

# USER MANUAL

## MC600plus



Oct-21

MC600 - Technical Documentation

## Contents

1	General Information .....	11
1.1	Introduction .....	11
1.1.1	Document Version .....	11
1.1.2	Revision Record .....	11
1.1.3	About this manual .....	11
1.1.4	Reservation of Changes and Validity .....	11
1.1.5	Exclusion of Liability .....	11
1.1.6	Completeness .....	12
1.1.7	Place of Storage .....	12
1.2	About Moog .....	13
1.3	Reader Instructions .....	14
1.4	Identification .....	16
1.4.1	Nameplate and Type designation .....	16
1.4.2	Manufacturer Name and Address .....	16
1.4.3	Declaration of Conformity .....	16
1.5	Safety Information .....	17
1.5.1	General notes .....	17
1.5.2	Qualified Personnel .....	17
1.5.3	Basic knowledge required .....	17
1.5.4	Proper use of the product .....	17
1.5.5	Scope of the operating instructions .....	17
1.5.6	Safety related system .....	17
1.5.7	Hazardous areas .....	18
1.5.8	Notes about usage .....	18
1.5.9	Working on the control cabinet .....	18
1.5.10	Project planning .....	18
1.5.11	Installation, Commissioning and maintenance .....	19
1.5.12	Connecting the power supply to MC600 .....	19
1.5.13	Connecting the power supply to connected sensors .....	19
1.5.14	Data security .....	20
1.6	Software Copyrights .....	21
2	Information For Use .....	22
2.1	Information for use .....	22
2.2	Intended use .....	22
2.3	Main features .....	22
2.4	Consumable parts .....	22
2.5	Repair .....	22
2.6	Applicable standards .....	23
2.6.1	CE Labeling .....	23
2.6.2	Electromagnetic compatibility (EMC) .....	23
2.6.3	Environmental conditions .....	23
2.6.4	Mechanical conditions and limits .....	24
2.6.5	Chemical conditions .....	24
2.6.6	IP Protection code .....	25

2.6.7	Reasonably foreseeable misuse.....	25
2.7	MC600 Components.....	26
2.7.1	Hardware components.....	26
2.7.2	Software features.....	26
2.7.3	MASS.....	26
2.8	Architecture overview.....	27
2.8.1	Block diagram .....	27
2.8.2	Available architecture .....	27
2.8.3	Centralized versus decentralized applications.....	27
2.8.4	License keys.....	28
2.9	Combining sockets to racks.....	29
2.10	Combining sockets and modules .....	30
2.11	Centralized: single-processor application.....	32
2.12	Decentralized: single-processor applications.....	33
2.13	Commissioning of MC600.....	34
2.13.1	Delivery state of MC600 .....	34
2.13.2	Remove battery protection.....	34
2.13.3	Power supply connection .....	34
2.13.4	Load the firmware .....	34
2.14	Operating Instruction .....	36
2.14.1	Programming and configuration.....	36
2.14.1.1	Communication between MC600 and MASS .....	36
2.14.1.2	Device status.....	36
2.14.1.3	Behavior of switching off or power supply failure .....	36
2.14.1.4	Behavior at power on.....	36
2.15	Decommissioning of MC600.....	37
2.15.1	Dismount MC600 .....	37
2.15.2	Disposal .....	37
3	Hardware.....	38
3.1	MC600 Hardware.....	38
3.2	Power Supply.....	40
3.3	IMI220-6031A001: POWER SUPPLY - MAIN CPU - HMI DRIVER.....	41
3.3.1	General Information .....	41
3.3.2	Technical Characteristics .....	41
3.3.3	Front View .....	42
3.3.3.1	L Section.....	43
3.3.3.2	M Section .....	43
3.3.3.3	R Section.....	43
3.3.4	Connections .....	44
3.3.4.1	L Section.....	44
3.3.4.2	M Section .....	46
3.3.4.3	R Section.....	46
3.3.5	Battery replacement.....	48
3.4	IMI220-6980A001: BUS TRANSCEIVER (TRX + PSU).....	50
3.4.1	General Information .....	50

