PowerFlex 40

Reference

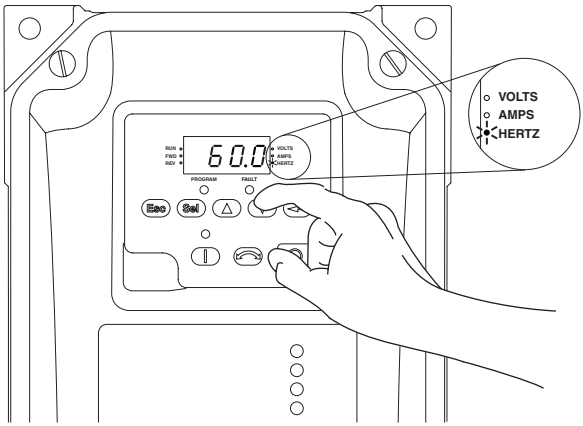
PowerFlex 40 *Quick Start,* Publication 22B-QS001… and PowerFlex 40 *User Manual,* Publication 22B-UM001…

Both publications are supplied with the drive.

Changing the Speed Reference of an IP66, NEMA/UL Type 4X rated drive

When a Display Group parameter, for example, d001 [Output Freq] is displayed, and P038 [Speed Ref] is set to A069 [Internal Freq], you can change the internal frequency using the Up Arrow and Down Arrow keys.

When the internal frequency is being adjusted, its value is displayed and the Hertz LED flashes. Any changes are saved immediately. The display then returns to the Display Group parameter previously shown.



Default Settings

By default, the speed reference of an IP66, NEMA/UL Type 4X rated drive is set to the internal frequency, A069 [Internal Freq].

The default value of A069 [Internal Freq] is 0 Hz. For IP20 rated PowerFlex 40 drives, the default value of this parameter is 60 Hz.

TIP: You can also change the speed reference by editing the parameter A069 [Internal Freq] in program mode. For details on how to enter the program mode, refer to the *User Manual*.

Multiple Digital Input Connections

Customer inputs can be wired per External Supply (SRC) only. SRC examples are shown on pages 1-19 and 1-20 of the *User Manual*.

The following attention paragraph replaces the one on pg 1-22 of the *User Manual*.

ATTENTION: Digital inputs on multiple drives should **not** be tied together when using SNK (Internal Supply) mode. In SNK mode, if power is removed from one drive, inadvertent operation of other drives that share the same I/O Common connection may occur.

New Advanced Program Group Parameter

The following parameter has been added with firmware version 5.xx.

A167 [PID Invert Error]

When set to "Inverted", changes the sign of the PID error. This causes an increase in the drive output frequency with PID Feedback greater than PID Setpoint, and a decrease in drive output frequency with PID Feedback less than PID Setpoint.

Options	0 "Not Inverted" (Default)	1 "Inverted"

Recommended Action for Fault F3

The description for fault F3 and the recommended actions to take when fault F3 occurs are revised.

No.	Fault	Type[1]	Description	Action
F3	Power Loss	②	Excessive DC bus voltage ripple.	1. Monitor the incoming line for phase loss or line imbalance. 2. Check input line fuse.

[1]Non-Resetable fault. This type of fault may require drive or motor repair, or is caused by wiring or programming errors. The cause of the fault must be corrected before the fault can be cleared.

Parameter Updates

The following parameter descriptions have been revised.

d012 [Control Source]

Related Parameter(s): P036, P038, A051-A054

Displays the active source of the Start Command and Speed Command which are normally defined by the settings of P036 [Start Source] and P038 [Speed Reference] but may be overridden by digital inputs. Refer to the flowcharts on pages 1-23 and 1-24 of the *User Manual* for details.

Start Command — Digit 0
0 = Keypad
1 = 3-Wire
2 = 2-Wire
3 = 2-Wire Level Sensitive
4 = 2-Wire High Speed
5 = RS485 (DSI) Port
9 = Jog

Speed Command — Digit 1
0 = Drive Potentiometer
1 = A069 [Internal Freq]
2 = 0-10V Input/Remote Potentiometer
3 = 4-20mA Input
4 = A070-A077 [Preset Freq x] (A051 - A053 [Digital Inx Sel] must be set to 4)
5 = RS485 (DSI) Port
6 = StepLogic Control (Parameters A140 - A147)
7= Anlg In Mult
8= PID
9 = Jog Freq

Reserved — Digit 2

Reserved — Digit 3

Values	Default:	Read Only
	Min/Max:	0/9
	Display:	1

P036 [Start Source]

Related Parameter(s): d012, P037

Stop drive before changing this parameter.

