

M3000 Control System



MSC Moog Servo Controller Digital Control Module



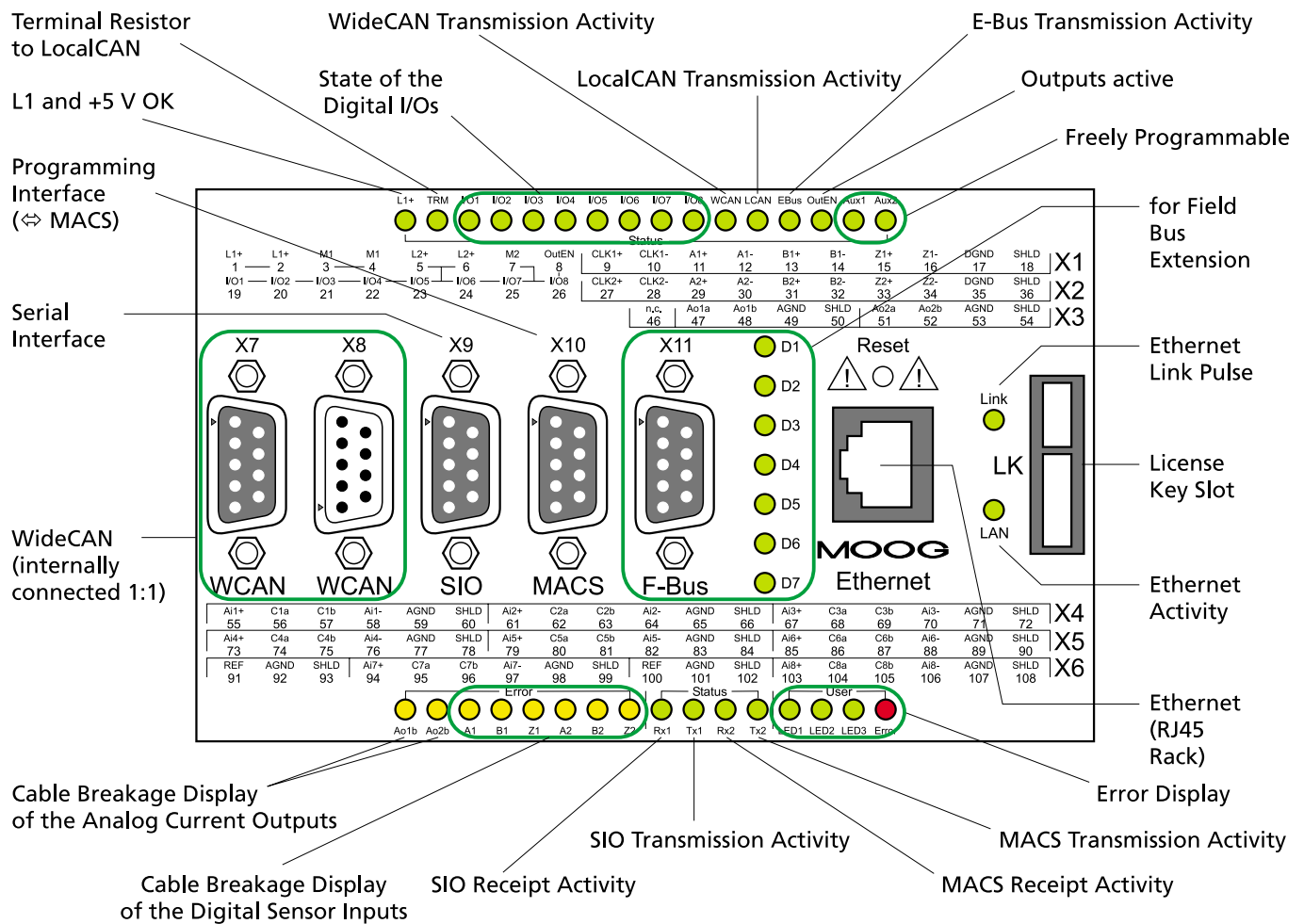
MOOG SERVO CONTROLLER (MSC)

- Freely programmable multi-axis controller
- Programming with IEC-61131 developer environment, MACS (Moog Axis Control Software)
- Integrated PLC functionality
- Realisation of quick and precise controls (e.g. for position, speed and force)
- Suitable for electrical and hydraulic drives
- Freely definable controller structures with cycle times from 500 µs
- Hardware functionality can be parameterised via MACS software (no jumpers or switches)
- PowerPC-based processor
- Memory: 2 MB RAM; 4,5 MB Flash EEPROM

