Release Notes v2.2.0

KINOVA® Gen3
Ultra lightweight robot
enabled by KINOVA® KORTEX™
Overview

This document provides release notes for the KINOVA® Gen3 Ultra lightweight robot enabled by KINOVA® KORTEX™. The document provides information about release version 2.2.0 (and previous releases) and includes:

- System requirements
- Definitions
- Software / firmware components release versions
- Features introduced
- Bugs fixed in release
- Known issues, limitations, and workarounds

System requirements

KINOVA® KORTEX™ Web App

For this release, the Web App is supported on the following:

- Google Chrome version 64+:
  - Microsoft Windows 7/10
  - Ubuntu LTS 16.04
  - Android 8.1 and higher

KINOVA® KORTEX™ development computer platform

These are the hardware and OS requirements for a development computer:

- Microsoft: Windows 7/10 (32-bit or 64-bit)
- Linux: Ubuntu 16.04 (64-bit)

Definitions

EXPERIMENTAL: Feature is available but not fully supported. To be used with caution.

ADVANCED USERS ONLY: Feature is supported but can be dangerous to people and equipment if used incorrectly. Should only be used by users who know exactly what they are doing.

For content which is identified as Experimental or Advanced, users should refer to the robot user guide before attempting to use the feature. Furthermore, users should stay out of the reach of the robot while using advanced and experimental modes.
Safety information

Users need to review safety and warning information about the Gen3 robot before using the robot. Safety information for the robot can be found in the introduction section of the Gen3 robot User Guide.

Compatibility Matrix

The following table gives the compatibility of different Gen3 robot hardware configurations with different software releases.

<table>
<thead>
<tr>
<th>Robot / gripper hardware configuration and API version</th>
<th>Robot firmware version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.1.7</td>
</tr>
<tr>
<td>6 DoF (fixed base with and without vision)</td>
<td>-</td>
</tr>
<tr>
<td>7 DoF</td>
<td></td>
</tr>
<tr>
<td>Quick connect base with vision</td>
<td>✔</td>
</tr>
<tr>
<td>Quick connect base without vision</td>
<td>-</td>
</tr>
<tr>
<td>Fixed base with vision</td>
<td>-</td>
</tr>
<tr>
<td>Fixed base without vision</td>
<td>-</td>
</tr>
<tr>
<td>Robotiq 2F-85 gripper</td>
<td>✔</td>
</tr>
<tr>
<td>Robotiq 2F-140 gripper</td>
<td>-</td>
</tr>
<tr>
<td>Recommended Kortex API version*</td>
<td>1.1.7</td>
</tr>
</tbody>
</table>

*In order to access the full feature set of the corresponding firmware version
New features and bug fixes

V2.2.0 release

Release date

2020-01

Software / firmware components release versions

- KINOVA® KORTEX™ API: 2.2.0
- Base firmware: 2.2.0
- Actuators firmware: 2.2.0
- Interface module firmware: 2.2.0
- Vision module firmware: 2.2.0

Features introduced in release

- Support for new 6 DoF robot model
- Support for robot with fixed base and no vision module option
- Faster robot movement (up to 50 cm/s)
- Ability to configure, via APIs, soft limits on speed and acceleration as well as desired speeds and accelerations for joystick control modes
- Teaching mode - create sequences easily in Web App Actions page sequence editor. Capture snapshots with wrist buttons in admittance modes
- Improved protection zones management in Web App
- Introduction of internal calibration process to improve precision and repeatability on newly manufactured robots
- Simulink Jetson TX2 / XAVIER platform support
- Control device mapping support - ability to edit, create, and delete mappings via API and Web App
Fixed in release

- GEN3-991 - Stop button does not stop gripper action play when ‘Hold to Play’ is disabled
- GEN3-1305 - Vision module firmware fails to upgrade
- GEN3-1351 - Need to clear browser cache after robot upgrade
- GEN3-1352 - Need to restore factory settings after robot software update
- GEN3-1682 - Gripper - invalid parameters loaded at boot
- GEN3-1783 - Joint error does not always display on the Web App > Safeties page
- GEN3-1944 - Playing second action while first is paused causes first action to resume
- GEN3-2132 - Unexpected movements when changing tool, payload, gravity vector
- GEN3-2154 - Issues Displaying Wifi-Network Information on Web App
- GEN3-2465 - Can't See Errors or Warnings on the Safeties Page

