Allen-Bradley

PowerFlex® 40

Adjustable Frequency AC Drive

FRN 1.xx - 6.xx

User Manual

Rockwell Automation

Programming and Parameters

Chapter 3 provides a complete listing and description of the PowerFlex 40 parameters. Parameters are programmed (viewed/edited) using the integral keypad. As an alternative, programming can also be performed using DriveExplorer™ or DriveExecutive™ software, a personal computer and a serial converter module. Refer to Appendix B for catalog numbers.

About Parameters

To configure a drive to operate in a specific way, drive parameters may have to be set. Three types of parameters exist:

- **ENUM**
  ENUM parameters allow a selection from 2 or more items. Each item is represented by a number.
- **Numeric Parameters**
  These parameters have a single numerical value (i.e. 0.1 Volts).
- **Bit Parameters**
  Bit parameters have four individual bits associated with features or conditions. If the bit is 0, the feature is off or the condition is false. If the bit is 1, the feature is on or the condition is true.

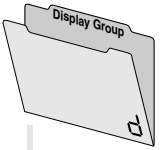
Some parameters are marked as follows.

= Stop drive before changing this parameter.

= 32 bit parameter. Parameters marked 32 bit will have two parameter numbers when using RS485 communications and programming software.

Parameter Organization

Refer to page 3-45 for an alphabetical listing of parameters.



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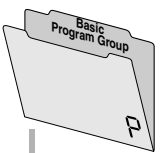
Output Freq	d001
Commanded Freq	d002
Output Current	d003
Output Voltage	d004
DC Bus Voltage	d005
Drive Status	d006
Fault 1 Code	d007
Fault 2 Code	d008
Fault 3 Code	d009
Process Display	d010
Control Source	d012
Contrl In Status	d013
Dig In Status	d014
Comm Status	d015
Control SW Ver	d016
Drive Type	d017
Elapsed Run Time	d018
Testpoint Data	d019
Analog In 0-10V	d020
Analog In 4-20mA	d021
Output Power	d022
Output Power Fctr	d023
Drive Temp	d024
Counter Status	d025
Timer Status	d026
Stp Logic Status	d028
Torque Current	d029



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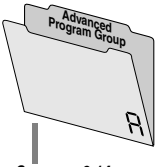
Motor NP Volts	P031
Motor NP Hertz	P032
Motor OL Current	P033
Minimum Freq	P034
Maximum Freq	P035
Start Source	P036
Stop Mode	P037
Speed Reference	P038
Accel Time 1	P039
Decel Time 1	P040
Reset To Defalts	P041
Voltage Class	P042
Motor OL Ret	P043



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Digital In1 Sel	A051
Digital In2 Sel	A052
Digital In3 Sel	A053
Digital In4 Sel	A054
Relay Out Sel	A055
Relay Out Level	A056
Opto Out1 Sel	A058
Opto Out1 Level	A059
Opto Out2 Sel	A061
Opto Out2 Level	A062
Opto Out Logic	A064
Analog Out Sel	A065
Analog Out High	A066
Accel Time 2	A067
Decel Time 2	A068
Internal Freq	A069
Preset Freq 0	A070
Preset Freq 1	A071
Preset Freq 2	A072
Preset Freq 3	A073
Preset Freq 4	A074
Preset Freq 5	A075
Preset Freq 6	A076
Preset Freq 7	A077
Jog Frequency	A078
Jog Accel/Decel	A079
DC Brake Time	A080
DC Brake Level	A081
DB Resistor Sel	A082
S Curve %	A083
Boost Select	A084
Start Boost	A085
Break Voltage	A086
Break Frequency	A087
Maximum Voltage	A088
Current Limit 1	A089
Motor OL Select	A090
PWM Frequency	A091
Auto Rstrt Tries	A092
Auto Rstrt Delay	A093
Start At PowerUp	A094
Reverse Disable	A095
Flying Start En	A096
Compensation	A097
SW Current Trip	A098
Process Factor	A099
Fault Clear	A100
Program Lock	A101
Testpoint Sel	A102
Comm Data Rate	A103
Comm Node Addr	A104
Comm Loss Action	A105

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Comm Loss Time	A106
Comm Format	A107
Language	A108
Anlg Out Setpt	A109
Anlg In 0-10V Lo	A110
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Anlg In4-20mA Lo	A112
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Current Limit 2	A118
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PID Trim Hi	A130
PID Trim Lo	A131
PID Ref Sel	A132
PID Feedback Sel	A133
PID Prop Gain	A134
PID Integ Time	A135
PID Diff Rate	A136
PID Setpoint	A137
PID Deadband	A138
PID Preload	A139
Stp Logic 0	A140
Stp Logic 1	A141
Stp Logic 2	A142
Stp Logic 3	A143
Stp Logic 4	A144
Stp Logic 5	A145
Stp Logic 6	A146
Stp Logic 7	A147
Stp Logic Time 0	A150
Stp Logic Time 1	A151
Stp Logic Time 2	A152
Stp Logic Time 3	A153
Stp Logic Time 4	A154
Stp Logic Time 5	A155
Stp Logic Time 6	A156
Stp Logic Time 7	A157
EM Brk Off Delay	A160
EM Brk On Delay	A161
MOP Reset Sel	A162
DB Threshold	A163
Comm Write Mode	A164
Anlg Loss Delay	A165
Analog In Filter	A166
PID Invert Error	A167

Display Group

d001 [Output Freq]

Related Parameter(s): d002, d010, P034, P035, P038

Output frequency present at T1, T2 & T3 (U, V & W).

Values	Default:	Read Only
	Min/Max:	0.0/P035 [Maximum Freq]
	Display:	0.1 Hz

d002 [Commanded Freq]

Related Parameter(s): d001, d013, P034, P035, P038

Value of the active frequency command. Displays the commanded frequency even if the drive is not running.

Important: The frequency command can come from a number of sources. Refer to Start and Speed Reference Control on page 1-23 for details.

Values	Default:	Read Only
	Min/Max:	0.0/P035 [Maximum Freq]
	Display:	0.1 Hz

d003 [Output Current]

The output current present at T1, T2 & T3 (U, V & W).

Values	Default:	Read Only
	Min/Max:	0.00/(Drive Rated Amps × 2)
	Display:	0.01 Amps

d004 [Output Voltage]

Related Parameter(s): P031, A084, A088

Output voltage present at terminals T1, T2 & T3 (U, V & W).

Values	Default:	Read Only
	Min/Max:	0/Drive Rated Volts
	Display:	1 VAC

d005 [DC Bus Voltage]

Present DC bus voltage level.

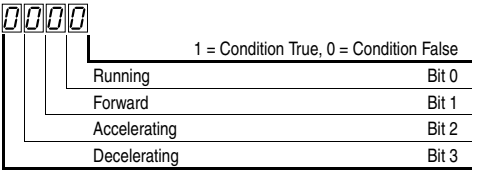
Values	Default:	Read Only
	Min/Max:	Based on Drive Rating
	Display:	1 VDC

Display Group *(continued)*

d006 [Drive Status]

Related Parameter(s): A095

Present operating condition of the drive.



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

d007 [Fault 1 Code]
d008 [Fault 2 Code]
d009 [Fault 3 Code]

A code that represents a drive fault. The codes will appear in these parameters in the order they occur (d007 [Fault 1 Code] = the most recent fault). Repetitive faults will only be recorded once.

Refer to Chapter 4 for fault code descriptions.

Values	Default:	Read Only
	Min/Max:	F2/F122
	Display:	F1

d010 [Process Display]

Related Parameter(s): d001, A099

32 32 bit parameter.

The output frequency scaled by A099 [Process Factor].

Output Freq x Process Factor = Process Display

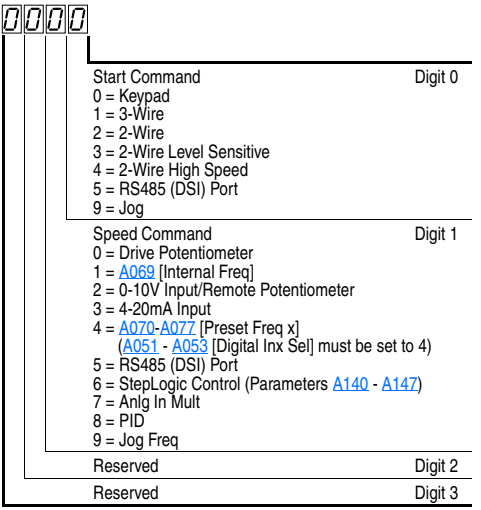
Values	Default:	Read Only
	Min/Max:	0.00/9999
	Display:	0.01 – 1

Display Group *(continued)*

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 for details.



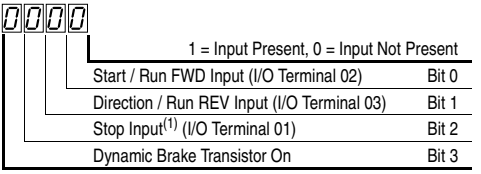
Values	Default:	Read Only
	Min/Max:	0/9
	Display:	1

d013 [Contrl In Status]

Related Parameter(s): d002, P034, P035

Status of the control terminal block control inputs.

Important: Actual control commands may come from a source other than the control terminal block.



(1) The stop input must be present in order to start the drive.
When this bit is a 1 the drive can be started.
When this bit is a 0 the drive will stop.

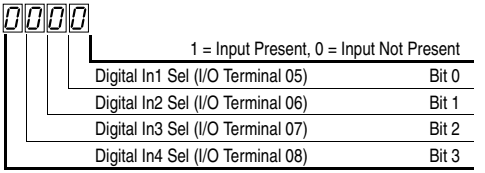
Values	Default:	Read Only
	Min/Max:	0/1
	Display:	1

Display Group *(continued)*

d014 [Dig In Status]

Related Parameter(s): A051-A054

Status of the control terminal block digital inputs.