FEATURES

- Tool-free assembly on DIN top-hat rail mounting
- Simple wiring with terminal strip
- Sustained short circuit protection for analog and digital outputs
- Over voltage protection up to ±40 V with analog inputs and outputs
- No parts subject to wear, no jumpers, no battery or rechargeable battery
- LED for status and error display
- Wire fault monitoring for all digital sensor inputs and analog current outputs
- Additional digital or analog inputs and outputs thanks to M3000 extension modules
- Simple connection of the M3000 modules via extension bus (E-bus)

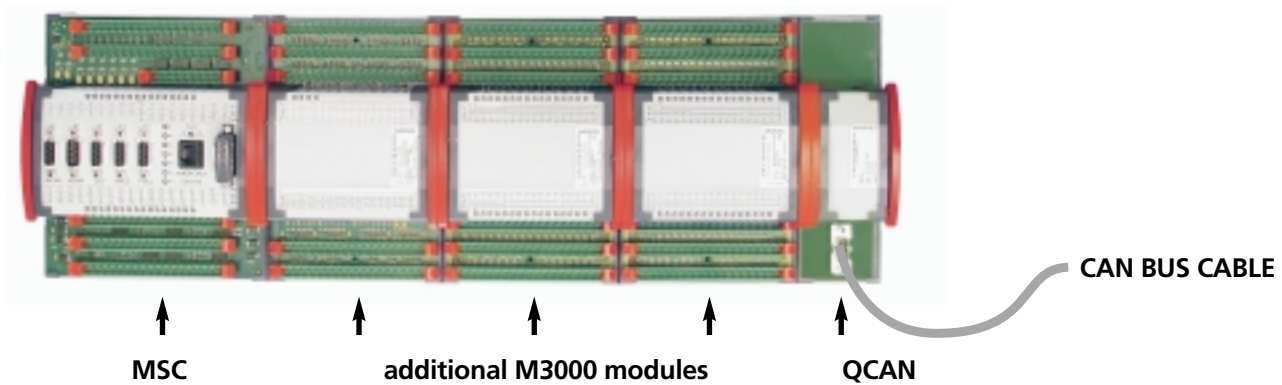
OVERVIEW: INTERFACES, CONNECTIONS AND LED'S



LOCAL EXTENSION POSSIBILITIES WITH M3000 MODULES VIA E-BUS

- Up to 7 further M3000 modules can be connected to the extension bus (E-bus) of the MSC.
- M3000 modules are put together and locked on the top-hat rail. The E-bus connection is simply and reliably produced via the side sockets.
- In this way, further digital and/or analog inputs and outputs can be added as required.
- The control and signal processing is done by the MSC. The connected extension modules do not require their own intelligence.