Pending deprecation notice

With this release, a number of API methods have been marked to be deprecated in a future release. For full details, see the API documentation on the Kortex GitHub repository.
V2.0.1 release

Release date
2019-09

Software / firmware components release versions

- KINOVA® KORTEX™ API: 2.0.1
- Base firmware: 2.0.1
- Actuators firmware: 2.0.1
- Interface module firmware: 2.0.1
- Vision module firmware: 2.0.1

Fixed in release

- GEN3-2366 - Arm not detected at boot-up
V2.0.0 release

Release date

2019-08

Software / firmware components release versions

- KINOVA® KORTEX™ API: 2.0.0
- Base firmware: 2.0.0
- Actuators firmware: 2.0.0
- Interface module firmware: 2.0.0
- Vision module firmware: 2.0.0

Features introduced in release

- Update to look and organization of Web App
- Interface module expansion (UART, I2C, GPIO, Ethernet) fully supported
- High-level control improvements
  - Command individual actuators at high-level with joint speed commands
  - Send high-level pre-computed joints trajectory command
  - Force control - Send Cartesian Wrench commands to tool (EXPERIMENTAL)
- Torque control - command individual actuators in low-level with torque commands (ADVANCED USERS ONLY)
- Control configuration
  - Configure gravity vector in control library to support all static mounting orientations
  - Configure tool mass, center of mass, and reference frame in control library
  - Configure payload in control library
- MATLAB and Simulink support, including vision support via MATLAB Image Toolbox Adapter. Introduction of new matlab_kortex GitHub repository
- Gazebo and MoveIt! Support added to ros_kortex GitHub repository
Fixed in release

- GEN3-688 - Reliability of ‘Hold to Play’ button in Web App
- GEN3-845 - Web App virtual joysticks and admittance controls can’t be used when pose play is pressed after the robot has already arrived at the pose
- GEN3-996 - Robot with Robotiq Gripper may come into contact with robot base
- GEN3-1019 - Safety information missing in the Web App Configurations page Safety tab after a local refresh
- GEN3-7756 - Web App may be improperly rendered on a tablet in portrait orientation
- GEN3-8117 - Many small sequences cause navigation to Web App ‘Actions’ page to crash Web App
- GEN3-8243 - Interface minimum voltage safety doesn’t clear when using "Clear all faults" in Web App
- GEN3-8333 - Web App camera pop-up window unreliable
V1.1.7 release

Release date

2019-04-26

Software / firmware components release versions

- KINOVA® KORTEX™ API: 0.0.2
- Base firmware: 1.1.7
- Actuators firmware: 1.1.7
- Interface module firmware: 1.1.7
- Vision module firmware: 1.1.7

Fixed in release

- GEN3-69 - In Web App > Controllers > XBox Mapping, the table showed internal names rather than user-friendly names for some items
- GEN3-73 - When Web App reconnects after rebooting with Cartesian virtual joystick open, Angular joystick commands will not be sent to the robot
- GEN3-74 - When editing values in Network page of Web App, backspace key deletes two characters
- GEN3-79 - When deleting a Pose card that is used in a Sequence, user receives notification "Device Error" and card is not deleted
- GEN3-80 - Web App Upgrade page should say Kortex API Version rather than Kortex Version
- GEN3-1310 - build.sh failed to download kortex_api in ROS Kortex
- GEN3-8984 - Following Error warning triggers with no movement from the robot
V1.1.6 release

Release date

2019-03-29

Software / firmware components release versions

- KINOVA® KORTEX™ API: 0.0.2
- Base firmware: 1.1.6
- Actuators firmware: 1.1.5
- Interface module firmware: 1.1.5
- Vision module firmware: 1.1.6

Features introduced in release

- Users can now set the country in the Configurations > Base > General tab of the Web App Configurations page.
- Redesign of Web App UI and functionality. Various improvements:
  - **Bottom panel**: Page shortcut icons removed. Snapshot controls consolidated into bottom Control Panel.
  - **Top bar**: Users have the ability to hide/show the left menu. The upper right notifications and controls have been updated, including a streamlined notifications panel.
  - **Left menu**: The Notifications page has been removed.
- Web App performance on mobile devices has been improved.
- Web App retrieves assigned IPv4 address when connected to a wireless access point
- Joint admittance tuning has been improved to lower stiffness and offer better stability.
Fixed in release