3.4.2	Power supply.....	50
3.4.3	Additional information.....	50
3.4.4	Technical Characteristics.....	50
3.4.5	<b>Front View</b> .....	51
3.4.5.1	TRANSCEIVER Section: .....	51
3.4.5.2	PSU Section:.....	52
3.4.6	Connections.....	52
3.4.6.1	TRANSCEIVER Section: .....	52
3.4.6.2	PSU Section:.....	52
3.5	IMI220-6970A001: POWER SUPPLY BOOSTER .....	54
3.5.1	General Information.....	54
3.5.2	Technical Characteristics.....	54
3.5.3	<b>Front View</b> .....	55
3.5.4	Connections.....	55
3.5.4.1	PSU Section.....	55
3.6	IMI220-6100A001: 16DI 24VDC.....	57
3.6.1	General Information.....	57
3.6.2	Technical Characteristics.....	57
3.6.3	<b>Front View</b> .....	58
3.6.4	Connections.....	58
3.6.5	Connections to the external.....	59
3.7	IMI220-6100B001: 16DI 24VDC.....	60
3.7.1	General Information.....	60
3.7.2	Technical Characteristics.....	60
3.7.3	<b>Front View</b> .....	61
3.7.4	Connections.....	62
3.7.5	Connections to the external.....	63
3.7.6	IO Configuration in MASS.....	63
3.8	IMI220-6150A001: 16DO 24VDC 0.5A.....	64
3.8.1	General Information.....	64
3.8.2	Technical Characteristics.....	64
3.8.3	<b>Front View</b> .....	65
3.8.4	Connections.....	65
3.8.5	Connections to the external.....	66
3.9	IMI220-6161A001: 8DO RELAY (TBD).....	67
3.9.1	General Information.....	67
3.10	IMI220-6180A001: 12DO 24VDC 2A.....	68
3.10.1	General Information.....	68
3.10.2	Technical Characteristics.....	68
3.10.3	<b>Front View</b> .....	69
3.10.4	Connections.....	69
3.10.5	Connections to the external.....	70
3.11	IMI220-6200A001: 4AI 16BIT.....	71
3.11.1	General Information .....	71
3.11.2	Technical Characteristics .....	71

3.11.3	<b>Front View</b>	72
3.11.4	Connections	73
3.11.5	Connections to the external	73
3.11.6	IO Configuration in MASS	73
3.12	IMI220-6201A001: 8AI 16BIT	75
3.12.1	General Information	75
3.12.2	Technical Characteristics	75
3.12.3	<b>Front View</b>	76
3.12.4	Connections	76
3.12.5	Connections to the external	77
3.12.6	IO Configuration in MASS	77
3.13	IMI220-6201A002: 8AI 16 BIT ±20mA	79
3.13.1	General Information	79
3.13.2	Technical Characteristics	79
3.13.3	<b>Front View</b>	80
3.13.4	Connections	80
3.13.5	Connections to the external	81
3.13.6	IO Configuration in MASS	81
3.14	IMI220-6204A001: 3 LVDT/Resolver	83
3.14.1	General Information	83
3.14.2	Technical Characteristics	83
3.14.3	<b>Front View</b>	84
3.14.4	Connections	84
3.14.5	Connections to the external	85
3.14.6	LVDT IO Configuration in MASS	85
3.15	IMI220-6501A001: 4 Encoder SSI/Quad	88
3.15.1	General Information	88
3.15.2	Technical Characteristics	88
3.15.3	<b>Front View</b>	89
3.15.4	Connections	90
3.15.5	Multi-magnets management	92
3.15.6	Connections to the external	94
3.15.7	IO Configuration in MASS	94
3.15.8	MC600plus calibration example	94
3.16	IMI220-6250A001: 4AO 16BIT	96
3.16.1	General Information	96
3.16.2	Technical Characteristics	96
3.16.3	<b>Front View</b>	97
3.16.4	Connections	98
3.16.5	Connections to the external	98
3.16.6	IO Configuration in MASS	98
3.17	IMI220-6251A001: 8AO 16BIT	100
3.17.1	General Information	100
3.17.2	Technical Characteristics	100
3.17.3	<b>Front View</b>	101