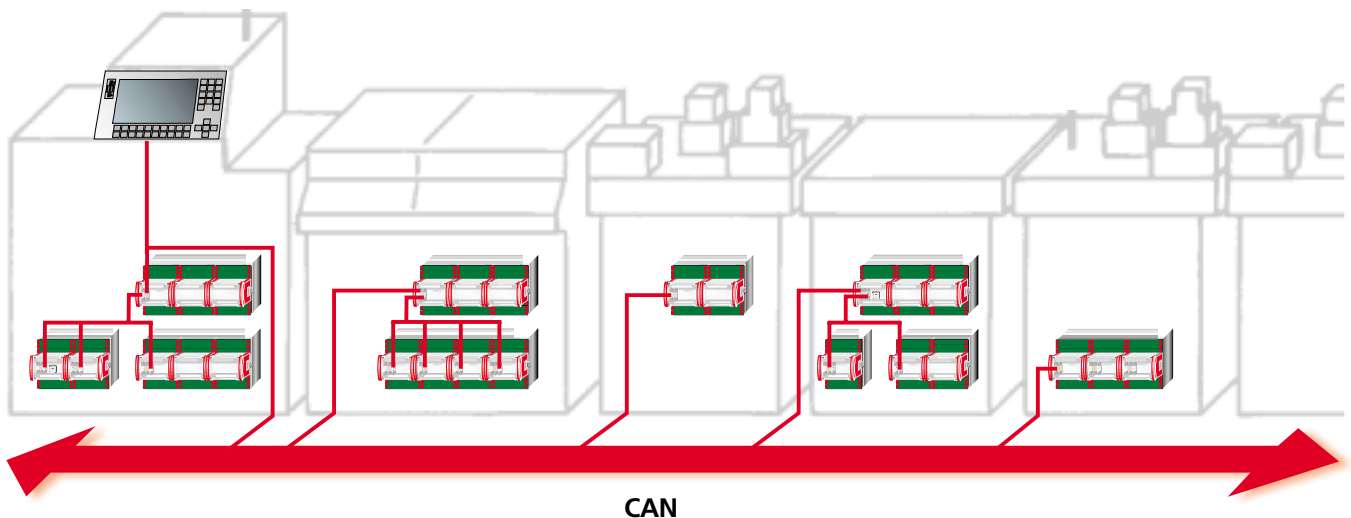
ARRANGEMENT OF M3000 MODULES VIA E-BUS



DECENTRALISED SET-UP WITH M3000 MODULES VIA E-BUS

- Further M3000 modules can be networked decentrally via the CAN bus.
- Extension modules can also be connected to each decentralised Moog Servo Controller (MSC).
- In addition, M3000 remote modules (e.g. displays, temperature controllers, digital inputs/outputs) can also be connected via the CAN bus.
- Further components with CAN or CANopen interfaces can be networked. For this, Moog provides an extensive selection of motor controllers, hydraulic valves and radial piston pumps.
- This enables a flexible set-up of automatic solutions.
- Further details can be seen from the relevant catalogues.

ARRANGEMENT OF M3000 MODULES VIA E-BUS



Module Data	Digital Control Module
Designation	Moog Servo Controller (MSC)
Order number	D136-001-001
Connection technique	Plug-in terminal strips for screwing or clamping
Assembly	NS 35/7.5 mounting rail to EN 50022 (DIN top-hat rail)
Dimensions WxDxH (mm)	160 x 170 x 85.5 (attachment dimension: W = 149/154.5)
Temperature range	+5°C (+41°F) to 55°C (+131°F) (operation) and -25°C (-13°F) to +70°C (+158°F) (storage)
Relative air humidity	Mean temperature in operation for 24 hrs.: max. +50°C (+122°F)
Operation height	10 % to 95 % (non-condensing)
Processor	Max. 2000 m; storage/transport max. 3000 m PowerPC Processor
Memory	32 bit, RISC architecture with floating point unit 2 MB burst RAM 4.5 MB burst Flash EEPROM; data maintenance: typically 10 years

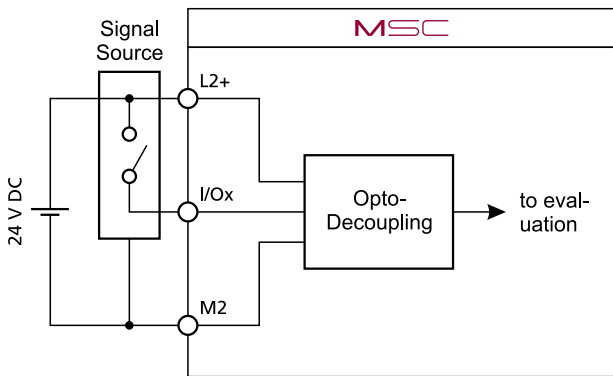
Standards	
Operating equipment demands and examinations	IEC 61131-2
Interference emission / immunity	EN 61000-6-4 / EN 61000-6-2, industrial part
Shock / vibration	IEC 60068 part 2-27 / IEC 60068 part 2-6
Protection class / protection system	III / IP20
Insulation strength	IEC 61131-2; test voltage 500 V DC

Energy Supply	
Voltage supply of module electronics	24 V DC (18–32 V DC) SELV pursuant to IEC 61131-2
Current consumption of module electronics	0.5 A / 2 A (idling / full load)
Potential separation	Separate potentials for: module electronics, 24 V supply, digital inputs/outputs, Ethernet
Internal voltages	All the voltages required are generated via internal DC/DC converters
Behavior at voltage failures/ cut-off of supply voltage	Necessary data are permanently stored (Flash EEPROM, data maintenance typically 10 years). If the supply voltage fails (<18 V), buffer capacitors provide the necessary energy.