- GEN3-54 - Subnet mask of 255.255.255.255 in Web App locks out other users
- GEN3-59 - Long-running sequence stopped because of Web App time-out
- GEN3-7403 - Base controller RJ-45 LED behavior
- GEN3-7414 - Robot moves erratically after 'W' key depression in Web App virtual joystick
- GEN3-7439 - Glitch when admittance mode activated during Web App robot sequence
- GEN3-7470 - When in admittance mode, robot drifts when robot has no gripper attached
- GEN3-7605 - Robot can fall during boot sequence
- GEN3-8157 - PlayCartesianTrajectory() does not work as intended
- GEN3-8170 - Robot shakes when moved manually in Cartesian admittance mode
- GEN3-8178 - Actuator firmware - persistent following error will not deactivate servoing
- GEN3-8328 - Segmentation fault when destroying API
- GEN3-8348 - Actuators sometimes return NaN’s as torque value for RefreshFeedback() calls
- GEN3-8353 - Torque safeties do not trigger on negative values
- GEN3-8632 - Communication issues controlling robot over wired Ethernet while video streaming activated
V1.1.4 release

Release date

2019-01-15

Software / firmware components release versions

- KINOVÃ® KORTEX™ API: 1.1.3
- Base firmware: 1.1.4
- Actuators firmware: 1.1.4
- Interface module firmware: 1.1.4
- Vision module firmware: 1.1.4

Features introduced in release

- KINOVÃ® KORTEX™ Web App (robot configuration, control and monitoring)
- ROS v1 support
- APIs: C++ and Python
- Control modes
  - Cartesian
  - Joint angles
  - Admittance – Cartesian, angular, and null-space
- Control features
  - Protection zones
  - Singularity avoidance
- Servoing modes
  - High-level
  - Low-level
- 2D / 3D video streaming
- Sequences and Actions
- Event notifications
- Safeties management
- Control device mapping
Known issues, limitations, and workarounds

GEN3-67 - Web App shows base communication only

After rebooting the robot or refreshing the Web App page, the Web App shows communication only on the base. The issue can be seen in the Configurations and Upgrade page of the Web App. Information about the actuators, interface module, and vision are missing.

Workaround:

Refresh the page. If this does not work, move the robot around and then reboot.

GEN3-802 - Robot jumps on its own when moved into position in Cartesian admittance mode and then released

In Cartesian admittance mode, the robot may suddenly shake during some motions when joint six is near its joint limit.

GEN3-805 - Vision module settings unaffected by Web App ‘Restore Factory Settings’

The ‘Restore Factory Settings’ button on the Web App > Configurations page has no impact on Vision module configuration.

Workaround:

Modify the Vision module parameters manually, as needed.

GEN3-973 - Robot may stop if selected speed constraint speed value is too high

When the speed constraint for a Cartesian pose is too high, the robot stops before attaining the commanded pose.

Workaround:

Edit the corresponding action and reduce constraint speed value.
GEN3-1030 - Robot moves off joint limit endpoint in Cartesian admittance mode after it is released

If the robot is in Cartesian admittance mode and the user attempts to bring it inside its joint limits, the robot may move on its own after the robot is released.

Workaround:

Be aware of robot joint limits and do not attempt to force the robot joints beyond the limits.

GEN3-1209 - Robot drops when doing Set Zero Offset on actuators

The robot may drop if Set Zero Offset is performed when the robot is in an unstable position.

Workaround: only use if robot in stable position.

GEN3-1398 - After flash upgrade Web App will not display Web App and Kortex versions completely

The Web App and Kortex API versions are displayed in the Web App - Upgrade page. The page may show the wrong information after upgrading the robot.

Workaround:

Do a force refresh of the Web App (press CTRL-F5).

GEN3-1558 - ‘IPv4 address not in valid range’ message sometimes appears while IP address and subnet mask are valid values

Web App may report error when changing both IPv4 address and subnet mask.

Workaround:

Change one of the two values at a time.
GEN3-1741 - Web App > Actions page loop and hold to play settings not shared across sessions

The Web App > Actions 'Hold to Play' and 'Loop' parameter values are specific to each Web App instance. A second Web App instance won't show the same values from the first instance.

GEN3-1844 -Pressing 'Set Axis Offset Zero' in Web App causes warnings and errors

Pressing the 'Set Axis Offset Zero' from the Web App may cause warnings and errors.

