MACHINE CONTROLLER

MC SERIES 600

Rev. 1.0, March 2011

OFFERING HIGHER PRECISION, MAXIMUM FLEXIBLITY AND FASTER CYCLE TIMES

WHAT MOVES YOUR WORLD

MOOG

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles. Enhance your machine's performance. And help take your thinking further than you ever thought possible.

SYSTEM OVERVIEW

The latest generation of Moog Machine Controllers (MC Series 600) was developed based on 30 years of experience working with customers to solve tough machine challenges. They provide a flexible and modular solution for high-performance, industrial machinery and incorporate a new level of hardware and software design.

Hardware

Available modules include CPUs, bus transceivers, a range of digital and 16-bit resolution analog I/O modules, temperature and other sensor modules. Several fieldbus communication modules are in development.

For greater flexibility Moog offers a range of Human Machine Interfaces (HMIs), either PLC operated or PC based.

The controller runs on a multitasking, Linux-based, realtime operating system that offers short reaction times and high frequency execution of tasks. Fast sampling, 16-bit analog I/O resolution and 2 Mbit/s sensor acquisition provide the basis for highly accurate control and positioning.

Software

All modules are programmed to incorporate the powerful yet easy-to-use Moog Application Software Suite (MASS). It is based on the latest version of the proven CoDeSys development tool and complies with the IEC 61131-3 standard for programming languages. It features additional libraries, plug-ins and programming capabilities that are ideally suited to applications such as the control of injection molding and blow molding machines.

Special software libraries are available for customer-specific solutions and a complete software library of easy-to-use application templates is available for simplified realization of user-specific control and sequence applications.

Applications

The modular design of the MC Series 600 ensures that it can be configured exactly to the specific application. It can be used in both centralized and decentralized control architectures. Using several CPU modules in a single application affords multi-processor solutions.

An important feature of the controller is its ability to operate in the extended temperature range -20 to +70 °C (-4 to +158 °F, non-condensing). This, together with the low power consumption technology and robust construction of the modules, makes the MC Series 600 ideal for use in demanding industrial environments such as plastic machinery.

The incorporation of integral functions such as temperature and parison profile control makes the MC Series 600 suitable for a wide variety of industrial applications including blow and injection molding, packaging, metal forming and presses.

Components	Description
CPU modules	
Main CPU modules	CPU: 400 MHz processor, 128 MB RAM, interfaces: EtherCAT master, Ethernet, USB 2.0, serial port, remote bus master, LCD/keyboard (optional); connectors: license key, power supply
Auxiliary CPU modules	CPU: 400 MHz processor, 128 MB RAM; interfaces: EtherCAT master, Ethernet, USB 2.0, serial port, remote bus IN/OUT; connectors: power supply
I/O modules	
Analog input modules	4 or 8 inputs; 16 bit resolution; 10 V_{DC} at 10 mA
Analog output modules	4 or 8 outputs; ranges: +5 V, +10 V, +10.8V, ±5 V, ±10 V, ±10.8 V; 10 mA
Digital input modules	16 digital inputs (2 groups of 8); 0.5 A
Digital output modules	12 or 16 digital outputs at 24 V_{DC}; source type: PNP; 2 A
Temperature input modules	4 or 8 temperature inputs, 16 bit resolution; PT100 sensors (2-, 3- and 4-wire)
Bus transceiver modules	Interfaces: remote bus IN/OUT; connectors: power supply
Human machine interfaces	PC-based HMI, PLC-operated HMI, Portable HMI
Software	Moog Application Software Suite based on CoDeSys

SYSTEM OVERVIEW

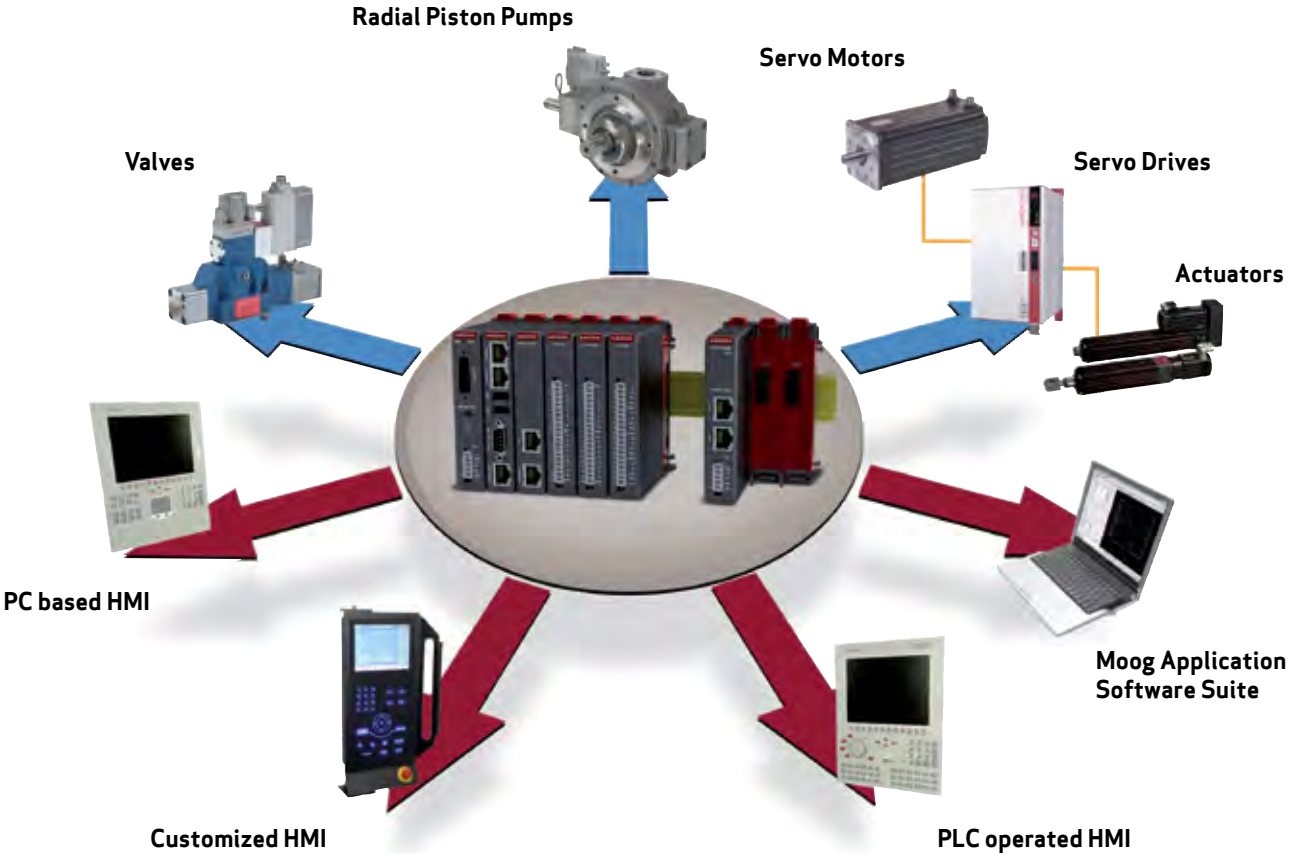
The MC Series 600 can increase the performance and the precision of other products in your system. Moog offers a wide range of products that are optimized to work together for the creation of complex and demanding applications in machine control.

The diagram shows the range of Moog products that are typically used as parts of advanced control and actuation systems used in some of today's most sophisticated machines. While this document features the primary products in the MC Series 600 system, technical information for all the other products are available in their respective catalogs.

The MC Series 600 analog I/O and temperature modules convert process signals with 16 bit resolution. A 16 bit value can represent 65,536 (2^{16}) different numbers. The precision of a command signal, e.g. for a valve, can be improved with this high resolution sampling of analog signals due to smaller deviation.

MC Series 600 offers maximum flexibiltiy to meet your control architecture requirements. A variety of structures can be configured – from small single rack applications to multi rack applications in one or more cabinets. Centralized and decentralized systems using multiple CPUs are supported to create complex control solutions. A process structure, e.g. for valves, pumps and servo motors, can be controlled from specific CPUs and I/Os. The machine can be operated with a HMI and a separate CPU as host for subsequent process clients.

The high CPU performance and the fast sensor acquisition offer short cycle times. The delay in closed-loop control can be minimzed.



FEATURES AND BENEFITS

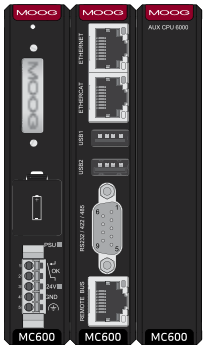
✓ Single-/multi-processor and centralized/decentralized configurations with up to 2,000 I/Os for complex applications	Flexible design
✓ Fewer modules required to make up the system	Easier to use and configure for your application needs
✓ Simple insertion of modules and automatic identification from software	Easy installation
✓ Modules can be mounted into empty/spare sockets after first installation without rack dismounting	Easily expandable
✓ High shock and vibration resistance, along with an extended operating temperature range	Robust construction even for use in harsh, non-condensing environments
✓ 2 Mbit/s sensor acquisition and 16 bit analog I/O	Precise positioning and better accuracy in temperature control processes
✓ Digital I/Os with short circuit, open circuit and high temperature protection	Robust electric design
✓ High processing power of the CPU together with a performance optimized system design	Short reaction and execution times of the application program
✓ Based on the latest version of CoDeSys to support machine builders standardized development environment for closed-loop control	Easy to use programming language
✓ Moog experts collaborate with customers to develop human machine interfaces, modules and application software	Adaptable to customer‘s needs
✓ Dedicated software modules are available for specific markets such as injection and blow moolding	Save development time

Socket with MAIN CPU 6001 module

Socket with I/O module

COMPONENTS OF THE MC SERIES 600

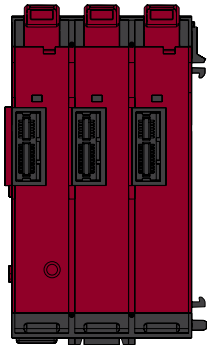
CPU modules



The two main CPU modules are the heart of each application. These modules have the same functionality, but the MAIN CPU 6001 additionally offers a LCD (monitor)and keyboard connector.

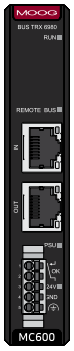
The auxiliary CPU module provides the ability to create multi-processor applications.

Sockets



The sockets are used to hold the modules and to electronically connect them by the local bus. Socket 6990 is the basic socket of each rack. Socket 6991 is an extension element.

Bus transceiver modules

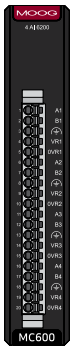


The bus transceiver module supports decentralized configurations in single and multi-processor applications.

Human Machine Interfaces (HMI)

Several PLC operated and PC based HMIs can be used within the MC Series 600.

I/O modules

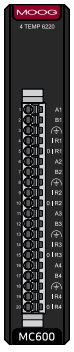


Various analog and digital I/O modules are available.

Moog Application Software Suite (MASS)

MASS is based on latest version of CoDeSys and has been extended by a number of libraries and plug-ins to enhance functionality.

Temperature modules



Two temperature modules are available with 4 and 8 inputs.

License keys

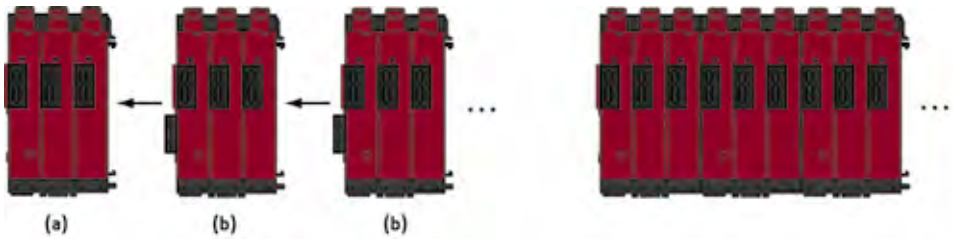
The type of license key affects the software functionality of the application. Different license keys are available for single-/multi-processor and customer-specific applications.