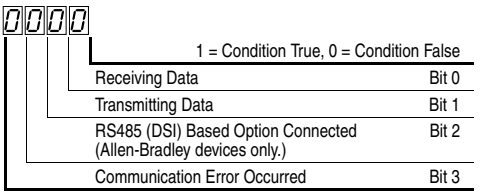


Values	Default:	Read Only
	Min/Max:	0/1
	Display:	1

d015 [Comm Status]

Related Parameter(s): A103-A107

Status of the communications ports.



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

d016 [Control SW Ver]

Main Control Board software version.

Values	Default:	Read Only
	Min/Max:	1.00/99.99
	Display:	0.01

d017 [Drive Type]

Used by Rockwell Automation field service personnel.

Values	Default:	Read Only
	Min/Max:	1001/9999
	Display:	1

Display Group *(continued)*

d018 [Elapsed Run Time]

Accumulated time drive is outputting power. Time is displayed in 10 hour increments.

Values	Default:	Read Only
	Min/Max:	0/9999 Hrs
	Display:	1 = 10 Hrs

d019 [Testpoint Data]

Related Parameter(s): A102

The present value of the function selected in A102 [Testpoint Sel].

Values	Default:	Read Only
	Min/Max:	0/FFFF
	Display:	1 Hex

d020 [Analog In 0-10V]

Related Parameter(s): A110, A111

The present value of the voltage at I/O Terminal 13 (100.0% = 10 volts).

Values	Default:	Read Only
	Min/Max:	0.0/100.0%
	Display:	0.1%

d021 [Analog In 4-20mA]

Related Parameter(s): A112, A113

The present value of the current at I/O Terminal 15 (0.0% = 4mA, 100.0% = 20mA).

Values	Default:	Read Only
	Min/Max:	0.0/100.0%
	Display:	0.1%

d022 [Output Power]

Output power present at T1, T2 & T3 (U, V & W).

Values	Default:	Read Only
	Min/Max:	0.00/(Drive Rated Power × 2)
	Display:	0.01 kW

d023 [Output Powr Fctr]

The angle in electrical degrees between motor voltage and motor current.

Values	Default:	Read Only
	Min/Max:	0.0/180.0 deg
	Display:	0.1 deg

Display Group *(continued)*

d024 [Drive Temp]

Present operating temperature of the drive power section.

Values	Default:	Read Only
	Min/Max:	0/120 degC
	Display:	1 degC

d025 [Counter Status]

The current value of the counter when counter is enabled.

Values	Default:	Read only
	Min/Max:	0/9999
	Display:	1

d026 [Timer Status]

32 32 bit parameter.

The current value of the timer when timer is enabled.

Values	Default:	Read Only
	Min/Max:	0.0/9999 Secs
	Display:	0.1 Secs

d028 [Stp Logic Status]

When P038 [Speed Reference] is set to 6 “Stp Logic”, this parameter will display the current step of the StepLogic profile as defined by parameters A140-A147 [Stp Logic x].

Values	Default:	Read Only
	Min/Max:	0/7
	Display:	1

d029 [Torque Current]

The current value of the motor torque current.

Values	Default:	Read Only
	Min/Max:	0.00/(Drive Rated Amps × 2)
	Display:	0.01 Amps

Basic Program Group

P031 [Motor NP Volts]

Related Parameter(s): d004, A084, A085, A086, A087

Stop drive before changing this parameter.

Set to the motor nameplate rated volts.

Values	Default:	Based on Drive Rating
	Min/Max:	20/Drive Rated Volts
	Display:	1 VAC

P032 [Motor NP Hertz]

Related Parameter(s): A084, A085, A086, A087, A090

Stop drive before changing this parameter.

Set to the motor nameplate rated frequency.

Values	Default:	60 Hz
	Min/Max:	15/400 Hz
	Display:	1 Hz

P033 [Motor OL Current]

Related Parameter(s): A055, A058, A061, A089, A090, A098, A114, A118

Set to the maximum allowable motor current.

The drive will fault on an F7 Motor Overload if the value of this parameter is exceeded by 150% for 60 seconds.

Values	Default:	Based on Drive Rating
	Min/Max:	0.0/(Drive Rated Amps × 2)
	Display:	0.1 Amps

P034 [Minimum Freq]

Related Parameter(s): d001, d002, d013, P035, A085, A086, A087, A110, A112

Sets the lowest frequency the drive will output continuously.

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

P035 [Maximum Freq]

Related Parameter(s): d001, d002, d013, P034, A065, A078, A085, A086, A087, A111, A113

Stop drive before changing this parameter.

Sets the highest frequency the drive will output.

Values	Default:	60 Hz
	Min/Max:	0/400 Hz
	Display:	1 Hz

Basic Program Group *(continued)*

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 Start and Speed Reference Control on page 1-23 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].
	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.

Basic Program Group *(continued)*

P037 [Stop Mode]

Related Parameter(s): P036, A080, A081, A082, A105, A160

Active stop mode for all stop sources [e.g. keypad, run forward (I/O Terminal 02), run reverse (I/O Terminal 03), RS485 port] except as noted below.

Important: I/O Terminal 01 is always a coast to stop input except when P036 [Start Source] is set for "3-Wire" control. When in three wire control, I/O Terminal 01 is controlled by P037 [Stop Mode].

Hardware Enable Circuitry

By default, I/O Terminal 01 is a coast to stop input. The status of the input is interpreted by drive software. If the application requires the drive to be disabled without software interpretation, a "dedicated" hardware enable configuration can be utilized. This is accomplished by removing the ENBL enable jumper on the control board. In this case, the drive will always coast to a stop regardless of the settings of P036 [Start Source] and P037 [Stop Mode].

Options	**0**	"Ramp, CF"(1) (Default)	Ramp to Stop. "Stop" command clears active fault.
	1	"Coast, CF"(1)	Coast to Stop. "Stop" command clears active fault.
	2	"DC Brake, CF"(1)	DC Injection Braking Stop. "Stop" command clears active fault.
	3	"DCBrkAuto,CF"(1)	DC Injection Braking Stop with Auto Shutoff. • Standard DC Injection Braking for value set in A080 [DC Brake Time]. OR • Drive shuts off if the drive detects that the motor is stopped. "Stop" command clears active fault.
	4	"Ramp"	Ramp to Stop.
	5	"Coast"	Coast to Stop.
	6	"DC Brake"	DC Injection Braking Stop.
	7	"DC BrakeAuto"	DC Injection Braking Stop with Auto Shutoff. • Standard DC Injection Braking for value set in A080 [DC Brake Time]. OR • Drive shuts off if current limit is exceeded.
	8	"Ramp+EM B,CF"	Ramp to Stop with EM Brake Control. "Stop" Command clears active fault.
	9	"Ramp+EM Brk"	Ramp to Stop with EM Brake Control.

(1) Stop input also clears active fault.

Basic Program Group *(continued)*

P038 [Speed Reference]

Related Parameter(s): d001, d002, d012, d020, d021, P039, P040, A051-A054, A069, A070-A077, A110-A113, A123, A132, A140-A147, A150-A157

Sets the source of the speed reference to the drive.

The drive speed command can be obtained from a number of different sources. The source is normally determined by P038 [Speed Reference]. However, when A051 - A054 [Digital Inx Sel] is set to option 2, 4, 5, 6, 11, 12, 13, 14, 15 and the digital input is active, or if A132 [PID Ref Sel] is not set to option 0, the speed reference commanded by P038 [Speed Reference] will be overridden. Refer to the flowchart on page 1-23 for more information on speed reference control priority.

Options	**0**	"Drive Pot" (Default)	Frequency command from the potentiometer on the integral keypad. **Important:** This option is not available with IP66, NEMA/UL Type 4X rated drives. Internal frequency command comes from A069 [Internal Freq].
	1	"InternalFreq" (IP66, NEMA/UL Type 4X Default)	Internal frequency command from A069 [Internal Freq]. Must be set when using MOP function.
	2	"0-10V Input"	External frequency command from the 0-10V or ±10V analog input or remote potentiometer.
	3	"4-20mA Input"	External frequency command from the 4-20mA analog input.
	4	"Preset Freq"	External frequency command as defined by A070 - A077 [Preset Freq x] when A051 - A054 [Digital Inx Sel] are programmed as "Preset Frequencies" and the digital inputs are active.
	5	"Comm Port"	External frequency command from the communications port. Refer to Appendix C for details.
	6	"Stp Logic"	External frequency command as defined by A070 - A077 [Preset Freq x] and A140 - A147 [Stp Logic x].
	7	"Anlg In Mult"	External frequency command as defined by the product of the analog inputs (shown in d020 [Analog In 0-10V] and d021 [Analog In 4-20mA]). [Analog In 0-10V] × [Analog In 4-20mA] = Speed Command Example: 100% × 50% = 50%

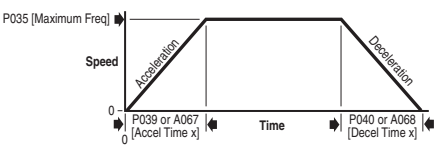
P039 [Accel Time 1]

Related Parameter(s): P038, P040, A051-A054, A067, A070-A077, A140-A147

Sets the rate of acceleration for all speed increases.

$$\frac{\text{Maximum Freq}}{\text{Accel Time}} = \text{Accel Rate}$$

Values	Default:	10.0 Secs
	Min/Max:	0.0/600.0 Secs
	Display:	0.1 Secs



Basic Program Group *(continued)*

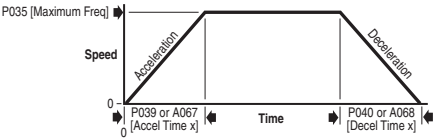
P040 [Decel Time 1]

Related Parameter(s): P038, P039, A051-A054, A068, A070-A077, A140-A147

Sets the rate of deceleration for all speed decreases.

$$\frac{\text{Maximum Freq}}{\text{Decel Time}} = \text{Decel Rate}$$

Values	Default:	10.0 Secs
	Min/Max:	0.1/600.0 Secs
	Display:	0.1 Secs



P041 [Reset To Defalts]

Stop drive before changing this parameter.