Sets the control scheme used to start the drive.

Refer to page 1-23 of the *User Manual* for details about how other drive settings can override the setting of this parameter.

Important: For all settings except option 3, the drive must receive a leading edge from the start input for the drive to start after a stop input, loss of power or fault condition.

Options	**0**	"Keypad" (Default)	• Integral keypad controls drive operation. • I/O Terminal 1 "Stop" = coast to stop. • When active, the Reverse key is also active unless disabled by A095 [Reverse Disable].
	1	"3-Wire"	I/O Terminal 1 "Stop" = stop according to the value set in P037 [Stop Mode].

P036 Options (Cont.)	**2**	"2-Wire"	I/O Terminal 1 "Stop" = coast to stop.
	3	"2-W Lvl Sens"	Drive will restart after a "Stop" command when: • Stop is removed and • Start is held active

ATTENTION: Hazard of injury exists due to unintended operation. When P036 [Start Source] is set to option 3, and the Run input is maintained, the Run inputs do not need to be toggled after a Stop input for the drive to run again. A Stop function is provided only when the Stop input is active (open).

	4	"2-W Hi Speed"	**Important:** There is greater potential voltage on the output terminals when using this option. • Outputs are kept in a ready-to-run state. The drive will respond to a "Start" command within 10 ms. • I/O Terminal 1 "Stop" = coast to stop.
	5	"Comm Port"	• Remote communications. Refer to Appendix C for details. • I/O Terminal 1 "Stop" = coast to stop.
	6	"Momt FWD/REV"	• Drive will start after a momentary input from either the Run FWD Input (I/O Terminal 02) or the Run REV Input (I/O Terminal 03). • I/O Terminal 1 "Stop" = coast to stop.

A055 [Relay Out Sel]

Related Parameter(s): P033, A056, A092, A140-A147, A150-A157, A160, A161

Sets the condition that changes the state of the output relay contacts.

Options	**0**	"Ready/Fault" (Default)	Relay changes state when power is applied. This indicates that the drive is ready for operation. Relay returns drive to shelf state when power is removed or a fault occurs.
	1	"At Frequency"	Drive reaches commanded frequency.
	2	"MotorRunning"	Motor is receiving power from the drive.
	3	"Reverse"	Drive is commanded to run in reverse direction.
	4	"Motor Overld"	Motor overload condition exists.
	5	"Ramp Reg"	Ramp regulator is modifying the programmed accel/decel times to avoid an overcurrent or overvoltage fault from occurring.
	6	"Above Freq"	• Drive exceeds the frequency (Hz) value set in A056 [Relay Out Level]. • Use A056 to set threshold.
	7	"Above Cur"	• Drive exceeds the current (% Amps) value set in A056 [Relay Out Level]. • Use A056 to set threshold. **Important:** Value for A056 [Relay Out Level] must be entered in percent of drive rated output current.
	8	"Above DCVolt"	• Drive exceeds the DC bus voltage value set in A056 [Relay Out Level]. • Use A056 to set threshold.
	9	"Retries Exst"	Value set in A092 [Auto Rstrt Tries] is exceeded.

