

Product Release Notice

KINGSTAR 4.1

General Availability Release Date

July 9, 2021

Product Overview

KINGSTAR is an all-software, complete “plug-and-play” PC-based Machine Automation platform for IoT and Industry 4.0. Key pre-tested and pre-integrated industrial machine components include software-based motion control, machine vision, programmable logic controller (PLC) and the industry’s only plug-and-play EtherCAT master that auto-discovers any vendor’s EtherCAT drive, IO or device and auto-configures the EtherCAT environment at startup. Built on the EtherCAT standard and supported by a real-time 64-bit Windows operating-system (RTOS) from IntervalZero, KINGSTAR empowers engineers to design, develop and integrate machine control applications or a system of controllers on a single Industrial PC. The KINGSTAR platform can replace all hardware with software-only motion controllers and machine vision positioning systems, quickly and cost effectively.

KINGSTAR version 4.1 allows developers to select only the functionality they need. KINGSTAR’s flexibility is provided through feature packages that allow you to grow your product at any time by adding functionality to the existing KINGSTAR Runtime.

Available KINGSTAR Runtime feature packages:

- Core packages for: 1, 2, 3 or 7 KINGSTAR cores
- Motion Packages for: Point to Point, Synchronization, Blending, and Kinematics
- Axis Packages for: 8, 16, 32 or unlimited Axis
- High Speed Timer
- Multiple Masters
- Hot Connect
- Cable Redundancy
- Programmable Logic Controller (PLC)

New Features

- The KINGSTAR EtherCAT Master now supports cable redundancy, a feature designed to compensate for a failure of a cable or node in an EtherCAT network, when using a ring topology. [KS-1837]
- Completely redesigns the KINGSTAR Analysis Console to be more user friendly. [KS-2572]
- Includes a new messaging service for debug messages and getting and setting Categories. [KS-2578]
- Adds support for cyclic switch feature to allow a switch to trigger on a set time or distance. [KS-562]
- Adds PLCOpen motion control functions and function blocks for the transformation between coordinate systems. [KS-1225]
- The KINGSTAR Configuration Tool now supports a device right-click option to Request state. [KS-2297]
- Adds functions and function blocks for group motion profiles. [KS-2627] [KS-2633]
- Adds functions for group-path cam switch. [KS-2466]
- Adds functions for adding, getting, and removing items from the variable table. [KS-2579]
- Adds a .NET Class GUI sample. [KS-2591]
- Adds structured text to read and write PDO variables in KINGSTAR PLC. [KS-2648]
- Supports the kinematic transformation between ACS and MCS. [KS-2651]
- Supports the kinematic transformation between MCS and PCS. [KS-2652]
- Supports generic Omron and Panasonic drives. [KS-2667]
- Adds the members of the McSource type for MCS and PCS. [KS-2815]
- Supports RTX64 4.1.1 and Windows 10, up to feature updates (2105) released in May 2021. [KS-2689] [KS-2690]

Updates

- In KINGSTAR Analysis Console > Diagnostic Tool, Port N CRC now has three values to show different errors. [KS-2594]
- The behavior of StartFromConfiguration was different among Real-time, Win32, .NET API, and .NET Class. Now all the APIs return errNoLicense under the same condition. [KS-2766]

- Real-time, Win32, and .NET API: the string "Actual" is removed from the names of these functions: GetGroupActualPosition, GetGroupActualVelocity, and GetGroupActualAcceleration. [KS-2814]
- Updates Real-time and Win32 sample code. [KS-2886]
- SetGroupPositionOffset now recovers values when it fails. [KS-3056]

Resolved Issues

- Resolves an issue where SetAxisHomeSwitch, SetAxisPositiveLimitSwitch, and SetAxisNegativeLimitSwitch did not properly return an error or apply settings if a sensor did not exist in the PDO. [KS-1316]
- Resolves an issue where a high acceleration or jerk value was seen in the log data after SetGroupPositionOffset is called. [KS-2347]
- Resolves an issue where axes vibrated when SetAxisPositionOffset was in velocity control modes. [KS-2554]
- Resolves an issue where CoeReadSdoODList had a possibility to crash the Windows (.exe) user program. [KS-2566]
- Resolves an issue where Real-time and Win32 processes calling ForceAxisInputs to write a value into real hardware returned an unknown error code. [KS-2600]
- Resolves an issue where SetAxisPositionOffset did not affect a commanded position. [KS-2603]
- Resolves an issue where an infinite loop occurred when an ESI file with corrupt data was imported into the KINGSTAR ESI Import Tool. [KS-2620]
- Resolves an issue where calls to blending motion commands while a motion queue was full would cause an exception to occur. [KS-2623]
- Resolves an issue where KINGSTAR PLC crashed when Modbus variables were being edited. [KS-2685]
- Resolves an issue where an error occurred if KINGSTAR PLC was installed without the KINGSTAR Runtime. [KS-2686]
- Resolves an issue where an access violation exception occurred when ReadSlaveEEPROM was called in the RtssDebug configuration. [KS-2688]
- Resolves an issue where FixedAddress (SlaveDiagnostics) did not follow the order of the devices connected with Ethernet cables. [KS-2699]
- Resolves an issue where an application crashed when WaitForCommand was used to wait for WriteSlaveRegister in a Windows (.exe) user process. [KS-2700]