Resets all parameter values to factory defaults.

Options	**0**	"Ready/Idle" (Default)	
	1	"Factory Rset"	• After the reset function is complete, this parameter will set itself back to "0". • Causes an F48 Params Defaulted fault.

P042 [Voltage Class]

Stop drive before changing this parameter.

Sets the voltage class of 600V drives.

Options	**2**	"Low Voltage"	480V
	3	"High Voltage" (Default)	600V

P043 [Motor OL Ret]

Related Parameter(s): P033

Enables/disables the Motor Overload Retention function. When Enabled, the value held in the motor overload counter is saved at power-down and restored at power-up. A change to this parameter setting resets the counter.

Options	**0**	"Disabled" (Default)
	1	"Enabled"

Advanced Program Group

A051 [Digital In1 Sel]
(I/O Terminal 05)
A052 [Digital In2 Sel]
(I/O Terminal 06)
A053 [Digital In3 Sel]
(I/O Terminal 07)
A054 [Digital In4 Sel]
(I/O Terminal 08)

Related Parameter(s): d012, d014, P038, P039, P040, A067, A068, A070-A077, A078, A079, A118, A140-A147

Stop drive before changing this parameter.

Selects the function for the digital inputs. Refer to the flowchart on page 1-23 for more information on speed reference control priority.

Options	**0**	"Not Used"	Terminal has no function but can be read over network communications via d014 [Dig In Status].
	1	"Acc & Dec 2"	• When active, A067 [Accel Time 2] and A068 [Decel Time 2] are used for all ramp rates except Jog. • Can only be tied to one input. Refer to the flowchart on page 1-24 for more information on Accel/Decel selection.
	2	"Jog"	• When input is present, drive accelerates according to the value set in A079 [Jog Accel/Decel] and ramps to the value set in A078 [Jog Frequency]. • When input is removed, drive ramps to a stop according to the value set in A079 [Jog Accel/Decel]. • A valid "Start" command will override this input.
	3	"Aux Fault"	When enabled, an F2 Auxiliary Input fault will occur when the input is removed.
	4	"Preset Freq" (A051 & A052 Default)	Refer to A070 - A077 [Preset Freq x]. **Important:** Digital Inputs have priority for frequency control when programmed as Preset Speed and are active. Refer to the flowchart on page 1-23 for more information on speed reference control priority.
	5	"Local" (A053 Default)	When active, sets integral keypad as start source and potentiometer on the integral keypad as speed source. **Important:** Speed source for IP66, NEMA/UL Type 4X rated drives comes from A069 [Internal Freq].
	6	"Comm Port"	• When active, sets communications device as default start/speed command source. • Can only be tied to one input.
	7	"Clear Fault"	When active, clears an active fault.
	8	"RampStop,CF"	Causes drive to immediately ramp to a stop regardless of how P037 [Stop Mode] is set.
	9	"CoastStop,CF"	Causes drive to immediately coast to a stop regardless of how P037 [Stop Mode] is set.
	10	"DCInjStop,CF"	Causes drive to immediately begin a DC Injection stop regardless of how P037 [Stop Mode] is set.
	11	"Jog Forward" (A054 Default)	Drive accelerates to A078 [Jog Frequency] according to A079 [Jog Accel/Decel] and ramps to stop when input becomes inactive. A valid start will override this command.
	12	"Jog Reverse"	Drive accelerates to A078 [Jog Frequency] according to A079 [Jog Accel/Decel] and ramps to stop when input becomes inactive. A valid start will override this command.

A051 - A054 Options (Cont.)	**13** "10V In Ctrl"	Selects 0-10V or ±10V control as the frequency reference. Start source is not changed.
	14 "20mA In Ctrl"	Selects 4-20mA control as the frequency reference. Start source is not changed.
	15 "PID Disable"	Disables PID function. Drive uses the next valid non-PID speed reference.
	16 "MOP Up"	Increases the value of A069 [Internal Freq] at the current Accel rate if P038 [Speed Reference] is set to 1 "InternalFreq". For IP20 rated drives, the default for A069 is 60.0 Hz. For IP66, NEMA/UL Type 4X drives, the default for A069 is 0.0 Hz.
	17 "MOP Down"	Decreases the value of A069 [Internal Freq] at the current Decel rate if P038 [Speed Reference] is set to 1 "InternalFreq". For IP20 rated drives, the default for A069 is 60.0 Hz. For IP66, NEMA/UL Type 4X drives, the default for A069 is 0.0 Hz.
	18 "Timer Start"	Clears and starts the timer function. May be used to control the relay or opto outputs.
	19 "Counter In"	Starts the counter function. May be used to control the relay or opto outputs.
	20 "Reset Timer"	Clears the active timer.
	21 "Reset Countr"	Clears the active counter.
	22 "Rset Tim&Cnt"	Clears the active timer and counter.
	23 "Logic In1"	Logic function input number 1. May be used to control the relay or opto outputs (see parameters A055, A058, A061 Options 11-14). May be used in conjunction with StepLogic parameters A140 - A147 [Stp Logic x].
	24 "Logic In2"	Logic function input number 2. May be used to control the relay or opto outputs (see parameters A055, A058, A061 Options 11-14). May be used in conjunction with StepLogic parameters A140 - A147 [Stp Logic x].
	25 "Current Lmt2"	When active, A118 [Current Limit 2] determines the drive current limit level.
	26 "Anlg Invert"	Inverts the scaling of the analog input levels set in A110 [Anlg In 0-10V Lo] and A111 [Anlg In 0-10V Hi] or A112 [Anlg In4-20mA Lo] and A113 [Anlg In4-20mA Hi].
	27 "EM Brk Rlse"	If EM brake function is enabled, this input releases the brake.

ATTENTION: If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used.

Advanced Program Group *(continued)*

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.
	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.

A055 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"	Prior to FRN 4.01, this option 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 Writing (06) Logic Command Data on page C-4.
	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].
	24 "MsgControl"	With FRN 4.01 and later, this option enables the output to be controlled over network communications by writing to A056 [Relay Out Level]. (0 = Off, 1 = On.)

A056 [Relay Out Level]

Related Parameter(s): A055

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.

With FRN 4.01 and later, 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

Advanced Program Group *(continued)*

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

Related Parameter(s): P033, A059, A062, A092, A122, A123, A160, A161, 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.

A058, A061 Options (Cont.)	**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.
	19 "Anlg In Loss"	Analog input loss has occurred. Program A122 [Analog In Loss] for desired action when input loss occurs.
	20 "ParamControl"	Prior to FRN 4.01, this option 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: Setting this option for A058 means the logic command word bit 6 has full control of A059. Setting this option for A059 means the logic command word bit 7 has full control of A062. See Writing (06) Logic Command Data on page C-4.
	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].
	24 "MsgControl"	With FRN 4.01 and later: Enables the output to be controlled over the network communications by writing to A059 or A062 [Opto Outx Level]. (0 = Off, 1 = On.)

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

Related Parameter(s): A058, A061

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.

With FRN 4.01 and later, 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

Advanced Program Group *(continued)*

A064 [Opto Out Logic]

Determines the logic (Normally Open/NO or Normally Closed/NC) of the opto outputs.

A064 Option	Opto Out1 Logic	Opto Out2 Logic
0	NO (Normally Open)	NO (Normally Open)
1	NC (Normally Closed)	NO (Normally Open)
2	NO (Normally Open)	NC (Normally Closed)
3	NC (Normally Closed)	NC (Normally Closed)

Values	Default:	0
	Min/Max:	0/3
	Display:	1

A065 [Analog Out Sel]

Related Parameter(s): P035, A066

Sets the analog output signal mode (0-10V, 0-20mA, or 4-20mA). The output is used to provide a signal that is proportional to several drive conditions.

