Pioneering new technologies

Sensor-Technik Wiedemann GmbH
Mobile Controllers and Measurement Technologies

Technical Data

Electronic Control Unit ESX-3CM

- preliminary -

www.sensor-technik.com

ESX-3CM - Electronic Control Unit

The Controller with the most needed I/O's
The hardware configuration matches most of the requirements of applications for controlling mobile working machines. In total 56 analog and digital in- and outputs for sensors and actuators can be used for ambitious solutions of controlling tasks.
In addition to 8 analog inputs, 20 inputs in 2 groups are designed as multifunction inputs. Configured by software, the input works as measurement device for current, voltage, or frequency or it can be used to evaluate digital signals and events.

Switch to 32 Bit
The ESX-3CM is the new member of the 32-Bit controller family of STW. It allows the almost cost neutral switch from the 16-Bit-ESX-2 controller to the modern and more powerful 32-Bit architecture with TriCore processors.

TECHNOLOGY	BENEFITS
► Safety (SIL 2 / PL d)	► A variant of the ESX-3CM for the programming of safety relevant applications is planned.
► High Switching Capacity	► Current outputs per group up to 15 A Parallel circuit of several outputs with up to 15 Ampere possible
► Freely Programmable	► Programming with CODESYS or "C"
► Communication Interfaces	► Multiple communication capabilities: 4 CAN interfaces, one with wake-up functionality, RS485, RS232 and optional Ethernet interface
► Starter-Kit	► All necessary components for fast commissioning and programming in one case: ESX-3CM, break-out Box, connecting cables, software, documentation
► Robust Construction	► Compliance with the standards for conformity with CE, E1, and RoHS. Qualified to the applicable standards for automotive, agricultural and construction industries Operating temperature range: -40°C to +85°C (-40°F to +185°F).

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System Software		
Programming	CODESYS V3	„C"
Safety	Variant for programming of safety relevant applications planned for: PL d according to DIN EN ISO13489-1 2008-12 SIL 2 according to IEC 61508 Edition 2.0 2010-04	

Processor and memory		
Type	Properties	Features
TriCore TC 1798	32 bit, 300 MHz	Optional: Separate system supervisor with programmable watchdog
SRAM	288 kB internal	
SDRAM	8 MB external	Available space for customer application (non-safety): in C: 7,80 MB in CODESYS: 1,00 MB
Flash	4 MB internal	Available space for customer application (non-safety): in C: 3,75 MB in CODESYS: 2,75 MB
EEPROM	32 kB	Available space for customer application (non-safety): in C: 24 kB in CODESYS: 24 kB

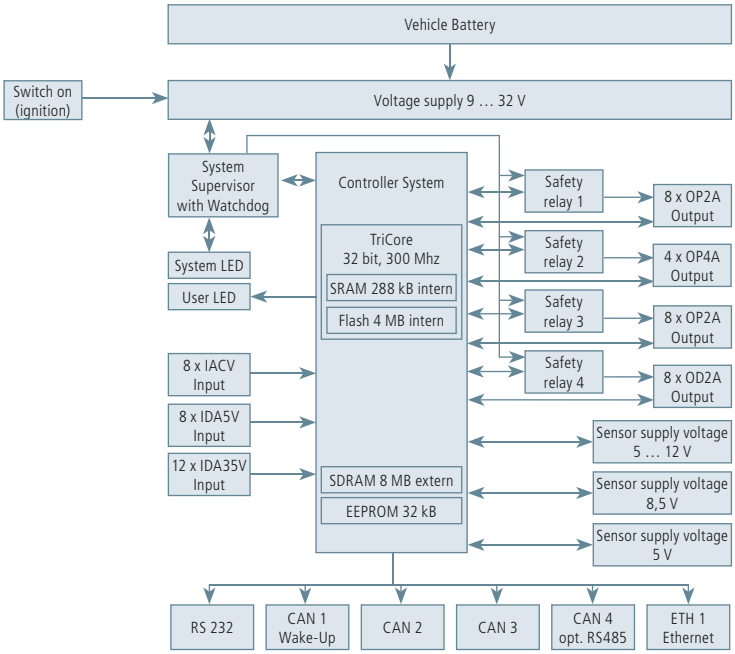
Communication Interfaces		
Type	Max. Quantity	Configuration
CAN	4	CAN 2.0 B, Low-/High-Speed max 1 Mbit/s
		CAN 1: Wake-up functionality
		CAN 4: CAN or configurable as RS 485, half-duplex, baud rate up to 115 kbit/s
RS 232	1	baud rate up to 115 kbit/s
Ethernet	1	Hardware-variant with additional connector. Speed 10/100 Mbit/s