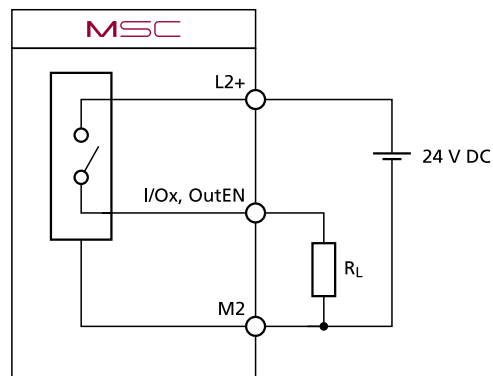
Interfaces	
Ethernet (10BaseT)	10 MBit/s; with 8-poled RJ45 connection
2 independent CAN interfaces »WCAN«	Transmission rate adjustable, 10 kBit/s to 1 MBit/s WideCAN: 2 Sub-D »WCAN« connectors on the front cover (are connected internally 1:1)
LocalCAN	LocalCAN: in the side E-bus sockets
»MACS« on front cover (RS 232)	Communication with the MACS software on the PC
»SIO« on front cover (RS 232)	For free use in the application program
Extension bus (E-bus)	Connectors on right and left of module for connecting up to 7 additional M3000 modules. Contains a serial bus (5 to 10 MBit/s), the LocalCAN bus (max. 1 MBit/s) and the energy supply for the logic part of the extension modules.

Digital inputs/outputs	
Voltage supply of the digital I/O	24 V DC (18–32 V DC) SELV pursuant to IEC 61131-2
Current consumption of the digital I/O	0.3 A in idling; all digital outputs active: 4 A
8 digital inputs and outputs	Individually configurable in MACS as input or output. Inputs: type 1 (current-consuming) pursuant to IEC 61131-2 Outputs: max. 0.5 A Sustained short-circuit protected, thermal overload protection
Watchdog output: "Outputs enabled" signal	Signalises readiness for operation of the analog and digital outputs. In the event of a fault, the watchdog output becomes highly resistive.

DIGITAL INPUT



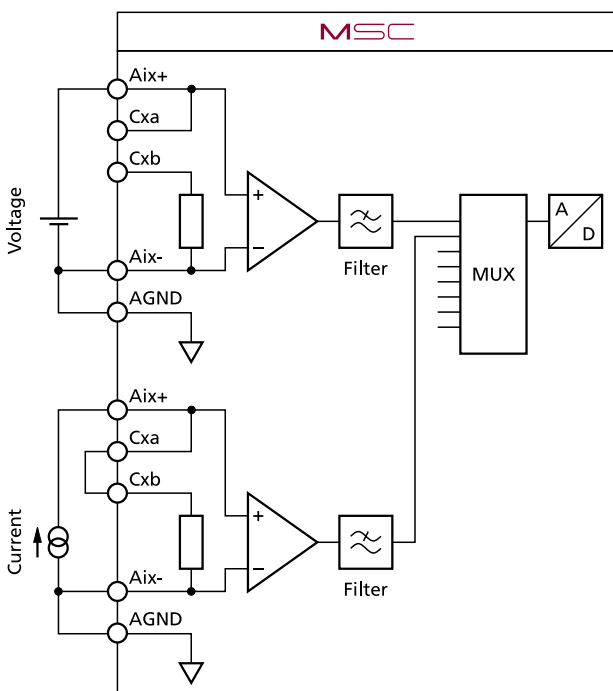
DIGITAL OUTPUT



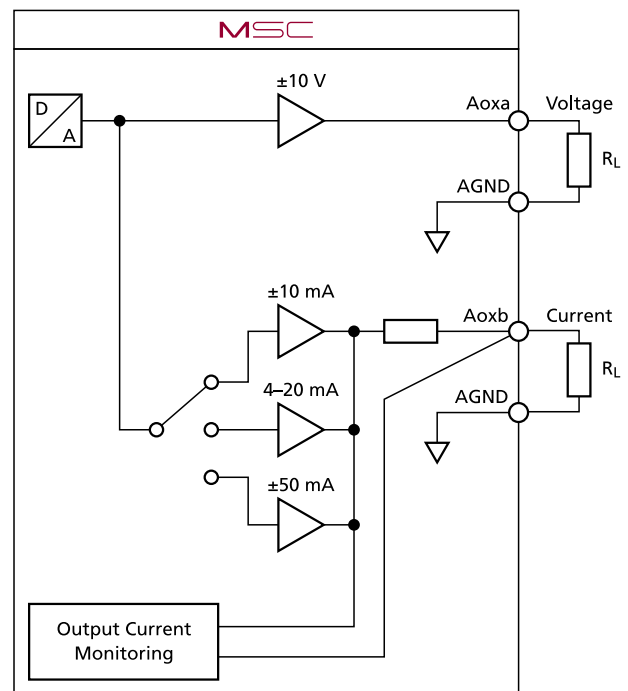
Analog Inputs/Outputs

Voltage supply to analog I/O	Internal via a DC/DC converter
8 analog inputs	16 Bit; individually configurable in the MACS software as ± 10 V, ± 10 mA or 4–20 mA; overvoltage protection up to ± 40 V
2 analog outputs	16 Bit; each ± 10 V, additionally individually configurable in the MACS software as ± 10 mA, ± 50 mA or 4–20 mA Overvoltage protection up to ± 40 V; sustained short-circuit protected

