

ESX-3CS

ESX Control units

KEY FEATURES

- Control specially designed for use in harsh mobile applications
- Flexible programming in C, CODESYS V3.5 IEC61131-3
- Suitable for safety-related applications up to SIL 2 according to IEC 61508:2010 or PL d according to EN ISO 13849-1:2015

TECHNICAL DATA

- TriCore TC 1798 32 bit, 300 MHz
- 288 kB SRAM internal, 8 MB SDRAM external
- 4 MB Flash internal
- 32 kB EEPROM
- 2 CAN interfaces (optional LIN, RS232 or Ethernet)
- 16 inputs (SENT support)
- 15 outputs

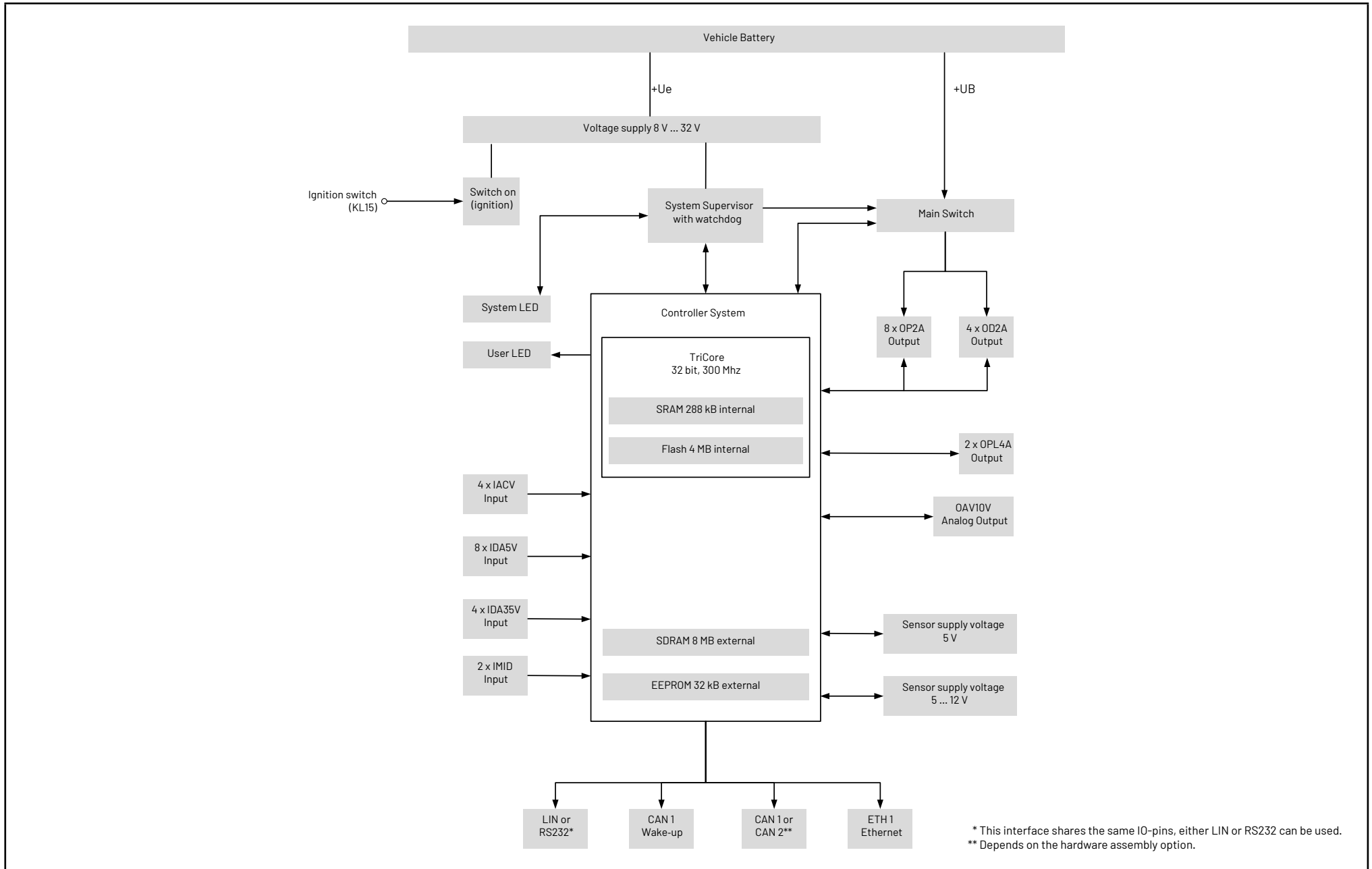
ACCESSORIES

- Debug Adapter
- Debugger
- Compiler
- ESX-Testbox Adapter
- StarterKit
- Component Deployment for C, CODESYS V3.5
- Mating Plug
- Lifecycle Tool openSYDE

