

ABB PROFILE STATE MACHINE WORK AROUND

Description:

The drive is programmed to use the ABB Profile for fieldbus communications. The drive is started (1151dec), then the drive is commanded to stop using a ramp to stop mode (1150dec). As the drive is ramping to a stop and start command (1151dec) is given to the drive. The drive continues to ramp to a stop and stops. The drive does not restart until a ready to run is commanded (1150dec) and then a start is commanded (1151dec). How do I make the drive be able to start and stop without coming to a complete stop?

Answer:

The solution below makes the following assumption: There is an individual jog button hardwired to the PLC for jogging; the hardwired Enable signal (shown connected to DI1 of the drive) is held closed during all jogging operations.

1. **ACS800 only.** Configure Parameter 10.06 to an unused Digital Input. Then hardwire a Jog button directly to the drive instead of the PLC. The jog speed is defined by parameter 12.15, Jog ramp times are defined by parameters 22.04, 22.05. It is also possible to leave the drive fluxed when at zero speed to improve the jog reaction time; this is done by increasing 21.10.
2. **ACS800 only.** Leave the Jog button wired to the PLC and change the logic in the PLC to write a different control word sequence. Presently the PLC writes an 1150 (Stop/Ready to Run) and 1151 (Start). The run command is the same as a jog command. To allow the drive to be issued a restart during a stop, bit 0 cannot be used in the Control word, rather Bit 3 (OFF3 CONTROL) must be used. The sequence should be as follows: Set parameter 42.01 = ON (This parameter will change the reaction of Bit 3 of the Status word. If 42.01 = OFF, then a coast to stop will result when Bit 3 is removed from Control Word, if 42.01 = ON, then ramp to stop will result when Bit 3 is removed from Control Word) Initial state before a start command = 1150 Jog or standard Run Command = 1151 Stop command from either run or jog = 1143 (remove only bit 3) Once Status Word (running bit, Bit 2) resets to a zero, then send 1150 to the Control Word so that it is ready for a restart. If Restart is desired while the 1143 has been issued, and drive has not stopped running (Status Word Bit 2 still = 1), then simply reissue the 1151 and drive will re-enter into a normal running state.

Author: Jeff Fell, Louis Chatfield – Application Eng.		Date: September, 2015
External http://www.abb.us/drives	Industry – Industrial	Document #: LVD-EOTN55U-EN
Product Categories: ACS350, ACS355, ACx550, ACS850, ACSM1, ACS800, DCS800, ACS880		Revision: C

3. **ACS880 only.** Leave the Jog button wired to the PLC and change the logic in the PLC to write a different control word sequence. Presently the PLC writes an 1150 (Stop/Ready to Run) and 1151 (Start). The run command is the same as a jog command. To allow the drive to be issued a restart during a stop, bit 0 cannot be used in the Control word, rather Bit 3 (OFF3 CONTROL) must be used. The sequence should be as follows: Set parameter 44.06 Brake control enable = Selected (This parameter will change the reaction of Bit 3 of the Status word. If 44.06 = Not Selected, then a coast to stop will result when Bit 3 is removed from Control Word, if 44.06 = Selected, then ramp to stop will result when Bit 3 is removed from Control Word) Initial state before a start command = 1150 Jog or standard Run Command = 1151 Stop command from either run or jog = 1143 (remove only bit 3) Once Status Word (running bit, Bit 2) resets to a zero, then send 1150 to the Control Word so that it is ready for a restart. If Restart is desired while the 1143 has been issued, and drive has not stopped running (Status Word Bit 2 still = 1), then simply reissue the 1151 and drive will re-enter into a normal running state.

4. **Any ABB Drive running ABB Profile.** This solution can also be implemented with the ACS800. Initial state before a start command = 1150 Jog or standard Run Command = 1151 Stop command from either run or jog = 1087 (remove only bit 6 of Control Word, (RAMP_IN_ZERO) this forces the input to the ramp generator to zero, and thus causes the drive to ramp to zero speed. Once the drive reaches zero speed, it will remain in a modulating state, thus the PLC must monitor actual motor speed and once at zero speed (or below a low speed value) for a period of time, then remove bit 0 and reset bit 6 (1150 dec) and the drive will shut off. If a restart is desired after Bit 6 has been removed from the control word and the drive is ramping to zero speed, then simply reapply bit 6 (1151 dec) and the drive will regain its normal running state.

5. **ACS550 and ACS355 Drive running ABB Profile.** Set parameter 2209, Ramp Input 0 to COMM. Send the stop/ready to run command of 1150 followed by 1151 to start the drive. To stop the drive from a running or jog state, send 1087 (remove bit 6 of Control Word, RAMP_IN_ZERO. This forces the input to the ramp generator to zero speed and causes the drive to ramp to zero speed. However, anytime during the ramp to zero speed sending 1151 will restart the drive and run the drive to the commanded speed reference.

Documents or other reference material:

None

Corrective Actions:

None

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