ANALOG INPUT (CURRENT/VOLTAGE)



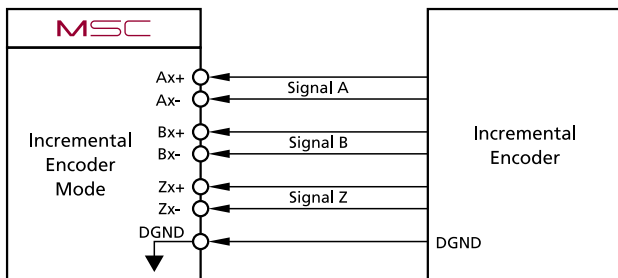
ANALOG OUTPUT (CURRENT/VOLTAGE)



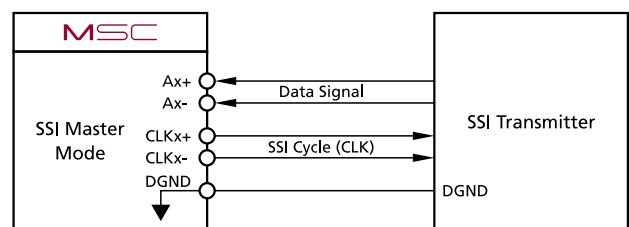
Reference for sensors	
Reference voltage output	+10 V; can bear up to max. 5 mA

Sensor Interfaces	
2 Sensor interfaces each configurable as a) incremental encoder b) SSI transmitter c) EnDat and Hiperface in preparation	Signals corresponding to RS 422 Wire fault monitoring of inputs Configurable in MACS software: a) Incremental encoder four-edge evaluation, max. pulse frequency 8 MHz b) SSI transmitter master or slave data format: gray code or binary; data bits 8 to 28 bit transmission frequency: 78 kHz to 5 MHz

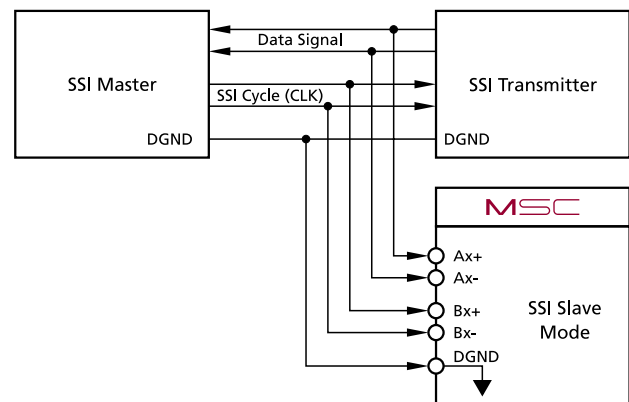
INCREMENTAL ENCODER



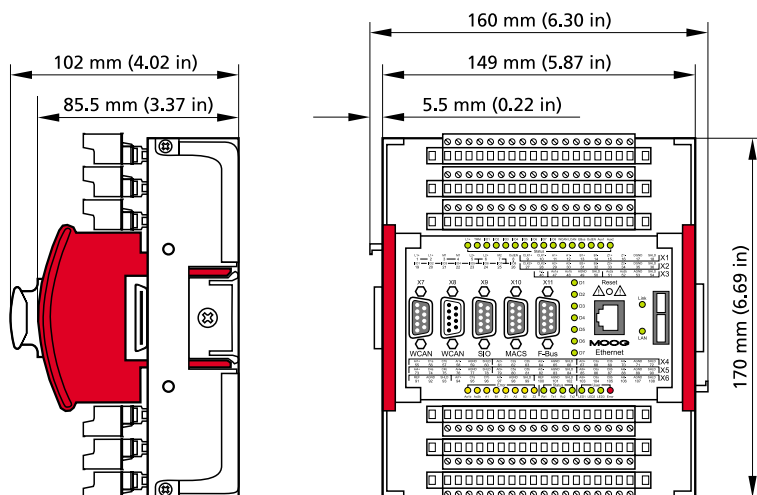
SSI MASTER



SSI SLAVE







DIMENSIONS



LICENCE KEY

(One licence key is needed per MSC)

