

Parameters

Chapter four details drive operation, parameters and their effect on motor performance. At power up, drive parameters stored in EEPROM are loaded into RAM memory within the DC104. These parameters are divided into read only and read/write type. The read only parameters are used for monitoring or feedback purposes. Examples include bus voltage, motor current, analog input values... Modifiable Read/Write parameters remain active until drive power is lost and a reset takes place unless they are saved into EEPROM using a separate instruction. A separate EEPROM save instruction is used to prevent stressing the fixed number of EEPROM save cycles. While the number of EEPROM save cycles is quite high, (over several hundred thousand) it can be inadvertently surpassed in a short period of time by a PC/104 host controller. A separate EEPROM save instruction accommodates applications that require parameters other than reference types to be updated on a continual basis without fear of stressing the limited write cycles of EEPROM memory.

Chapter conventions Parameters are organized in numerical order as they appear in the I/O register map. Parameters with bit field structure include a high and low byte table indicating individual bit locations followed by a description below.

High Byte

Bit 15	Bit 14	Bit 13	Bit 12	Bit11	Bit10	Bit 9	Bit 8
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Low Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
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Read/Write Type

Factory Default:

Units: Parameter specific units (example will be included for units with decimal places)

Description: Description of the parameter function and its effect on other parameters if applicable.

Bit field description: If applicable

Parameter 1 Output Volts

Read Only

Factory Default: None

Units: .1 Volts (Ex: 543 equals 54.3 volts)

Description: This parameter contains the output voltage commanded at terminals M1 and M2.

Parameter 2 Output Amps

Read Only

Factory Default: None

Maximum: 2x drive rating

Minimum: -2X drive rating

Units: .01 Amps

Description: This parameter contains the amperage of the motor at terminals M1 and M2.

Parameter 3 Speed Output

Read Only

Factory Default: None

Maximum: 32,767

Minimum: -32,767

Units: Engineering Units 4096 units = 100% speed

Description: This parameter contains the speed output from the drive.

Parameter 4 Digital Speed Command

Read/Write

Factory Default: 0

Maximum: 32,767

Minimum: -32,767

Units: Engineering Units 4096 units = 100% speed output

Description: This parameter contains the speed command from the host controller. If the drive has been configured to accept one of the two analog signals as the speed command, data sent to this parameter will have no effect.

Parameter 5 Maximum Speed

Read/Write

Factory Default: 4096

Maximum: 32,767

Minimum: 0

Units: Engineering Units 4096 units = 100% base speed.

Description: This parameter limits the maximum speed output of the drive. If the Host Speed Command is user, this parameter limits the speed output from parameter 4. In the case of an analog input speed reference, it scales the input. Maximum speed must be greater than the value in the minimum speed parameter. This parameter cannot be changed while the drive is running.

Parameter 9 Drive command

High Byte							
Bit 15	Bit 14	Bit 13	Bit 12	Bit11	Bit10	Bit 9	Bit 8
-	-	-	-	-	-	-	Encoder reset

Low Byte							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Clear Fault	-	-	-	-	Reverse Enable	Stop type	Run

Read/Write **Factory Default: 0x00**

Description: Bit control over drive run, stop type and clearing of fault condition.

Note: Parameter 9 values will not be written to Eeprom when a save parameters to eeprom command is given. Parameter 9 will reset to 0 upon application of power to the main control board of the drive.

Bit field description:

Bit 8 Encoder reset

- 1 = Setting this bit hit resets the encoder counts (P24) value to 0. The drive will return the bit to zero after the encoder counts register has been cleared..
- 0 = No effect

Bit 7 Clear Fault

- 1 = If a fault has been generated due to over-voltage, over-current... setting this bit will trigger the DC104 drive to attempt to clear the fault. The bit will return to zero after attempting to clear any faults. Setting this bit will only have an effect if a fault has occurred.
- 0 = No effect

Bit 2 Reverse Enable

- 1 = Allows the drive to reverse.
- 0 = Does not allow the drive to reverse.

Bit 1 Stop type

- 1 = Ramp to stop. The drive will decelerate per the Decel time parameter to zero upon receiving a stop command.
- 0 = Coast to stop. The drive will shut off power to the motor upon a stop command.

Bit 0 Run

- 1 = Run. This bit must be at logic 1 for the drive to run.
- 0 = Stop. The drive will stop according to the setting of bit 1.