A055 Options (Cont.)	**10** "Above Anlg V"	• Analog input voltage (I/O Terminal 13) exceeds the value set in A056 [Relay Out Level]. • Do not use if A123 [10V Bipolar Enbl] is set to 1 "Bi-Polar In". • This parameter setting can also be used to indicate a PTC trip point when the input (I/O Terminal 13) is wired to a PTC and external resistor. • Use A056 to set threshold.
	11 "Logic In 1"	An input is programmed as "Logic In 1" and is active.
	12 "Logic In 2"	An input is programmed as "Logic In 2" and is active.
	13 "Logic 1 & 2"	Both Logic inputs are programmed and active.
	14 "Logic 1 or 2"	One or both Logic inputs are programmed and one or both is active.
	15 "StpLogic Out"	Drive enters StepLogic step with Digit 3 of Command Word (A140 - A147) set to enable StepLogic output.
	16 "Timer Out"	• Timer has reached value set in A056 [Relay Out Level]. • Use A056 to set threshold.
	17 "Counter Out"	• Counter has reached value set in A056 [Relay Out Level]. • Use A056 to set threshold.
	18 "Above PF Ang"	• Power Factor angle has exceeded the value set in A056 [Relay Out Level]. • Use A056 to set threshold.
	19 "Anlg In Loss"	Analog input loss has occurred. Program A122 [Analog In Loss] for desired action when input loss occurs.
	20 "ParamControl"	Enables the output to be controlled over network communications by writing to A056 [Relay Out Level]. (0 = Off, 1 = On.) With FRN 4.01 and later, the logic command word bit 15 has full control of A056. See page C-4 of the *User Manual*.
	21 "NonRec Fault"	• Value set in A092 [Auto Rstrt Tries] is exceeded. • A092 [Auto Rstrt Tries] in not enabled. • A Non-resettable fault has occurred.
	22 "EM Brk Cntrl"	EM brake is energized. Program A160 [EM Brk Off Delay] and A161 [EM Brk On Delay] for desired action.
	23 "Above Fcmd"	The current commanded frequency exceeds the value set in A056 [Relay Out Level].

A056 [Relay Out Level]

Related Parameter(s): A055, A058, A061

32 32 bit parameter.

Sets the trip point for the digital output relay if the value of A055 [Relay Out Sel] is 6, 7, 8, 10, 16, 17, 18 or 20. When the value of A055 is set to 20, the logic command word bit 15 has full control of A056.

A055 Setting	A056 Min/Max
6	0/400 Hz
7	0/180%
8	0/815 Volts
10	0/100%
16	0.1/9999 Secs
17	1/9999 Counts
18	1/180 degs
20	0/1
23	0/400 Hz

Values	Default:	0.0
	Min/Max:	0.0/9999
	Display:	0.1

A058 [Opto Out1 Sel]
A061 [Opto Out2 Sel]

Related Parameter(s): P033, A056, A092, A140-A147, A150-A157

Determines the operation of the programmable opto outputs.

Options	**0**	"Ready/Fault"	Opto outputs are active when power is applied. This indicates that the drive is ready for operation. Opto outputs are inactive when power is removed or a fault occurs.
	1	"At Frequency" (A061 Default)	Drive reaches commanded frequency.
	2	"MotorRunning" (A058 Default)	Motor is receiving power from the drive.
	3	"Reverse"	Drive is commanded to run in reverse direction.
	4	"Motor Overld"	Motor overload condition exists.
	5	"Ramp Reg"	Ramp regulator is modifying the programmed accel/decel times to avoid an overcurrent or overvoltage fault from occurring.
	6	"Above Freq"	• Drive exceeds the frequency (Hz) value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold.
	7	"Above Cur"	• Drive exceeds the current (% Amps) value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold. **Important:** Value for A059 or A062 [Opto Outx Level] must be entered in percent of drive rated output current.
	8	"Above DCVolt"	• Drive exceeds the DC bus voltage value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold.
	9	"Retries Exst"	Value set in A092 [Auto Rstrt Tries] is exceeded.
	10	"Above Anlg V"	• Analog input voltage (I/O Terminal 13) exceeds the value set in A059 or A062 [Opto Outx Level]. • Do not use if A123 [10V Bipolar Enbl] is set to 1 "Bi-Polar In". • This parameter setting can also be used to indicate a PTC trip point when the input (I/O Terminal 13) is wired to a PTC and external resistor. • Use A059 or A062 to set threshold.
	11	"Logic In 1"	An input is programmed as "Logic In 1" and is active.
	12	"Logic In 2"	An input is programmed as "Logic In 2" and is active.
	13	"Logic 1 & 2"	Both Logic inputs are programmed and active.
	14	"Logic 1 or 2"	One or both Logic inputs are programmed and one or both is active.
	15	"StpLogic Out"	Drive enters StepLogic step with Digit 3 of Command Word (A140 - A147) set to enable StepLogic output.
	16	"Timer Out"	• Timer has reached value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold.
	17	"Counter Out"	• Counter has reached value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold.
	18	"Above PF Ang"	• Power Factor angle has exceeded the value set in A059 or A062 [Opto Outx Level]. • Use A059 or A062 to set threshold.

