

Tech Note

Submitted By: James Cox **Date Submitted:** 6.22.2018
Description: ACS880 – Setting up a simple PID Loop
Category: Hints & Tips

Brief Description:

This note is intended to guide a user through the set-up of a PID controller within the ACS880 with Primary (Standard) Firmware.

Overview

Example assumes motor data and basic functionality has already been configured for operating in DTC mode.

Example: Controlling a Compressor

Specifications:

0-125 PSI, 0-10V feedback
65 PSI, Fixed Internal Set Point
Speed Range 300 to 1800 RPM
DI1 Start/Stop Signal
DI3 Constant Speed Select 300 RPM
Always in EXT 2 (PID Control)

Select PID Macro

Par **96.04** Macro Select: **PID Macro**

A default set of parameters for PID will be set in the drive (Reference [ACS880 Firmware Manual](#) for complete description). Depending on your current IO, you may see an error on the display. Press Hide & Continue.

Set the following parameters:

Par **19.11** EXT ½ Select: **EXT 2**

Par. **20.08** EXT2 In1 Source: **DI1**

Par **20.12** Run Enable 1 Source: **Selected** (If a permissive signal is required Run Enable, it can be set here)

Scale the Analog

Par **12.25** AI2 Unit Selection: **V**

Par **12.27** AI2 Min: **0 V**

Par **12.28** AI2 Max: **10 V**

Par **12.29** AI2 Scaled Min: **0**

Par **12.30** AI2 Scaled Max: **125**

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PID Scaling & Set point

Par **40.12** Set 1 Unit Selection: **PID User unit 1**

Par **40.14** Set 1 set point scaling: **125**

Par **40.15** Set 1 output scaling: **1800**

Par **40.16** Set 1 set point 1 source: **Internal Setpoint**

Par **40.21** Set 1 Internal set point: **65**

Note – common requests are to have the set point adjusted by the Control Panel (Keypad). In such cases, simply select **Par 40.16** Set 1 set point 1 source: **Control Panel**

Limit the Control Range

Par **40.36** Set 1 output min: **300** (This value should match Par 30.11 Minimum Speed)

Par **40.37** Set output max: **1800** (This value should match Par 30.12 Maximum Speed)

Displaying PID values on the main screen

Press Back until the Menu Screen is shown

Arrow up to Settings and press select

Arrow down to Edit Texts

Locate **PID User unit 1** and change to **PSI**

Navigate to Par **40.02** for the Process PID Feedback

Press **View => add to view**

The display will return to the home screen with a flashing box on the current selected area. Press the up/down or right/left arrows to choose alternate screens or locations and then press **Replace**.

Repeat step above for Par **40.03** for the Process PID Set Point & **40.04** for Process PID Deviation

Tuning

Par **40.32** Set 1 Gain

Par **40.33** Set 1 Integration time

These values are very conservative from factory default and can be adjusted to suit the process needs.

Recommended compressor settings: Gain 5, Integration 10

Note – the use of PID User Units to display in PSI is a function of the keypad and is not internally stored programming. If multiple drives are configured with copies parameter sets, each VFD will need to have this function entered at the keypad.

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Optional Sleep Function

The sleep function can be used in PID control applications where the consumption varies. When used, it stops the pump completely during low demand, instead of running the pump slowly below its efficient operating range.

In this example:

Sleep mode begins if the motor has run at minimum speed for 60 seconds (65 PSI on the compressor)

The drive will Wake when the PID feedback has dropped below 55 PSI for more than 5 seconds

Par **40.41** Set 1 Sleep Mode: **Internal**

Par **40.42** Set 1 Sleep Enable: **Selected**

Par **40.43** Sleep Level: **300**

Par **40.44** Sleep Delay: **60**

Par **40.47** Set 1 Wake up deviation: **10 PSI**

Par **40.48** Set 1 Wake up delay: **5**

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