CONFIGURATION

Combining sockets to racks

The MC Series 600 is organized in racks which are mounted on DIN rails. A rack consists of a number of nested sockets.

The first socket of a rack is always a Socket 6990 (a), all other sockets of a rack are Socket 6991 (b).



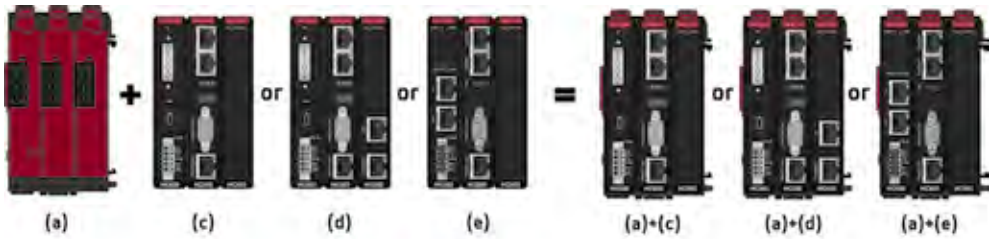
Combining sockets and modules

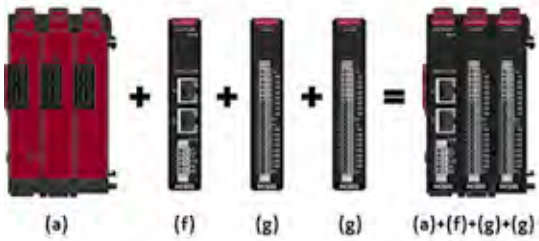
The modules are plugged into the slots of a socket. Each socket has three slots. The CPU modules are triple modules and thus occupy a complete socket.

All other modules are single modules and need only one slot of a socket. Within a rack the modules are electronically connected through the local bus which is provided by means of the sockets.

Socket 6990 for CPU and bus transceiver modules

Socket 6990 (a) is used with a CPU module (c, d and e) or a bus transceiver module (f). The bus transceiver module is put into the first slot, so up to two I/O modules can be inserted in the other two slots (g).





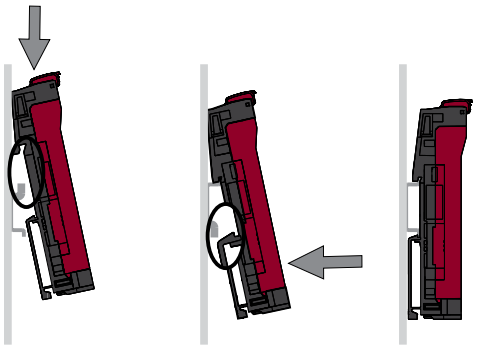
Socket 6991 for I/O and temperature modules

Socket 6991 (b) can be combined with up to three I/O modules or temperature modules (g).

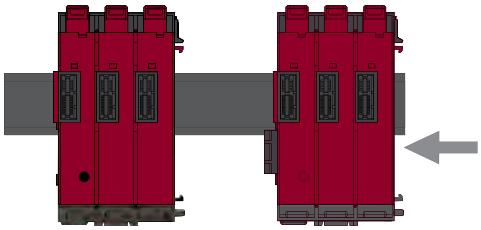
EASY MOUNTING

Assembly

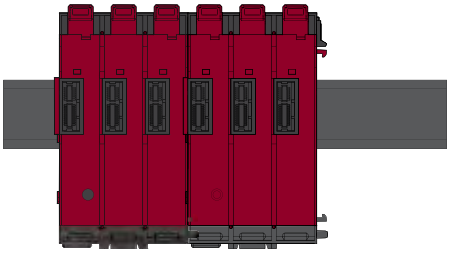
Step 1: Clip socket on DIN rail



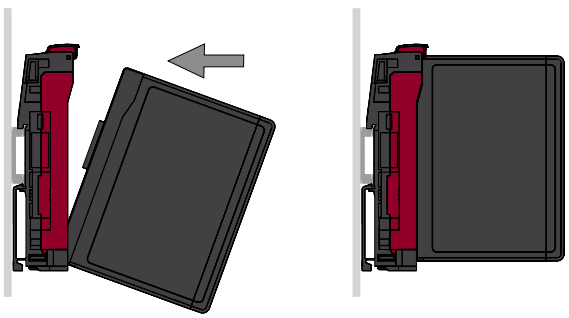
Step 2: Push sockets together until ...



Step 3: ... the right socket snaps into the left one

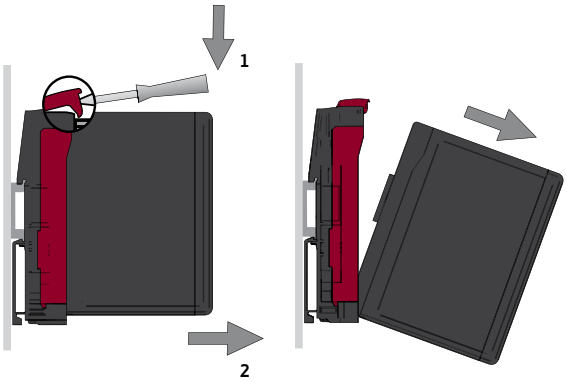


Step 4: Plug module into socket

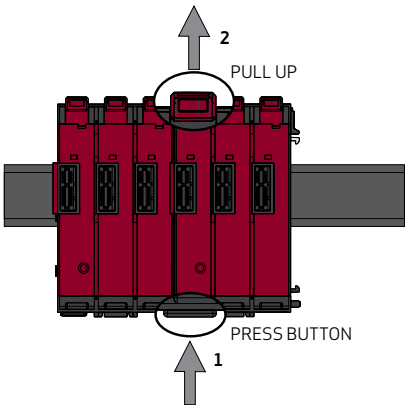


Disassembly

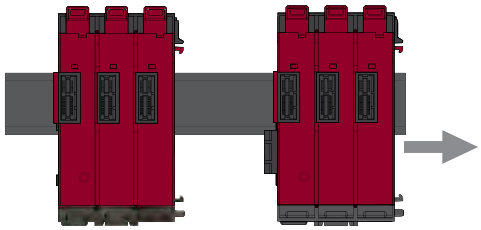
Step 1: Press button at bottom and pull up locking at top



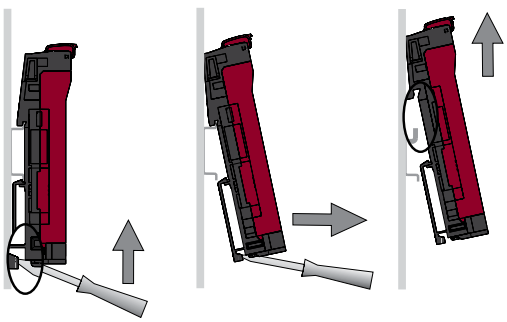
Step 2: Press button at bottom and pull up locking at top



Step 3: Move socket away



Step 4: Unclip socket from rail



APPLICATION EXAMPLES

Introduction

An MC Series 600 application can vary in complexity based on the number of racks and/or number of processors:

- Centralized applications with only one rack
- Decentralized applications with more than one rack
- Single-processor applications
- Multi-processor applications

Centralized versus decentralized applications
The simplest variant is a system with only one rack. A rack consists of one or more sockets mechanically fit together. All modules on a rack are electronically connected by the local bus.

An application with only one rack is a centralized application.

A decentralized application consists of several racks which are electronically connected by the remote bus.

Single-processor versus multi-processor applications
Each application has exactly one main CPU module that controls all the other modules via remote bus or local bus. An application with more than one main CPU module is not possible.

An application that contains only a main CPU module is a single-processor application.

A multi-processor application can be realized by using one or more auxiliary CPU modules which are controlled by the main CPU module via remote bus. Multi-processor applications provide a distributed architecture with shorter cycle times.

Power supply
Each rack needs an external 24 V_{DC} power supply to be connected to a CPU module or a bus transceiver. Thus, each rack starts with one of these types of modules.

License keys
Both for single-processor and multi-processor applications different license keys are available. The type of license key affects the software functionality, see section “License Keys” on page 15.

Centralized, single-processor application

A simple variant consists of a single rack with one main CPU module (MAIN CPU 6000 or MAIN CPU 6001) and with one to three I/O modules.

Ordering list for this application (displayed in dark gray):

1 Socket 6990 (a)
1 Socket 6991 (b)
1 MAIN CPU 6000 (c), or alternatively MAIN CPU 6001
3 I/O modules (g)
1 License key

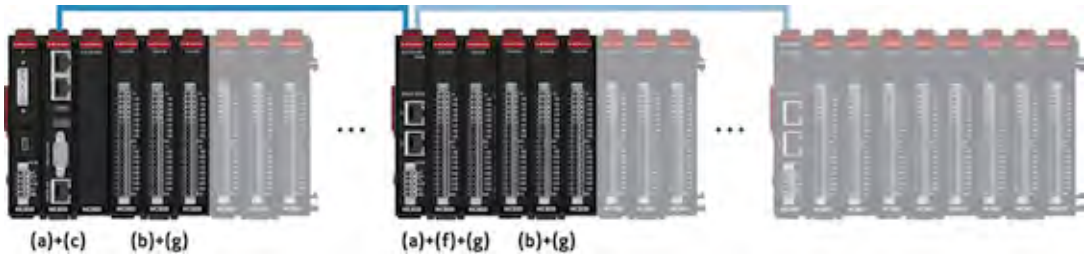
Extension possibilities for this application (displayed in light gray):

- Additional Sockets 6991 with up to three I/O modules each

APPLICATION EXAMPLES

Decentralized, single-processor applications

These applications consist of two or more racks, one main CPU module, one or more bus transceiver modules and several I/O modules.



Ordering list for this application (displayed in dark gray):

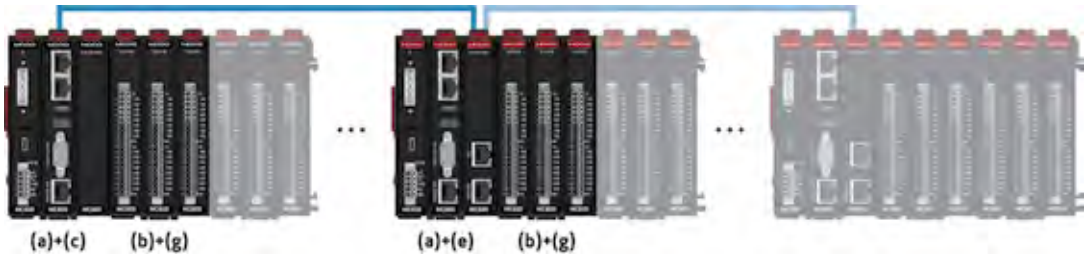
2 Sockets 6990 (a)
2 Sockets 6991 (b)
1 MAIN CPU 6000 (c), or alternatively MAIN CPU 6001
1 BUS TRX 6980 (f)
8 I/O modules (g)
1 License key

Extension possibilities for this application (displayed in light gray):

- Additional Sockets 6991 for an existing rack with up to three I/O modules each
- Additional racks which contain at least a Socket 6990 and a BUS TRX 6980

Decentralized, multi-processor applications (auxiliary CPU modules)

This variant has two or more racks, one main CPU module, one or more auxiliary CPU modules and several I/O modules.



Ordering list for this application (displayed in dark gray):

2 Sockets 6990 (a)
2 Sockets 6991 (b)
1 MAIN CPU 6000 (c), or alternatively MAIN CPU 6001
1 AUX CPU 6010
6 I/O modules (g)
1 License key

Extension possibilities for this application (displayed in light gray):

- Additional Sockets 6991 with up to three I/O modules each
- Additional racks which contain at least a Socket 6990 and a AUX CPU 6010 or a BUS TRX 6980

APPLICATION EXAMPLES

Decentralized, multi-processor applications (Auxiliary CPU and bus transceiver modules)

It is possible to combine main CPU module, auxiliary CPU modules and bus transceiver modules in an application.
The order of rack 2 and 3 can be changed.

