Open Architecture Control Software

SoftPLC Power Loss Detection & Automatic Backup

Application Note: SPZ-AN-2

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This document describes a power loss detection and automatic back-up mechanism that can save the contents of SoftPLC's datatable, program memory and force table to a disk drive in case of a power failure.

For this mechanism to work, the hardware on which you are running SoftPLC must have a battery back-up or Uninterruptible Power Supply (UPS) which, in the event of a power loss, will continue powering the hardware sufficiently long enough to be able to back-up SoftPLC's memory. Normally, the time required to save SoftPLC's memory is on the order of seconds although the exact figure depends on the size and number of program files, data files and the hardware you are using.

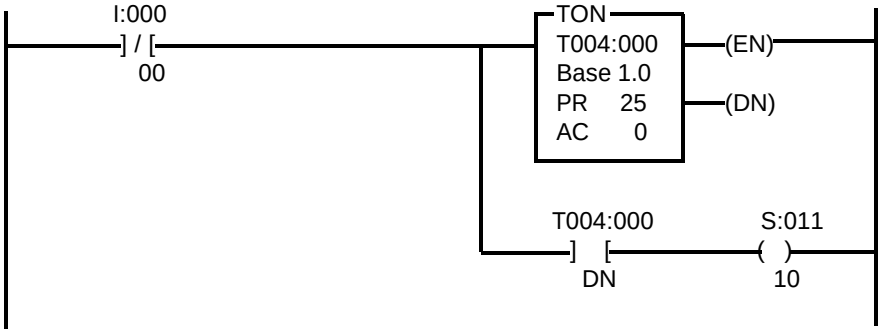
In addition, you must set an environment variable called “SPLCPOWERLOSS” in the SoftPLC computer systems for this feature to work. If the environment variable is not set with the file name to use, the file does not get saved.

Example: To save a file called “myprog”, use the following statement prior to loading SoftPLC:

SET SPLCPOWERLOSS=C:\SPLCZ\MYPROG.LOB

SoftPLC is made aware of a power loss by setting bit 10 in status word S:11 (Major Fault Flags). How to set this bit is application specific although we have provided 2 examples herein:

EXAMPLE 1:



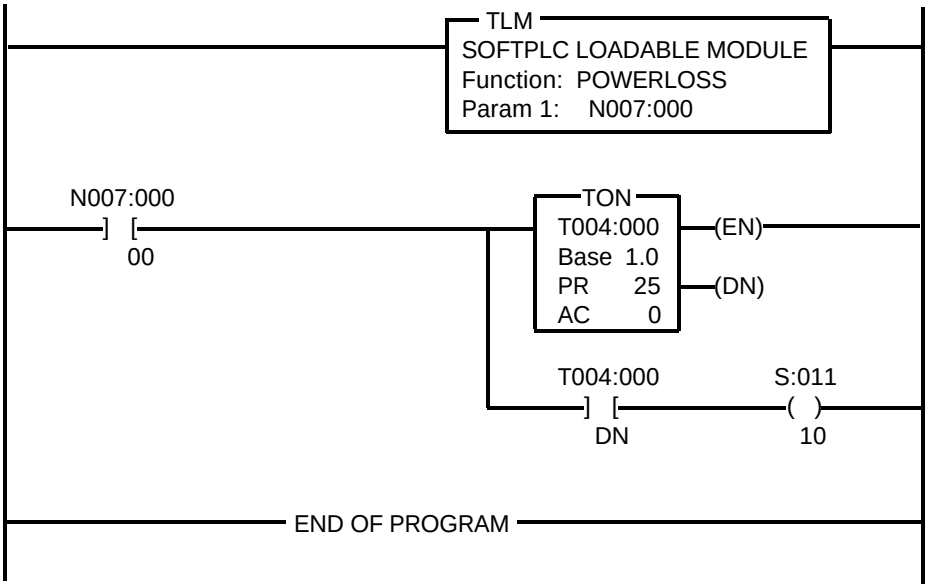
In this example, a digital input I:000/00 has been connected to the power line and tied to a normally closed contact. In the presence of supply voltage, I:000/00 is active and the normally closed contact does not pass control to the remainder of the rung. When supply voltage is cut off, I:000/00 becomes inactive and the normally closed contact passes control. This triggers the timer T004:000 whose accumulated value (T004:000.ACC) starts incrementing until it becomes equal to the preset value (T004:000.PRE). In this example, it takes 25 seconds for the timer to stop accumulating from the time it was started. At this point, timer stops accumulating and its done bit (T004:000.DN) is set.

This sets the Major Fault Flag (S:011/10) for power loss. SoftPLC detects that this bit was set and it is faulted. In addition to being faulted, SoftPLC saves the ladder program, datatable and the force table to disk. This back-up operation takes place only once although SoftPLC may remain in faulted state for a long time as a result of power loss. The purpose of having the 25 second time delay between the time the power loss was detected and SoftPLC was faulted is to prevent false triggering due to momentary glitches in the power line or short periods of power loss which can be handled by the UPS.

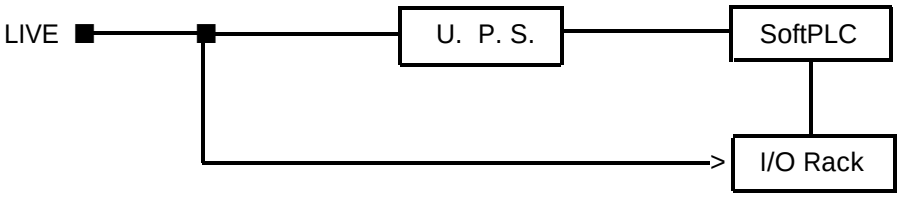
When power is restored, the rung goes FALSE, T004:000.DN is reset and this resets S:011/10 which clears the fault condition and puts SoftPLC in PROGRAM mode.

EXAMPLE 2:

On some hardware platforms running SoftPLC, the power loss detection mechanism can be realized without having to use a digital input. SoftPLC can execute user-written 'C' functions that can be called from the ladder program. A 'C' function can be used to read an I/O Port to detect power loss and set a bit in SoftPLC's datatable which may be used to trigger the timer that eventually set the Power Loss fault bit (S:11/10) when the timer expires. The ladder rungs below describes this method:



The following diagram shows an example of connecting an external UPS to SoftPLC:



TFI, Inc. (a sister company to SoftPLC) provides complete hardware/software solutions which include a UPS and the 'C' function to implement this automatic backup capability. Contact your local SoftPLC representative or distributor for information on TFI SoftPLC Processor Systems.