Optidrive Applications Support Library

Application Note	AN-ODV-2-076
Title	Using the Pump Clean Function
Related Products	Optidrive HVAC
Level **1**	1 – Fundamental - No previous experience necessary 2 – Basic – Some Basic drives knowledge recommended 3 – Advanced – Some Basic drives knowledge required 4 – Expert – Good experience in topic of subject matter recommended

Overview

The Pump cleaning function is used to remove blockages from a pump. The pump clean function can be manually triggered by a digital input or can be triggered automatically on start-up, or when the drive detects an over-torque condition (due to blockage forming).

When the Pump cleaning cycle is activated the Optidrive HVAC will perform a predefined motion profile (cleaning cycle) in order to attempt to remove the blockage.

Operational Overview

The pump cleaning function is enabled or disabled and its automatic triggering defined by parameter P8-03 Pump Cleaning Function Configuration. Options included for parameter P8-03 include:

> 0. Disabled
> 1. Pump cleaning function activated on drive start up
> 2. Pump cleaning function activated on drive start up or over-torque detection
> 3. Pump cleaning function activated on over-torque detection

If either option 1 or option 2 is selected for P8-03 then the drive will run the pump cleaning cycle immediately on drive enable (enable command given of digital input 1, drive terminal 2). Once the pump cleaning cycle is complete the drive will return to normal set-point control.

If either option 2 or option 3 is selected for P8-03 then the Load Profile Monitoring function must be set-up in order to detect an over-torque condition. Set up the Load Profile Monitoring function as per the instructions in this guide.

Refer to Application Note AN-ODV-2-075 Load Torque Monitoring Function.

When the Pump cleaning function is triggered from an over-torque condition then the drive does not go into an over-torque trip following an over torque condition but instead automatically runs the pump clean function. On exiting the pump clean function the drive will return to its normal operating set-point. If any further over-torque events occur within 60 seconds of a pump clean function finishing then this will then cause an over-torque trip.

Further attempts to clean the pump (up to a maximum of 5 attempts) can be programmed through the Automatic Trip Reset function (see P2-36 – Start Mode Select). When auto-restarting from an over-torque trip the drive will automatically run the pump clean function provided the pump clean function is enabled.

If a digital input is assigned to this function then it will activate the pump clean sequence regardless of the setting of parameter P8-03 (Pump Cleaning Function Configuration). When the Pump Clean Function is initiated via an input to the drive, the drive will ramp immediately from its current operation speed to the first speed defined by the pump clean cycle using applicable ramp rates.

The digital input assignment for the pump cleaning function is defined through P9-42 – Clean trigger input edge. Menu 9 can only be accessed using the advanced level security access (default P1-14 – 201). Set P9-42 with the value associated with the digital input to be used.

The Pump Cleaning cycle is defined by setting two segment speeds, a ramp time (used for acceleration and deceleration), and a segment time in the following parameters:

Parameter Number	Description
P2-05	Clean Speed 1
P2-06	Clean Speed 2
P8-04	Pump Cleaning Function Time Interval
P8-05	Pump Cleaning Function Ramp Time

If either of the two Pump Cleaning Speeds are set to zero then that segment of the cleaning cycle is disabled. Pump cleaning speeds can be set with positive or negative values to allow forward or reverse motion to be performed and two stage or bidirectional profiles to be created. The Acceleration ramp for the pump clean function is determined by setting P8-05. The deceleration ramp rate is determined by the standard deceleration ramp parameter P1-04.

⚠️ **Caution: Always ensure that the pump is suitable for reverse operation before applying a negative speed reference to either Clean Speed 1 or Clean Speed 2 (P2-05 & P2-06).**

An example of the Pump cleaning profile is shown below.
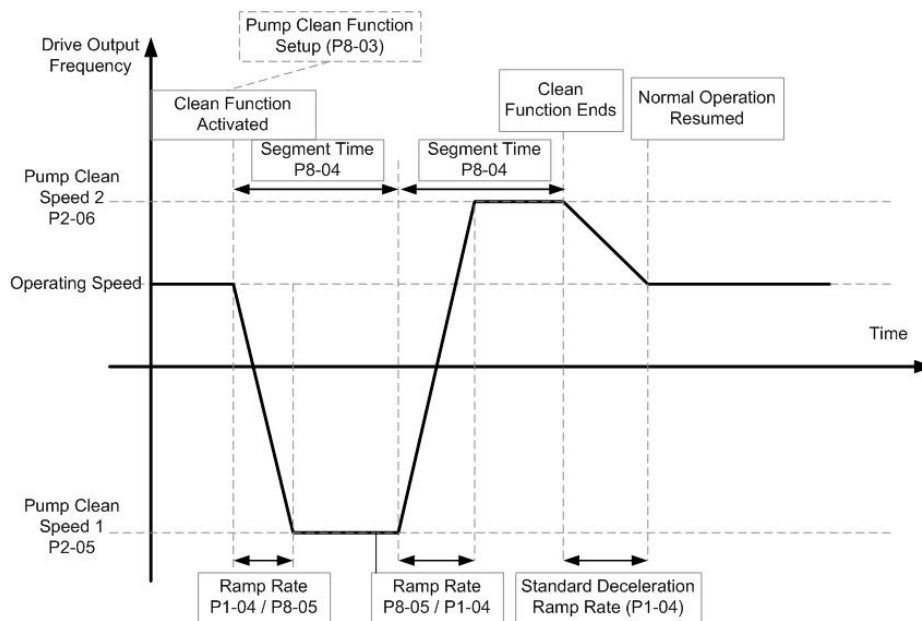
When the Pump Cleaning function is completed the drive returns immediately to the current set-point speed. Return to normal operating speed is done using the standard ramp settings (P1-03 / P1-04). Segment execution time (set in P8-04) encompasses the time taken to accelerate the motor to the cleaning speed but does not include the ramped return to normal operating speed.

Quick Setup Overview:

- If the Pump Cleaning function is to be triggered by an over-torque condition then **section 7.4, Load Profile Monitoring Function must be commissioned prior to set-up of the Pump Clean function.**
- Set Basic parameters P1-01 to P1-10. Energy Optimiser P1-06 must remain disabled.
- Set Parameter P1-14 = 101 to allow access to advanced parameters in menu 8
- Set the segment speed for each cleaning segment in parameters P2-05 and P2-06
- Enable the Pump Clean function by setting P8-03. Setting of P8-03 is not necessary if the Pump Clean function is activated only by a digital input.
  - 0: Disabled
  - 1: Activated on enable (Pump start up)
  - 2: Activated on enable (Pump start up), or operation in Over-torque region
  - 3: Activated by operation in Over-torque region
- Set the segment time for the cleaning cycle in parameter P8-04. This is the time to run each cleaning segment, including acceleration.
- Set a ramp time for the Pump Clean function is P8-05. This is the ramp rate to use in accelerating to Pump Clean Speed 1 and Pump Clean Speed 2.

Appendix:

Revision History			
Issue	Comments	Author	Date
01	Document Creation	KB	23/04/14