3.17.4	Connections.....	102
3.17.5	Connections to the external.....	102
3.17.6	IO Configuration in MASS.....	102
3.18	IMI220-6260A001: 4AO I/V 16BIT.....	104
3.18.1	General Information.....	104
3.18.2	Technical Characteristics.....	104
3.18.3	<b>Front View</b> .....	105
3.18.4	Connections.....	106
3.18.5	Connections to the external.....	107
3.18.6	IO Configuration in MASS.....	107
3.19	IMI220-6262A001: 4AO I/V 16BIT 100mA.....	108
3.19.1	General Information.....	108
3.19.2	Technical Characteristics.....	108
3.19.3	Performance Example.....	109
3.19.4	Block Diagram.....	110
3.19.5	Front View.....	110
3.19.6	Connections.....	111
3.19.7	Connections to the external.....	112
3.19.8	IO Configuration in MASS.....	112
3.20	IMI220-6220A001: 4TEMPERATURE 16BIT.....	114
3.20.1	General Information.....	114
3.20.2	Technical Characteristics.....	114
3.20.3	<b>Front View</b> .....	115
3.20.4	Connections.....	115
3.20.5	Connections to the external.....	117
3.20.6	IO Configuration in MASS.....	117
3.21	IMI220-6221A001: 8TEMPERATURE 16BIT.....	118
3.21.1	General Information.....	118
3.21.2	Technical Characteristics.....	118
3.21.3	<b>Front View</b> .....	119
3.21.4	Connections.....	119
3.21.5	Connections to the external.....	120
3.21.6	IO Configuration in MASS.....	120
3.22	Installation distances.....	122
3.23	Din Rail.....	123
3.24	Assembly.....	124
3.25	Disassembly.....	126
3.26	Processor Modules dimensions.....	128
3.27	Main socket dimensions.....	130
3.28	I/O Modules Dimensions.....	131
3.29	I/O Socket Dimensions.....	133
3.30	License Key.....	134
3.30.1	MC600plus license key.....	134
3.31	C46665: Power Supply Connector .....	135
3.31.1	Technical Characteristics .....	135

3.31.2	Top/Side View.....	136
3.31.3	<b>Connections</b> .....	136
3.32	C46666: I/O Connector.....	138
3.32.1	Technical Characteristics.....	138
3.32.2	Top/Side.....	139
3.33	IMI220-6990A001: 3 SLOT SOCKET - MAIN.....	140
3.33.1	Technical Characteristics.....	140
3.33.2	<b>Front View</b> .....	140
3.34	IMI220-6991A001: 3 SLOT SOCKET - I/O .....	142
3.34.1	Technical Characteristics .....	142
3.34.2	<b>Front View</b> .....	142
3.35	IMI220-7000A001: HMI TOUCH PANEL 7".....	144
3.35.1	<b>General Information</b> .....	144
3.35.2	Technical Characteristics.....	144
3.35.3	<b>Front View</b> .....	145
3.35.4	Communication Mode .....	146
3.35.5	Connections.....	146
3.35.6	Connections to the supply.....	147
3.35.7	Installation.....	148
3.36	IMI220-7001A001: HMI TOUCH PANEL 10.4".....	151
3.36.1	<b>General Information</b> .....	151
3.36.2	Technical Characteristics .....	151
3.36.3	<b>Front View</b> .....	152
3.36.4	Communication Mode .....	153
3.36.5	Connections.....	153
3.36.6	Connections to the supply.....	154
3.36.7	Installation.....	155
3.37	IMI220-7002A001: HMI TOUCH PANEL 12.1".....	158
3.37.1	<b>General Information</b> .....	158
3.37.2	Technical Characteristics .....	158
3.37.3	<b>Front View</b> .....	159
3.37.4	Communication Mode .....	160
3.37.5	Connections.....	160
3.37.6	Connections to the supply.....	161
3.37.7	Installation.....	163
3.38	IMI220-123B002: Local Graphic Panel Color LCD - Touch screen - Keyboard - LVDS Communication - USB - Rotary Knob ....	166
3.38.1	General Information .....	166
3.38.2	Technical Characteristics .....	166
3.38.3	Front View .....	167
3.38.4	Keys Management.....	168
3.38.5	Communication Mode .....	169
3.38.6	Connections.....	169
3.38.7	Connections to the supply.....	170
3.38.8	Installation .....	171
3.38.9	UL certification .....	174