Option	Output Range	Minimum Output Value	Maximum Output Value A066 [Analog Out High]	DIP Switch Position	Related Parameter
0 “OutFreq 0-10”	0-10V	0V = 0 Hz	P035 [Maximum Freq]	0-10V	d001
1 “OutCurr 0-10”	0-10V	0V = 0 Amps	200% Drive Rated Output Current	0-10V	d003
2 “OutVolt 0-10”	0-10V	0V = 0 Volts	120% Drive Rated Output Volts	0-10V	d004
3 “OutPowr 0-10”	0-10V	0V = 0 kW	200% Drive Rated Power	0-10V	d022
4 “TstData 0-10”	0-10V	0V = 0000	65535 (Hex FFFF)	0-10V	d019
5 “OutFreq 0-20”	0-20mA	0 mA = 0 Hz	P035 [Maximum Freq]	0-20mA	d001
6 “OutCurr 0-20”	0-20mA	0 mA = 0 Amps	200% Drive Rated Output Current	0-20mA	d003
7 “OutVolt 0-20”	0-20mA	0 mA = 0 Volts	120% Drive Rated Output Volts	0-20mA	d004
8 “OutPowr 0-20”	0-20mA	0 mA = 0 kW	200% Drive Rated Power	0-20mA	d022
9 “TstData 0-20”	0-20mA	0 mA = 0000	65535 (Hex FFFF)	0-20mA	d019
10 “OutFreq 4-20”	4-20mA	4 mA = 0 Hz	P035 [Maximum Freq]	0-20mA	d001
11 “OutCurr 4-20”	4-20mA	4 mA = 0 Amps	200% Drive Rated Output Current	0-20mA	d003
12 “OutVolt 4-20”	4-20mA	4 mA = 0 Volts	120% Drive Rated Output Volts	0-20mA	d004
13 “OutPowr 4-20”	4-20mA	4 mA = 0 kW	200% Drive Rated Power	0-20mA	d022
14 “TstData 4-20”	4-20mA	4 mA = 0000	65535 (Hex FFFF)	0-20mA	d019
15 “OutTorq 0-10”	0-10V	0V = 0 Amps	200% Drive Rated FLA	0-10V	d029
16 “OutTorq 0-20”	0-20 mA	0 mA = 0 Amps	200% Drive Rated FLA	0-20 mA	d029
17 “OutTorq 4-20”	4-20 mA	4 mA = 0 Amps	200% Drive Rated FLA	0-20 mA	d029
18 “Setpnt 0-10”	0-10V	0V = 0%	100.0% Setpoint Setting	0-10V	A109
19 “Setpnt 0-20”	0-20 mA	0 mA = 0%	100.0% Setpoint Setting	0-20 mA	A109
20 “Setpnt 4-20”	4-20 mA	4 mA = 0%	100.0% Setpoint Setting	0-20 mA	A109
21 “MinFreq 0-10”	0-10V	0V = Min. Freq	P035 [Maximum Freq]	0-10V	d001
22 “MinFreq 0-20”	0-20 mA	0 mA = Min. Freq	P035 [Maximum Freq]	0-20 mA	d001
23 “MinFreq 4-20”	4-20 mA	4 mA = Min. Freq	P035 [Maximum Freq]	0-20 mA	d001

Values	Default:	0
	Min/Max:	0/23
	Display:	1

Advanced Program Group *(continued)*

A066 [Analog Out High]

Related Parameter(s): A065

Scales the Maximum Output Value for the A065 [Analog Out Sel] source setting.

Examples:

A066 Setting	A065 Setting	A065 Max. Output Value
50%	1 “OutCurr 0-10”	5V for 200% Drive Rated Output Current
90%	8 “OutPowr 0-20”	18mA for 200% Drive Rated Power

Values	Default:	100%
	Min/Max:	0/800%
	Display:	1%

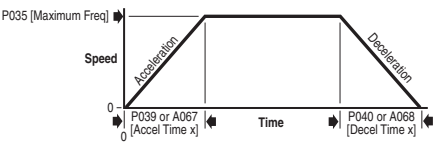
A067 [Accel Time 2]

Related Parameter(s): P039, A051-A054, A070-A077, A140-A147

When active, sets the rate of acceleration for all speed increases except jog. Refer to the flowchart on page 1-24 for details.

$$\frac{\text{Maximum Freq}}{\text{Accel Time}} = \text{Accel Rate}$$

Values	Default:	20.0 Secs
	Min/Max:	0.0/600.0 Secs
	Display:	0.1 Secs



Advanced Program Group *(continued)*

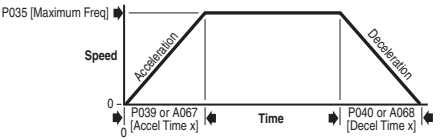
A068 [Decel Time 2]

Related Parameter(s): P040, A051-A054, A070-A077, A140-A147

When active, sets the rate of deceleration for all speed decreases except jog. Refer to the flowchart on page 1-24 for details.

$$\frac{\text{Maximum Freq}}{\text{Decel Time}} = \text{Decel Rate}$$

Values	Default:	20.0 Secs
	Min/Max:	0.1/600.0 Secs
	Display:	0.1 Secs



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

Advanced Program Group *(continued)*

A070 [Preset Freq 0](1)
A071 [Preset Freq 1]
A072 [Preset Freq 2]
A073 [Preset Freq 3]
A074 [Preset Freq 4]
A075 [Preset Freq 5]
A076 [Preset Freq 6]
A077 [Preset Freq 7]

Related Parameter(s): P038, P039, P040, A051-A053, A067, A068, A140-A147, A150-A157

Values	A070 Default:(1)	0.0 Hz
	A071 Default:	5.0 Hz
	A072 Default:	10.0 Hz
	A073 Default:	20.0 Hz
	A074 Default:	30.0 Hz
	A075 Default:	40.0 Hz
	A076 Default:	50.0 Hz
	A077 Default:	60.0 Hz
	Min/Max:	0.0/400.0 Hz
	Display:	0.1 Hz

Provides a fixed frequency command value when A051 - A053 [Digital Inx Sel] is set to 4 “Preset Frequencies”.

An active preset input will override speed command as shown in the flowchart on page 1-23.

(1) To activate A070 [Preset Freq 0] set P038 [Speed Reference] to option 4 “Preset Freq 0-3”.

Input State of Digital In 1 (I/O Terminal 05 when A051 = 4)	Input State of Digital In 2 (I/O Terminal 06 when A052 = 4)	Input State of Digital In 3 (I/O Terminal 07 when A053 = 4)	Frequency Source	Accel / Decel Parameter Used(2)
0	0	0	A070 [Preset Freq 0]	[Accel Time 1] / [Decel Time 1]
1	0	0	A071 [Preset Freq 1]	[Accel Time 1] / [Decel Time 1]
0	1	0	A072 [Preset Freq 2]	[Accel Time 2] / [Decel Time 2]
1	1	0	A073 [Preset Freq 3]	[Accel Time 2] / [Decel Time 2]
0	0	1	A074 [Preset Freq 4]	[Accel Time 1] / [Decel Time 1]
1	0	1	A075 [Preset Freq 5]	[Accel Time 1] / [Decel Time 1]
0	1	1	A076 [Preset Freq 6]	[Accel Time 2] / [Decel Time 2]
1	1	1	A077 [Preset Freq 7]	[Accel Time 2] / [Decel Time 2]

(2) When a Digital Input is set to “Accel 2 & Decel 2”, and the input is active, that input overrides the settings in this table.

A078 [Jog Frequency]

Related Parameter(s): P035, A051-A054, A079

Sets the output frequency when a jog command is issued.

Values	Default:	10.0 Hz
	Min/Max:	0.0/[Maximum Freq]
	Display:	0.1 Hz

Advanced Program Group *(continued)*

A079 [Jog Accel/Decel]

Related Parameter(s): A078, A051-A054

Sets the acceleration and deceleration time when a jog command is issued.

Values	Default:	10.0 Secs
	Min/Max:	0.1/600.0 Secs
	Display:	0.1 Secs

A080 [DC Brake Time]

Related Parameter(s): P037, A081

Sets the length of time that DC brake current is "injected" into the motor. Refer to parameter A081 [DC Brake Level].

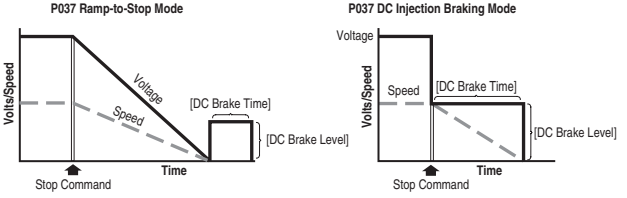
Values	Default:	0.0 Secs
	Min/Max:	0.0/99.9 Secs (A setting of 99.9 = Continuous)
	Display:	0.1 Secs

A081 [DC Brake Level]

Related Parameter(s): P037, A080

Defines the maximum DC brake current, in amps, applied to the motor when P037 [Stop Mode] is set to either "Ramp" or "DC Brake".

Values	Default:	Drive Rated Amps × 0.05
	Min/Max:	0.0/(Drive Rated Amps × 1.8)
	Display:	0.1 Amps



ATTENTION: If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used.

ATTENTION: This feature should not be used with synchronous or permanent magnet motors. Motors may be demagnetized during braking.

Advanced Program Group *(continued)*

A082 [DB Resistor Sel]

Related Parameter(s): P037

Stop drive before changing this parameter.

Enables/disables external dynamic braking.

Setting	Min/Max
0	"Disabled"
1	"Normal RA Res" (5% Duty Cycle) – Refer to Table B.C on page B-2.
2	"NoProtection" (100% Duty Cycle)
3-99	"x%Duty Cycle" Limited (3% – 99% of Duty Cycle)

The drive is able to provide full braking indefinitely. Braking power is limited by the external DB resistor. When this parameter is set to 1 "Normal RA Res" and an appropriate resistor is used (see selection Table B.C), the drive provides calculated resistor overload protection. However, the drive cannot protect against a brake IGBT failure.

ATTENTION: A risk of fire exists if external braking resistors are not protected. The external resistor package must be self-protected from over temperature or the protective circuit shown in Figure B.9 on page B-13, or equivalent, must be supplied.

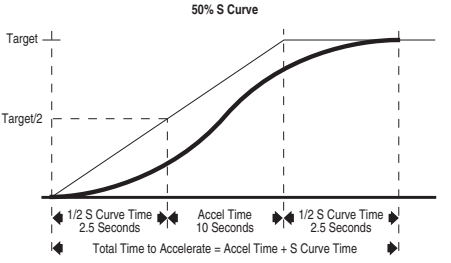
Values	Default:	0
	Min/Max:	0/99
	Display:	1

A083 [S Curve %]

Sets the percentage of acceleration or deceleration time that is applied to the ramp as S Curve. Time is added, 1/2 at the beginning and 1/2 at the end of the ramp.