Ordering list for this application (displayed in dark gray):

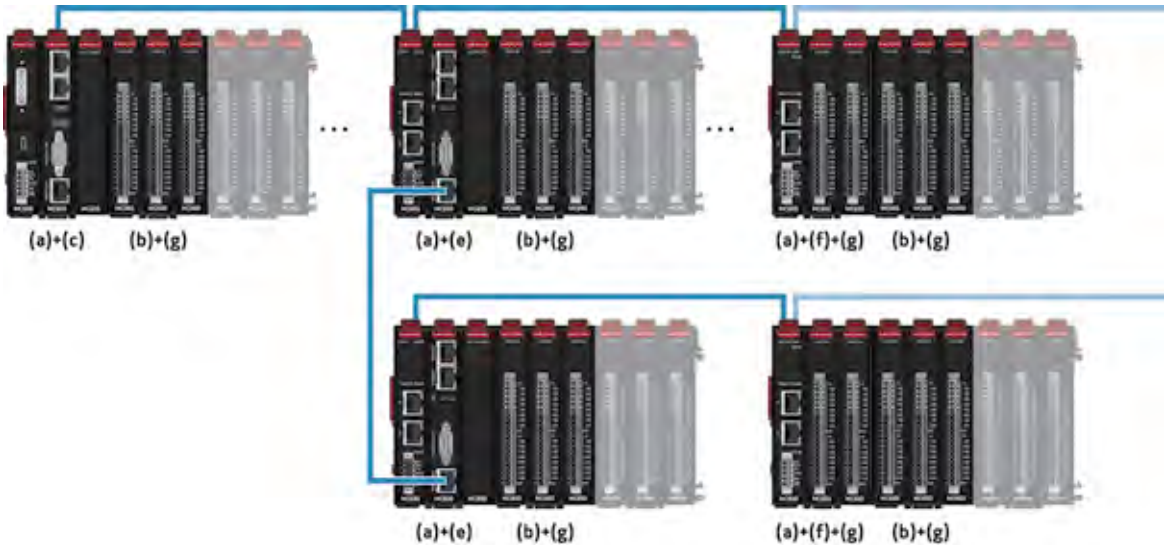
3 Sockets 6990 (a)
3 Sockets 6991 (b)
1 MAIN CPU 6000 (c), or alternatively MAIN CPU 6001
1 AUX CPU 6010 (e)
1 BUS TRX 6980 (f)
11 I/O modules (g)
1 License key

Extension possibilities for this application (displayed in light gray):

- Additional Sockets 6991 for an existing rack with up to three I/O modules each
- Additional racks which contain at least a Socket 6990 and either a AUX CPU 6010 or a BUS TRX 6980

Decentralized, multi-processor applications (Complex architecture)

To realize complex archictures, parallel lines of racks can be connected to a auxialiary module or a bus transceiver.
The order of the racks in a line can be changed.



Ordering list for this application (displayed in dark gray):

5 Sockets 6990 (a)
5 Sockets 6991 (b)
1 MAIN CPU 6000 (c), or alternatively MAIN CPU 6001
2 AUX CPU 6010 (e)
2 BUS TRX 6980 (f)
19 I/O modules (g)
1 License key

Extension possibilities for this application (displayed in light gray):

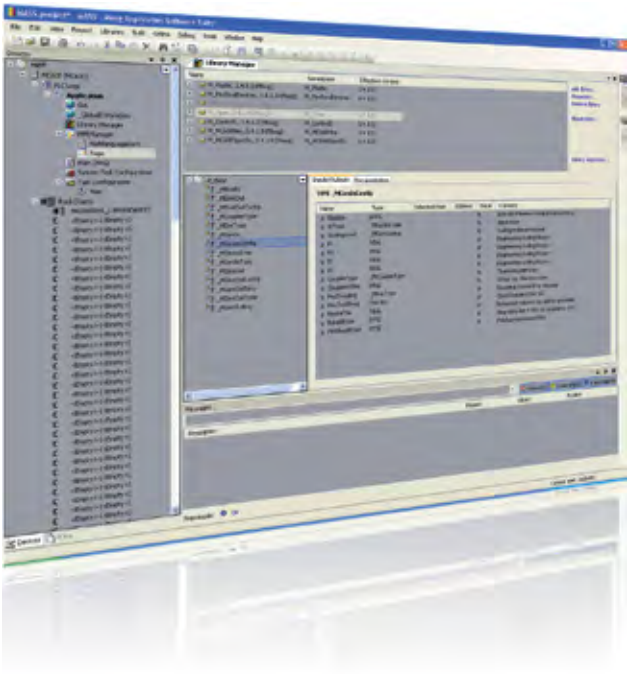
- Additional Sockets 6991 for an existing rack with up to three I/O modules each
- Additional racks which contain at least a Socket 6990 and either a AUX CPU 6010 or a BUS TRX 6980

MOOG APPLICATION SOFTWARE SUITE

MASS Software Basic Functions

The Moog Application Software Suite (MASS) is based on the CoDeSys environment. The CoDeSys technology is not only a PLC programming system, it is a complete automation platform to create customer specific software systems for programming and configuring field devices.

PLC networks
- Several devices per project
- Accommodates programmable and parameterable devices
- Several functions per device (e.g. PLC, Web-Server)
- Network and fieldbus hierarchy displayed in device tree
- Devices of different manufacturers with specific configurators can be mixed
- Logical extension of the CoDeSys Automation Alliance concept



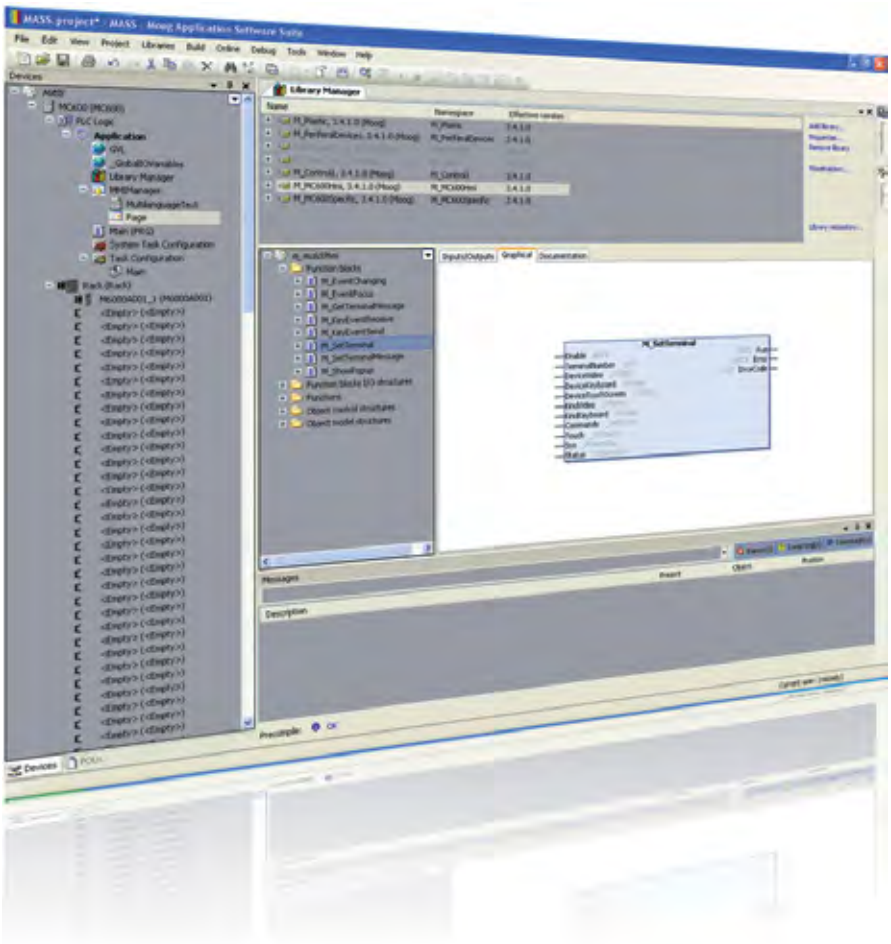
Version profiles
- Several versions can be installed in parallel
- All versions available for service technicians
- Creation version of each project is defined
- Every project can be edited in all versions
- Different versions of runtime system and programming system can operate together
- Individual functionalities (e.g. editor, menu commands) can be upgraded independently

Object orientation
- Real object-oriented features
  - Classes
  - Interfaces
  - Methods
  - Inheritance
  - Polymorphism and dynamic binding
- Seamless extension of the IEC function block
- Unchanged classic programming possible

IEC 61131-3 visualization
- Uniform display concept for all visualization forms
  - Target system visualization
  - Web visualization
  - PC-based visualization
  - Visualization integrated in the programming system
- Stand-alone visualization possible
- Connection of external systems via DataServer possible
- Development of proprietary elements possible

MOOG APPLICATION SOFTWARE SUITE

MASS Software Libraries



M_Plastic

- Functions and function blocks for motion control and parison control

M_MC600Specific

- Functions and function blocks created specifically for the MC Series 600

M_MC600HMI

- Data structures and functional blocks for the management of Moog HMIs connected to the MC Series 600

M_Control1

- Function blocks for managing the temperature control

M_Type

- Data structures for the management of the MC Series 600 modules

M_WrapperLogos3

- Import functions for Logos projects
- Import functions for applications written according to IEC 61131 standards
- Data types and structures of Logos

MOOG APPLICATION SOFTWARE SUITE

MASS Software Plug-ins

Device Editor

The Device Editor allows users to graphically build the configuration of our PLC in a simple and intuitive way. Through a list it is possible to quickly and easily choose the module and to insert our rack. The composition of the rack is freely configurable and follows the concept described in the section “Concepts”.

System Task Wizard

The System Task Wizard allows users to manage the multitasking section via the control video task, the control axis task and the temperatures task. Through this tool it is possible to automatically implement the task desired inside the application with a simple command (Run Wizard).

MMI Manager

The MMI Manager allows users to manage the HMI connections, displayed pages and languages. Inside are two sub-editors:

- The Multi-Language Text Editor allows users to insert different programming languages in tabular form.
- The Page Editor enables the user to create application pages through a tool box.

LICENSE KEYS

The license key contains the runtime license for the Moog Application Software Suite (MASS). The various functions of MASS are enabled according to the license key being used.

The license key additionally contains:

- IP address
- Profibus-DP station address
- CANopen node ID

Designation	Color	Functions	Order number
Controls	Gray	MASS runtime license with basic functionality: • CoDeSys operators and standard IEC 61131 library • Ethernet communication to MASS development environment • Moog hardware libraries • Moog control technique library • Basic PID axis motion control • Temperature control with auto tuning • Direct driven HMI video control functionality • Interface library for EIA-232 and CAN bus • Interface library for EtherCAT master • Basic TCP/IP communication libary • Support for OPC and DDE interfaces • Basic remote diagnostic functions	D138-002-001
Motion	Green	All functions of “Controls” license key and additionally: • Moog motion control library according to PLCopen • Moog motion control function blocks • Advanced fieldbus interface like CANopen, Profibus-DP, EtherCAT slave, other fieldbuses upon request [1)] • Transfer function library (Z functions) • Parison field and other future complex fields for visualization • Matlab/Simulink model execution [1)] • Multi-processor systems • Advanced communication protocol with PLC • Web visualization • Advanced remote diagnostic functions	D138-002-002
Professional	Blue	All functions of “Motion” license key and additionally: • 3D Soft Motion: Caming and gearing • Advanced control with auto adapted algorithms for Plastic Market	D138-002-003
System	Red	Program parts and/or complete application programs, produced specifically upon customer request.	Specific to the order

1) This function is currently under development.

