

KINGSTAR Support for EtherCAT Technology Group Standards

INTRODUCTION

To maintain the high standards of the EtherCAT protocol, the EtherCAT Technology Group provides a list of features for EtherCAT Master devices with a defined set of functionalities.

KINGSTAR EtherCAT provides a subset of these functions for its motion control platform. The table below shows which EtherCAT features are included in KINGSTAR. If you need additional features or the full functionality of an EtherCAT Master, KINGSTAR partners with several leading Class A EtherCAT Master providers, including ESD, koenig, and acontis.



Basic Features

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Service Commands	Support Of All Commands	x	x	x
IRQ field in datagram	Use IRQ information from Slave in datagram header	x	x	x
Slaves with Device Emulation	Support Slaves with and without application controller	x	x	x
EtherCAT State Machine	Support of ESM special behavior	x	x	x
Error Handling	Checking of network or slave errors, e.g. Working Counter	x	x	x
VLAN	Support VLAN Tagging	x	--(2*)	--
EtherCAT Frame Types	Support EtherCAT Frames	x	x	x
UDP Frame Types	Support UDP Frames	--(1*)	--(2*)	--
Multiple Instances	One control system operating multiple networks	x	x	--

Process Data Exchange

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Cyclic PDO	Cyclic process data exchange	x	x	x
Multiple Tasks	Different cycle tasks	x	x	x
	Multiple update rates for PDO			x
Frame repetition	Send cyclic frames multiple times to increase immunity	--(*1)	--(*2)	--



Network Configuration

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Online scanning	Network configuration functionality included in EtherCAT Master	x	x	x
Reading ENI	Network Configuration taken from ENI file	x	x	x
Compare Network configuration	Compare configured and existing network configuration during boot-up	x	x	x
Explicit Device identification	Identification used for Hot Connect and prevention against cable swapping	x	x	x
Station Alias Addressing	Network Configuration taken from ENI file i.e. enable 2nd Address and use it	x	x	x
Access to EEPROM	Support routines to access EEPROM via ESC register	x	x	x

Mailbox Support

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Support Mailbox	Main functionality for mailbox transfer	x	x	x
Mailbox Resilient Layer	Support underlying resilient layer	x	x	x
Multiple Mailbox channels		x	x	x
Mailbox polling	Polling Mailbox state in slaves	x	x	x



CAN application layer over EtherCAT (CoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
SDO Up/Download	Normal and expedited transfer	x	x	x
Segmented Transfer	Segmented transfer	x	x	x
Complete Access	Transfer the entire object (with all sub-indices) at once	x	x	x
SDO Info service	Services to read object dictionary	x	x	--
Emergency Message	Receive Emergency messages	x	x	x
PDO in CoE	PDO services transmitted via CoE	--(*1)	--(*2)	--

Ethernet over EtherCAT (EoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
EoE protocol	Services for tunneling Ethernet frames. includes all specified EoE services	x	x	--
Virtual Switch	Virtual Switch functionality	x	x	--
EoE Endpoint to Operation Systems	Interface to the Operation System on top of the EoE layer	FP(*1)	FP(*2)	--

File access over EtherCAT (FoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
FoE protocol	Support FoE Protocol	x	--(*2)	--
Firmware Up-/Download	Password, FileName should be given by the application	x	--(*2)	--
Boot State	Support Boot-State for Firmware Up/Download	x	--(*2)	--



Servodrive-Profile over EtherCAT (SoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
SoE Services	Support SoE Services	x	x	--

ADS over EtherCAT (AoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
AoE Protocol	Support AoE Protocol	x	--(*2)	--

Vendor over EtherCAT (VoE)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
VoE Protocol	External Connectivity supported	x	--(*2)	--

Synchronization with Distributed Clock (DC)

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
DC support	Support of Distributed Clock	x	--(*2)	x
Continuous Propagation Delay compensation	Continuous Calculation of the propagation delay	x	--(*2)	x
Sync window monitoring	Continuous monitoring of the Synchronization difference in the slaves	x	--(*2)	x



Slave-to-Slave Communication

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
via Master	Information is given in ENI file or can be part of any other network configuration. Copying of the data can be handled by master stack or master's application. Required to support FSoE Safety slaves.	x	x	--

Master information

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Master Object Dictionary	Support of Master Object Dictionary	FP(*1)	FP(*2)	--
	(ETG.5001 MDP sub profile 1100)			--

Feature Packs

FEATURES NAME	SHORT DESCRIPTION	CLASS A	CLASS B	KINGSTAR
Cable Redundancy	Stay operational in case of cable break between two slaves	FP	FP	--
Hot Connect	Add or remove additional slave devices during bus communication is in progress. Newly added slaves are automatically transferred into the OPERATIONAL state.	FP	FP	--
TCP-Server and Remote API	The TCP-Server together with the Remote API Context.Scope.Library allows accessing EC-Master from a remote system	FP	FP	--
EoE Endpoint	The interface allows sending and receiving Ethernet frames to/from the EtherCAT network	FP	FP	--



CONCLUSION

KINGSTAR provides a wide range of features from the EtherCAT Technology Group's set of defined functionality in support of its motion control platform. For more information on KINGSTAR EtherCAT, including our EtherCAT Master partners, visit www.kingstar.com/products/ethercat.