Parameter 10 Drive configuration

Read/Write

Factory Default: 0xAA00

Description: This parameter determines the operating mode of the drive. This parameter cannot be changed while the drive is running.

- 0 = Voltage Regulation mode
- 1 = Encoder feedback closed loop control (requires optional encoder feedback module)
- 2 = Process PID mode (voltage regulation feedback)
- 3 = Process PID mode (encoder feedback, requires optional encoder feedback module)

Parameter 11 Drive status

High Byte

Bit 15	Bit 14	Bit 13	Bit 12	Bit11	Bit10	Bit 9	Bit 8
Internal error	-	-	-	Under voltage fault	Over voltage fault	Over current fault	Over load fault

Low Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
At speed	Bus limit	Accel	Decel	Current limit	-	Not Enabled	Running

Read only

Factory Default: 0x00

Description: DC104 status bits.

Bit field description: The status condition of the drive is presented in binary format. Logic 1 indicates that a particular condition is true.

- Internal error- The drive generated a self diagnostic error.
- Under voltage fault – The DC bus level has dropped below 115VDC
- Over voltage fault – The drive bus has exceeded 390 volts
- Over current fault – The drive output current has exceeded 180% of its rating
- Over load fault – The drive output current has exceeded 100% for 1 minute
- At speed – DC104 drive has reached commanded speed
- Bus limit – The DC bus has reached 110% of nominal rating
- Accel – The drive is accelerating
- Decel- The drive is decelerating
- Current limit - The drive is in current limit
- Enabled – The drive enable signal is present
- Running – The drive is running

Parameter 12 Speed Control Reference Source

Read/Write

Factory Default: 0

Maximum: 2

Minimum: 0

Units: Volts

Description: This value determines the source of the speed control reference. This value is active only when the drive is speed regulation or PID process mode. (Parameter 10 is equal to 0 or 1)

- 0 = Digital speed reference located at parameter 4.

1 = Analog input 1

2 = Analog input 2

Parameter 13 Reserved for future use

Read/Write

Factory Default: 0

Maximum: 32,767

Minimum: -32,767

Units: None

Description: Future

Parameter 14 PID Set-point Reference Source

Read/Write

Factory Default: 0

Maximum: 2

Minimum: 0

Units: None

Description: This value determines the source of the process PID set-point. This value is active only when the drive is in PID process mode. (Parameter 10 is equal to 2 or 3.)

0 = Digital PID set point at parameter 46.

1 = Analog input 1

2 = Analog input 2

Parameter 15 PID Process Variable Reference Source

Read/Write

Factory Default: 0

Maximum: 2

Minimum: 0

Units: None

Description: This value determines the source of the process variable. This value is active only when the drive is in PID process mode. (Parameter 10 is equal to 3.)

0 = None.

1 = Analog input 1

2 = Analog input 2

Parameter 16 Base Volts

Read/Write

Factory Default: 90

Maximum: 2400

Minimum: 300

Units: .1 volts

Description: This value should be set to the motor nameplate voltage.

Parameter 17 Base Amps

Read/Write

Factory Default: 1

Maximum: 2X Drive rating

Minimum: 1

Units: .1 amps (Ex: 24 equals 2.4 amps)

Description: This value should be set to the motor nameplate amperage

Parameter 18 Max Volts

Read/Write **Factory Default:** 90

Maximum: 2400 **Minimum:** 300

Units: .1 Volts (Ex: 855 equals 85.5 volts)

Description: This value represents the highest output voltage from the drive. If sufficient input voltage does not exist to produce the value in this parameter, the maximum output voltage will be limited by the input voltage.

Parameter 19 Base Speed

Read/Write **Factory Default:** 0

Maximum: 10,000 **Minimum:** 300

Units: RPM

Description: This value represents the motor nameplate base speed.

Parameter 20 Current Limit

Read/Write **Factory Default:** 6,144

Maximum: 6144 **Minimum:** 1024

Units: Engineering units 4096 = 100% of drive current rating

Description: This value sets the current output from the drive before the current limit regulator becomes active.

Parameter 21 IR comp

Read/Write **Factory Default:** 0

Maximum: 120 **Minimum:** 0

Units: Volts

Description: This value sets a level of voltage to the motor to compensate for resistance losses within the motor. The additional IR compensation voltage is proportionately added based on motor current. The value in this parameter represents the voltage added at 100% nameplate current. This helps improve speed accuracy and starting torque, but can cause instability if set too high. Set to the highest value without introducing instability.