3.39	C46670: LVDS Splitter/Repeater .....	176
3.39.1	<b>General Information</b> .....	176
3.39.2	Technical Characteristics.....	176
3.39.3	<b>Front View</b> .....	176
3.39.4	Connections.....	177
3.39.5	Dimensions.....	179
3.40	IMI220-7100A001: HMI AUTOMATION KEYBOARD 7x3.....	180
3.40.1	<b>General Information</b> .....	180
3.40.2	Technical Characteristics.....	180
3.40.3	<b>Front View</b> .....	180
3.40.4	Keys Management.....	181
3.40.5	Communication Mode .....	182
3.40.6	Connections.....	182
3.40.7	Dimensions.....	183
3.40.8	Cut Out.....	183
3.40.9	Strips .....	184
3.41	IMI220-7101A001: HMI AUTOMATION KEYBOARD 10x2.....	185
3.41.1	<b>General Information</b> .....	185
3.41.2	Technical Characteristics.....	185
3.41.3	<b>Front View</b> .....	185
3.41.4	Keys Management.....	186
3.41.5	Communication Mode .....	187
3.41.6	Connections.....	187
3.41.7	Dimensions.....	188
3.41.8	Cut Out.....	188
3.41.9	Strips .....	188
3.42	IMI220-7102A001: HMI AUTOMATION KEYBOARD 10x4.....	190
3.42.1	General Information .....	190
3.42.2	Technical Characteristics.....	190
3.42.3	Front View .....	190
3.42.4	Keys Management.....	191
3.42.5	Communication Mode .....	192
3.42.6	Connections.....	192
3.42.7	Dimensions.....	193
3.42.8	Cut Out.....	193
3.42.9	Strips .....	194
3.43	IMI220-7103A001: HMI AUTOMATION KEYBOARD 12x4.....	195
3.43.1	<b>General Information</b> .....	195
3.43.2	Technical Characteristics .....	195
3.43.3	<b>Front View</b> .....	195
3.43.4	Keys Management.....	196
3.43.5	Communication Mode .....	197
3.43.6	Connections.....	197
3.43.7	Dimensions .....	198
3.43.8	Cut Out.....	199

3.43.9	Strip .....	199
3.44	C46668: Remote Keyboard module .....	201
3.44.1	<b>General Information</b> .....	201
3.44.2	Technical Characteristics .....	201
3.44.3	<b>View</b> .....	201
3.44.4	Configuration .....	202
3.44.5	Connections .....	202
3.44.6	Dimensions .....	203
4	Software Features .....	204
4.1	Software features .....	204
4.2	WebServer .....	205
4.2.1	Information .....	205
4.2.2	Tasks .....	205
4.2.3	Diagnostic .....	205
4.2.4	Support .....	205
4.2.4.1	Firmware update .....	205
4.3	VNC .....	207
4.4	FTP .....	208
4.5	EoE - FoE .....	209
5	MASS .....	210
5.1	Device Editor (Rack) .....	211
5.1.1	Add Device MC600 .....	212
5.1.2	Module List .....	214
5.1.3	Inserting Main Processor Modules .....	216
5.1.4	Module Insertion .....	217
5.1.5	Moog Unified I/O .....	220
5.1.5.1	Digital inputs .....	223
5.1.5.2	Digital outputs .....	225
5.1.5.3	Analog inputs .....	227
5.1.5.4	Analog outputs .....	229
5.1.6	Sheet Rack .....	231
5.1.7	Sheet Units .....	233
5.1.8	Sheet Status .....	235
5.1.9	Information Sheet .....	236
5.1.10	Operation on module .....	237
5.1.11	Cutting a Module .....	238
5.1.12	Copying a Module .....	239
5.1.13	Pasting a Module .....	240
5.1.14	Adding a Module .....	241
5.1.15	Moving a Module .....	243
5.1.16	Toggle optionality .....	244
5.1.17	Toggle enable .....	245
5.1.18	Locate a Module .....	246
5.2	Moog MMI Manager .....	247
5.2.1	Options .....	251