Values	Default:	0% (Disabled)
	Min/Max:	0/100%
	Display:	1%

Example:
Accel Time = 10 Seconds
S Curve Setting = 50%
S Curve Time = 10 × 0.5 = 5 Seconds
Total Time = 10 + 5 = 15 Seconds



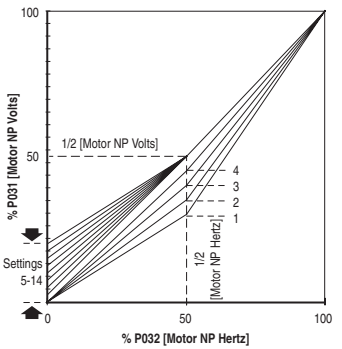
Advanced Program Group *(continued)*

A084 [Boost Select]

Related Parameter(s): d004, P031, P032, A085, A086, A087, A125

Sets the boost voltage (% of P031 [Motor NP Volts]) and redefines the Volts per Hz curve.
Active when A125 [Torque Perf Mode] = 0 "V/Hz".
Drive may add additional voltage unless Option 5 is selected.

Options			
	0	"Custom V/Hz"	
	1	"30.0, VT"	Variable Torque (Typical fan/pump curves.)
	2	"35.0, VT"	
	3	"40.0, VT"	
	4	"45.0, VT"	
	5	"0.0 no IR"	Constant Torque
	6	"0.0"	
	7	"2.5, CT" [Default for 4.0, 5.5, 7.5 & 11 kW (5.0, 7.5, 10 & 15 HP) Drives]	
	8	"5.0, CT" (Default)	
	9	"7.5, CT"	
	10	"10.0, CT"	
	11	"12.5, CT"	
	12	"15.0, CT"	
	13	"17.5, CT"	
	14	"20.0, CT"	



Advanced Program Group *(continued)*

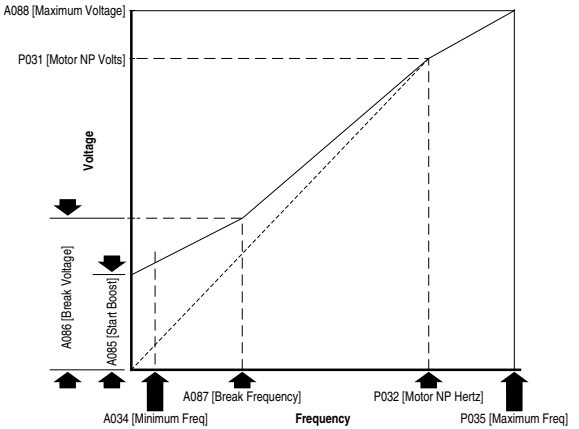
A085 [Start Boost]

Related Parameter(s): P031, P032, P034, P035, A084, A086, A087, A088, A125

Sets the boost voltage (% of P031 [Motor NP Volts]) and redefines the Volts per Hz curve when A084 [Boost Select] = 0 “Custom V/Hz” and A125 [Torque Perf Mode] = 0 “V/Hz”.

Drive may add additional voltage unless Option 5 is selected.

Values	Default:	2.5%
	Min/Max:	0.0/25.0%
	Display:	0.1%



A086 [Break Voltage]

Related Parameter(s): P031, P032, P034, P035, A084, A085, A087, A088, A125

Sets the frequency where break voltage is applied when A084 [Boost Select] = 0 “Custom V/Hz” and A125 [Torque Perf Mode] = 0 “V/Hz”

Values	Default:	25.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

A087 [Break Frequency]

Related Parameter(s): P031, P032, P034, P035, A084, A085, A086, A088, A125

Sets the frequency where break frequency is applied when A084 [Boost Select] = 0 “Custom V/Hz” and A125 [Torque Perf Mode] = 0 “V/Hz”

Values	Default:	15.0 Hz
	Min/Max:	0.0/400.0 Hz
	Display:	0.1 Hz

Advanced Program Group *(continued)*

A088 [Maximum Voltage]

Related Parameter(s): d004, A085, A086, A087

Sets the highest voltage the drive will output.

Values	Default:	Drive Rated Volts
	Min/Max:	20/Drive Rated Volts
	Display:	1 VAC

A089 [Current Limit 1]

Related Parameter(s): P033, A118

Maximum output current allowed before current limiting occurs.

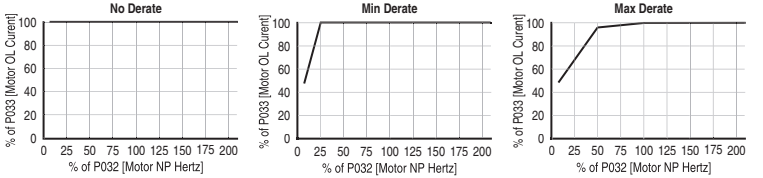
Values	Default:	Drive Rated Amps × 1.5
	Min/Max:	0.1/Drive Rated Amps × 1.8
	Display:	0.1 Amps

A090 [Motor OL Select]

Related Parameter(s): P032, P033

Drive provides Class 10 motor overload protection. Settings 0-2 select the derating factor for the I^2t overload function.

Options	**0**	"No Derate" (Default)
	1	"Min Derate"
	2	"Max Derate"



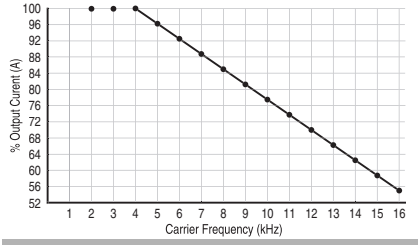
A091 [PWM Frequency]

Related Parameter(s): A124

Sets the carrier frequency for the PWM output waveform. The chart below provides derating guidelines based on the PWM frequency setting.

Important: Ignoring derating guidelines can cause reduced drive performance.

Values	Default:	4.0 kHz
	Min/Max:	2.0/16.0 kHz
	Display:	0.1 kHz



Advanced Program Group *(continued)*

A092 [Auto Rstrt Tries]

Related Parameter(s): A055, A058, A061, A093

Sets the maximum number of times the drive attempts to reset a fault and restart.

Clear a Type 1 fault and restart the drive.

1. Set A092 [Auto Rstrt Tries] to a value other than "0".
2. Set A093 [Auto Rstrt Delay] to a value other than "0".

Clear an OverVoltage, UnderVoltage or Heatsink OvrTmp fault without restarting the drive.

1. Set A092 [Auto Rstrt Tries] to a value other than "0".
2. Set A093 [Auto Rstrt Delay] to "0".

ATTENTION: Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

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

A093 [Auto Rstrt Delay]

Related Parameter(s): A092

Sets the time between restart attempts when A092 [Auto Rstrt Tries] is set to a value other than zero.

Values	Default:	1.0 Secs
	Min/Max:	0.0/300.0 Secs
	Display:	0.1 Secs

A094 [Start At PowerUp]

Stop drive before changing this parameter.

Enables/disables a feature that allows a Start or Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Requires a digital input configured for Run or Start and a valid start contact.

This parameter will not function if parameter P036 [Start Source] is set to 4 "2-W High Speed".

ATTENTION: Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

Options	**0**	"Disabled" (Default)
	1	"Enabled"

Advanced Program Group *(continued)*

A095 [Reverse Disable]

Related Parameter(s): d006

Stop drive before changing this parameter.

Enables/disables the function that allows the direction of motor rotation to be changed. The reverse command may come from a digital command, the keypad or a serial command. All reverse inputs including two-wire Run Reverse will be ignored with reverse disabled.

Options	**0**	"Rev Enabled" (Default)
	1	"Rev Disabled"

A096 [Flying Start En]

Sets the condition that allows the drive to reconnect to a spinning motor at actual RPM.

Options	**0**	"Disabled" (Default)
	1	"Enabled"

A097 [Compensation]

Enables/disables correction options that may improve problems with motor instability.

Options	**0**	"Disabled"	
	1	"Electrical" (Default)	Some drive/motor combinations have inherent instabilities which are exhibited as non-sinusodial motor currents. This setting attempts to correct this condition.
	2	"Mechanical"	Some motor/load combinations have mechanical resonances which can be excited by the drive current regulator. This setting slows down the current regulator response and attempts to correct this condition.
	3	"Both"	

A098 [SW Current Trip]

Related Parameter(s): P033

Enables/disables a software instantaneous (within 100 ms) current trip.

Values	Default:	0.0 (Disabled)
	Min/Max:	0.0/(Drive Rated Amps × 2)
	Display:	0.1 Amps

A099 [Process Factor]

Related Parameter(s): d010

Scales the output frequency value displayed by d010 [Process Display].

Output Freq x Process Factor = Process Display

Values	Default:	30.0
	Min/Max:	0.1/999.9
	Display:	0.1

Advanced Program Group *(continued)*

A100 [Fault Clear]

Stop drive before changing this parameter.

Resets a fault and clears the fault queue. Used primarily to clear a fault over network communications.

Options	**0**	"Ready/Idle" (Default)	
	1	"Reset Fault"	
	2	"Clear Buffer"	(Parameters d007-d009 [Fault x Code])

A101 [Program Lock]

Protects parameters against change by unauthorized personnel.

Options	**0**	"Unlocked" (Default)
	1	"Locked"

A102 [Testpoint Sel]

Related Parameter(s): d019

Used by Rockwell Automation field service personnel.

Values	Default:	400
	Min/Max:	0/FFFF
	Display:	1 Hex

A103 [Comm Data Rate]

Related Parameter(s): d015

Sets the serial port rate for the RS485 (DSI) port.

Important: Power to drive must be cycled before any changes will affect drive operation.

Options	**0**	"1200"
	1	"2400"
	2	"4800"
	3	"9600" (Default)
	4	"19.2K"
	5	"38.4K"

A104 [Comm Node Addr]

Related Parameter(s): d015

Sets the drive node address for the RS485 (DSI) port if using a network connection.

Important: Power to drive must be cycled before any changes will affect drive operation.

