

Application Note

Using the Yaskawa P5 AC Drive with LonWorks

Applicable Product:

CM047

Subject: Application Note	Product: CM047	Doc#: AN.P5.01
Title: Using the Yaskawa P5 AC Drive with LonWorks		

INTRODUCTION

The following document deals with the issue of a P5+ (GPD506) drive, connected to a LonWorks network and powered up with terminal **S1** closed.

INTENDED AUDIENCE

This document assumes that the reader is familiar with Yaskawa P5/P5+ AC drives and LonWorks.

OVERVIEW OF ISSUE

- The LonWorks option, CM047, is compatible with both the P5 (GPD505) and P5+(GPD506) drives. During the power up sequence, the LonWorks option checks to see which drive it is connected to by **querying** an internal drive register. If the register has the most significant bit (msb) set to **1**, the option recognizes the drive as a P5+ drive. If the register has the most significant bit (msb) set to **0**, the option recognizes the drive as a P5 drive.
- Parameter **n002** controls the source of the run command. If **n002** is set to 6, 7 or 8, the run command will come from the LonWorks controller. If parameter **n002** is set to 1, 3 or 5, the run command will come from the drive terminals.
- With parameter **n002** set to 1, 3 or 5 and terminal **S1** closed, the drive powers up in run mode. The P5/P5+ register queried by the LonWorks option is inaccessible while the drive is in the run mode.
- If the P5/P5+ register is inaccessible, the LonWorks option, by default, determines that it is connected to a P5 instead of a P5+. Since the parameter addressing between the two drive types is slightly different, this causes invalid data to be passed through LonWorks to the controller.

HOW TO CHECK FOR A P5+ DRIVE

- Examine the contents of **nvoDriveStatus**. If the msb is set, the the drive is a P5+ (GPD506) drive.
- **nvoDriveStatus** = [#,#,#,#,#,#,#,#,#,#,#,0] the drive is a P5
- **nvoDriveStatus** = [#,#,#,#,#,#,#,#,#,#,#,1] the drive is a P5+

WORK AROUND FOR LONWORKS CONTROL

- **Work Around #1 – LonWorks Control**
 - The main work around is to handle the run command directly through the LonWorks controller. Program **n002** to 6, 7 or 8 to control the drive run command via the LonWorks controller.
 - If the application dictates that the run command must come from the drive terminals, then another work around must be used.

n002 =	SEQ	REF
6	COM	COM
7	COM	OPR
8	COM	TRM

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WORK AROUNDS FOR 2-WIRE RESET

2-Wire control uses a “maintained” switch or relay contact as the run input. It is used on applications where it is desirable to have the drive restart on restoration of power. It should not be used where safety of attending personnel might be threatened by a restart. This method is generally restricted to unattended fans and pumps, or where another controller is entrusted with the restart decision.

With 2-Wire control terminal **S1** becomes the **Run Forward** command and terminal **S2** becomes the **Run Reverse** command. In this case, the drive will power up with run active if either terminal **S1** or **S2** is closed at that time.

- **Work Around #2 -- S1 Becomes A Safety Interlock**

- Program **n002** to 6, 7 or 8 to control the drive run command via the LonWorks controller.
- Program **n040**, terminal **S6**, to 21, PID I Disable. Terminal **S1** then becomes a safety interlock. When **S1** is closed and the drive receives a run command, the drive will run. The drive will Stop whenever either **S1** opens or it receives a Stop command via the LonWorks controller. **Note: only terminal S6, n040, can be programmed to 21 and cause S1 to become a safety interlock.**
- The run command source is the LonWorks controller.