Workaround:
Clear all faults from Xbox gamepad or Web App and resume normal operations.

GEN3-1922 - After FW upgrade, Web App may still report old vision module FW version

The vision firmware takes a few minutes to update. The information on the Web App > Upgrades page will refresh quickly while the vision firmware is still in the process of updating.

Workaround:
Wait several minutes and re-open the Web App.

GEN3-1932 - Protection zone limitations due to placement of monitored points

The robot currently detects entry of the robot into protection zones by checking for intersections of a set of discrete checkpoints on the robot with the protection zone volume. This behaves intuitively in most cases but can produce expected behavior for some protection zones with at least one thin dimension such that the robot can wrap around the zone or the zone can end up between two monitored points.

Workaround:
Read the User Guide Protection zone information in the robot controls section for more information about the monitored points and limitations of protection zones.
GEN3-1957 - ROS Movelt! - when joint goes over hard limit, it does not move anymore

Movelt! cannot plan a trajectory when the robot is inside of its joint limits because the robot is not considered to be in a ‘possible’ position.

Workaround:

Use the virtual joystick of the web app to move away from the joint limits before doing a Movelt trajectory.

GEN3-2001 - Device routing packets are sometimes lost between base and actuators

When communicating with actuators via the Kortex API, a timeout error may be reported on rare occasions when packets are lost.

Workaround:

Ensure that the client code handles timeouts (e.g. putting in a place a retry on timeout).

GEN3-2084 - Null space admittance mode does not respect protection zone limits

Protection zones are only considered in modes which are in cartesian space. Null space admittance is a mode which is in joint space. There the robot does not avoid or stop for protection zones while in null space admittance.

GEN3-2258 - Limitations on interface UART

Sending too large a message via UART can result in lost data or other issues with the interface. Very long messages (more than 500 characters) will result in the interface not responding and requiring a reboot of the robot to reactivate.

Workaround:

Take into account the configured baud rate of the UART and avoid sending more data than this baud rate.
GEN3-3566 - In some cases Cartesian trajectories fail to achieve desired pose

Cartesian trajectories may sometimes fail to reach the desired pose if the joint speed limits set are too low or if singularities are present within the trajectory.

Workaround:

Increase joint speeds or reduce Cartesian speeds. Avoid singularities in your trajectory.

GEN3-3596 - For angular trajectories, new default joint speed limits may impact existing trajectories with speed constraints

To ensure that existing unconstrained angular trajectories behave the same after the update, the default joint speeds limit in angular trajectories is set to 25°/s. An existing Sequence with a joint speed constraint configured higher than this will become invalid after upgrade to v2.2.0 when attempting to execute the Sequence.

Workaround:

Using the new Web App Speed Limits page, increase the joint speed limits globally or specifically for angular trajectory control mode. Alternatively, reduce the joint speed constraint in the Sequence.

GEN3-3645 - Active mapping is reset to default maps after a reboot

The active mapping will be reset to the default mapping after a reboot. It is therefore unadvised to change the location of the Emergency Stop button on any user-defined mapping.

GEN3-3699 - Sequences playing only null space admittance mode teach poses don’t play as expected

During teach mode, moving the robot using null space admittance between two snapshots does not guarantee that the movement will be the same. A new trajectory will be generated between the two snapshots which may differ.
**GEN3-3701 - Web App notifications for triggered warnings and faults for Interconnect safeties are wrong**

Notifications displayed in Web App for safeties triggered in Interconnect / Gripper will not specify the correct safety.

*Workaround:*

Look at the safety page in the Web App to see the correct Interconnect safety that was triggered.

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**GEN3-8633 - Robot reboot using Web App not working**

Rebooting the robot using the Web App (Configurations page > Base) may not work (intermittent).

*Workaround:*

If this occurs, reboot the robot using the power button on the robot base controller.
Support

If you have any issues, questions or comments, please don’t hesitate to contact us.

Access all technical and product resources on the Kinova website product support.

Contact your Field Applications Engineer if you have questions:

kinovarobotics.com/support
There is no need too small. No task too great.

kinovarobotics.com

Kinova inc. (Headquarters)
4333, Boulevard de la Grande-Allée
Boisbriand (QC) J7H 1M7
Canada
+1 (514) 277-3777

Kinova Europe GmbH
Großkitzighofer Straße 7 a
86853 Langerringen
+49 8248 8887-928
Assistive Solutions: +49 2241-169 47 13