

Control Systems & Software

MCS2 Modular Concept

The MCS2 Series is based on a highly modular system concept which allows SmarAct to provide you with a perfectly adapted and pre-configured control system. The following modules of the MCS2 modular system are available.

Main Controller Module with communication interface:

This module is the core component of every MCS2 configuration. It reads the sensor data from the sensor module and performs closed-loop position control and drives the stages. It also includes the communication interface module which can offer either an USB or an Ethernet interface.

Sensor Module

This module converts the analog sensor data into digitized data which is processed by the main controller module.

Hand Control Module

The hand control module offers a touchscreen, physical buttons and two analog joysticks to manually interact with the positioning system. Physical axis of the positioning system can be easily mapped to joystick axis for easy manual positioning. If the stages are equipped with position sensors the actual stage position can be read of the module's touchscreen.

I/O Modules:

SmarAct offers a wide variety of I/O modules. From simple modules with digital outputs up to multi-purpose modules with both digital and analog input and output functionality. Fast digital outputs can be used to trigger external devices on specific internal events of the main controller (e.g. Position Reached Events). Digital device inputs allow to trigger the MCS2 by an external device for example to perform, an emergency stop or to synchronize data streaming. General purpose digital inputs and outputs provide control signals to control light sources, relays, dispensers, etc. or to read the state of safety switches, light barriers, etc. Analog inputs can be used to read analog voltage signals from external devices. The controller supports to feed these signals into the control loop allowing closed loop operation depending on external sensor signals. I/O modules double also as multifunctional data acquisition cards as the value of the connected signals is available via the SDK. Whenever it is required to stream data from a MCS2 controller equipped with specific I/O module it is possible to equip it also with a High Speed Data Reader (HSDR) extension board. The HSDR allows to stream position and other channel data with a maximum possible frame rates of up to 50kHz via a dedicated USB port using the SmarAct API.

Module	I/O Type	Number of Channels	Resolution	Max. Sample Update Rate	Purpose
Type 1	Digital-Output	3		50 kHz	Output Trigger: Position Compare, Position Reached, Actively Moving
	Digital Input	1		1 kHz	Input Trigger: Emergency Stop, Trajectory Streaming, Synchronization, Command Group Trigger
Type 2	Digital Output	4			General Purpose Digital Input
		3		50 kHz	Output Trigger: Position Compare, Position Reached, Actively Moving
	Digital Output	4			General Purpose Digital Output, Open Collector
		6	16 bits	15 kHz	General Purpose Analog Input, Control Loop Feedback
	Analog Output	2	16 bits		General Purpose +/- 10V Analog Voltage Output
	Type 3	Digital Input	1		1 kHz
Digital Output		3		50 kHz	Output Trigger: Position Compare, Position Reached, Actively Moving
Type 4	Digital Input	1		1 kHz	Input Trigger: Emergency Stop, Trajectory Streaming, Synchronization, Command Group Trigger
		4			General Purpose Digital Input
	Digital Output	3		50 kHz	Output Trigger: Position Compare, Position Reached, Actively Moving
		4			General Purpose Digital Output, Open Collector
	Analog Input	6	16 bits	15 kHz	General Purpose Analog Input, Control Loop Feedback
	Analog Output	2	16 bits		Output Trigger: Position Compare, Position Reached, Actively Moving
Type 6	Digital Input	1		1 kHz	Input Trigger: Emergency Stop, Trajectory Streaming, Synchronization, Command Group Trigger
		4			General Purpose Digital Input
	Digital Output	3		50 kHz	Output Trigger: Position Compare, Position Reached, Actively Moving
		4			General Purpose Digital Output, Open Collector
	Analog Input	6	16 bits	15 kHz	General Purpose Analog Input, Control Loop Feedback
	Analog Output	2	16 bits		Output Trigger: Position Compare, Position Reached, Actively Moving
HSDR		1			High Speed Data Reader with dedicated USB Interface