HUMAN MACHINE INTERFACE

PLC operated HMI with 12“ color touch screen

Portable HMI 16x 4 LCD B/W

Modular Parison Controller, 4 channels, 400 points

HMI with touch screen

PC based HMI with 12“ color screen

Interfaces
Moog terminals permit users to connect the MC Series 600 via:

- LVDS (Low Voltage Differential Signaling) communication
- Ethernet communication
- Serial communication (e. g. protocol VT100, V52)
- Touch Screen

Our terminals can be equipped with a touch screen panel. This touch screen can be resistive or capacitive type. The capacitive touch screen can be applied to the LCD. The capacitive touch screen panel eliminates mechanical keys.

User Buttons
Moog terminals allow different buttons:

- Touch screen capacitive buttons
- Touch screen resistive buttons
- Mechanical buttons
- Electromechanical buttons

PC based and PLC operated
Our terminals can be PC based or not.

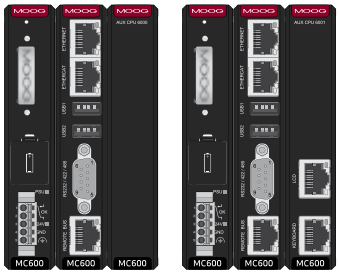
We have a PC based HMI with optional touch screen, 512 MB RAM, SSD 1 GB with XP embedded, CPU 800 MHz fanless, 12“ LCD (800 x 600 pixels), serial ports, UPS control, USB ports and 36 buttons + 36 LEDs.
The non-PC based HMI family uses the LVDS communication to connect to the MC Series 600. We have a HMI LVDS with touch screen, 12“ LCD (800 x 600 pixels), rotary knob, alphanumeric keypad, USB ports and 36 buttons + 36 LEDs.

Customized Terminals
Moog utilizes its own know-how to design custom terminals. The customer may request to customize their terminal following the family feeling of the company into their own. Moog gives full availability in the creation of custom terminals following step-by-step througout the procedure.

CPU MODULES

Overview

MAIN CPU 6000 / MAIN CPU 6001

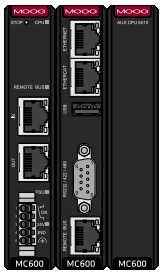


Each MC Series 600 application needs exactly one main CPU module, either MAIN CPU 6000 or MAIN CPU 6001. It is not possible to use more than one main CPU module in an application.

The main CPU module controls all other modules of the application. The two main CPU modules have the same functionality, including battery backup, wake-up function and a license key connector for advanced algorithms. The MAIN CPU 6001 module comes with an additional HMI connector for LCD (monitor) and keyboard.

See page 18.

Auxiliary CPU modules



For decentralized, multi-processor applications, one or more auxiliary CPU modules AUX CPU 6010 can be connected to the main CPU module by remote bus.

See page 20.

Power supply

Each of these modules has its own internal power supply unit (PSU) that requires a nominal +24 V_{DC} input to produce the logic voltages necessary for the other modules.

The external +24 V_{DC} power supply for the modules must be combined with either a CPU module or a bus transceiver module.

All modules monitor voltage, current, and temperature or any other data from the power supply. The main CPU modules have a wake-up function to start-up the power supply. The power available from the modules limits the number of modules to be used in an application.

Additional information

For decentralized applications, additionally bus transceiver modules are available, see section ""Bus Transceiver Modules" on page 22.

I/O and temperature modules are connected to each of the CPU modules via local bus, see sections ""I/O Modules" on page 24 and "Temperature Modules" on page 33.

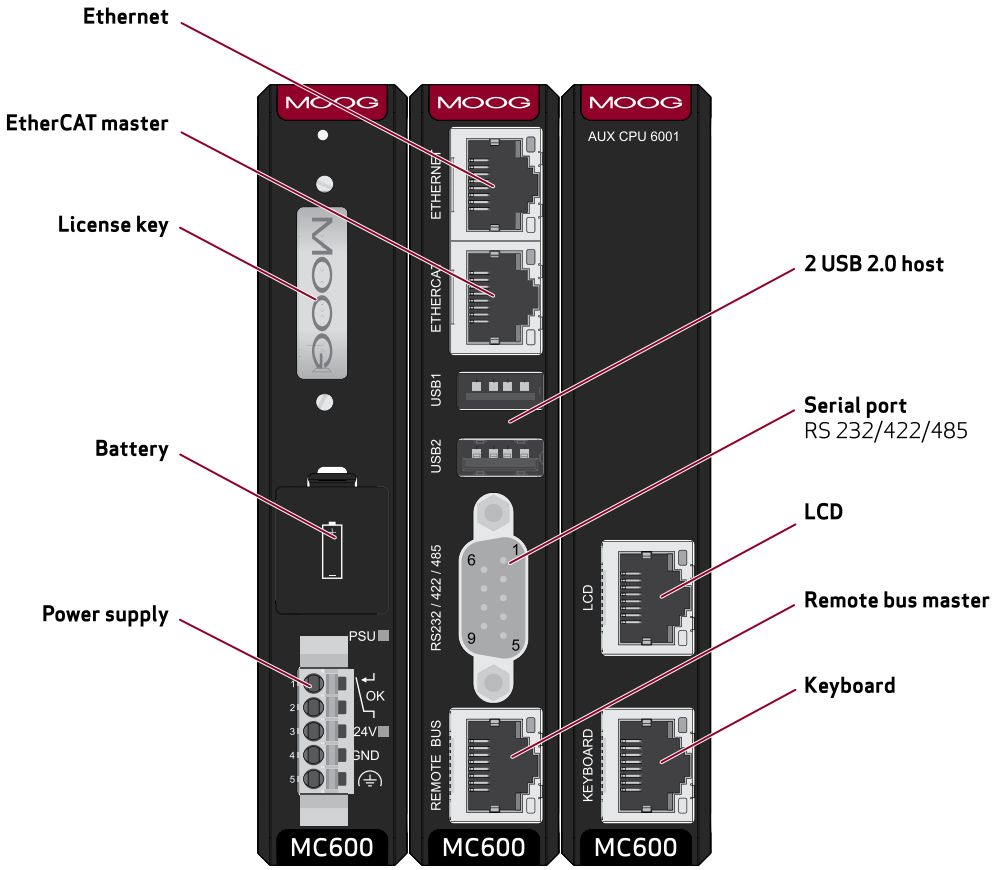
For possible combinations of modules and application samples, see section ""Concepts" on page 7.

Connectors and additional features

	MAIN CPU 6000	MAIN CPU 6001	AUX CPU 6010
EtherCAT master	1	1	1
Ethernet	1	1	1
USB 2.0 host	2	2	1
Serial port	1	1	1
Remote bus master	1	1	–
Remote bus IN/OUT	–	–	1/1
LCD/ keyboard	–	1/1	–
License key	1	1	–
Backup battery	1	1	–

MAIN CPU MODULES

Overview



Technical data

Type of module	MAIN CPU 6000	MAIN CPU 6001
Type code	IMI220-6000A001	IMI220-6001A001
Processor		
Microprocessor	PowerPC type MPC5200 400 MHz	
Cooling	Natural convection	
Memory		
RAM	128 MB	
Flash-EPROM	64 MB	
Nonvolatile RAM	2 MB	
Fastest task	300 µs	
Interfaces		
Integrated interfaces	EtherCAT master Ethernet Remote bus master Serial port RS 232/422/485 USB 2.0 Host	EtherCAT master Ethernet Remote bus master Serial port RS 232/422/485 USB 2.0 Host Keyboard LCD

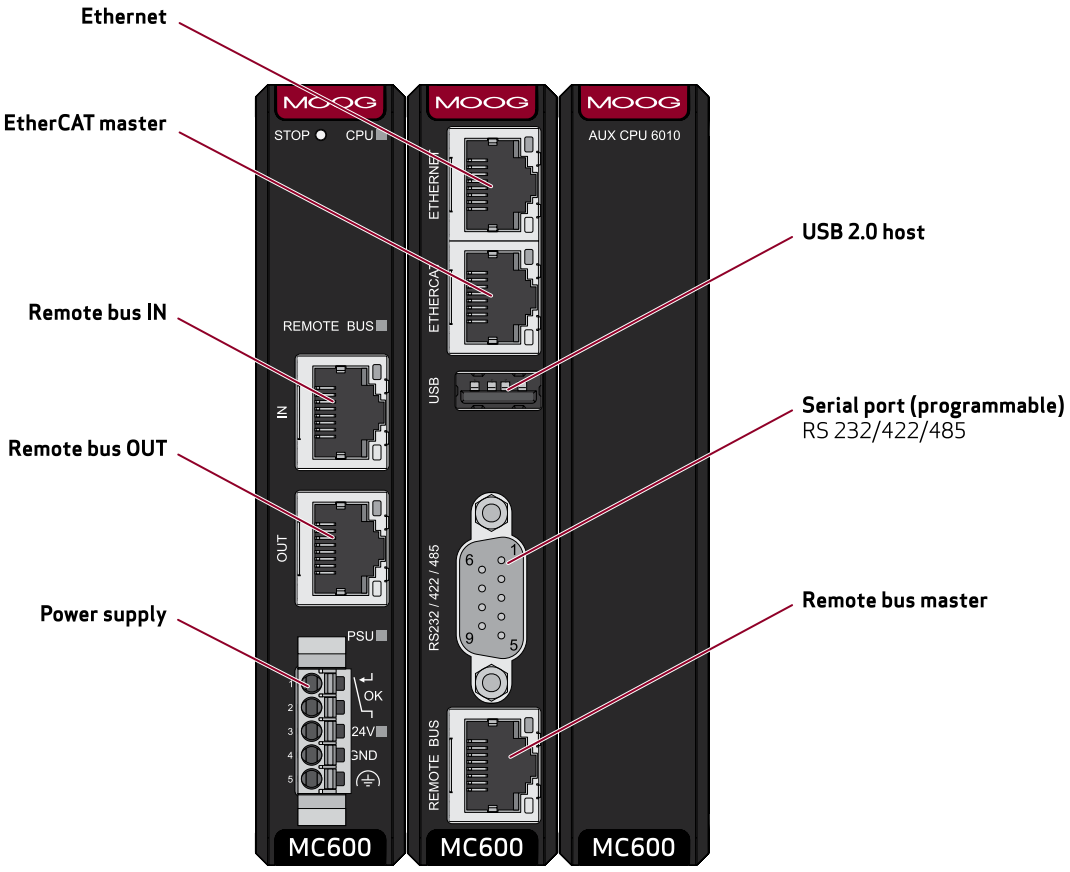
MAIN CPU MODULES

Type of module		**MAIN CPU 6000**	**MAIN CPU 6001**
EtherCAT			
Transmission protocol		EtherCAT	
Transmission rate		100 MBit/s	
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation	
Ethernet			
Transmission protocol		Ethernet	
Transmission rate		10/100 MBit/s	
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation	
RS 232/422/485			
Transmission protocol		Programmable	
Transmission rate		Programmable	
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation	
Diagnostics			
24 V_{DC}	Voltage presence	Green LED	
Battery	Low battery	Red LED	
CPU	Run, stop, programming, halt	Bicolor LED	
EtherCAT	Link	Green LED	
	Activity	Yellow LED	
Ethernet	Link	Green LED	
	Activity	Yellow LED	
Keyboard	Keyboard active	–	Green LED
LCD (monitor)	LCD active	–	Green LED
PSU	Fault, ok, stand-by	Bicolor LED	
Remote bus	Link	Green LED	
	Activity	Yellow LED	
Special features			
Software activation		License key	
Auto power		ON/OFF by internal clock	
Stop user application		Push button	-
HMI video interface			
Resolution		–	1,028 x 800 pixels
Color depth		–	16 bit (65,535 colors)
Cursor		–	2 independent cursors
Display orientation		–	Portrait and landscape
Support of touch screen		–	Yes
HMI keyboard interface			
Maximum number of keys managed		–	176
Maximum number of LED managed		–	50
Support of rotary knob		–	Yes
USB managed		–	Yes

General technical data see section “General Technical Data” on page 35.

