# PowerFlex 523 Adjustable Frequency AC Drive

## Parameter Groups

### Basic Display
- **b** Drive Status
- **b006** Control In Status
- **b013** Elapsed Run Time
- **b019** Accum Cost Sav
- **b025**

### Basic Program
- **P** Motor NP FLA
- **P034** Autotune
- **P040** Log Stop Mode
- **P045** Start Source 3
- **P050**

### Terminal Blocks
- **t** DigIn TermBlk 06
- **t066** EM Brk Off Delay
- **t086** Anlg In 4-20mA Lo
- **t095** Sleep-Wake Sel
- **t100**

### Communications
- **C** Comm Loss Time
- **C126** Opt Data In 4
- **C164** MultiDrv Sel
- **C169** DSI/10 Clg
- **C175**

### Advanced Display
- **d** Elapsed Time-min
- **d363** Drive Type
- **d367** Speed Feedback
- **d376** PID1 Fdbk Displ
- **d383**

### Advanced Program
- **A** DC Brake Level
- **A435** PID 1 Trim Sel
- **A458** Motor OL Ret
- **A494** Power Loss Mode
- **A548**

### Network
- **N** This group contains parameters for the network option card that is installed.

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### Additional parameters are listed on the next page.
Modified M This group contains parameters that have their values changed from the factory default.

**Fault and Diagnostic**
- F Fault 1 Time-min
  - F621 Fault 4 Current
  - F644 Comm Sts - Opt
  - F682 Drv 2 Feedback
  - F716
- F Fault 4 Code
  - F604 Fault 2 Time-min
  - F645 Drv 0 Logic Cmd
  - F686 Drv 3 Logic Cmd
  - F717
- F Fault 5 Code
  - F605 Fault 3 Time-min
  - F646 Drv 0 Feedback
  - F705 Drv 3 Reference
  - F718
- F Fault 6 Code
  - F606 Fault 4 Time-min
  - F652 Drv 0 Reference
  - F706 Drv 3 Logic Sts
  - F719
- F Fault 7 Code
  - F607 Fault 5 Time-min
  - F653 Drv 0 Logic Sts
  - F707 Drv 3 Feedback
  - F720
- F Fault 8 Code
  - F608 Fault 6 Freq
  - F654 Drv 0 Feedback
  - F708 Drv 4 Logic Cmd
  - F721
- C Fault 9 Code
  - F609 Fault 7 Freq
  - F655 Drv 1 Logic Cmd
  - F709 Drv 4 Reference
  - F722
- F Fault10 Code
  - F610 Fault 8 Freq
  - F661 Drv 1 Reference
  - F710 Drv 4 Logic Sts
  - F723
- F Fault 1 Time-hr
  - F611 Fault 9 Freq
  - F662 Drv 1 Logic Sts
  - F711 Drv 4 Feedback
  - F724
- F Fault 2 Time-hr
  - F612 Fault 10 Freq
  - F663 Drv 1 Feedback
  - F712 DSI Errors
  - F731
- F Fault 3 Time-hr
  - F613 Fault 1 Current
  - F664 Drv 2 Logic Cmd
  - F713
- F Fault 4 Time-hr
  - F614 Fault 2 Current
  - F665 Drv 2 Reference
  - F714
- F Fault 5 Time-hr
  - F615 Fault 3 Current
  - F683 Drv 2 Logic Sts
  - F715

**AppView Parameter Groups**

**Conveyor**
- G1 Motor NP FLA
  - P034 Stop Mode
  - P045 Anlg In 0-10V Hi
  - t092 Jog Accel/Decel
  - A432
- P035 Start Source 1
  - P046 Anlg In 4-20mA Lo
  - t095 S Curve %
  - A439
- P040 Speed Reference 1
  - P047 Anlg In 4-20mA Hi
  - t096 Reverse Disable
  - A544

**Language**
- P030 Motor NP Flows
  - P035 Start Source 1
  - P046 Anlg In 0-10V Lo
  - t091 Jog Frequency
  - A431
- P040 Speed Reference 1
  - P047 Anlg In 4-20mA Lo
  - t092
- P043 Minimum Freq
  - P044 Anlg In 4-20mA Hi
  - t096
- P041 Start Source 1
  - P046 Anlg In 4-20mA Hi
  - t097
- P034 Maximum Freq
  - P047 Anlg In 0-10V Lo
  - t091
- P034 Minimum Freq
  - P043 Anlg In 0-10V Lo
  - t091
- P043 Anlg In 0-10V Hi
  - t092
- P044 Anlg In 0-10V Hi
  - t092