Values	Default:	100
	Min/Max:	1/247
	Display:	1

Advanced Program Group *(continued)*

A105 [Comm Loss Action]

Related Parameter(s): d015, P037, A106

Selects the drive's response to a loss of the communication connection or excessive communication errors.

Options	**0**	"Fault" (Default)	Drive will fault on an F81 Comm Loss and coast to stop.
	1	"Coast Stop"	Stops drive via coast to stop.
	2	"Stop"	Stops drive via P037 [Stop Mode] setting.
	3	"Continu Last"	Drive continues operating at communication commanded speed saved in RAM.

A106 [Comm Loss Time]

Related Parameter(s): d015, A105

Sets the time that the drive will remain in communication loss before implementing the option selected in A105 [Comm Loss Action].

Values	Default:	5.0 Secs
	Min/Max:	0.1/60.0 Secs
	Display:	0.1 Secs

A107 [Comm Format]

Related Parameter(s): d015

Selects the protocol (RTU only), data bits (8 data bits only), parity (None, Even, Odd), and stop bits (1 stop bit only) used by the RS485 port on the drive.

Refer to Appendix C for details on using the drive communication features.

Important: Power to drive must be cycled before any changes will affect drive operation.

Options	**0**	"RTU 8-N-1" (Default)
	1	"RTU 8-E-1"
	2	"RTU 8-O-1"
	3	"RTU 8-N-2"
	4	"RTU 8-E-2"
	5	"RTU 8-O-2"

A108 [Language]

Selects the language displayed by the remote communications option.

Options	**1**	"English" (Default)
	2	"Français"
	3	"Español"
	4	"Italiano"
	5	"Deutsch"
	6	"Reserved"
	7	"Português"
	8	"Reserved"
	9	"Reserved"
	10	"Nederlands"

Advanced Program Group *(continued)*

A109 [Anlg Out Setpt]

Related Parameter(s): A065

When A065 [Analog Out Sel] is set to option 18, 19 or 20, this parameter sets the percentage of analog output desired.

Values	Default:	0.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

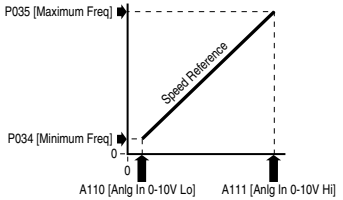
A110 [Anlg In 0-10V Lo]

Related Parameter(s): d020, P034, P038, A122

Sets the analog input level that corresponds to P034 [Minimum Freq] if a 0-10V input is used by P038 [Speed Reference].

Analog inversion can be accomplished by setting this value larger than A111 [Anlg In 0-10V Hi].

Values	Default:	0.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%



A111 [Anlg In 0-10V Hi]

Related Parameter(s): d020, P035, P038, A122, A123

Sets the analog input level that corresponds to P035 [Maximum Freq] if a 0-10V input is used by P038 [Speed Reference].

Analog inversion can be accomplished by setting this value smaller than A110 [Anlg In 0-10V Lo].

Values	Default:	100.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

A112 [Anlg In4-20mA Lo]

Related Parameter(s): d021, P034, P038

Sets the analog input level that corresponds to P034 [Minimum Freq] if a 4-20mA input is used by P038 [Speed Reference].

Analog inversion can be accomplished by setting this value larger than A113 [Anlg In4-20mA Hi].

Values	Default:	0.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

Advanced Program Group *(continued)*

A113 [Anlg In4-20mA Hi]

Related Parameter(s): d021, P035, P038

Sets the analog input level that corresponds to P035 [Maximum Freq] if a 4-20mA input is used by P038 [Speed Reference].

Analog inversion can be accomplished by setting this value smaller than A112 [Anlg In4-20mA Lo].

Values	Default:	100.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

A114 [Slip Hertz @ FLA]

Related Parameter(s): P033

Compensates for the inherent slip in an induction motor. This frequency is added to the commanded output frequency based on motor current.

Values	Default:	2.0 Hz
	Min/Max:	0.0/10.0 Hz
	Display:	0.1 Hz

A115 [Process Time Lo]

Related Parameter(s): d010, P034

Scales the time value when the drive is running at P034 [Minimum Freq]. When set to a value other than zero, d010 [Process Display] indicates the duration of the process.

Values	Default:	0.00
	Min/Max:	0.00/99.99
	Display:	0.01

A116 [Process Time Hi]

Related Parameter(s): d010, P035

Scales the time value when the drive is running at P035 [Maximum Freq]. When set to a value other than zero, d010 [Process Display] indicates the duration of the process.

Values	Default:	0.00
	Min/Max:	0.00/99.99
	Display:	0.01

A117 [Bus Reg Mode]

Controls the operation of the drive voltage regulation, which is normally operational at decel or when the bus voltage rises.

Refer to the Attention statement on page P-3 for important information on bus regulation.

Options	**0**	"Disabled"
	1	"Enabled" (Default)

A118 [Current Limit 2]

Related Parameter(s): P033, A051-A054, A089

Maximum output current allowed before current limiting occurs. This parameter is only active if A051 - A054 [Digital Inx Sel] is set to 25 "Current Lmt2" and is active.

Values	Default:	Drive Rated Amps × 1.5
	Min/Max:	0.1/(Drive Rated Amps × 1.8)
	Display:	0.1 Amps

Advanced Program Group *(continued)*

A119 [Skip Frequency]

Related Parameter(s): A120

Sets the frequency at which the drive will not operate.

A setting of 0 disables this parameter.

Values	Default:	0 Hz
	Min/Max:	0/400 Hz
	Display:	1 Hz

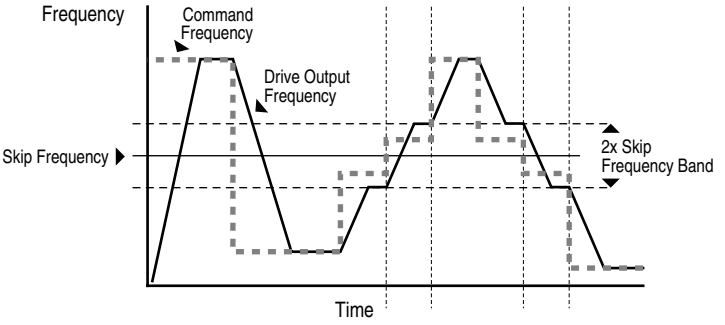
A120 [Skip Freq Band]

Related Parameter(s): A119

Determines the bandwidth around A119 [Skip Frequency]. A120 [Skip Frequency Band] is split applying 1/2 above and 1/2 below the actual skip frequency.

A setting of 0.0 disables this parameter.

Values	Default:	0.0 Hz
	Min/Max:	0.0/30.0 Hz
	Display:	0.1 Hz



A121 [Stall Fault Time]

Sets the time that the drive will remain in stall mode before a fault is issued.

Options	**0**	"60 Seconds" (Default)
	1	"120 Seconds"
	2	"240 Seconds"
	3	"360 Seconds"
	4	"480 Seconds"
	5	"Flt Disabled"

Advanced Program Group *(continued)*

A122 [Analog In Loss]

Related Parameter(s): A110, A111, A132

Selects drive action when an input signal loss is detected. Signal loss is defined as an analog signal less than 1V or 2mA. The signal loss event ends and normal operation resumes when the input signal level is greater than or equal to 1.5V or 3mA. If using a 0-10V analog input, set A110 [Anlg In 0-10V Lo] to a minimum of 20% (i.e. 2 volts).

Options	**0**	"Disabled" (Default)	
	1	"Fault (F29)"	F29 Analog Input Loss
	2	"Stop"	Uses P037 [Stop Mode]
	3	"Zero Ref"	Drive runs at zero speed reference.
	4	"Min Freq Ref"	Drive runs at minimum frequency.
	5	"Max Freq Ref"	Drive runs at maximum frequency.
	6	"Int Freq Ref"	Drive runs at internal frequency.

A123 [10V Bipolar Enbl]

Related Parameter(s): P038, A111

Enables/disables bipolar control. In bipolar mode direction is commanded by the sign of the reference.

Options	**0**	"Uni-Polar In" (Default)	0 to 10V only
	1	"Bi-Polar In"	±10V

A124 [Var PWM Disable]

Related Parameter(s): A091

Stop drive before changing this parameter.

Enables/disables a feature that varies the carrier frequency for the PWM output waveform defined by A091 [PWM Frequency].

Disabling this feature when low frequency conditions exist may result in IGBT stress and nuisance tripping.

Options	**0**	"Enabled" (Default)
	1	"Disabled"

A125 [Torque Perf Mode]

Related Parameter(s): A084, A085, A086, A087, A127

Stop drive before changing this parameter.

Enables/disables sensorless vector control operation.

Options	**0**	"V/Hz"
	1	"Sensrls Vect" (Default)

A126 [Motor NP FLA]

Related Parameter(s): A127

Set to the motor nameplate rated full load amps.

Values	Default:	Drive Rated Amps
	Min/Max:	0.1/(Drive Rated Amps × 2)
	Display:	0.1 Amps

Advanced Program Group *(continued)*

A127 [Autotune]

Related Parameter(s): A125, A126, A128, A129

Stop drive before changing this parameter.

Provides an automatic method for setting A128 [IR Voltage Drop] and A129 [Flux Current Ref], which affect sensorless vector performance. Parameter A126 [Motor NP FLA] must be set to the motor nameplate full load amps before running the Autotune procedure.

Options	**0**	"Ready/Idle" (Default)
	1	"Static Tune"
	2	"Rotate Tune"

"Ready" (0) = Parameter returns to this setting following a "Static Tune" or "Rotate Tune."

"Static Tune" (1) = A temporary command that initiates a non-rotational motor stator resistance test for the best possible automatic setting of A128 [IR Voltage Drop]. A start command is required following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required operate the drive in normal mode. Used when motor cannot be uncoupled from the load.