AUX CPU MODULES

Interfaces



Technical data

Type of module	**AUX CPU 6010**
Type code	IMI220-6010A001
Processor	
Microprocessor	PowerPC type MPC5200 400 MHz
Cooling	Natural cooling
Memory	
RAM	128 MB
Flash-EPROM	64 MB
Nonvolatile RAM	2 MB
Fastest task	300 µs
Interfaces	
Integrated interfaces	EtherCAT master Ethernet Remote bus master Remote bus IN Remote bus OUT Serial port RS 232/422/485 USB

AUX CPU MODULES

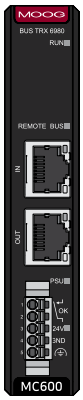
Type of module		**AUX CPU 6010**
EtherCAT		
Transmission protocol		EtherCAT
Transmission rate		100 MBit/s
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation
Ethernet		
Transmission protocol		Ethernet
Transmission rate		10/100 MBit/s
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation
RS 232/422/485		
Transmission protocol		Programmable
Transmission rate		Programmable
Signal inputs/outputs		In accordance to standard IEEE 802.3, no galvanic isolation
Diagnostics		
24 V_{DC}	Voltage presence	Bicolor LED
CPU	Run, stop, prog, halt	Bicolor LED
EtherCAT	Link	Green LED
	Activity	Yellow LED
Ethernet	Link	Green LED
	Activity	Yellow LED
Power supply unit (PSU)	Fault, ok, stand-by	Bicolor LED
Remote bus	Link	Green LED
	Activity	Yellow LED
Special features		
Stop user application		Push button

General technical data see section “General Technical Data” on page 35.

BUS TRANSCEIVER MODULES

Overview

BUS TRX 6980



Decentralized applications can also be extended by using several BUS TRX 6980 modules that are connected to the CPU modules via remote bus.

The BUS TRX 6980 module is the interface between the remote bus coming from the CPU module and the local bus of the rack on which the bus transceiver is mounted. It also acts as a bridge to other bus transceiver modules boosting the electrical signals thus allowing communication over long distances.

The bus transceiver module is equipped with two remote bus connecters (1 IN, 1 OUT).

Power supply

The bus transceiver module has its own internal power supply unit (PSU) that requires a nominal +24 V_{DC} input to produce the logic voltages necessary for the other modules.

The external +24 V_{DC} power supply for the modules must be combined with either a CPU module or a bus transceiver module.

All modules monitor voltage, current, and temperature or any other data from the power supply. The main CPU modules have a wake-up function to start-up the power supply. The power available from the modules limits the number of modules to be used in an application.

Additional information

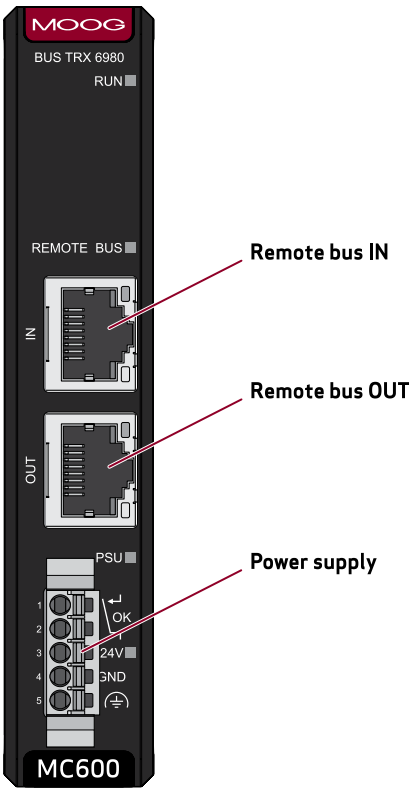
Bus transceiver modules are connected to CPU module. For available CPU modules see section “CPU Modules” on page 17.

I/O and temperature modules are connected to a bus transceiver module via local bus, see sections “I/O Modules” on page 24 and “Temperature Modules” on page 33.

For possible combinations of modules and application samples see section “Concepts” on page 7.

BUS TRANSCEIVER MODULES

Interfaces



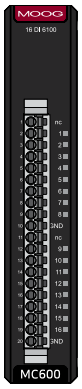
Technical data

Type of module		**BUS TRX 6980**
Type code		IMI 220-6980A001
Interfaces		
Integrated interfaces		Remote bus IN Remote bus OUT
Protection		
Reverse polarity protection		Yes
Diagnostics		
24 V_{DC}	Voltage presence	Green LED
Power supply unit (PSU)	Fault, ok, stand-by	Bicolor LED
Remote bus IN	Rx active	Green LED
	Node activity	Yellow LED
Remote bus OUT	Cable link	Green LED
	Bus activity	Yellow LED

General technical data see section “General Technical Data” on page 35.

I/O MODULES

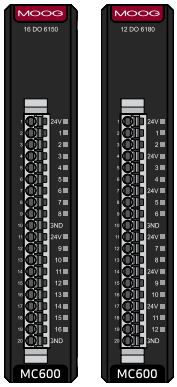
Digital input modules



16 DI 6100
This module provides a total of 16 digital inputs. The inputs are sinking type and are divided into 2 groups of 8. Individual green LEDs provide the actual status of each input.

See page 25.

Digital output modules

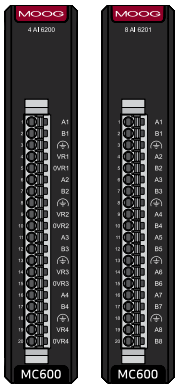


16 DO 6150
This module has a total of 16 digital outputs at 24 V_{DC}. The outputs are sourcing type (PNP) with a maximum current for each channel of 0.5 A and are divided into 2 groups of 8. The green LEDs provide the actual status of each output. The red LEDs provide the fault status of the 2 groups of outputs.

12 DO 6180
This module has a total of 12 digital outputs at 24 V_{DC}. The outputs are sourcing type (PNP) with a maximum current for each channel of 2 A and are divided into 6 groups of 2. The green LEDs provide the actual status for each output. The red LEDs provide the fault status of the 6 groups of outputs.

See page 27.

Analog input modules

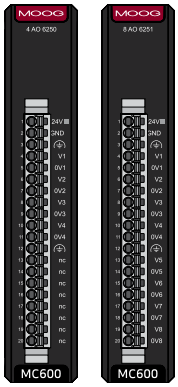


4 AI 6200
This module has a total of 4 analog inputs. The inputs are differential type with 16 bit resolution. A reference voltage of 10 V_{DC} at 10 mA (maximum) is provided for each channel. The reference voltage outputs are both overvoltage and short-circuit protected.

8 AI 6201
This module has a total of 8 analog inputs. The inputs are differential type with 16 bit resolution.

See page 29.

Analog output modules

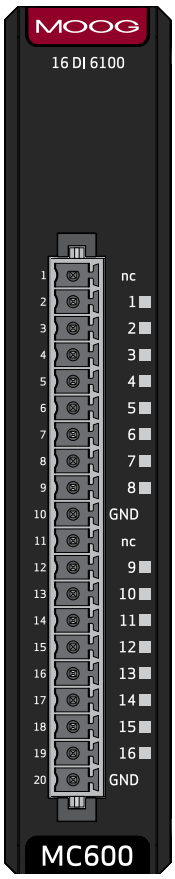


4 AO 6250 / 8 AO 6251
There are two different analog output modules which provide either 4 or 8 analog outputs. The outputs are single-ended with 16 bit resolution. Each channel can be configured via software to any of these six output ranges: +5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V. The maximum current for each channel is 10 mA. The outputs are both overvoltage and short-circuit protected. A bicolor LED provides module status (fault, ok, standby).

See page 31.

DIGITAL INPUT MODULES

Pin assignment 16 DI 6100



Pin	Designation	Pin assignment
1	nc	Not used
2	1	Digital input 1
3	2	Digital input 2
4	3	Digital input 3
5	4	Digital input 4
6	5	Digital input 5
7	6	Digital input 6
8	7	Digital input 7
9	8	Digital input 8
10	GND	Ground
11	nc	Not used
12	9	Digital input 9
13	10	Digital input 10
14	11	Digital input 11
15	12	Digital input 12
16	13	Digital input 13
17	14	Digital input 14
18	15	Digital input 15
19	16	Digital input 16
20	GND	Ground

DIGITAL INPUT MODULES

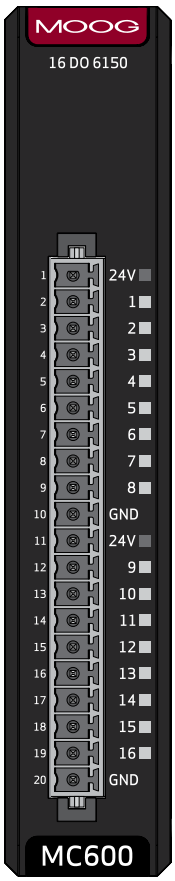
Technical data

Type of module	**16 DI 6100**
Type code	IMI220-6100A001
Basic data	
Type of input	IEC 61131-2 type 3
Number of digital inputs	16 (2 groups of 8 channels)
Power supply	
Supply voltage	24 V_{DC} ± 20 %
Electrical data	
Signal voltage at signal input	24 V_{DC}
Signal voltage - ON level	9.5 V_{DC}
Signal voltage - OFF level	7.7 V_{DC}
Maximum frequency of signal voltage	2 kHz
Input current at 24 V DC	6 mA
Common points between channels	GND (0V)
Signal processing	
Delay time from ON to OFF	300 µs
Delay time from OFF to ON	150 µs
Diagnostics	
Inputs	Green LED
Isolation	
Channel group to channel group	No
Channel to bus	Yes
Channel to channel	No

General technical data see section “General Technical Data” on page 35.

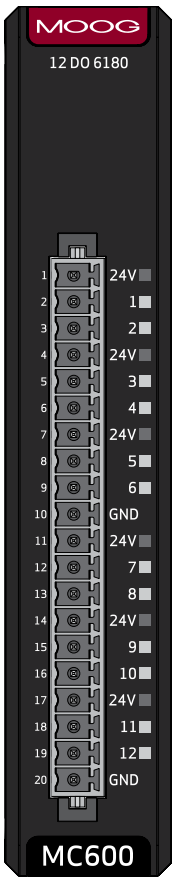
DIGITAL OUTPUT MODULES

Pin assignment 16 DO 6150



Pin	Designation	Pin assignment
1	24V	Supply voltage
2	1	Digital output 1
3	2	Digital output 2
4	3	Digital output 3
5	4	Digital output 4
6	5	Digital output 5
7	6	Digital output 6
8	7	Digital output 7
9	8	Digital output 8
10	GND	Ground
11	24V	Supply voltage
12	9	Digital output 9
13	10	Digital output 10
14	11	Digital output 11
15	12	Digital output 12
16	13	Digital output 13
17	14	Digital output 14
18	15	Digital output 15
19	16	Digital output 16
20	GND	Ground

Pin assignment 12 DO 6180



Pin	Designation	Pin assignment
1	24V	Supply voltage
2	1	Digital output 1
3	2	Digital output 2
4	24V	Supply voltage
5	3	Digital output 3
6	4	Digital output 4
7	24V	Supply voltage
8	5	Digital output 5
9	6	Digital output 6
10	GND	Ground
11	24V	Supply voltage
12	7	Digital output 7
13	8	Digital output 8
14	24V	Supply voltage
15	9	Digital output 9
16	10	Digital output 10
17	24V	Supply voltage
18	11	Digital output 11
19	12	Digital output 12
20	GND	Ground

DIGITAL OUTPUT MODULES

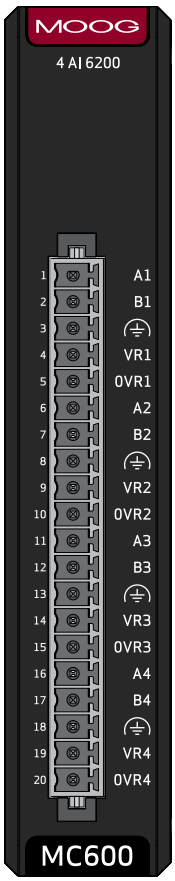
Technical data

Type of module	**16 DO 6150**	**12 DO 6180**
Type code	IMI220-6150A001	IMI220-6180A001
Basic data		
Type of output	PNP	
Number of digital outputs	16 (2 groups of 8 channels)	12 (6 groups of 2 channels)
Power supply		
Supply voltage	24 V_{DC} ± 20 %	
Electrical data		
Common points between channels	GND (0V)	
Maximum allowable load inductance	6 H	
Output current		
OFF level	10 µA	5 µA
For each channel	0.5 A	2 A
For each group of of channels	4 A	
Total	8 A	24 A
Signal processing		
Memory to output delay time TQT from ON to OFF	216 µs	166 µs
Memory to output delay time TQT from OFF to ON	76 µs	56 µs
Delay time from ON to OFF	210 µs	160 µs
Delay time from OFF to ON	70 µs	50 µs
Protection		
Fuse for protection	Integrated (cannot be exchanged)	
Overtemperature	Yes	
Overvoltage	Yes	
Minimum overvoltage	35 V_{DC}	
Short circuit	Yes	
Short circuit current limit	1.1 A	12 A
Short circuit peak current	1.9 A	15 A
Inductive load switch off output clamp	-30 V_{DC} (U_{supply}: -54 V_{DC})	-13 V_{DC}
Diagnostics		
Faults	16 green LED	12 green LED
Outputs	2 red LED	6 red LED
Isolation		
Channel group to channel group	No	
Channel to bus	No	
Channel to channel	Yes	

General technical data see section “General Technical Data” on page 35.

