
Pump Control for Energy Management

DOC 106A

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Generally

For most press brakes it is desirable to minimize the energy usage within the plant. The iCON system has a built in energy management system operating from the iCON-1 motion controller. This feature operates in different control modes as selected by the commissioning engineer. Each Control Mode features functions which are “setting specific” to that mode. I/O points are assigned a Type number as described following. These functions are available in the Maintenance screens S8.1. for iCON-100 and within the “Settings” groups for the iCON-10. Refer to DOC 107A for a full description of I/O point Types and the procedures to assign them.

Modes of Pump Motor Operation.

Control Mode – None:

In this mode it is assumed that the pump is always on and ready. The pump is not controlled by iCON.

Control Mode - Basic:

Movement of the tool will be inhibited until the pump is stable. This mode requires at least 1 x iCON-1 Input from the pump delta contactor to advise iCON that the pump is running. An Output can be assign (not mandatory) to turn the pump contactor on or the pump can be started by stand-alone start stop switches. In this case the machine will be inhibited until the assigned Input closes.

Control Mode - Normal:

As per the Basic Mode but the assigned Output will turn the pump OFF after a fixed period of inactivity on the iCON controller.

Control Mode – Auto:

As per Normal Mode but the assigned Output will also turn the pump ON when iCON accepts a command from the operator to initiate a movement of the tool (eg. Pressing a footswitch will cause the pump to start). The pump in some cases may be controlled by VSD (Variable speed drive) set up to run 2 speeds. An idle speed (eg. 15hz) which will run after an inactivity time out occurs and a Fast speed (eg. 50 or 60Hz). See setting 5 for this application.

Pump Control Settings:

Five settings are included with iCON to facilitate the various operational modes.

Setting 1- **Selects the Control mode** as detailed above.

Setting 2 – **Wind down time**. If the pump is stopped and that is monitored by iCON then it will prevent the short cycling of the pump until this timer has expired. Time in seconds.

Setting 3 – **Wind up time**. The time in seconds it takes for the pump to reach full speed after a new start. It should include the star delta change time. iCON will inhibit movement until this timer has expired.

Setting 4 – **Idle time**. The time delay (minutes) after the last requested move by an operator and when iCON will automatically turn the pump off.

Setting 5 – **Minimum VSD output** – This is the minimum DAC output from iCON to keep the pump just on idle when in the “off” condition. This function is not yet implemented.

Required Inputs:

In order to take advantage of these functions offered by iCON inputs must be assigned as required for the various modes.

Input A – Start/Stop Pump. A normally open contact from a momentary Start/Stop button. Close this contact for about 0.3 secs to initiate a pump start. Hold it closed for more than 3 secs to cause iCON to stop the pump. The INput selected will be required to be assigned the Type number of 14 for N.O. or 15 for N.C. active. For example use IN16 (CON4/8).

Input B.- Pump Running. To operate in the Basic, Normal and Auto modes described above a second INput is required to monitor the pump running contactor or flow switch. Until this input closes, the message “Pump Not Running” is displayed to the operator. This input will require the Type number to be assigned as 16 for N.O. and 17 for N.C. as the active condition. For example use IN15 (CON4/7).

Output A – Run Pump. To operate in Normal or Auto modes an OUTPUT will be assigned Type 15. This output will actuate the pump contactor. The pump should be ON when this output is ON and OFF when this output is OFF. For example use OUT 16 (CON6/8) This output will drive a 24V DC relay coil which will activate the Start contactor.

Output B – Pump Running Indicator. A pump running indicator lamp can be driven by another OUTPUT with the Type assigned as 14. This indicator lamp will blink slowly when the pump is off but ready to be actuated. Blinks fast when the pump is running up to speed and remains steady ON when the pump is running proper. For example use OUT 15 (CON6/7).