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# Optidrive Applications Support Library

Application Note	AN-ODV-2-025
Title	**Remote Push-button Speed Control**
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

For some applications it can be preferable to control the speed of a motor by increasing and decreasing speed using push-button controls mounted on a control panel or operator station, sometimes referred to as Digital Potentiometer Speed Control. This application note describes two examples of how this can be implemented on the Optidrive HVAC.

Solution One Wiring Diagram

The Following circuit uses a standard single pole switch for start and stop control with momentary push buttons to increase and decrease speed.
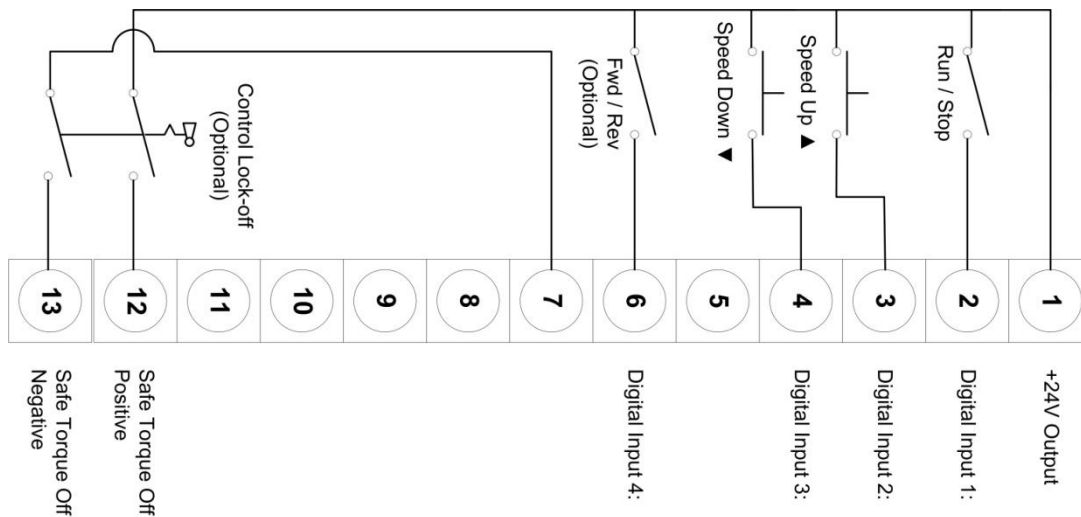
Solution One Operation

The optional lock off provides a useful feature which stops operation of all of the other input functions and prevents operation of the drive when in the open position. It could be provided as a key switch or a lock off on the control panel. The start mode for the drive is set to edge triggered so that the start input must always be applied after the control lock-off is disabled (closed). If this input is to provide a safety related input for the application then it must be configured as per the relevant safety standard to the safety levels specified therein.

The Run/Stop input provides a Run command to the drive when the switch is in the closed position and a Stop when the switch is open.

The Speed Up and Speed Down are momentary push buttons that are held in to increase or decrease the speed reference to the drive.

The Fwd / Rev switch is optional depending on whether bi-directional (forward and reverse) motor rotation is required. The drive operates in the forward direction when the switch is open and reverses when the switch closes.

Solution One parameter Set-up

The drive should be defaulted back to factory settings prior to set-up. The following parameters are set within the drive to activate the functionality shown in the control diagram. Check all parameters have been set correctly prior to enabling the drive. Note that Parameter P1-14 must be set to the value listed in the table before access will be permitted to menu 2 and 9 parameters.

Parameter Changes:

Par	Description	Value	Par	Description	Value
P1-13	Digital inputs function select	0	P9-18	Speed select input 0	Off
P1-14	Extended Menu Access code	201	P9-19	Speed select input 1	Off
P2-36	Start Mode Select	Edge-r	P9-28	Remote up input source	Din-2
P9-06	Reverse enable	Din-4	P9-29	Remote down input source	Din-3
P9-10	Speed source 1	D-Pot			

Menu 9 Reference (Parameter remaining at Default):

Par	Description	Value	Par	Description	Value
P9-01	Enable input source	Din-1	P9-09	Terminal ctrl override source	On
P9-02	Fast stop input source	Off	P9-11 – P9-17	Speed Source Reference 2 - 8	Not Applicable
P9-03	Run (FWD) input source	Din-1	P9-20	Speed select input 2	Off
P9-04	Run (REV) input source	Off	P9-21 – P9-23	Preset Speed Selection	Not Applicable
P9-05	Latch function enable	Off	P9-24 – P9-27	Ramp Selection	Not Applicable
P9-07	Reset input source	Din-1	P9-30 – P9-31	Speed Limit Switches	Not Applicable
P9-08	External Trip input source	Off	P9-32 – P9-41	PID and Output Functions	Not Applicable

The above table is included as a reference so the full configuration of menu 9 can be observed.