"Rotate Tune" (2) = A temporary command that initiates a "Static Tune" followed by a rotational test for the best possible automatic setting of A129 [Flux Current Ref]. A start command is required following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required to operate the drive in normal mode. **Important:** Used when motor is uncoupled from the load. Results may not be valid if a load is coupled to the motor during this procedure.

ATTENTION: Rotation of the motor in an undesired direction can occur during this procedure. To guard against possible injury and/or equipment damage, it is recommended that the motor be disconnected from the load before proceeding.

If the Autotune routine fails, an F80 SVC Autotune fault is displayed.

A128 [IR Voltage Drop]

Related Parameter(s): A127

Value of volts dropped across the resistance of the motor stator.

Values	Default:	Based on Drive Rating
	Min/Max:	0.0/230.0 VAC
	Display:	0.1 VAC

A129 [Flux Current Ref]

Related Parameter(s): A127

Value of amps for full motor flux.

Values	Default:	Based on Drive Rating
	Min/Max:	0.00/[Motor NP FLA]
	Display:	0.01 Amps

Advanced Program Group *(continued)*

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

A132 [PID Ref Sel]

Related Parameter(s): P038, A122

Stop drive before changing this parameter.

Enables/disables PID mode and selects the source of the PID reference. Refer to Appendix F for details.

Options	**0**	"PID Disabled" (Default)
	1	"PID Setpoint"
	2	"0-10V Input"
	3	"4-20mA Input"
	4	"Comm Port"
	5	"Setpnt, Trim"
	6	"0-10V, Trim"
	7	"4-20mA, Trim"
	8	"Comm, Trim"

A133 [PID Feedback Sel]

Select the source of the PID feedback. Refer to Appendix F for details.

Options	**0**	"0-10V Input" (Default)	The PID will not function with a bipolar input. Negative voltages are treated as 0 volts.
	1	"4-20mA Input"	
	2	"Comm Port"	

A134 [PID Prop Gain]

Sets the value for the PID proportional component when the PID mode is enabled by A132 [PID Ref Sel].

Values	Default:	0.01
	Min/Max:	0.00/99.99
	Display:	0.01

Advanced Program Group *(continued)*

A135 [PID Integ Time]

Sets the value for the PID integral component when the PID mode is enabled by A132 [PID Ref Sel].

Values	Default:	0.1 Secs
	Min/Max:	0.0/999.9 Secs
	Display:	0.1 Secs

A136 [PID Diff Rate]

Sets the value for the PID differential component when the PID mode is enabled by A132 [PID Ref Sel].

Values	Default:	0.01 (1/Secs)
	Min/Max:	0.00/99.99 (1/Secs)
	Display:	0.01 (1/Secs)

A137 [PID Setpoint]

Provides an internal fixed value for process setpoint when the PID mode is enabled by A132 [PID Ref Sel].

Values	Default:	0.0%
	Min/Max:	0.0/100.0%
	Display:	0.1%

A138 [PID Deadband]

Sets the lower limit of the PID output.

Values	Default:	0.0%
	Min/Max:	0.0/10.0%
	Display:	0.1%

A139 [PID Preload]

Sets the value used to preload the integral component on start or enable.

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

Advanced Program Group *(continued)*

A140 [Stp Logic 0]
A141 [Stp Logic 1]
A142 [Stp Logic 2]
A143 [Stp Logic 3]
A144 [Stp Logic 4]
A145 [Stp Logic 5]
A146 [Stp Logic 6]
A147 [Stp Logic 7]

Related Parameter(s): P038, P039, P040, A051-A054, A055, A058, A061, A067, A068, A070-A077, A150-A157

Stop drive before changing this parameter.

Values	Default:	00F1
	Min/Max:	0001/bAFF
	Display:	4 Digits

Parameters A140-A147 are only active if P038 [Speed Reference] is set to 6 “Stp Logic”.

These parameters can be used to create a custom profile of frequency commands. Each “step” can be based on time, status of a Logic input or a combination of time and the status of a Logic input.

Digits 0-3 for each [Stp Logic x] parameter must be programmed according to the desired profile.

A Logic input is established by setting a digital input, parameters A051 - A054 [Digital Inx Sel], to 23 “Logic In1” and/or 24 “Logic In2”.

A time interval between steps can be programmed using parameters A150 - A157 [Stp Logic Time x]. See the table below for related parameters.

The speed for any step is programmed using parameters A070 - A077 [Preset Freq x].

StepLogic Parameter (Active when P038 = 6 “Stp Logic”)	Related Preset Frequency Parameter (Can be activated independent of StepLogic Parameters)	Related StepLogic Time Parameter (Active when A140-A147 Digit 0 or 1 are set to 1, b, C, d or E)
A140 [Stp Logic 0]	A070 [Preset Freq 0]	A150 [Stp Logic Time 0]
A141 [Stp Logic 1]	A071 [Preset Freq 1]	A151 [Stp Logic Time 1]
A142 [Stp Logic 2]	A072 [Preset Freq 2]	A152 [Stp Logic Time 2]
A143 [Stp Logic 3]	A073 [Preset Freq 3]	A153 [Stp Logic Time 3]
A144 [Stp Logic 4]	A074 [Preset Freq 4]	A154 [Stp Logic Time 4]
A145 [Stp Logic 5]	A075 [Preset Freq 5]	A155 [Stp Logic Time 5]
A146 [Stp Logic 6]	A076 [Preset Freq 6]	A156 [Stp Logic Time 6]
A147 [Stp Logic 7]	A077 [Preset Freq 7]	A157 [Stp Logic Time 7]

How StepLogic Works
The StepLogic sequence begins with a valid start command. A normal sequence always begins with A140 [Stp Logic 0].

Digit 0: Logic For Next Step
This digit defines the logic for the next step. When the condition is met the program advances to the next step. Step 0 follows Step 7. Example: Digit 0 is set 3. When “Logic In2” becomes active, the program advances to the next step.

Digit 1: Logic to Jump to a Different Step
For all settings other than F, when the condition is met, the program overrides Digit 0 and jumps to the step defined by Digit 2.

Digit 2: Different Step to Jump
When the condition for Digit 1 is met, the Digit 2 setting determines the next step or to end the program.

Digit 3: Step Settings

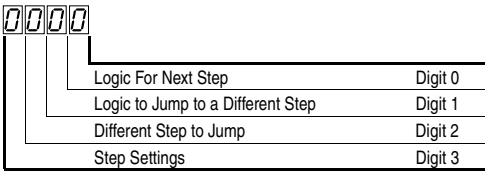
This digit defines what accel/decel profile the speed command will follow and the direction of the command for the current step. In addition, if a relay or opto output (parameters A055, A058 and A061) is set to 15 “StpLogic Out”, this parameter can control the status of that output.

Any StepLogic parameter can be programmed to control a relay or opto output, but you can not control different outputs based on the condition of different StepLogic commands.

StepLogic Settings

The logic for each function is determined by the four digits for each StepLogic parameter. The following is a listing of the available settings for each digit.

Refer to Appendix E for details.



Digit 3 Settings

Required Setting	Accel/Decel Param. Used	StepLogic Output State	Commanded Direction
0	Accel/Decel 1	Off	FWD
1	Accel/Decel 1	Off	REV
2	Accel/Decel 1	Off	No Output
3	Accel/Decel 1	On	FWD
4	Accel/Decel 1	On	REV
5	Accel/Decel 1	On	No Output
6	Accel/Decel 2	Off	FWD
7	Accel/Decel 2	Off	REV
8	Accel/Decel 2	Off	No Output
9	Accel/Decel 2	On	FWD
A	Accel/Decel 2	On	REV
b	Accel/Decel 2	On	No Output

Digit 2 Settings

0 = Jump to Step 0
1 = Jump to Step 1
2 = Jump to Step 2
3 = Jump to Step 3
4 = Jump to Step 4
5 = Jump to Step 5
6 = Jump to Step 6
7 = Jump to Step 7
8 = End Program (Normal Stop)
9 = End Program (Coast to Stop)
A = End Program and Fault (F2)

Digit 1 and Digit 0 Settings

0 = Skip Step (Jump Immediately)
1 = Step Based on [Stp Logic Time x]
2 = Step if “Logic In1” is Active
3 = Step if “Logic In2” is Active
4 = Step if “Logic In1” is Not Active
5 = Step if “Logic In2” is Not Active
6 = Step if either “Logic In1” or “Logic In2” is Active
7 = Step if both “Logic In1” and “Logic In2” is Active
8 = Step if neither “Logic In1” or “Logic In2” is Active
9 = Step if “Logic In1” is Active and “Logic In2” is Not Active
A = Step if “Logic In2” is Active and “Logic In1” is Not Active
b = Step after [Stp Logic Time x] and “Logic In1” is Active
C = Step after [Stp Logic Time x] and “Logic In2” is Active
d = Step after [Stp Logic Time x] and “Logic In1” is Not Active
E = Step after [Stp Logic Time x] and “Logic In2” is Not Active
F = Do Not Step/Ignore Digit 2 Settings

Advanced Program Group *(continued)*

A150 [Stp Logic Time 0]
A151 [Stp Logic Time 1]
A152 [Stp Logic Time 2]
A153 [Stp Logic Time 3]
A154 [Stp Logic Time 4]
A155 [Stp Logic Time 5]
A156 [Stp Logic Time 6]
A157 [Stp Logic Time 7]

Related Parameter(s): P038, A055, A058, A061, A070-A077, A140-A147

Sets the time to remain in each step if the corresponding StpLogic command word is set to “Step after Time”.

