

RoboteQ DC Drive's 3.2 Firmware Release Notes

Iss:1/Rev.:0

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Introduction

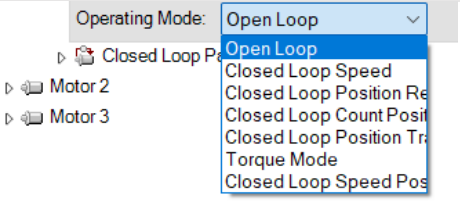
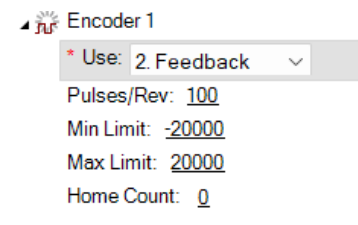
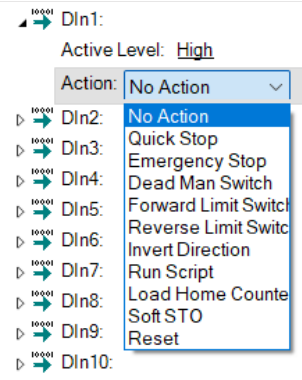
Firmware v3.2 has been validated and released for use with the new generation of RoboG4 brushed DC drives. The RoboG4 products are the successors to the non-G models, offering the same dimensions, power specifications, and connections to enable a seamless transition. RoboG4 drives retain all the features of the previous generation and introduce advanced features that, when enabled, can enhance application performance.

Important Note

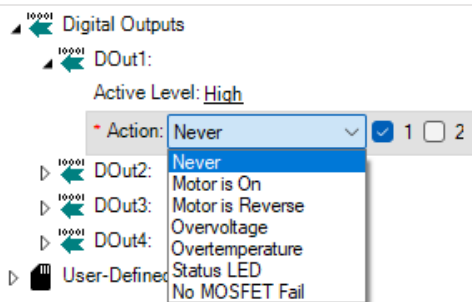
Make sure you use the latest Roborun+ PC Utility (v3.2 or newer) when configuring and operating drives running firmware 3.2. The latest released version can be downloaded from Roboteq's website.

List of Features

Operational Features

Various operating modes, including Open Loop, Torque Mode, Closed Loop Speed and Position modes.	
Support of Encoder sensors for feedback: Encoder sensors allow the Closed Loop Speed and Position control of the motor.	
Multifunctional Inputs: Offers versatile input options that can be configured for various control tasks and signals, including digital, analog and pulse functions.	

Configurable digital output action: Digital outputs can implement functions that serve status LEDs and critical fault indicators.



Customizable Scripting Language: Provides the ability to tailor functions to specific applications through easy-to-use native scripting. MicroBasic language enables control over the drive's I/Os, runtime variables, and allows modification of the drive's configuration during operation.

```
start:

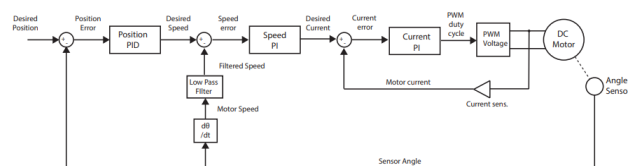
up = getvalue(_DI,UP_SW)
down = getvalue(_DI,DOWN_SW)

if up and not down

    setcommand(_S,CC,UP_SPEED)

end if
```

Cascaded Control Modes: In FOC control, the Speed and Torque loops operate in a cascaded configuration, enabling optimal motor control. Cascaded operation is enabled by setting the FOC Torque gains.



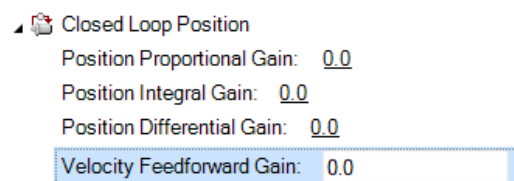
Configurable Low Pass Filter for Speed Control: Enhances control stability and performance by filtering out high-frequency noise.

Closed Loop Feedback Sensor: Other
Speed feedback filter bandwidth (Hz): 45

16 kHz Current Loop (New RoboG4 Feature): Having a 16 times faster control loop than before allows for the ultimate control of the motor current even at most demanding command or load changes.