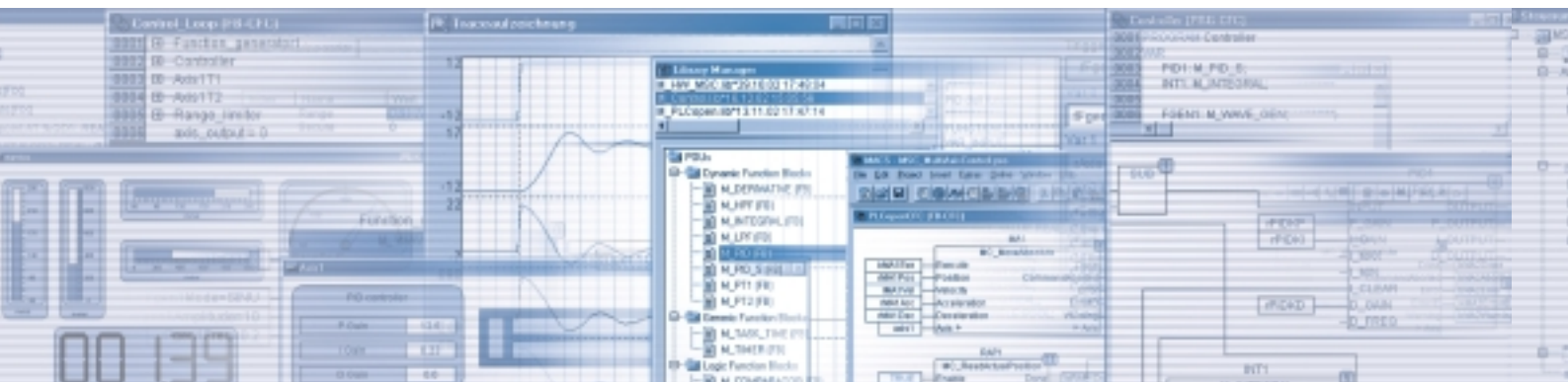
The licence key contains the term licence for the MSC. According to the licence key used, an additional scope of functions of the MACS software is released for use step by step.

Designation	Scope of function	Order number
Controls (Color: Grey) 	<ul style="list-style-type: none"> • MACS term licence for application program • CodeSys operators and standard IEC 61131 library • MSC hardware library • Moog control technique library • Interface library for RS 232 and CAN bus • Support for OPC and DDE interfaces • Ethernet communication to MACS software 	D138-002-001
Motion (Color: green) 	All functions of "Controls" and additionally: <ul style="list-style-type: none"> • Motion control library according to PLCopen • Moog motion control function blocks • Library with transmission functions (Z functions) • CANopen, Profibus DP slave and TCP/IP libraries (depending on hardware option) 	D138-002-002
Professional (Color: blue) 	All functions of "Controls" and "Motion" and additionally: <ul style="list-style-type: none"> • Professional, market-specific application solutions • Libraries for realization of complex control structures 	D138-002-003
System (Color: red) 	Program parts and/or complete application programs, produced specifically upon customer's request Price according to scope of function, expenditure etc.	Is stipulated specific to the order

Accessories		
Connectors (five 18-poled and one 9-poled are needed per module)		
Designation	Description	Order number
Screw terminal, 18-poled	up to max. conductor cross-section of 2,5 mm ² (14 AWG)	VK055-018
Screw terminal, 9-poled	up to max. conductor cross-section of 2,5 mm ² (14 AWG)	VK055-009
Spring-power clamp, 18-poled	up to max. conductor cross-section of 2,5 mm ² (14 AWG)	B95907-018
Spring-power clamp, 9-poled	up to max. conductor cross-section of 2,5 mm ² (14 AWG)	B95907-009



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Singapore
South Africa
Spain
Sweden
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Our quality standard is according to DIN EN ISO 9001.



The modules described in this catalog have passed the EMV examination according to the EU directive.

NOTES

This catalog is intended for users with technical knowledge. In order to ensure that the peripheral conditions necessary for the function and the safety of the system have been fulfilled, the user must examine the suitability of the modules described herein. Please contact Moog for further clarification.

Technical changes are reserved.

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