**Motor NP Volts**
- P031 Motor NP Volts
  - P033 Maximum Freq
  - P046 Anlg In 4-20mA Lo
  - t095
- P035 Start Source 1
  - P046 Anlg In 4-20mA Hi
  - t097
- P035 Start Source 1
  - P046 Anlg In 4-20mA Hi
  - t097

**Compressor**
- G3 Motor NP Current
  - P033 Minimum Freq
  - P043 Anlg In 0-10V Lo
  - t091
- P035 Maximum Freq
  - P044 Anlg In 0-10V Hi
  - t092
- P040 Speed Reference 1
  - P044 Anlg In 0-10V Hi
  - t092
- P033 Minimum Freq
  - P040 Speed Reference 1
  - P047 Anlg In mA Loss
  - t097
- P034 Maximum Freq
  - P044 Anlg In 0-10V Lo
  - t091

**Motor NP Volts**
- P031 Motor NP Volts
  - P033 Start Source 1
  - P044 Anlg In 0-10V Lo
  - t091
- P035 Start Source 1
  - P045 Anlg In 4-20mA Lo
  - t095
- P035 Start Source 1
  - P045 Anlg In 4-20mA Hi
  - t096

**Motor NP Current**
- P031 Motor NP Current
  - P040 Speed Reference 1
  - P047 Anlg In mA Loss
  - t097
- P032 Maximum Freq
  - P041 Anlg In 0-10V Lo
  - t091
- P032 Start Source 1
  - P044 Anlg In 0-10V Lo
  - t091
- P034 Maximum Freq
  - P044 Anlg In 0-10V Hi
  - t092
- P034 Maximum Freq
  - P044 Anlg In 0-10V Hi
  - t092
- P033 Start Source 1
  - P044 Anlg In 0-10V Lo
  - t091

**Centrifugal Pump**
- G4 Motor NP Volts
  - P035 Speed Reference 1
  - P047 PID Trim Hi
  - t091
- P035 Speed Reference 1
  - P047 PID Trim Hi
  - t091
- P034 Speed Reference 1
  - P047 PID Trim Hi
  - t091
- P034 Speed Reference 1
  - P047 PID Trim Hi
  - t091
- P035 Speed Reference 1
  - P047 PID Trim Hi
  - t091

**Output Freq**
- P041 Anlg In 0-10V Lo
  - t091
- P042 Anlg In 0-10V Hi
  - t092
- P042 Anlg In 0-10V Hi
  - t092
- P043 Anlg In 0-10V Hi
  - t092
- P044 Anlg In 0-10V Hi
  - t092

**Motor NP Volts**
- P031 Motor NP Volts
  - P041 Anlg In 0-10V Hi
  - t092
- P031 Motor NP Volts
  - P041 Anlg In 0-10V Hi
  - t092
- P031 Motor NP Volts
  - P041 Anlg In 0-10V Hi
  - t092
- P031 Start Source 1
  - P044 Anlg In 0-10V Lo
  - t091
- P031 Start Source 1
  - P044 Anlg In 0-10V Lo
  - t091

**Motor NP Current**
- P033 Motor NP Current
  - P045 Anlg In mA Loss
  - t097
- P033 Stop Mode
  - P045 Anlg In mA Loss
  - t097
- P033 Stop Mode
  - P045 Anlg In mA Loss
  - t097

**Motor NP FLA**
- P034 Start Source 1
  - P046 Preset Freq 0
  - t091
- P034 Start Source 1
  - P046 Preset Freq 0
  - t091
- P034 Start Source 1
  - P046 Preset Freq 0
  - t091

**Additional groups are listed on the next page.**
### PowerFlex 523 Adjustable Frequency AC Drive

**CustomView Parameter Group**

**Extruder**
- **G6** Motor OL Current
- **P033** Maximum Freq
- **P044** Anlg In4-20mA Lo
- **t095** Pulse In Scale
- **A537**

**Language**
- **P030** Motor NP FLA
- **P034** Stop Mode
- **P045** Anlg In4-20mA Hi
- **t096** Power Loss Mode
- **A548**

**Output Freq**
- **b001** Motor NP Poles
- **P035** Start Source 1
- **P046** Anlg In mA Loss
- **t097** Half Bus Enable
- **A549**