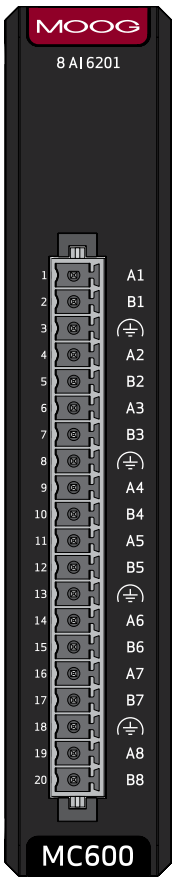
ANALOG INPUT MODULES

Pin assignment 4 AI 6200



Pin	Designation	Pin assignment
1	A1	Positive analog input 1
2	B1	Negative analog input 1
3	PE	Protective earth
4	VR1	+10 V reference
5	0VR1	0 V reference
6	A2	Positive analog input 2
7	B2	Negative analog input 2
8	PE	Protective earth
9	VR2	+10 V reference
10	0VR2	0 V reference
11	A3	Positive analog input 3
12	B3	Negative analog input 3
13	PE	Protective earth
14	VR3	+10 V reference
15	0VR3	0 V reference
16	A4	Positive analog input 4
17	B4	Negative analog input 4
18	PE	Protective earth
19	VR4	+10 V reference
20	0VR4	0 V reference

Pin assignment 8 AI 6201



Pin	Designation	Pin assignment
1	A1	Positive analog input 1
2	B1	Negative analog input 1
3	PE	Protective earth
4	A2	Positive analog input 2
5	B2	Negative analog input 2
6	A3	Positive analog input 3
7	B3	Negative analog input 3
8	PE	Protective earth
9	A4	Positive analog input 4
10	B4	Negative analog input 4
11	A5	Positive analog input 5
12	B5	Negative analog input 5
13	PE	Protective earth
14	A6	Positive analog input 6
15	B6	Negative analog input 6
16	A7	Positive analog input 7
17	B7	Negative analog input 7
18	PE	Protective earth
19	A8	Positive analog input 8
20	B8	Negative analog input 8

ANALOG INPUT MODULES

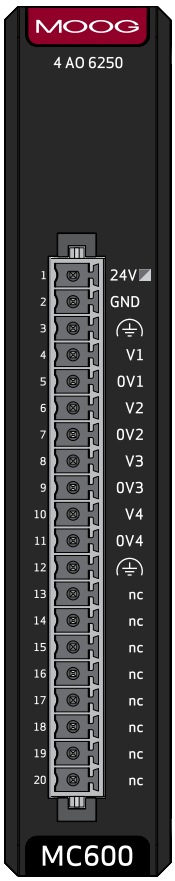
Technical data

Type of module	**4 AI 6200**	**8 AI 6201**
Type code	IMI220-6200A001	IMI220-6201A001
Basic data		
Type of input	Differential	
Number of analog inputs	4	8
Power supply		
Supply voltage	24 V_{DC} ± 20 %	
Electrical data		
Common points between channels	0VR1 / 0VR2 / 0VR3 / 0VR4	–
Current at signal input	4 µA	
Maximum allowable permanent overload	30 V_{DC}	
Voltage at signal input	±30 V_{DC}	
Signal processing		
Common mode rejection ratio	80 dB	
Conversion method	Successive approximation	
Crosstalk between channels	63 dB	
Cut off frequency of input filter	800 Hz	
Maximum analog input error at 25 °C	0.1 %	
Maximum error over full temperature range	0.66 % FS	
Order of input filter	1°	
Repeatability at full scale	0.02 %	
Resolution	16 bit (15 bit + SIGN)	
Temperature coefficient at analog signal input	125 ppm/°C	
Total input system transfer time	47 µs	
Type of input filter	Low pass	
Value of LSB	0.3 mV	
Reference voltage outputs		
Number	4 (independent)	–
Voltage	10 V_{DC}	–
Maximum current	10 mA	–
Precision	±0.01 %	–
Overvoltage protection	Yes	–
Short circuit protection	Yes	–
Isolation		
Channel group to channel group	No	
Channel to bus	Yes	
Channel to channel	No	

General technical data see section “General Technical Data” on page 35.

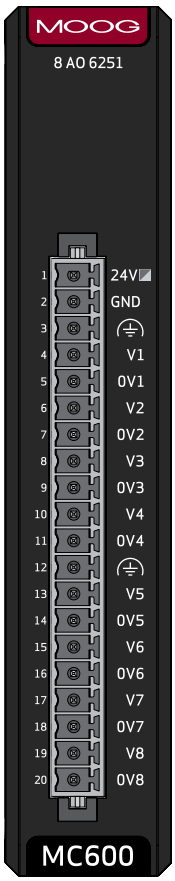
ANALOG OUTPUT MODULES

Pin assignment 4 AO 6250



Pin	Designation	Pin assignment
1	24V	Supply voltage
2	GND	Ground
3	PE	Protective earth
4	V1	Analog output 1
5	0V1	0 V reference output 1
6	V2	Analog output 2
7	0V2	0 V reference output 2
8	V3	Analog output 3
9	0V3	0 V reference output 3
10	V4	Analog output 4
11	0V4	0 V reference output 4
12	PE	Protective earth
13	nc	Not used
14	nc	Not used
15	nc	Not used
16	nc	Not used
17	nc	Not used
18	nc	Not used
19	nc	Not used
20	nc	Not used

Pin assignment 8 AO 6251



Pin	Designation	Pin assignment
1	24V	Supply voltage
2	GND	Ground
3	PE	Protective earth
4	V1	Analog output 1
5	0V1	0 V reference output 1
6	V2	Analog output 1
7	0V2	0 V reference output 2
8	V3	Analog output 3
9	0V3	0 V reference output 3
10	V4	Analog output 4
11	0V4	0 V reference output 4
12	PE	Protective earth
13	V5	Analog output 5
14	0V5	0 V reference output 5
15	V6	Analog output 6
16	0V6	0 V reference output 6
17	V7	Analog output 7
18	0V7	0 V reference output 7
19	V8	Analog output 8
20	0V8	0 V reference output 8

ANALOG OUTPUT MODULES

Technical data

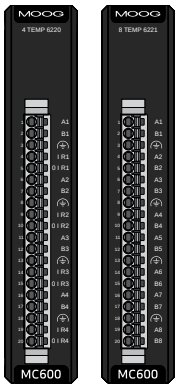
Type of module		**4 AO 6250**	**8 AO 6251**
Type code		IMI220-6250A001	IMI220-6251A001
Basic data			
Type of output		Single ended	
Number of analog outputs		4	8
Electrical data			
Current at signal output		±10 mA	
Common points between channels		0V1 to 0V4	0V1 to 0V8
Maximum allowable permanent overload		30 V_{DC}	
Output resistance		0.5 Ω	
Voltage at signal output		+5 V / +10 V / +10.8 V / ±5 V / ±10 V / ±10.8 V	
Signal processing			
Conversion method		Successive approximation	
Crosstalk between channels		66 dB	
Maximum analog output error at 25 °C		0.46 % [1)]	
Resolution		16 bit	
Maximum offset error		±6 mV	
Maximum error over full temperature range		0.54 % FS	
Output control during power-up/brownout		Yes (0 V_{DC} clamped with 4 kΩ resistor)	
Repeatability at full scale		0.02 %	
Temperature coefficient at analog signal ouput		18 ppm/°C	
Total output system transfer time		20 µs	
Total unadjusted error (TUE) of full scale		±0.1 %	
Value of LSB		0.3 mV (for ±10 V_{DC} output range)	
Protection			
Short circuit		Yes	
Overvoltage		Yes	
Diagnostics			
24 V_{DC}	Fault, ok, stand-by	Bicolor LED	
Isolation			
Channel group to channel group		No	
Channel to bus		Yes	
Channel to channel		No	

1) I_{load} = 10 mA

General technical data see section “General Technical Data” on page 35.

TEMPERATURE MODULES

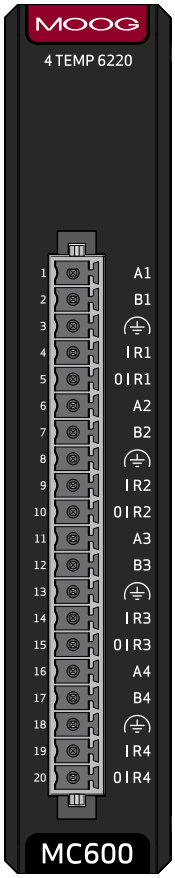
Temperature input modules



4 TI 6220 / 8 TI 6221

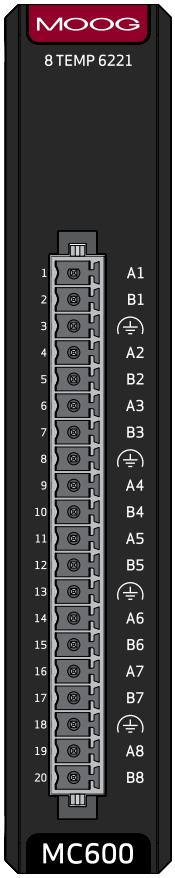
There are two different temperature modules which provide either 4 or 8 temperature inputs. The inputs are differential type with 16 bit resolution. The 4 TEMP 6220 module is compatible with all thermocouple types as well as PT100 sensors (2-, 3-, and 4-wire type). The 8 TEMP 6221 module is compatible with all thermocouple types and PT100 sensors with 2 wires.