- Resolves an issue where range protection for digital cam switch didn't always work. [KS-2701]
- Resolves an issue where when WaitForCommand was used for Stop, it returned errNoError when a background thread was still running. [KS-2702]
- Resolves an issue where some IO-Link masters could not reach Safe-Op when no IO-Link module was defined. [KS2704]
- Resolves an issue where GetSlaveById could not get correct values for AliasAddress and SerialNumber. [KS-2715]
- Resolves .NET API issues where:
 - Api.WriteSlaveRegister and Api.ReadSlaveEEprom did not work properly. [KS-2722]
 - Api.GetAliasesStatus returned the wrong alias state. [KS-2734]
 - Motion.SetAxisPositionOffset returned the wrong KsCommandStatus. [KS2735]
 - Motion.GetAxisCamInfo returned the wrong McCamInfo. [KS-2739]
 - Motion.SimulateAxisCam returned the wrong McCamInfo. [KS-2740]
 - Motion.GetGroupActualVelocity and Motion.GetGroupActualAcceleration returned the wrong value for McGroupValue. [KS2742]
 - Motion.SetGroupPositionOffset did not set position offset properly. [KS-2743]
 - Api.RequestState did not set the EtherCAT state properly. [KS-2744]
 - Motion.GetAxisState did not get the correct axis state. [KS-2745]
- Resolves an issue where SetGroupPositionOffset and WaitForCommand always returned errWrongParameter if McExecutionMode is mcQueued. [KS-2747]
- Resolves an issue with the Modbus server where the response length of the HOLDING REGISTER command was too long, which caused some HMIs to refuse to respond. [KS-2748]
- Resolves an issue where Win32 API AoeWriteSdoObject caused a Windows (.exe) program to crash. [KS-2754]
- Resolves an issue where SetCycleTime did not return errNoLicense when cycle time was less than 1 millisecond and High Speed Timer Package was not activated. [KS-2762]
- Resolves an issue where calling WriteSlaveAlias would cause an exception. [KS-2769]
- Resolves an issue where ReadSlaveAlias always returned zero in a real-time process. [KS-2770]

- Resolves an issue where SetAxisCamSwitch could not get the expected result if it applied OnCompensation and OffCompensation of the McTrack structure. [KS-2785]
- Resolves an issue where SetAxisCamSwitch could not get the expected result when an axis passed LastOnPosition and moved backward. [KS-2790]
- Resolves an issue where WriteSlaveAlias could not successfully write station alias when called from a real-time or Win32 process. [KS-2809]
- Resolves an issue where the PLC function block MC_GearIn didn't work as expected. [KS-2830]
- Resolves an issue where the PLC function block MC_Jog generated different deceleration results for JogForward and JogBackward. [KS-2832]
- Resolves an issue where, if all DC-enabled devices are behind a coupler that didn't support DC, the KINGSTAR Subsystem could not be started. [KS-2862]
- Resolves an issue where FoeReadFileToBuffer caused an access violation when the transfer finished because of an error in how the ReadLength pointer was used. [KS-2863]
- Resolves an issue where, when the KINGSTAR Subsystem could not be started due to a DC issue, it would crash when started a second time. [KS-2864]
- Resolves an issue where .NET Class ISubsystem.Tables had a count of zero when ISubsystem.State was ecatOP. [KS-2872]
- Resolves an issue where PLC function block in the MC_CAMSWITCH_REF structure, AxisDirection's data type should be DINT. [KS-2925]
- Resolves an issue where the length value retrieved by methods Api.CoeReadSdoODList and ISlave.CoeReadSdoODList was incorrect. [KS-2933]
- Resolves an issue where cyclic tasks were not triggered when a cyclic packet was lost. [KS-2966]
- Resolves an issue where the motion state remained in the acceleration state even when the axis had reached the target position. [KS-2977]
- Resolves an issue where KINGSTAR 4.0 API did not have group states. [KS-3008]
- Resolves an exception that occurred when ISubsystem.DcSystemTime property was called before starting the KINGSTAR Subsystem. [KS-3075]
- Resolves an issue where axes were stuck at certain target positions when MoveLinearAbsolute was used with SetGroupPositionOffset in Axis Coordinate System (ACS). [KS-3086]
- Resolves an issue where the PLC program that runs the ksStart variable had an exception after adding new devices. [KS-3137]

Hardware Support

KINGSTAR has added out-of-the-box support for the following new hardware. See the *KINGSTAR Supported Hardware* document for a complete list of supported hardware.

Servo drives

- HIWIN E1 [KS-2765]
- Mitsubishi MR-J5-G-N1 [KS-2684]

Stepper drives

- MOONS' SSDC06W-EC-H [KS-2749]

I/O modules

- Beckhoff EP(P)1008, EPP1321, EPP1332, EPP1342, EP(P)1809, EP(P)2008, EP (P)2028, EP(P)2308, EP(P)2316, EP(P)2339, EP(P)2809, EP(P)3174, EP(P)3314, EP (P)3744, EP(P)4174, EP(P)4374, EP(P)6228, EP(P)7342 [KS-2626]

Couplers

- IFM AL1332 IO-Link master [KS-2711]

Availability

KINGSTAR 4.1 is available beginning July 9, 2021, from the [IntervalZero Customer Center](#) or by contacting Sales: sales@intervalzero.com or (781) 996-4481.

We welcome your comments and feedback. If you have any recommendations or wish to suggest product enhancements, please contact [Product Management](#).