
RoboteQ ACIM Drive's 3.2 Firmware Release Notes

Iss:1/Rev.:0

Table of Contents

Introduction	3
List of Features.....	3
Operational Features	3
Protections and Safety Features	5
References	7

Introduction

Firmware v3.2 has been validated and released for use with the new generation of RoboG4 ACIM 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

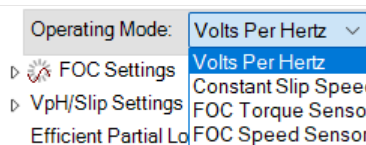
Make sure you use the latest Roborun+ PC Utility (v3.2 or newer) when configuring and operating drives running firmware 3.2. The latest released version can be downloaded from Roboteq's website.

List of Features

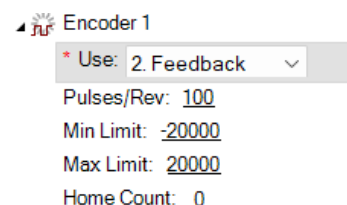
Operational Features

Open Loop V/Hz, Constant Slip, FOC Torque and FOC Speed modes:

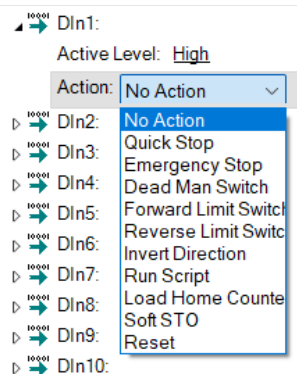
The user can select from various AC control operating modes, ranging from the simplest (V/Hz) to the most advanced and effective FOC mode.



Support of Encoder sensors for feedback: Encoder sensors allow the Closed Loop Speed control of the motor.

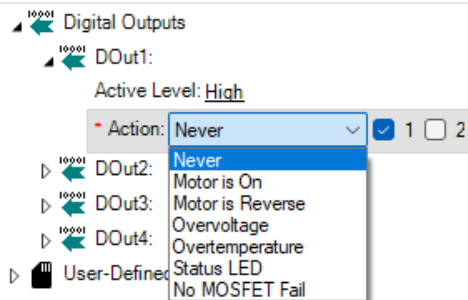


Multifunctional Inputs: Offers versatile input options that can be configured for various control tasks and signals, including digital, analog and pulse functions.



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)

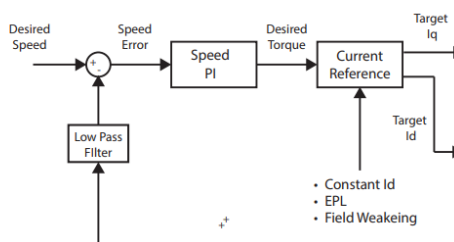
if up and not down

    setcommand(_S,CC,UP_SPEED)

end if
```

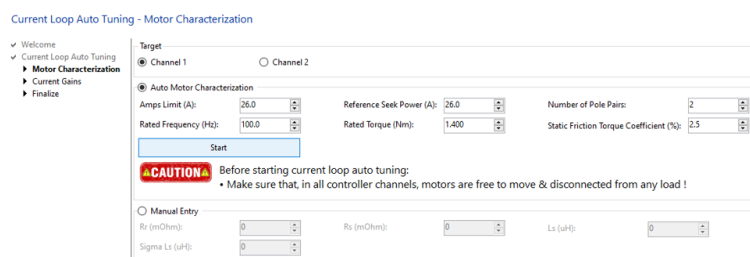
Cascaded Control Modes: In FOC

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.



Automatic Motor Characterization (New RoboG4 feature):

Automatically estimates the motor's parameters that are necessary for running the motor in FOC torque and Speed mode



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.



Automatic Field Weakening (New RoboG4 Feature): Enhances high-speed motor performance by automatically reducing field magnetization when the requested speed surpasses the motor's nominal range. Automatic field weakening is enabled by reducing the maximum allowed voltage ratio.

▸ VpH/Slip Settings

Efficient Partial Load: Disabled

Field Weakening Voltage Ratio (%): 100.0

Maximum Motor Output Power (W): 3780.0

Reference Seek Power (A): 5.0

Efficient Partial Load (EPL) function (New RoboG4 Feature): Enhances motor performance by optimizing efficiency when operating at partial load conditions, typically below the nominal load.

▸ VpH/Slip Settings

Efficient Partial Load: Disabled

Field Weakening Voltage Ratio (%): 100.0

Maximum Motor Output Power (W): 3780.0

Reference Seek Power (A): 5.0

Current Decoupling Terms (New RoboG4 Feature): Improves motor control precision by compensating for the cross-coupling effect of induction motors. Decoupling control is automatically enabled in all FOC modes when all motor parameters and FOC Torque and Flux PI gains are set.

▴ Motor Parameters

Rotor Resistance (Rr - mOhms): 0

Stator Resistance (Rs - mOhms): 0

Stator Inductance (Ls - uH): 0

Leakage Inductance (sigma Ls - uH): 0

Protections and Safety Features

Sensor Error Detection: A fault will be triggered if not all necessary motor parameters are set in FOC modes. Furthermore, 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.

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.

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.

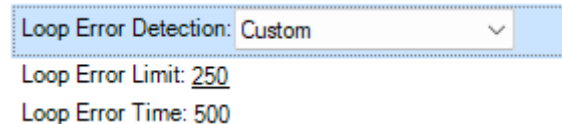
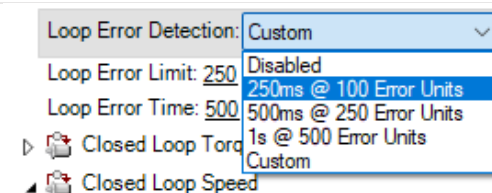
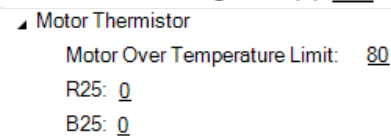
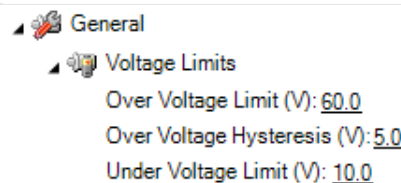
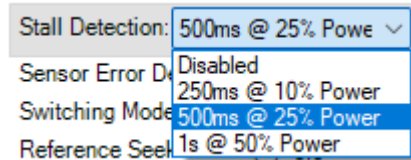
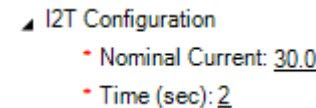
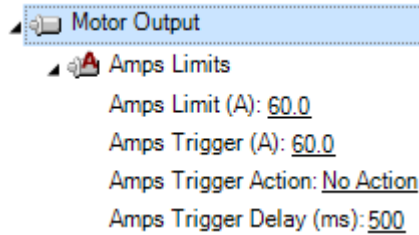
Overvoltage/Undervoltage Detection: The power stage is disabled if the DC bus voltage gets out of the permissible limits.

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.

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.

Customizable Loop Error Detection (New Feature): The specific Loop Error duration and level are fully customizable in 3.0+ firmware

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.

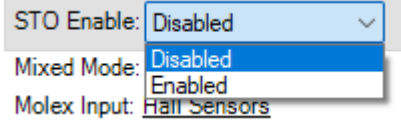


- Not Configurable -

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.

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.

- Not Configurable -



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