A058, A061 Options (Cont.)	**19** "Anlg In Loss"	Analog input loss has occurred. Program A122 [Analog In Loss] for desired action when input loss occurs.
	20 "ParamControl"	Enables the output to be controlled over network communications by writing to A059 or A062 [Opto Outx Level]. (0 = Off, 1 = On.) With FRN 4.01 and later, the logic command word bit 6 has full control of A059 and bit 7 has full control of A062. See page C-4 of the *User Manual*.
	21 "NonRec Fault"	• Value set in A092 [Auto Rstrt Tries] is exceeded. • A092 [Auto Rstrt Tries] in not enabled. • A Non-resettable fault has occurred.
	22 "EM Brk Cntrl"	EM brake is energized. Program A160 [EM Brk Off Delay] and A161 [EM Brk On Delay] for desired action.
	23 "Above Fcmd"	The current commanded frequency exceeds the value set in A059 or A062 [Opto Outx Level].

A059 [Opto Out1 Level]
A062 [Opto Out2 Level]

32 32 bit parameter.

Determines the on/off point for the opto outputs when A058 or A061 [Opto Outx Sel] is set to option 6, 7, 8, 10, 16, 17, 18 or 20. When the value of A058 is set to 20, the logic command word bit 6 has full control of A059 and when the value of A061 is set to 20, bit 7 has full control of A062.

A058 & A061 Setting	A059 & A062 Min/Max
6	0/400 Hz
7	0/180%
8	0/815 Volts
10	0/100%
16	0.1/9999 Secs
17	1/9999 Counts
18	1/180 degs
20	0/1
23	0/400 Hz

Values	Default:	0.0
	Min/Max:	0.0/9999
	Display:	0.1

A069 [Internal Freq]

Related Parameter(s): P038, A162

Provides the frequency command to the drive when P038 [Speed Reference] is set to 1 "Internal Freq". When enabled, this parameter will change the frequency command in "real time" using the integral keypad Up Arrow or Down Arrow when in program mode.

Important: Once the desired command frequency is reached, the Enter key must be pressed to store this value to EEPROM memory. If the ESC key is used before the Enter key, the frequency will return to the original value following the normal accel/decel curve.

If A051 - A054 [Digital Inx Sel] is set to 16 "MOP Up" or 17 "MOP Down" this parameter acts as the MOP frequency reference.

Values	Default:	60.0 Hz for IP20 rated drives 0.0 Hz for IP66, NEMA/UL Type 4X drives
	Min/Max:	0.0/400.0 Hz
	Display:	0.1 Hz

A130 [PID Trim Hi]

Sets the maximum positive value that is added to the speed reference when PID trim is used.

Values	Default:	60.0
	Min/Max:	0.0/400.0
	Display:	0.1

A131 [PID Trim Lo]

Sets the maximum positive value that is subtracted from the PID reference when PID trim is used.

Values	Default:	0.0
	Min/Max:	0.0/400.0
	Display:	0.1

Writing (06) Logic Command Data

The descriptions of bits 6, 7 and 15 for register address 8192 (Logic Command) are updated.

Logic Command		
Address (Decimal)	**Bit(s)**	**Description**
8192	6	Not Used in FRN 3.03 and earlier. In FRN 4.01 and later, activates Opto Output 1. Note: This bit controls the output when the value of parameter A058 is set to 20.
	7	Not Used in FRN 3.03 and earlier. In FRN 4.01 and later, activates Opto Output 2. Note: This bit controls the output when the value of parameter A061 is set to 20.
	15	Not Used in FRN 3.03 and earlier. In FRN 4.01 and later, activates C-form relay. Note: This bit controls the output when the value of parameter A055 is set to 20.

RS485/Modbus RTU Control Addresses

Reading (03) Logic Command Data

In addition to being written, register address 8192 can now be read using Function Code 03.

Reading (03) Reference

In addition to being written, register address 8193 can now be read using Function Code 03.