**Commanded Freq**
- **b002** Autotune
- **P040** Speed Reference1
- **P047** Slip Hz Meter
- **d375**

**Output Current**
- **b003** Accel Time 1
- **P041** Relay Out1 Sel
- **t076** Speed Feedback
- **d376**

**Motor NP Volts**
- **P031** Decel Time 1
- **P042** Anlg In 0-10V Lo
- **t091** Preset Freq 0
- **A410**

**Motor NP Hertz**
- **P032** Minimum Freq
- **P043** Anlg In 0-10V Hi
- **t092** Stall Fault Time
- **A492**

**Textile/Fiber**
- **G8** Autotune
- **P040** DigIn TermBlk 03
- **t063** Preset Freq 0
- **A410** Traverse Inc
- **A568**

**Custom GC**
- This group can store up to 100 of your frequently used parameters for your application.

### Fault Descriptions

<table>
<thead>
<tr>
<th>No.</th>
<th>Fault</th>
<th>Type</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>F000</td>
<td>No Fault</td>
<td>–</td>
<td>No fault present.</td>
<td>–</td>
</tr>
<tr>
<td>F002</td>
<td>Auxiliary Input</td>
<td>1</td>
<td>External trip (Auxiliary) input.</td>
<td>• Check remote wiring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Verify communications programming for intentional fault.</td>
</tr>
<tr>
<td>F003</td>
<td>Power Loss</td>
<td>2</td>
<td>Single phase operation detected with excessive load.</td>
<td>• Monitor the incoming AC line for low voltage or line power-interruption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check input fuses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Reduce load.</td>
</tr>
<tr>
<td>F004</td>
<td>UnderVoltage</td>
<td>1</td>
<td>DC bus voltage fell below the minimum value.</td>
<td>Monitor the incoming AC line for low voltage or line power interruption.</td>
</tr>
<tr>
<td>F005</td>
<td>OverVoltage</td>
<td>1</td>
<td>DC bus voltage exceeded maximum value.</td>
<td>Monitor the AC line for high line voltage or transient conditions. Bus overvoltage can also be caused by motor regeneration. Extend the decel time or install dynamic brake option.</td>
</tr>
<tr>
<td>F006</td>
<td>Motor Stalled</td>
<td>1</td>
<td>Drive is unable to accelerate or decelerate motor.</td>
<td>• Increase P041, A442, A444, A446 [Accel Time x] or reduce load so drive output current does not exceed the current set by parameter A484 [Current Limit 1] for too long.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check for overhauling load.</td>
</tr>
<tr>
<td>F007</td>
<td>Motor Overload</td>
<td>1</td>
<td>Internal electronic overload trip.</td>
<td>• An excessive motor load exists. Reduce load parameter P033 [Motor OL Current].</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Verify A530 [Boost Select] setting.</td>
</tr>
<tr>
<td>F008</td>
<td>Heatsink OvrTmp</td>
<td>1</td>
<td>Heatsink/Power Module temperature exceeds a predefined value.</td>
<td>• Check for blocked or dirty heat sink fins. Verify that ambient temperature has not exceeded the rated ambient temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check fan.</td>
</tr>
<tr>
<td>F009</td>
<td>CC OvrTmp</td>
<td>1</td>
<td>Control module temperature exceeds a predefined value.</td>
<td>• Check product ambient temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check for airflow obstruction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check for dirt or debris.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Check fan.</td>
</tr>
<tr>
<td>F012</td>
<td>HW OverCurrent</td>
<td>2</td>
<td>The drive output current has exceeded the hardware current limit.</td>
<td>Check programming. Check for excess load, improper A530 [Boost Select] setting, DC brake volts set too high or other causes of excess current.</td>
</tr>
</tbody>
</table>