n002 =	SEQ	REF
6	COM	COM
7	COM	OPR
8	COM	TRM

- **Work Around #3 -- Run/Stop Must be Hard Wired**

- Program **n002** to 1, 3 or 5. The run command will be controlled through the drive terminals. If either **S1** or **S2** is closed during power up, the drive will be in the run mode prior to the LonWorks option determining whether it is connected to a P5 or a P5+. This will result in the drive being determined as a P5 drive.
- Move the run FWD connection from terminal **S1** and connect it to an **unused** multi-function output, either terminal **MA** or terminal **M1**.
- Connect the other side of the **selected** multi-function output to **S1**. If **MA** is used, connect **MC** to **S1**. If **M1** is used, connect **M2** to **S1**.
- **If reverse is required**, remove the reverse run connection from terminal **S2** and connect it to **another unused** multi-function output.
- Connect the open terminal of the **selected** multi-function output to **S2**. If **MA** is used, connect **MC** to **S2**. If **M1** is used, connect **M2** to **S2**.
- Program the **necessary** multi-function outputs to 11, Timer Function. Parameter **n041=11** for **MA-MC** and **n042=11** for **M1-M2**.
- Program **n080**, On-Delay Timer, to a value greater than 2.0 seconds.
- Connect one of the unused multi-function input terminals, **S4**, **S5** or **S6**, to terminal **SC**.
- Program the parameter of that **particular** multi-function input (**n038** to **n040**) to 22, Timer Function.
- This will cause a two second delay in the run command after a power up. Giving the LonWorks option enough time to correctly determine whether the drive is a P5 (GPD505) drive or a P5+ (GPD506) drive.

n002 =	SEQ	REF
1	TRM	OPR
3	TRM	TRM
5	TRM	COM

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WORK AROUNDS FOR 3-WIRE RESET

3-wire **control** utilizes “momentary” buttons or switches. This control scheme emulates the traditional 3-wire motor starter control. If **S2** is closed, momentary closure of **S1** latches the drive in the run mode. A momentary opening of **S2** unlatches run mode bringing the drive to a stop. The 3-wire sequence is used where it would be dangerous for the drive to restart after a power outage.

With **3-Wire control** terminal **S1** becomes the **run** command and terminal **S2** becomes the **normally closed stop** command. In this case, the drive will power up with Run active if terminal **S2** is closed and terminal **S1** is closed momentarily during that time. The run direction is determined by the state of terminal **S3**.

- **Work Around #4 -- S1 Becomes A Safety Interlock**

- This method is not available to a 3-wire reset.
- In 3-wire **control**, terminal **S1** is a momentary run input. Terminal **S2** is a N.C. Stop input and is considered the safety interlock. If **S2** is closed and **S1** is closed momentarily, the run command is latched inside the drive through Terminal **S2**. The drive will stop whenever **S2** opens regardless of the state of **S1**.

- **Work Around #5 -- Run/Stop Must be Hard Wired**

- Program **n002** to 1, 3 or 5. The run command will be controlled through the drive terminals. If terminals **S1** and **S2** are closed during power up, the drive will be in the run mode prior to the LonWorks option determining whether it is connected to a P5 or a P5+. This will result in the drive being determined as a P5 drive.
- Remove the run forward connection from terminal **S1** and connect it to **an unused** multi-function output, either terminal **MA** or terminal **M1**.
- Connect the other side of the **selected** multi-function output to **S1**. If **MA** is used, connect **MC** to **S1**. If **M1** is used, connect **M2** to **S1**.
- Program **the necessary** multi-function output **M1-M2** or **MA-MC** to 11, Timer Function. Parameter **n041=11** for **MA-MC** and **n042=11** for **M1-M2**.
- Program **n080**, On-Delay Timer, to a value greater than 2.0 seconds.
- Connect one of the free multi-function inputs, terminals **S4**, **S5** or **S6**, to terminal **SC**.
- Program the parameter of that **particular** multi-function input (**n038** to **n040**) to 22, Timer Function.
- This will cause a two second delay in the run command after a power up. Giving the LonWorks option enough time to correctly determine whether the drive is a P5 (GPD505) drive or a P5+ (GPD506) drive.

n002 =	SEQ	REF
1	TRM	OPR
3	TRM	TRM
5	TRM	COM

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