Pin assignment 4 TEMP 6220



Pin	Designation	Pin assignment
1	A1	Positive analog input 1
2	B1	Negative analog input 1
3	PE	Protective earth
4	I R1	Current reference
5	0 I R1	Current reference 0
6	A2	Positive analog input 2
7	B2	Negative analog input 2
8	PE	Protective earth
9	I R2	Current reference
10	0 I R2	Current reference 0
11	A3	Positive analog input 3
12	B3	Negative analog input 3
13	PE	Protective earth
14	I R3	Current reference
15	0 I R3	Current reference 0
16	A4	Positive analog input 4
17	B4	Negative analog input 4
18	PE	Protective earth
19	I R4	Current reference
20	0 I R4	Current reference 0

Pin assignment 8 TEMP 6221



Pin	Designation	Pin assignment
1	A1	Positive analog input 1
2	B1	Negative analog input 1
3	PE	Protective earth
4	A2	Positive analog input 2
5	B2	Negative analog input 2
6	A3	Positive analog input 3
7	B3	Negative analog input 3
8	PE	Protective earth
9	A4	Positive analog input 4
10	B4	Negative analog input 4
11	A5	Positive analog input 5
12	B5	Negative analog input 5
13	PE	Protective earth
14	A6	Positive analog input 6
15	B6	Negative analog input 6
16	A7	Positive analog input 7
17	B7	Negative analog input 7
18	PE	Protective earth
19	A8	Positive analog input 8
20	B8	Negative analog input 8

TEMPERATURE MODULES

Technical data

Type of module	**4 TEMP 6220**	**8 TEMP 6221**
Type code	IMI220-6220A001	IMI220-6221A001
Basic data		
Number of temperatur inputs	4	8
Type of input	Differential	
Electrical data		
Input resistance	>2 MΩ	
Maximum allowable permanent overload	110 V_{DC}	
Voltage at signal input	±106 mV	
Signal processing		
Crosstalk between channels	100 dB	
Cold joint compensation	Yes	
Conversion method	Delta sigma	
Common mode characteristic at 60 Hz	100 dB	
Cut off frequency of input filter	1 Hz	
Interrupt	TBD	
Maximum analog input error at 25 °C	0.1 % [1)]	
Maximum number of temperatur sensors	4	8
Reading under overload condition	Full scale value (saturation)	
Reference current for thermo resistance	102.4 µA	
Maximum error over full temperature range	0.57 % FS	
Sample duration time	2.5 ms	
Temperature coefficient at analog signal input	125 ppm/°C	
Total output system transfer time	20 µs	
Resolution	16 bit	
Type of input filter	Low pass	
Type of temperature sensor	Thermocouple PT100 2, 3, 4 wires	Thermocouple PT100 2 wires
Sample repetition time	User programmable	
Type of protection	RC element	
Total input system transfer time	10 ms	20 ms
Isolation		
Channel group to channel group	No	
Channel to bus	Yes	
Channel to channel	No	

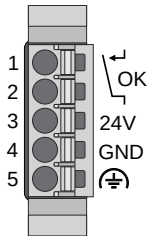
1) Based on the measurement range, without consideration of the reference junction measurement error

General technical data see section “General Technical Data” on page 35.

GENERAL TECHNICAL DATA

Power Supply

Each of the CPU modules and the bus transceiver module have a connector for an external power supply. One external power supply per rack is needed. Type of connector: 5-pin 3.5 mm female.



Supply voltage	24 V_{DC} ± 20 %
Maximum input current	1 A
Reverse polarity protection	Yes
Isolation	Yes
Protection	Integrated fuse (not self-repairing)
Reverse polarity protection	Yes

Cable specifications for power supply and I/O connectors

Cable cross section range	
Solid wires	0.2 to 1.5 mm^2
Stranded wires	0.2 to1.5 mm^2
Stranded wires, with ferrule, without plastic sleeve	0.25 to 1.5 mm^2
Stranded wires, with ferrule, with plastic sleeve	0.25 to 0.75 mm^2
AWG/kcmil	24/16
AWG, according to UL/CUL	24/16

Environmental data

Mounting orientation	Vertical
OK relay	Single contact N/O 1 A 30 V_{DC}
Cooling	Natural convection
Operating temperature range	-20 to +70 °C (-4 to +158 °F), non-condensing
Degree of protection	IP 20
Weight	390 g (CPU modules); 90 g (other modules)

HUMAN MACHINE INTERFACES

Type	**PC-based HMI**
Order number	IMI220-107A001
Supply voltage	24 V_{DC}
Voltage range	18 to 36 V_{DC}
Current consumption	3 A
Floppy disk drive	No
CPU type	Transmeta Crusoe TM5900, 800 MHz
RAM memory	256 MB
Hard disk	1 GB
Solid state disk	Yes
Slot for expansion	Yes
Vibration immunity	Yes
EMC environment	Yes
Protection system	IP 65 (mounted only)
Software characteristics	
Browser	Movicon
Operating system	MS Windows XP Embedded
Interface characteristics	
Serial port	2 x EIA-232 - SER3 EIA-232/422/485; 115 kBit/s
Parallel port	Optional
EtherNet	10/100 Mbit
VGA	1
PS/2	1
USB 2.0	5
Display characteristics	
Display type	Color TFT VGA 12.1" 350 cd/mq; 262,144 colors
Touch screen	Only IMI220-107B108 (??)
Resolution	800 x 600 pixels
Graphics	Yes
Video adapter	ATI Rage PCI 4 MB
Backlight	2 CCFL (Cold Cathode Fluorescent Lamp)
Font	User programmable
Stand by	User programmable
LED	
Power	Green LED
2nd Function (?)	Green LED
On line	Green LED
Programmable keys	Green LED
Keyboard characteristics	
Total number of keys	84
Function keys	12 (24 with 2nd function)
Programmable keys	36 (with programmable LED)
Mouse	Touch pad + 2 buttons
Connectors	
Power supply	3 pins male, 5.08 mm
Serial port	Sub-D 9-pole, male
Serial port (SER3)	Sub-D 15-pole, male
EtherNet	RJ 45, 8-pole
VGA	Sub-D, 15-pole, female
PS/2	6-pole, female
USB 2.0	Type A
General technical data	
Operating temperature	0 to 60 °C (32 to 140 °F)
Dimensions (H x W x D)	428 x 335 x 93.6 mm (16.85 x 13.19 x 3.68 in)
Weight	5.8 kg (12.8 lb)

HUMAN MACHINE INTERFACES

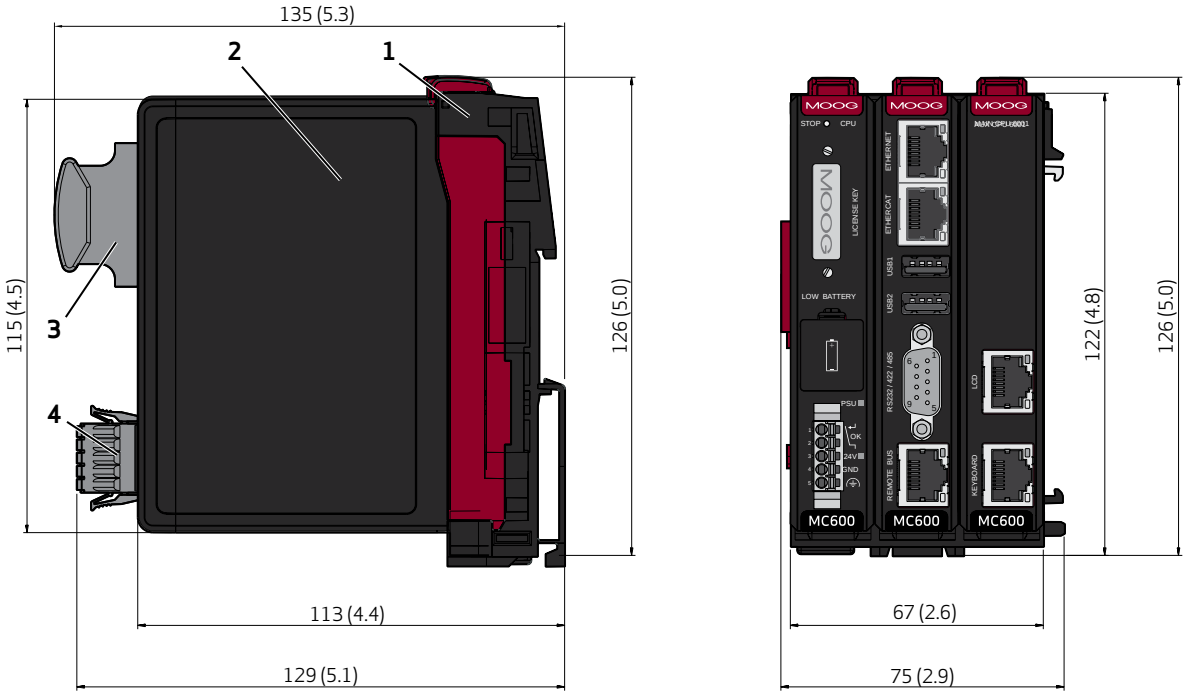
Type	**PLC-operated HMI**
Order number	IMI220-123B001
Supply voltage	24 V_{DC} ± 15 %
Current consumption	1 A
Floppy disk drive	No
USB drive	Yes
Interface characteristics	
LCD	For MAIN CPU 6001 (IMI220-6001A001)
Keyboard	For MAIN CPU 6001 (IMI220-6001A001)
Display characteristics	
Display type	Color LCD TFT
Touch screen	Yes
Backlight	Neon lamp
Resolution	800 x 600 pixels
Graphics	Yes
Fonts	User programmable
Stand by	User programmable
Brightness regulation	Yes
LEDs	
Power	Green LED
2nd function of function key	Green LED
X10	Green LED
Set	Green LED
Enter	Green LED
Programmable keys	Green LED
Keys	
Total number of keys	73 + rotary knob
Function keys	12
Programmable keys	36 (with programmable LED)
Software characteristics	
Programming software	MASS
Alarm message	User programmable
Language	User programmable
Password	User programmable
Field types	Alphanumeric, button, check, constant, date, date and time, deviation, graphic, histogram, numeric, string, text list, time, time of day, parison
Connectors	
Power supply	3-pole male, 3.5 mm
Display	RJ 45
Keyboard	RJ 45
Cable sections	
Display	CAT E5/E6/E7
Keyboard	CAT E5/E6/E7
General technical data	
Operating temperature	0 to 60 °C (32 to 140 °F)
Dimensions (H x W x D)	428 x 335 x 90 mm (16.85 x 13.19 x 3.54 in)
Weight	5.9 kg (13.0 lb)

HUMAN MACHINE INTERFACES

Type	**Portable HMI**
Order number	IMI220-124A001
Supply voltage	24 V_{DC} ± 15 % (or internal battery)
Current consumption	120 mA
Interface characteristics	
Serial port	EIA-232
Baud rate	19200 bit/s
Display characteristics	
Display type	B/W LCD
Touch screen	No
Backlight	LED matrix
Resolution	128 x 64 pixels
Lines x columns	16 x 4
Graphics	No
Fonts	User programmable
Stand by	User programmable
Contrast regulation	No
Brightness regulation	No
Keyboard characteristics	
Total number of keys	18
Function keys	3
Programmable keys	No
Programmable LEDs	No
Software characteristics	
Programming software	MASS
Alarm message	User programmable
Language	User programmable
Password	User programmable
Field types	Alphanumeric, button, check, constant, date, date and time, deviation, graphic, histogram, numeric, string, text list, time, time of day, parison
Connectors	
Power supply	Jack, 2-pole, female
Serial port	Sub-D, 9-pole, female
General technical data	
Operating temperature	0 to 60 °C (32 to 140 °F)
Dimensions (H x W x D)	220 x 116 x 51 mm (8.66 x 4.57 x 2.00 in)
Weight	72 g (2.54 oz)