Values	Default:	30.0 Secs
	Min/Max:	0.0/999.9 Secs
	Display:	0.1 Secs

A160 [EM Brk Off Delay]

Related Parameter(s): P037

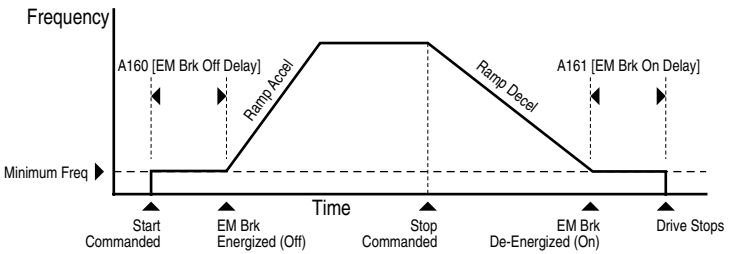
Sets the time the drive remains at minimum frequency before the relay or an opto output is energized and the drive ramps to the commanded frequency.

The relay or opto output is typically connected to a user-supplied electromechanical brake coil relay.

Set P037 [Stop Mode] to 8 “Ramp+EM B,CF” or 9 “Ramp+EM Brk” to enable the electromechanical brake option.

Set A055 [Relay Out Sel], A058 or A061 [Opto Outx Sel] to 22 “EM Brk Cntrl” to control brake operation.

Values	Default:	2.00 Secs
	Min/Max:	0.01/10.00 Secs
	Display:	0.01 Secs



Advanced Program Group *(continued)*

A161 [EM Brk On Delay]

Related Parameter(s): P037

Sets the time the drive remains at minimum frequency before the relay or an opto output is de-energizing and the drive stops.

The relay or opto output is typically connected to a user-supplied electromechanical brake coil relay.

Set P037 [Stop Mode] to 8 “Ramp+EM B,CF” or 9 “Ramp+EM Brk” to enable the electromechanical brake option.

Set A055 [Relay Out Sel], A058 or A061 [Opto Outx Sel] to 22 “EM Brk Cntrl” to control brake operation.

Values	Default:	2.00 Secs
	Min/Max:	0.01/10.00 Secs
	Display:	0.01 Secs

A162 [MOP Reset Sel]

Related Parameter(s): A069

Set the drive to save the current MOP reference command.

Options	**0**	“Zero MOP Ref”	This option clamps A069 [Internal Freq] at 0.0 Hz when the drive is not running.
	1	“Save MOP Ref” (Default)	Reference is saved in A069 [Internal Freq].

A163 [DB Threshold]

Related Parameter(s): P037, A080, A081, A082

Sets the DC bus Voltage Threshold for Dynamic Brake operation. If the DC bus voltage falls below the value set in this parameter, the Dynamic Brake will not turn on. Lower values will make the Dynamic Braking function more responsive but may result in nuisance Dynamic Brake activation.

Values	Default	100.0%
	Min/Max:	0.0/110.0%
	Display:	0.0%

ATTENTION: Equipment damage may result if this parameter is set a value that causes the dynamic braking resistor to dissipate excessive power. Parameter settings less than 100% should be carefully evaluated to ensure that the dynamic brake resistor’s wattage rating is not exceeded. In general, values less than 90% are not needed. This parameter’s setting is especially important if parameter A082 [DB Resistor Sel] is set to 2 “No Protection”.

Advanced Program Group *(continued)*

A164 [Comm Write Mode]

Determines whether parameter changes made over communication port are saved and stored in Non-Volatile Storage (NVS) or RAM only. If they are stored in RAM, the values will be lost at power-down.

Options	**0**	"Save" (Default)
	1	"RAM Only"

ATTENTION: Risk of equipment damage exists. If a controller is programmed to write parameter data to Non-Volatile Storage (NVS) frequently, the NVS will quickly exceed its life cycle and cause the drive to malfunction. Do not create a program that frequently uses configurable outputs to write parameter data to NVS unless A164 [Comm Write Mode] is set to option 1.

A165 [Anlg Loss Delay]

Related Parameter(s): A122

Sets the length of time after power-up during which the drive will not detect an analog signal loss. The drive response to an analog signal loss is set in A122 [Analog In Loss].

Values	Default:	0.0 Secs
	Min/Max:	0.0/20.0 Secs
	Display:	0.1 Secs

A166 [Analog In Filter]

Sets level of additional filtering of the analog input signals. A higher number increases filtering and decreases bandwidth. Each setting doubles the applied filtering (1 = 2x filter, 2 = 4x filter, etc...). No additional filtering is applied when set to "0".

Values	Default:	0
	Min/Max:	0/14
	Display:	1

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"

Parameter Cross Reference – by Name

Parameter Name	No.	Group
10V Bipolar Enbl	A123	Advanced Program
Accel Time 1	P039	Basic Program
Accel Time 2	A067	Advanced Program
Analog In 0-10V	d020	Display
Analog In 4-20mA	d021	Display
Analog In Filter	A166	Advanced Program
Analog In Loss	A122	Advanced Program
Analog Out High	A066	Advanced Program
Analog Out Sel	A065	Advanced Program
Anlg In 0-10V Hi	A111	Advanced Program
Anlg In 0-10V Lo	A110	Advanced Program
Anlg In4-20mA Hi	A113	Advanced Program
Anlg In4-20mA Lo	A112	Advanced Program
Anlg Loss Delay	A166	Advanced Program
Anlg Out Setpt	A109	Advanced Program
Auto Rstrt Delay	A093	Advanced Program
Auto Rstrt Tries	A092	Advanced Program
Autotune	A127	Advanced Program
Boost Select	A084	Advanced Program
Break Frequency	A087	Advanced Program
Break Voltage	A086	Advanced Program
Bus Reg Mode	A117	Advanced Program
Comm Data Rate	A103	Advanced Program
Comm Format	A107	Advanced Program
Comm Loss Action	A105	Advanced Program
Comm Loss Time	A106	Advanced Program
Comm Node Addr	A104	Advanced Program
Comm Status	d015	Display
Comm Write Mode	A164	Advanced Program
Commanded Freq	d002	Display
Compensation	A097	Advanced Program
Contrl In Status	d013	Display
Control Source	d012	Display
Control SW Ver	d016	Display
Counter Status	d025	Display
Current Limit x	A089, A118	Advanced Program
DB Resistor Sel	A082	Advanced Program
DB Threshold	A163	Advanced Program
DC Brake Level	A081	Advanced Program
DC Brake Time	A080	Advanced Program
DC Bus Voltage	d005	Display
Decel Time 1	P040	Basic Program
Decel Time 2	A068	Advanced Program
Dig In Status	d014	Display
Digital Inx Sel	A051-A054	Advanced Program
Drive Status	d006	Display
Drive Temp	d024	Display
Drive Type	d017	Display
Elapsed Run Time	d018	Display
EM Brk Off Delay	A160	Advanced Program
EM Brk On Delay	A161	Advanced Program
Fault Clear	A100	Advanced Program
Fault x Code	d007-d009	Display
Flux Current Ref	A129	Advanced Program
Flying Start En	A096	Advanced Program
Internal Freq	A069	Advanced Program
IR Voltage Drop	A128	Advanced Program
Jog Accel/Decel	A079	Advanced Program
Jog Frequency	A078	Advanced Program
Language	A108	Advanced Program
Maximum Freq	P035	Basic Program
Maximum Voltage	A088	Advanced Program
Minimum Freq	P034	Basic Program
MOP Reset Sel	A162	Advanced Program
Motor NP FLA	A126	Advanced Program
Motor NP Hertz	P032	Basic Program
Motor NP Volts	P031	Basic Program
Motor OL Current	P033	Basic Program
Motor OL Ret	P043	Basic Program
Motor OL Select	A090	Advanced Program
Opto Out Logic	A064	Advanced Program
Opto Outx Level	A059, A062	Advanced Program
Opto Outx Sel	A058, A061	Advanced Program
Output Current	d003	Display
Output Freq	d001	Display
Output Power	d022	Display
Output Powr Fctr	d023	Display
Output Voltage	d004	Display
PID Deadband	A138	Advanced Program
PID Diff Rate	A136	Advanced Program
PID Feedback Sel	A133	Advanced Program
PID Integ Time	A135	Advanced Program
PID Invert Error	A167	Advanced Program
PID Preload	A139	Advanced Program
PID Prop Gain	A134	Advanced Program
PID Ref Sel	A132	Advanced Program
PID Setpoint	A137	Advanced Program
PID Trim Hi	A130	Advanced Program
PID Trim Lo	A131	Advanced Program
Preset Freq x	A070-A077	Advanced Program
Process Display	d010	Display
Process Factor	A099	Advanced Program
Process Time Hi	A116	Advanced Program
Process Time Lo	A115	Advanced Program
Program Lock	A101	Advanced Program
PWM Frequency	A091	Advanced Program
Relay Out Level	A056	Advanced Program
Relay Out Sel	A055	Advanced Program
Reset To Defalts	P041	Basic Program
Reverse Disable	A095	Advanced Program
S Curve %	A083	Advanced Program
Skip Freq Band	A120	Advanced Program
Skip Frequency	A119	Advanced Program
Slip Hertz @ FLA	A114	Advanced Program
Stp Logic Status	d028	Display
Stp Logic x	A140-A147	Advanced Program
Stp Logic Time x	A150-A157	Advanced Program
Speed Reference	P038	Basic Program
Stall Fault Time	A121	Advanced Program
Start At PowerUp	A094	Advanced Program
Start Boost	A085	Advanced Program
Start Source	P036	Basic Program
Stop Mode	P037	Basic Program
SW Current Trip	A098	Advanced Program

Parameter Name	No.	Group
Testpoint Data	d019	Display
Testpoint Sel	A102	Advanced Program
Timer Status	d026	Display
Torque Current	d029	Display
Torque Perf Mode	A125	Advanced Program
Var PWM Disable	A124	Advanced Program
Voltage Class	P042	Basic Program