Inputs				
Type	Max. Quantity	Configuration	Measurement	Options / Dependencies
Analog Input IACV	8	Voltage	0 … 12 V	
		Current	4 … 20 mA	
		Digital	Voltage	Cutoff frequency: 100 Hz
Multi Function Input IDA5V	8	Analog Voltage	0 … 5 V	
		Digital	Low-Active	Programmable pull-up resistor 1 kOhm to 5 V
			High-Active	External pull-down resistor required
		Frequency	0,6 Hz… 20 kHz	
		Edge Evaluation	Events, rising/falling edges	
		SENT Interface		
Multi Function Input IDA35V	12	Analog Voltage	0 … 35 V	
		NAMUR Sensors		
		Digital	Low-Active	Programmable pull-up (1 kOhm to 8,5 V) or pull-down resistors
			High-Active	
		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 4 incremental encoder inputs

Outputs All outputs are short circuit protected						
Type	Max. Quantity	Configuration	Range	Property	Features	Grouping
Digital-/PWM-Output OP4A	4	Digital	0 … 4 A	Current On/Off	• High Side Switch • Current control with 2 % accuracy • Digital feedback • Cut-off at overcurrent (> 7,5 A ±20%) • Several outputs in parallel circuit for up to 15 A	Group 2 all outputs in summary max. 15 A
		PWM		0 … 100 % max. 500 Hz		
Digital-/PWM- Output OP2A	16	Digital	0 … 2,5 A	Current On/Off	• High Side Switch • Current control with 2 % accuracy • Digital Feedback • Cut-off at overcurrent (> 4,6 A ±20%) • Several outputs in parallel circuit for up to 15 A	Group 1 8 outputs Group 3 8 outputs all outputs per group in summary max. 15 A
		PWM		0 … 100 % max. 500 Hz		
Digital-/PWM- Output OD2A	8	Digital	0 … 2,5 A	Current On/Off	• High side switch • Voltage measurement with ±3 % accuracy • Current detection	Group 4 all outputs per group in sum-mary max. 15 A
		PWM		0 … 100 % max. 500 Hz		
Sensor Supply UExt	3	Programmable	5 … 12 V	100 … 250 mA		
		Fixed Voltage	8,5 V	Max. Current 250 mA		
		Fixed Voltage	5 V			

System Data		
Type	Property	Values
Supply Voltage	Direct Current (DC)	9 … 32 V
Power Consumption	Without external load	< 400 mA at 12 V supply voltage < 240 mA at 24 V supply voltage
	Standby (ignition off)	< 1 mA
	Maximum load current	60 A
Temperature	Chassis Temperature	-40 °C … +85 °C -40 °F … +185 °F
Connector	Automotive Type (Tyco / AMP): Ethernet-Variant:	81 Pins 4-pin M12 sleeve with D-Code
Indicators	2 LED	1 for system status and 1 freely programmable
Housing	Die-cast aluminum	GORE-TEX® Membrane for pressure equalization
Dimensions	Standard Variant Variant with Ethernet-connector	217 mm x 138 mm x 51 mm 217 mm x 152,5 mm x 51 mm
Weight		Ca. 1,3 kg (2,9 lbs)
Degree of Protection	IP6k7 and IP6k9k without Ethernet-connector	
	IP6k7 with Ethernet-connector	
Certificates and Compliance	Qualified to the applicable standards for automotive, agricultural and construction industries	
	CE	
	RoHS	
	E1: All vehicle types with a 12 V resp. 24 V – electrical wiring and battery (-) at the body.	