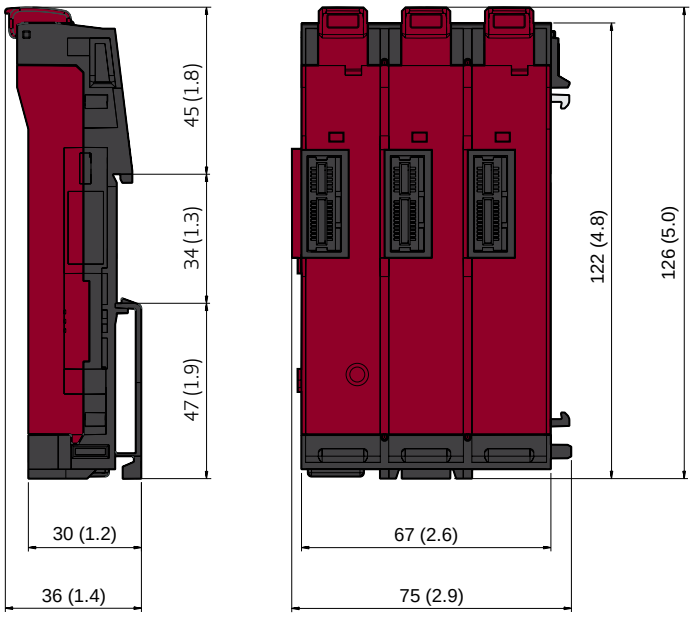
DIMENSIONAL DRAWINGS

Dimensional drawing of CPU module with socket



1 - Socket
2 - CPU module
3 - License key
4 - Power supply connector

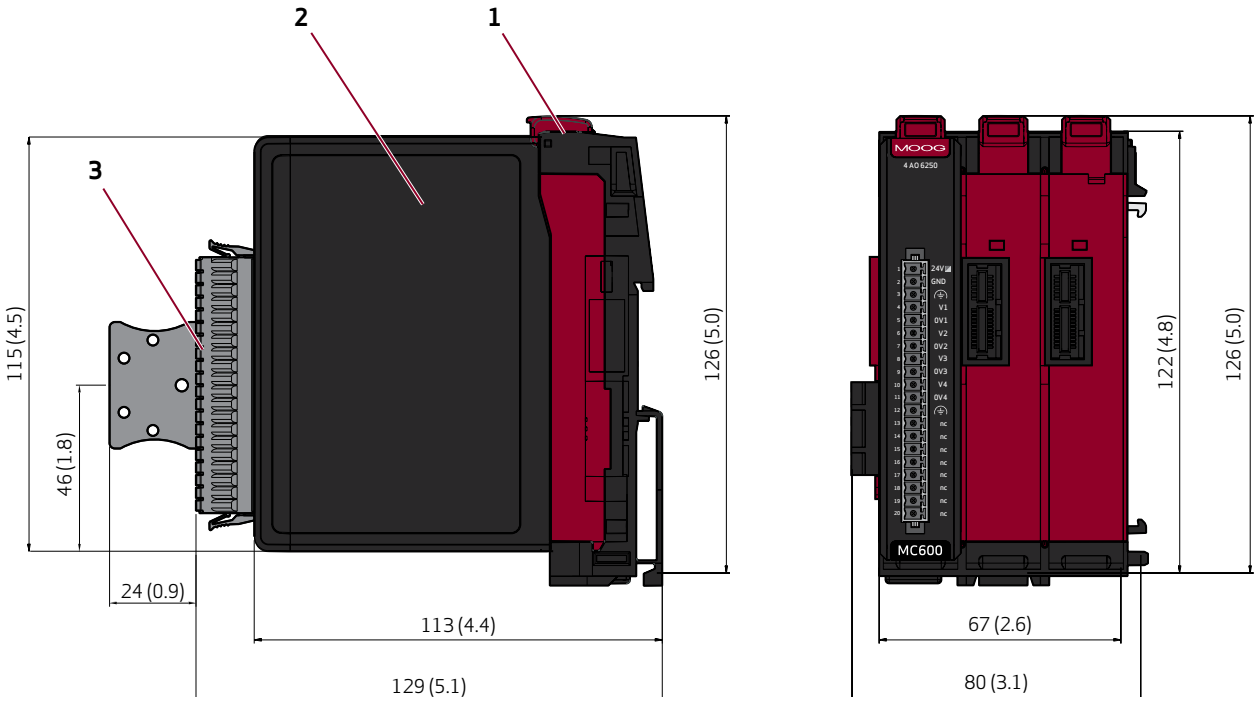
Dimensional drawing of socket for CPU modules



Note: Dimensions in mm (in)

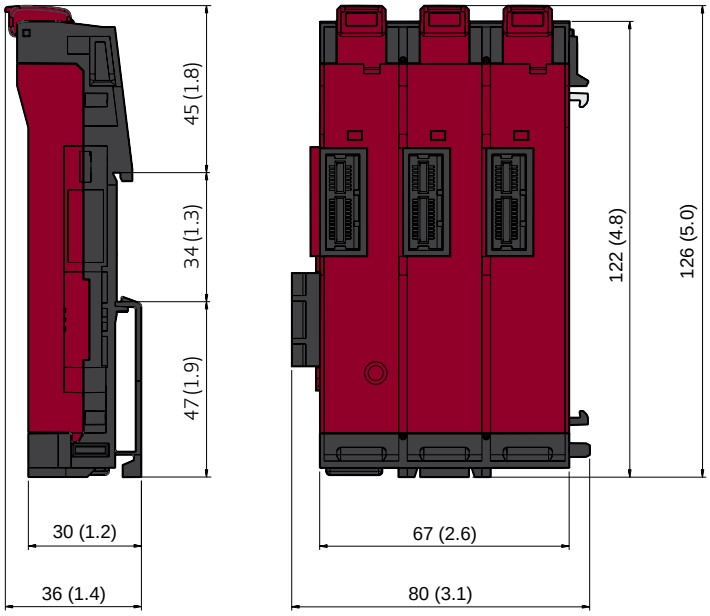
DIMENSIONAL DRAWINGS

Dimensional drawing of I/O module with socket



1 - Socket
2 - I/O module
3 - Connector

Dimensional drawing ofof socket for I/O modules



Note: Dimensions in mm (in)

ABOUT MOOG

Moog Industrial Group provides high-performance motion control solutions for a wide range of industrial applications including plastics processing, metal forming presses, power generation, test and simulation, motorsport, oil and gas exploration, and others. The industrial group is part of Moog Inc. (NYSE: MOG.A and MOG.B), a nearly $2 billion organization that also encompasses the Aircraft, Space and Defense, Medical Devices and Components Groups.

Moog maintains facilities in 25 countries around the globe. This vast scope ensures that our engineers remain close to the needs of machine builders and provide flexible design solutions and technical expertise tailored to our customers' toughest challenges.

Moog experts work in close collaboration with machine builders and application engineers to design motion control systems for greater productivity, higher reliability, superior connectivity, less costly maintenance and more effective operations. Our regional presence, industry knowledge and design flexibility ensures Moog motion control solutions are tailored to their environment—from meeting operating regulations and performance standards, to taking machine performance to a higher level.

Servo Drives

Servo Motors

Servo Valves

Radial Piston Pumps

Products

At the heart of every Moog solution is an array of products engineered for precision, high performance and reliability. For more than five decades, Moog products have been specified for critical machine applications.

Some are developed specifically for unique operating environments. Others are standard equipment on machines across many industries. All are continuously improved to take advantage of the latest technology breakthroughs and advancements.

Moog products include:

- Servo Valves and Proportional Valves
- Servo Motors and Servo Drives
- Controllers and Software
- Radial Piston Pumps
- Actuators
- Integrated Hydraulic Manifold Systems and Cartridge Valves
- Slip Rings
- Motion Bases

ABOUT MOOG

Hydraulic solutions

Since Bill Moog invented the first commercially viable Servo Valve in 1951, Moog has set the standard for world-class hydraulic technology. Today, Moog products are used in a variety of applications - providing high power, enhanced productivity and ever better performance for some of the worlds most demanding applications.

Electric solutions

Clean operation, low noise generation, less maintenance and reduced power consumption make Moog electric solutions ideal for applications worldwide. Moog is the ideal partner for applications where transitioning technologies requires special expertise.

Hybrid solutions

By incorporating the advantages of existing hydraulic and electric technologies - including modular flexibility, increased efficiency and cleanliness - into innovative hybrid solutions, Moog offers new performance potential in specialized applications.

Moog Global Support

Moog Global Support™ is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet the unique service requirements of your facility

Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime
- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support™, visit www.moog.com/industrial/service

MOOG GLOBAL SUPPORT™

ORDERING INFORMATION

Designation	Description	Order number
CPU modules		
MAIN CPU 6000	MAIN CPU + PSU	IMI220-6000A001
MAIN CPU 6001	MAIN CPU + PSU + HMI driver	IMI220-6001A001
AUX CPU 6010	AUX CPU + PSU	IMI220-6010A001
I/O modules		
16 DI 6100	16 digital inputs, 24 V_{DC}	IMI220-6100A001
16 DO 6150	16 digital outputs, 24 V_{DC}, 0.5 A	IMI220-6150A001
12 DO 6180	12 digital outputs, 24 V_{DC}, 2 A	IMI220-6180A001
4 AI 6200	4 analog inputs, 16 Bit	IMI220-6200A001
8 AI 6201	8 analog inputs, 16 Bit	IMI220-6201A001
4 AO 6250	4 analog outputs, 16 Bit	IMI220-6250A001
8 AO 6251	8 analog outputs, 16 Bit	IMI220-6251A001
4 TEMP 6220	4 temperature inputs	IMI220-6220A001
8 TEMP 6221	8 temperature inputs	IMI220-6221A001
Bus transceiver modules		
BUS TRX 9680	Bus transceiver TRX + PSU	IMI220-6980A001
Sockets		
3 SLOT SOCKET MAIN	Socket with 3 slots for CPU modules	IMI220-6990A001
3 SLOT SOCKET I/O	Socket with 3 slots for I/O modules	IMI220-6190A001
Human Machine Interfaces (HMI)		
PC based HMI	12“, 800 MHz CPU, 512 MB SSD, 256 MB RAM, keyboard, natural cooling	IMI220-107B107
PC based HMI with touch screen	12“, 800 MHz CPU, 512 MB SSD, 256 MB RAM, keyboard, natural cooling, touch screen	IMI220-108B108
Local graphic HMI with touch screen	Color, 800 x 600 pixels, keyboard, LVDS communication, USB	IMI220-123B001
Portable HMI	16 x 4 LCD B/W, VT100 protocol, RS 232 interface	IMI220-124A001
License keys	For a description of the license key functions see page 15.	
Controls		D138-002-001
Motion		D138-002-002
Professional		D138-002-003
System		Specific to the order
Cables		
LVDS cable set for HMI	3 m	C46659
	10 m	C46660
	15 m	C46661
Batteries		
Battery for PSU	Kit includes: • 1 battery size 1/2 AA lithium; 3.6 V; not recharchable; 750 mAh • 1 plastic holder	C46663

TAKE A CLOSER LOOK.

Moog designs a range of motion control products that complement the performance of those featured in this catalog. Visit our website for more information and contact the Moog facility nearest you.

Argentina
+54 11 4326 5916
info.argentina@moog.com

Australia
+61 3 9561 6044
info.australia@moog.com

Brazil
+55 11 3572 0400
info.brazil@moog.com

Canada
+1 716 652 2000
info.canada@moog.com

China
+86 21 2893 1600
info.china@moog.com

Finland
+358 10 422 1840
info.finland@moog.com

France
+33 1 4560 7000
info.france@moog.com

Germany
+49 7031 622 0
info.germany@moog.com

Hong Kong
+852 2 635 3200
info.hongkong@moog.com

India
+91 80 4057 6605
info.india@moog.com

Ireland
+353 21 451 9000
info.ireland@moog.com

Italy
+39 0332 421 111
info.italy@moog.com

Japan
+81 46 355 3767
info.japan@moog.com

Korea
+82 31 764 6711
info.korea@moog.com

Luxembourg
+352 40 46 401
info.luxembourg@moog.com

The Netherlands
+31 252 462 000
info.thenetherlands@moog.com

Norway
+47 6494 1948
info.norway@moog.com

Russia
+7 8 31 713 1811
info.russia@moog.com

Singapore
+65 677 36238
info.singapore@moog.com

South Africa
+27 12 653 6768
info.southafrica@moog.com

Spain
+34 902 133 240
info.spain@moog.com

Sweden
+46 31 680 060
info.sweden@moog.com

Switzerland
+41 71 394 5010
info.switzerland@moog.com

United Kingdom
+44 168 429 6600
info.uk@moog.com

USA
+1 716 652 2000
info.usa@moog.com

www.moog.com/industrial

MC Series 600 Machine Controller
PIM/Rev. 1.0, March 2011, Id. CDL 30267-en