Solution Two Wiring Diagram

The Following circuit uses a standard momentary switches for start and stop control and for the push buttons to increase and decrease speed.
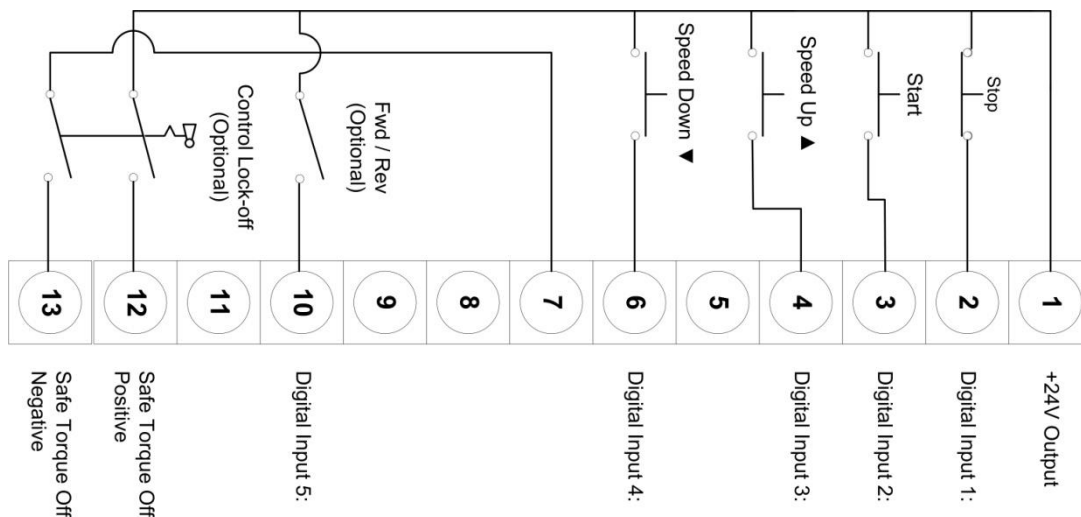
Solution Two Operation

Fully detail of the optional lock off is provided in solution one operation description.

The Stop input is a normally closed momentary switch that provides a stop command to the drive when opened. The drive will stop when this switch is activated (opened) and will prevent the drive starting whilst held in the open position. The switch is a normally closed configuration to help protect against wire-break in the control circuitry.

The Start input is a normally open momentary switch that provides a Run command to the drive when the switch is closed. The input is latched so that the switch can be released once the drive is started and will continue to run until over-written by a stop input.

The Speed Up and Speed Down are momentary push buttons that are held in to increase or decrease the speed reference to the drive.

The Fwd / Rev switch is optional depending on whether bi-directional (forward and reverse) motor rotation is required. The drive operates in the forward direction when the switch is open and reverses when the switch closes.

Solution Two parameter Set-up

The drive should be defaulted back to factory settings before the following parameters are set within the drive. Check all parameters have been set correctly prior to enabling the drive.
Note that Parameter P1-14 must be set to the value listed in the table before access will be permitted to menu 9 parameters.

Parameter Changes:

Par	Description	Value
P1-13	Digital inputs function select	0
P1-14	Extended Menu Access code	201
P2-36	Start Mode Select	Edge-r
P9-03	Run (FWD) input source	Din-2
P9-05	Latch function enable	On
P9-06	Reverse enable	Din-5

Par	Description	Value
P9-10	Speed source 1	D-Pot
P9-18	Speed select input 0	Off
P9-19	Speed select input 1	Off
P9-28	Remote up input source	Din-3
P9-29	Remote down input source	Din-4

Menu 9 Reference (Parameter remaining at Default):

Par	Description	Value
P9-01	Enable input source	Din-1
P9-02	Fast stop input source	Off
P9-04	Run (REV) input source	Off
P9-07	Reset input source	Din-1
P9-08	External Trip input source	Off
P9-09	Terminal ctrl override source	On

Par	Description	Value
P9-11 – P9-17	Speed Source Reference 2 - 8	Not Applicable
P9-20	Speed select input 2	Off
P9-21 – P9-23	Preset Speed Selection	Not Applicable
P9-24 – P9-27	Ramp Selection	Not Applicable
P9-30 – P9-31	Speed Limit Switches	Not Applicable
P9-32 – P9-41	PID and Output Functions	Not Applicable

The above table is included as a reference so the full configuration of menu 9 can be observed.

Notes on Remote Push-button Speed Control:

The rate of change of the set-point is pre-set within the drive to match the ramp rates set in P1-03 (acceleration ramp) and P1-04 (deceleration ramp) and cannot be adjusted independently. Therefore, as the ramp rate parameters are increased / decreased, the rate of change of the motor set-point is correspondingly altered. The frequency shown on the drive display should match closely the drive output speed to the motor at any given time.
The momentary push buttons for increasing and decreasing the speed set-point are mirrored by the up and down push buttons on the drive keypad. The Stop / Start keypad buttons have no effect on drive operation unless the drive is configured in keypad over-ride mode. The start / stop push buttons on the keypad are disabled for normal operation.
If both speed set-point push buttons (increase and decrease) are operated simultaneously then the decrease speed button will over-ride the functionality of the increase speed push button and the speed set-point will decrease.

Appendix

Revision History			
Issue	Comments	Author	Date
01	Document Creation	JP	08/02/12
02	Updated to new format	KB	28/04/14