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BLOCK DIAGRAM



TECHNICAL DATA

Processor and memory

Type	Properties	Features
TriCore TC 1798	32 bit, Multicore	@ 300 MHz
SRAM	288 kB internal	
SDRAM	8 MB external	Available space for customer application (non-safety): in C: 7.80 MB in CODESYS: 3.00 MB
Flash	4 MB internal	Available space for customer application (non-safety): in C: 3.75 MB in CODESYS: 2.00 MB
EEPROM	32 kB	Available space for customer application (non-safety): in C: 24 kB in CODESYS: 24 kB

Communication Interfaces

Type	Max. Quantity	Configuration
CAN	2	CAN 2.0 B, Low-/High-Speed max. 1 MBit/s CAN 1: Wake-up functionality
Opt. RS 232	1	Baud rate up to 115 kbit/s
Opt. Ethernet	1	ETH1: Speed up to 100 MBit/s
Opt. LIN	1	LIN 2.2A

Inputs

Type	Max. Quantity	Configuration	Measurement	Options / Dependencies
Analog Input IACV	4	Voltage	0 ... 12 V	
		Current	4 ... 25 mA	
		Digital	Voltage	Cutoff frequency: 100 Hz
Multi Function Input IDA5V	8	Edge Evaluation	Events, rising/falling edges	
		Analog Voltage	0 ... 5 V	e.g. PT1000, KTY
		Digital	Low-Active	Programmable pull-up resistor 6 k Ω to 5 V
			High-Active	External pull-down resistor required
		Frequency	0.6 Hz ... 20 kHz	
Edge Evaluation	Events, rising/falling edges			
SENT Interface				

TECHNICAL DATA

Inputs

Type	Max. Quantity	Configuration	Measurement	Options / Dependencies
Multi Function Input IDA35V	4	Analog Voltage	0 ... 35 V	
		NAMUR Sensors		
		Digital	Low-Active High-Active	Programmable pull-up (1k Ω to 8.5V) or pull-down resistors (1k Ω to GND)
		Frequency	0.6 Hz ... 20 kHz	A maximum of 8 Inputs can be used for the function "Average Frequency Measurement"
		Edge Evaluation	Events, rising/falling edges	
Incremental Input		Position or angle change		Pairs of 2 inputs can be connected to a maximum of 2 incremental encoder inputs
Ident Input IMID	2	Identifier Input	8 Conditions	

Outputs (All outputs are short circuit protected)

