when the counter current value equals the value in V3743/3742
<b>SP606</b>	Current = target value	On when the counter current value equals the value in V3745/3744
<b>SP607</b>	Current = target value	On when the counter current value equals the value in V3747/3746
<b>SP610</b>	Current = target value	On when the counter current value equals the value in V3751/3750
<b>SP611</b>	Current = target value	On when the counter current value equals the value in V3753/3752
<b>SP612</b>	Current = target value	On when the counter current value equals the value in V3755/3754
<b>SP613</b>	Current = target value	On when the counter current value equals the value in V3757/3756
<b>SP614</b>	Current = target value	On when the counter current value equals the value in V3761/3760
<b>SP615</b>	Current = target value	On when the counter current value equals the value in V3763/3762
<b>SP616</b>	Current = target value	On when the counter current value equals the value in V3765/3764
<b>SP617</b>	Current = target value	On when the counter current value equals the value in V3767/3766