Additional faults are listed on the next page.
<table>
<thead>
<tr>
<th>Fault Code</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>F013</td>
<td>Ground Fault</td>
<td>A current path to earth ground has been detected at one or more of the drive output terminals. Check the motor and external wiring to the drive output terminals for a grounded condition.</td>
</tr>
<tr>
<td>F021</td>
<td>Output Ph Loss</td>
<td>Output Phase Loss (if enabled). Configure with A357 [Output Phas Loss En]. • Verify motor wiring. • Verify motor.</td>
</tr>
<tr>
<td>F029</td>
<td>Analog In Loss</td>
<td>An analog input is configured to fault on signal loss. A signal loss has occurred. Configure with t094 [Anlg In V Loss] or t097 [Anlg In mA Loss]. • Check for broken/loose connections at inputs. • Check parameters.</td>
</tr>
<tr>
<td>F033</td>
<td>Auto Rstrt Tries</td>
<td>Drive unsuccessfully attempted to reset a fault and resume running for the programmed number of A541 [Auto Rstrt Tries]. Correct the cause of the fault and manually clear.</td>
</tr>
<tr>
<td>F038</td>
<td>Phase U to Gnd</td>
<td>A phase to ground fault has been detected between the drive and motor in this phase. • Check the wiring between the drive and motor. • Check motor for grounded phase. • Replace drive if fault cannot be cleared.</td>
</tr>
<tr>
<td>F039</td>
<td>Phase V to Gnd</td>
<td>Excessive current has been detected between these two output terminals. Check the motor and drive output terminal wiring for a shorted condition. Replace drive if fault cannot be cleared.</td>
</tr>
<tr>
<td>F040</td>
<td>Phase W to Gnd</td>
<td>The drive was commanded to write default values to EEPROM. • Clear the fault or cycle power to the drive. • Program the drive parameters as needed.</td>
</tr>
<tr>
<td>F041</td>
<td>Phase U V Short</td>
<td>Programmed A486 [Shear Pin 1 Level] has been exceeded for a time period greater than the time programmed in A487 [Shear Pin 1 Time]. • Verify connections between motor and load. • Verify level and time requirements.</td>
</tr>
<tr>
<td>F042</td>
<td>Phase UW Short</td>
<td>The drive was commanded to write default values to EEPROM. • Clear the fault or cycle power to the drive. • Program the drive parameters as needed.</td>
</tr>
<tr>
<td>F043</td>
<td>Phase VW Short</td>
<td>Control over the Modbus or DSI communications link has been interrupted. • Cycle power. • Check communications cabling. • Check Modbus or DSI setting. • Check Modbus or DSI status.</td>
</tr>
<tr>
<td>F048</td>
<td>SW OverCurrent</td>
<td>The drive was commanded to write default values to EEPROM. • Clear the fault or cycle power to the drive. • Program the drive parameters as needed.</td>
</tr>
<tr>
<td>F053</td>
<td>Function Loss</td>
<td>&quot;Freeze-Fire&quot; (Function Loss) input is inactive, input to the programmed terminal is open. Close input to the terminal and cycle power.</td>
</tr>
<tr>
<td>F081</td>
<td>DSI Comm Loss</td>
<td>Communications between the drive and the Modbus or DSI master device have been interrupted. • Cycle power. • Check communications cabling. • Check Modbus or DSI setting. • Check Modbus or DSI status. • Modify using C125 [Comm Loss Action]. • Connecting I/O terminals C1 and C2 to ground may improve noise immunity. • Replace wiring, Modbus master device, or control module.</td>
</tr>
<tr>
<td>F082</td>
<td>Option Comm Loss</td>
<td>Communications between the drive and the network option card have been interrupted. • Cycle power. • Reinstall option card in drive. • Modify using C125 [Comm Loss Action]. • Replace wiring, port expander, option card, or control module.</td>
</tr>
<tr>
<td>F094</td>
<td>Function Loss</td>
<td>&quot;Freeze-Fire&quot; (Function Loss) input is inactive, input to the programmed terminal is open. Close input to the terminal and cycle power.</td>
</tr>
<tr>
<td>F100</td>
<td>Power Unit</td>
<td>Failure has been detected in the drive power section. • Check maximum ambient temperature has not been exceeded. • Cycle power. • Replace drive if fault cannot be cleared.</td>
</tr>
<tr>
<td>F101</td>
<td>DSI Net Loss</td>
<td>Control over the Modbus or DSI communications link has been interrupted. • Cycle power. • Check communications cabling. • Check Modbus or DSI setting. • Check Modbus or DSI status.</td>
</tr>
<tr>
<td>F102</td>
<td>Opt Net Loss</td>
<td>Control over the network option card's remote network has been interrupted. • Cycle power. • Check communications cabling. • Check network adapter setting. • Check external network status.</td>
</tr>
<tr>
<td>F103</td>
<td>Opt Comm Loss</td>
<td>Communications between the drive and the network option card have been interrupted. • Cycle power. • Reinstall option card in drive. • Modify using C125 [Comm Loss Action]. • Replace wiring, port expander, option card, or control module.</td>
</tr>
<tr>
<td>F104</td>
<td>Function Loss</td>
<td>&quot;Freeze-Fire&quot; (Function Loss) input is inactive, input to the programmed terminal is open. Close input to the terminal and cycle power.</td>
</tr>
<tr>
<td>F105</td>
<td>Parameter</td>
<td>Drive parameter non-volatile storage is corrupted. Set P053 [Reset To Defalts] to 2 &quot;Factory Rset&quot;.</td>
</tr>
<tr>
<td>F106</td>
<td>Incompat C-P</td>
<td>The control module could not recognize the power module. • Cycle power. • Flash with newer firmware version. • Replace drive if fault cannot be cleared.</td>
</tr>
<tr>
<td>F107</td>
<td>Replaced C-P</td>
<td>The control module was mounted to a power module with a different power rating. Set P053 [Reset To Defalts] to any of the reset options.</td>
</tr>
</tbody>
</table>