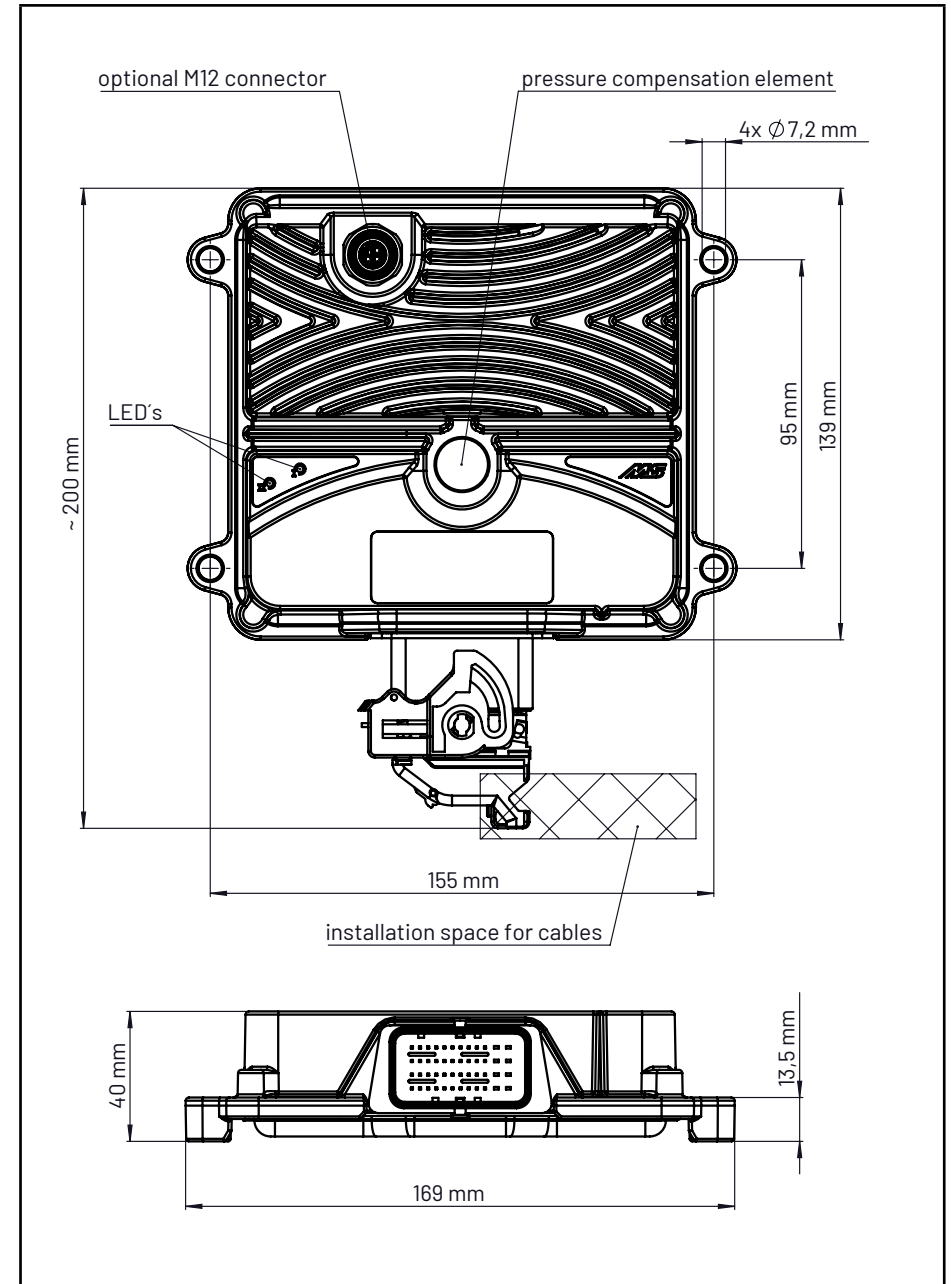
Type	Max. Quantity	Configuration	Range	Property	Features
Digital-/ PWM-Output OP2A	8	Digital PWM	0 ... 2.5 A	Current On/Off 0 ... 100 % max. 1000 Hz	High side switch Current control with 2 % accuracy Digital feedback Cut-off at overcurrent (>4.6 A \pm 20 %) Several outputs in parallel circuit for up to 12 A
Digital-/ PWM-Output OD2A	4	Digital PWM	0 ... 2.5 A	Current On/Off 0 ... 100 % max. 1000 Hz	High side switch Voltage measurement with \pm 3 % accuracy Current detection
Digital-/ PWM-Output OPL4A	2	Digital PWM	0 ... 4 A	Current On/Off 0 ... 100 % max. 1000 Hz	Low side switch Current control with 3 % accuracy Voltage measurement with \pm 3.5 % accuracy Cut-off at overcurrent (> 7.5 A \pm 20 %)
Analog Output OAV10V	1	Analog	0 ... 10 V	Voltage On/Off	Load impedance min. 500 Ω Resolution 10 mV
Sensor Supply UExt	2	Programmable	5 ... 12 V	up to 250 mA	
		Fixed Voltage	5 V	max. 250 mA	

TECHNICAL DATA

System Data

Type	Property	Values
Supply Voltage	Direct Current (DC)	8...32 V
Power Consumption	Without external load	
	Standby (ignition off)	< 1mA
	Maximum load current	
Temperature	Chassis Temperature	-40 °C ... +85 °C (-40 °F ... +185 °F) variant without M12 connector
		-25 °C ... +85 °C (-13 °F ... +185 °F) variant with M12 connector
Connector	XS1	Automotive 48 pins, matching plug: molex 64320-1311 and molex 64320-3311
	ETH1	4 pins, M12 connector, D-coded
Indicators	2 LED (dual color)	1 x for system status and 1 x freely programmable
Housing	Die-cast aluminum	GORE-TEX® Membrane for pressure equalization
Dimensions	Standard Variant	169 mm x 139 mm x 40 mm
Weight		about 0.565 kg (1.25 lbs)
Degree of Protection	Variant without M12 connector	IP6k9k
	Variant with M12 connector	IP6k7