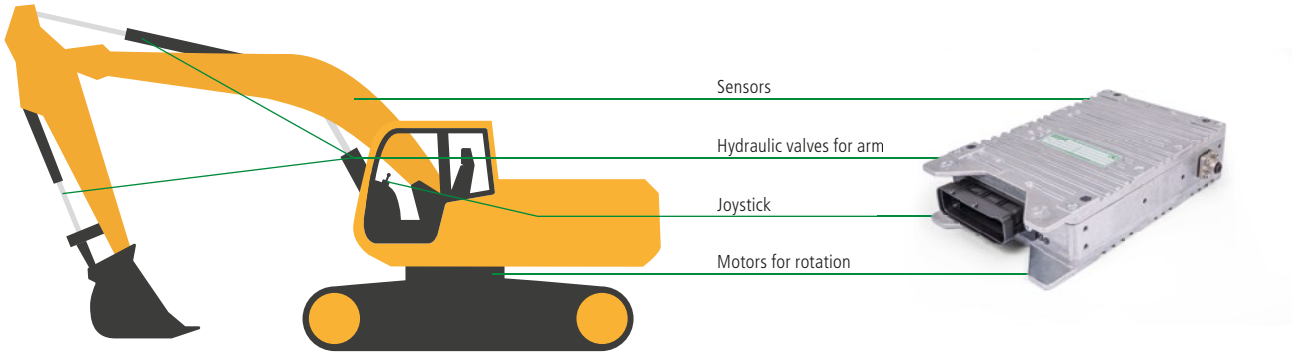
Block diagram



ESX-3CM - Application examples

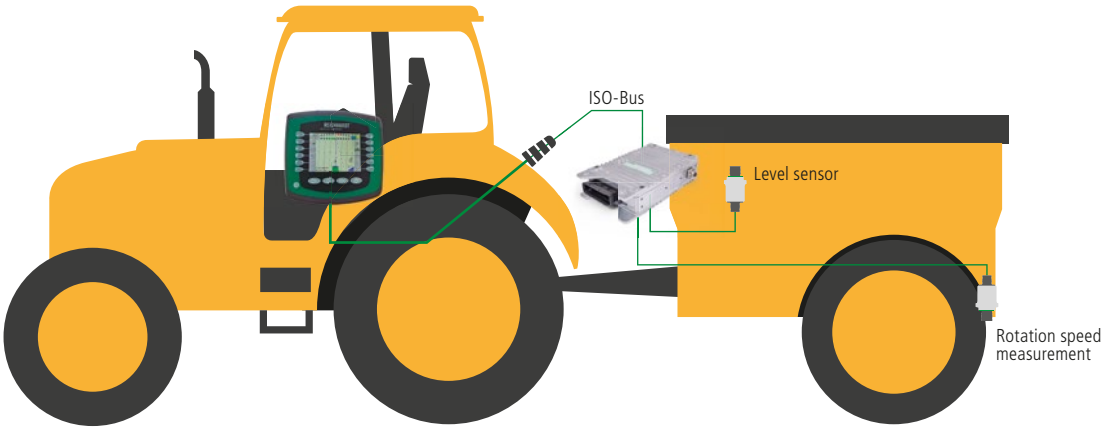
ESX-3CM as Central Controller

The ESX-3CM can be used as central controller on construction machines. Inputs of the machine operators may come from a joystick. With the connected sensors and actuators the controlling of the complete hydraulic system is possible as well as inclination and niveau control.



ESX-3CM as ISO-Bus Implement-ECU

The ESX-3CM can be used on agricultural accessory equipment as ISO-Bus Implement-ECU. In this use case, the ESX-3CM records operational states over the connected sensors like rotation speed, pressure, filling level or temperature and controls various functionalities by hydraulic valves or servomotors. Via the ISO-Bus, all data can be visualized on an ISO-Bus enabled terminal in the tractor and functionalities can be controlled.



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20160121 EN — Preliminary — Subject to change without notice —