Parameter 22 Bus volts

Read only **Factory Default:** 0

Maximum: 400 **Minimum:** 0

Units: Volts

Description: This parameter contains the voltage level of the DC bus.

Parameter 23 Encoder PPR

Read/Write **Factory Default:** 4096

Maximum: 4,096 **Minimum:** 100

Units: Encoder counts/1 revolution

Description: This parameter sets the encoder feedback pulse per revolution. This parameter is used only on DC104 drives with the optional encoder feedback module.

Parameter 24 Encoder count

Read only **Factory Default:** 0

Maximum: 65,535 **Minimum:** 0

Units: Encoder counts

Description: This parameter contains the 16 bits of the encoder count accumulator. This parameter is used only on DC104 drives with the optional encoder feedback module.

Parameter 25 Encoder speed

Read only **Factory Default:** 0

Maximum: 32,767 **Minimum:** -32,767

Units: Engineering Units 4096 = 100%

Description: This parameter contains the speed of the motor as measured by encoder counts and scaled to the base speed of the motor. A value of 4096 = base speed of the motor programmed at parameter 19. This parameter is used only on DC104 drives with the optional encoder feedback module.

Parameter 26 Reserved

Read/Write **Factory Default:** 0

Maximum: 32,767 **Minimum:** -32,767

Units: None

Description: Future

Parameter 27 Speed Kp

Read/Write **Factory Default:** 0

Maximum: 4095 **Minimum:** 0

Units: Engineering units 256 = 1

Description: This parameter contains the Kp or gain value of the velocity loop. This parameter is active only if the optional encoder feedback module is used and encoder feedback is selected in parameter 10.

Parameter 28 Speed Ki

Read/Write **Factory Default:** 0

Maximum: 4095 **Minimum:** 0

Units: Engineering units 256 = 1

Description: This parameter contains the Ki or integral value of the velocity loop. This parameter is active only if the optional encoder feedback module is used and encoder feedback is selected in parameter 10.

Parameter 29 Reserved for future use

Read/Write **Factory Default:** 0

Maximum: 32,767 **Minimum:** -32,767

Units: None

Description: Future

Parameter 30 Reserved for future use

Read/Write **Factory Default:** 0
Maximum: 32,767 **Minimum:** -32,767
Units: None
Description: Future

Parameter 31 Reserved for future use

Read/Write **Factory Default:** 0
Maximum: 32,767 **Minimum:** -32,767
Units: None
Description: Future

Parameter 32 Analog Output configurator

High Byte

Bit 15	Bit 14	Bit 13	Bit 12	Bit11	Bit10	Bit 9	Bit 8

Low Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
						A0SEL1	A0SEL0

Read/Write **Factory Default:** 0x00

Description: Bit field control over links to the analog outputs.

Bit field description:

Bit 1:0 **A0SEL1: A0SEL0 (Analog 0)**

10 = 0-10V is controlled by the host writing to parameter 33

01 = 0-10V is equal to 0-200% of drive rated current.

00 = 0-10V is equal to 0-100% of maximum speed.

Parameter 33 Analog Out 0

Read/Write **Factory Default:** 0
Maximum: 4096 = 10V **Minimum:** 0
Units: Engineering units 4096 = 10V

Description: This parameter contains the value of Analog Output 0. If host control of this channel is chosen in P32, writing to this parameter will drive the 0-10VDC output at the terminal blocks. +12VDC is required on the PC014 stack in order for the analog output to function. The analog output will be active only while the drive is running.

to RAM. The drive must be off in order to perform any of these functions. Parameter 48 must contain a value of 255 prior to issuing any commands. Otherwise, they will be ignored.

0xAA = Save the current parameters in drive RAM to eeprom

0x55 = Load the factory defaults to the drive RAM

0x22 = Load the stored data in eeprom into the drive RAM

Parameter 48	Memory lock
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Read/Write

Factory Default: 0

Maximum: 65,535

Minimum: 0

Units: Engineering units

Description: This parameter locks and unlocks the drive eeprom. A value of 0xFF unlocks the eeprom controller to accept commands in parameter 47. The drive will change this value to a locked state after every eeprom command write in parameter 47.