TECHNICAL DRAWING

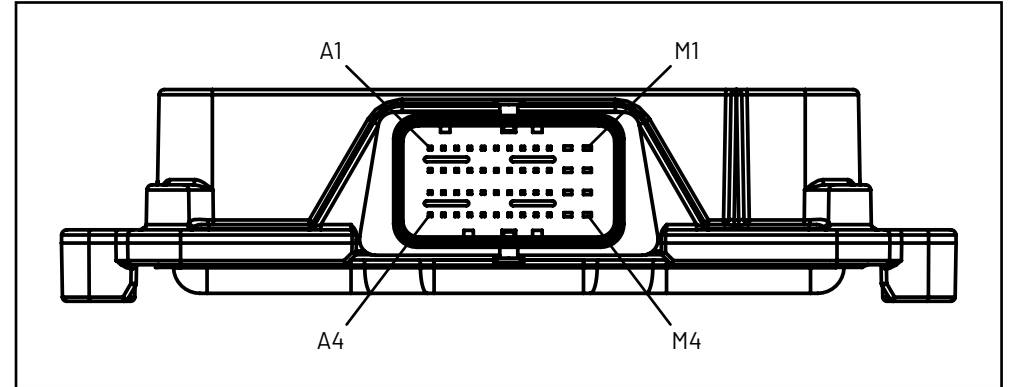


PIN ASSIGNMENT

Pin Assignment 48 Pin Connector:

Pin	Description
A1	CAN bus 1 low
B1	CAN bus 1 high
C1	RS 232 (Tx)
D1	RS 232 (Rx)
E1	Multi Function Input IDA5V_3
F1	Multi Function Input IDA5V_2
G1	Multi Function Input IDA35V_2
H1	Digital-/ PWM-Output OD2A_2
J1	Digital-/ PWM-Output OP2A_4
K1	Digital-/ PWM-Output OP2A_3
L1	Analog Output OAV10V
M1	UB: Power supply for the outputs of type OP2A and OD2A
A2	CAN bus 2 low CAN bus 1 low (2nd Pin)
B2	CAN bus 2 high CAN bus 1 high (2nd Pin)
C2	Analog Input IACV_3
D2	Analog Input IACV_2
E2	Multi Function Input IDA5V_6
F2	Multi Function Input IDA5V_4
G2	Multi Function Input IDA35V_3
H2	Digital-/ PWM-Output OD2A_3
J2	Digital-/ PWM-Output OP2A_6
K2	Digital-/ PWM-Output OP2A_5
L2	Digital-/ PWM-Output OPL4A_2
M2	Digital-/ PWM-Output OPL4A_1
A3	Ident Input IMID_2
B3	Ident Input IMID_1
C3	Sensor Supply UExt
D3	Sensor Supply UExt

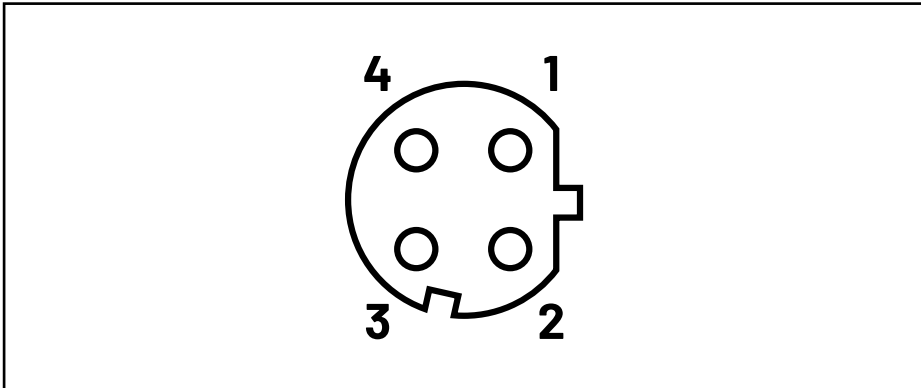
Pin	Description
E3	Multi Function Input IDA5V_7
F3	Multi Function Input IDA5V_5
G3	Multi Function Input IDA35V_4
H3	Digital-/ PWM-Output OD2A_4
J3	Digital-/ PWM-Output OP2A_8
K3	Digital-/ PWM-Output OP2A_7
L3	Digital-/ PWM-Output OP2A_2
M3	Digital-/ PWM-Output OP2A_1
A4	Analog GND
B4	Analog GND
C4	Analog GND
D4	Analog Input IACV_4
E4	Analog Input IACV_1
F4	Multi Function Input IDA5V_8
G4	Multi Function Input IDA5V_1
H4	Multi Function Input IDA35V_1
J4	Digital-/ PWM-Output OD2A_1
K4	Ignition (KL15)
L4	GND
M4	UE: Power Supply Electronic



PIN ASSIGNMENT

Pin Assignment M12 Connector:

Pin	Description
1	Ethernet 1(Tx+)
2	Ethernet 1(Rx+)
3	Ethernet 1(Tx-)
4	Ethernet 1(Rx-)



QUALIFICATION

EMC industrial (CE)	This chapter is not fully available at this state of the ESX-3CS development.
EMC automotive	This chapter is not fully available at this state of the ESX-3CS development.
Electrical tests	This chapter is not fully available at this state of the ESX-3CS development.
Climatic and mechanical tests	This chapter is not fully available at this state of the ESX-3CS development.