Feedforward control (New RoboG4 Feature): Feedforward control is supported in both speed and position modes, enhancing the system's responsiveness through both steady-state and transient operations.



Protections and Safety Features

Sensor Error Detection: the protection will detect unexpected changes in the motor's feedback, indicating a sensor error.	- Motor Parameters - Rotor Resistance (Rr - mOhms): 0 - Stator Resistance (Rs - mOhms): 0 - Stator Inductance (Ls - uH): 0 - Leakage Inductance (sigma Ls - uH): 0
Amps Limiting function: The drive can limit the maximum motor current, with the allowable value set by the user's Amp Limit, in conjunction with the I2T configuration and the Max Power setting. Amps Trigger Function: This protection will trigger an error if the motor current exceeds a permissible value for longer than the defined time.	- Motor Output - Amps Limits - Amps Limit (A): 60.0 - Amps Trigger (A): 60.0 - Amps Trigger Action: No Action - Amps Trigger Delay (ms): 500
I2T protection: This feature safeguards the motor from thermal overload by monitoring the integral of the current squared over time (I^2T), preventing damage due to excessive current draw over a period. It allows for brief current surges but limits long-term overcurrent conditions.	- I2T Configuration - Nominal Current: 30.0 - Time (sec): 2
Stall detection: An error is triggered if there is no change in the sensor signals for a defined amount of time and at a minimum PWM duty cycle.	- Stall Detection: 500ms @ 25% Power - Sensor Error Detection: Disabled - Switching Mode: 250ms @ 10% Power - Reference Speed: 500ms @ 25% Power - Reference Speed: 1s @ 50% Power
Overvoltage/Undervoltage Detection: The power stage is disabled if the DC bus voltage gets out of the permissible limits.	- General - Voltage Limits - Over Voltage Limit (V): 60.0 - Over Voltage Hysteresis (V): 5.0 - Under Voltage Limit (V): 10.0
Overtemperature protection: The motor voltage or current (dependent on the operating mode) will start to derate to prevent the motor from exceeding the configured temperature threshold.	- Motor Thermistor - Motor Over Temperature Limit: 80 - R25: 0 - B25: 0
Loop Error Detection: An error is triggered when the Loop Error runtime value surpasses a predefined threshold for a specified duration, allowing for the detection of load variations or mechanical faults.	- Loop Error Detection: Custom - Loop Error Limit: 250 - Loop Error Time: 500 - Closed Loop Torque: 250ms @ 100 Error Units - Closed Loop Torque: 500ms @ 250 Error Units - Closed Loop Torque: 1s @ 500 Error Units - Closed Loop Torque: Custom - Closed Loop Speed
Customizable Loop Error Detection (New Feature): The specific Loop Error duration and level are fully customizable in 3.0+ firmware	- Loop Error Detection: Custom - Loop Error Limit: 250 - Loop Error Time: 500

Short circuit detection: The drive immediately disables the power stage if the measured motor current exceeds 120% of the drive's maximum current rating, protecting against potential damage from short circuits.

- Not Configurable -

MOSfail detection: The drive checks the health of the MOSFETs at every startup and when a specific command is issued. If a failed MOSFET is detected, the H-bridge is disabled.

- Not Configurable -

STO Function: STO circuitry prevents the motor from generating any additional torque when the STO is triggered. The motor will continue to rotate with the existing torque until it is stopped by the friction of the mechanical parts.

STO Enable: Disabled
Mixed Mode: Disabled
Molex Input: Hall Sensors

Important Note

For additional information regarding Operational Features and Protections, refer to the latest Roboteq Drives User Manual.

Important Note

To configure a RoboG4 drive from scratch, please refer to the latest Roborun+ Utility User Manual (v3.2), the latest Roboteq Drives User Manual, and the relevant Quick Startup and Configuration Guides.

References

Please refer to the below table for the documentation and support resources related to RoboG4 products.

Table 1: References

Document	Source
Roborun+ 3.2 latest User Manual	https://www.roboteq.com/support/documentation-download
Roboteq Drives 3.2 latest User Manual	https://www.roboteq.com/support/documentation-download
Roborun+ 3.2 latest software update	https://www.roboteq.com/support/files-download
Latest v3.2 Firmware	https://www.roboteq.com/support/files-download
Quick Startup and Configuration guides	https://roboteq.freshdesk.com/en/support/solutions/folders/70000481967