Additional faults are listed on the next page.
F109  Mismatch C-P 2  The control module was mounted to a different drive type power module.  
   Set P053 [Reset To Default] to any of the reset options.

F110  Keypad Membrane 2  Keypad membrane failure / disconnected.  
   • Cycle power.  
   • Replace control module if fault cannot be cleared.

F114  uC Failure 2  Microprocessor failure.  
   • Cycle power.  
   • Replace control module if fault cannot be cleared.

F122  I/O Board Fail 2  Failure has been detected in the drive control and I/O section.  
   • Cycle power.  
   • Replace drive or control module if fault cannot be cleared.

F125  Flash Update Req 2  The firmware in the drive is corrupt, mismatched, or incompatible with the hardware.  
   Perform a firmware flash update operation to attempt to load a valid set of firmware.

F126  NonRecoverableErr 2  A non-recoverable firmware or hardware error was detected. The drive was automatically stopped and reset.  
   • Clear fault or cycle power to the drive.  
   • Replace drive or control module if fault cannot be cleared.

F127  DSIFlashUpdateReq 2  A critical problem with the firmware was detected and the drive is running using backup firmware that only supports DSI communications.  
   Perform a firmware flash update operation using DSI communications to attempt to load a valid set of firmware.

(1) Type 1 = Auto-Reset/Run faults. Type 2 = Non-Resettable faults.

All the recommended documentation listed in this section is available online at http://www.rockwellautomation.com/literature.

The following publications provide general drive information:

<table>
<thead>
<tr>
<th>Title</th>
<th>Publication</th>
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<tbody>
<tr>
<td>Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives</td>
<td>DRIVES-IN001</td>
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<tr>
<td>Preventive Maintenance of Industrial Control and Drive System Equipment</td>
<td>DRIVES-TD001</td>
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<tr>
<td>Safety Guidelines for the Application, Installation and Maintenance of Solid State Control</td>
<td>SGI-1.1</td>
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<tr>
<td>A Global Reference Guide for Reading Schematic Diagrams</td>
<td>100-2.10</td>
</tr>
<tr>
<td>Guarding Against Electrostatic Damage</td>
<td>8000-4.5.2</td>
</tr>
</tbody>
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The following publications provide specific PowerFlex 520-Series information on drive installation, features, specifications, and service:

<table>
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<tr>
<th>Title</th>
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<tbody>
<tr>
<td>PowerFlex 520-Series Adjustable Frequency AC Drive User Manual</td>
<td>520-UM001</td>
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<td>PowerFlex 520-Series AC Drive Specifications</td>
<td>520-TD001</td>
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<tr>
<td>PowerFlex Dynamic Braking Resistor Calculator</td>
<td>PFPLEX-AT002</td>
</tr>
<tr>
<td>PowerFlex AC Drives in Common Bus Configurations</td>
<td>DRIVES-AT002</td>
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The following publications provide specific Network Communications information:

<table>
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<th>Publication</th>
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<tbody>
<tr>
<td>PowerFlex 25-COMM-D DeviceNet Adapter User Manual</td>
<td>520CDM-UM002</td>
</tr>
<tr>
<td>PowerFlex 25-COMM-E2P Dual-Port EtherNet/IP Adapter User Manual</td>
<td>520CDM-UM003</td>
</tr>
<tr>
<td>PowerFlex 25-COMM-P PROFIBUS DP Adapter</td>
<td>520CDM-UM004</td>
</tr>
</tbody>
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Power, Control and Information Solutions Headquarters
Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleelaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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