5.2.2	Font.....	253
5.2.3	Variables.....	256
5.2.4	Multilanguage Text Object.....	257
5.2.4.1	Export all texts .....	258
5.2.4.2	Import all texts .....	260
5.2.4.3	Multilanguage Text Context Menu.....	262
5.2.4.4	Cut .....	263
5.2.4.5	Copy.....	264
5.2.4.6	Paste.....	265
5.2.4.7	Delete.....	266
5.2.4.8	New Language .....	267
5.2.4.9	Remove Current Language.....	268
5.2.4.10	Rename Current Language.....	269
5.2.4.11	Duplicate Current Language .....	270
5.2.4.12	Block/Unblock Language.....	271
5.2.4.13	Insert Texts.....	272
5.2.4.14	Show Characters Map.....	274
5.2.4.15	Renumbering.....	275
5.2.4.16	Goto.....	277
5.2.4.17	Import.....	278
5.2.4.18	Export.....	280
5.2.5	Page Object.....	282
5.2.5.1	Operation on the page.....	284
5.2.5.2	Page Properties .....	285
5.2.5.3	Insert Object.....	287
5.2.5.4	Select Object.....	288
5.2.5.5	Move Object.....	290
5.2.5.6	Menu Pages .....	292
5.2.5.7	Tool Bar .....	293
5.2.5.8	Tool Box.....	294
5.2.5.9	Page Context Menu.....	295
5.2.5.10	Common Objects Properties.....	313
5.2.5.11	Object Panel.....	319
5.2.5.12	Object Variable Value.....	323
5.2.5.13	Object Static Text.....	333
5.2.5.14	Object Bar Graph .....	337
5.2.5.15	Object Selector .....	348
5.2.5.16	Object Image .....	357
5.2.5.17	Object Button.....	360
5.2.5.18	Object Parison Editor.....	370
5.2.5.19	Object XY Graph .....	382
5.2.5.20	Object Model.....	387
5.2.6	Variable Description Text Object.....	390
5.2.6.1	Variable description text Context Menu .....	392
5.3	Moog Font Editor .....	411

5.3.1	File menu.....	413
5.3.2	Edit menu.....	418
5.3.3	Char menu.....	424
5.3.4	Visualization menu.....	428
5.3.5	Help menu.....	429
5.3.6	Tool bar.....	430
5.3.7	Font Installation procedure.....	431
5.4	Moog USB stick generation.....	432
5.4.1	System Update.....	433
5.4.2	Clone Application.....	434
5.4.3	System Network Setting .....	435
5.4.4	Get System information.....	436
5.4.5	Application Update .....	437
5.4.6	Full System Backup.....	438
5.5	System Task Configuration (Wizard).....	439
5.5.1	Auto Tuning Temperature Controls .....	442
5.5.2	Auto Tuning Axis Controls .....	450
5.5.3	Video Control.....	456

# 1 General Information

## 1.1 Introduction

This "MC600 User Manual" has been prepared in accordance with EN 82079, "Preparation of instructions for use - Structuring content and presentation".

The manual was written and checked at the best experience of Moog.

Moog has written this technical documentation in compliance with the requirements of the Machinery Directive 2006/42/CE.

 !	WARNING! No part of this document may be copied, duplicated, reproduced, stored in a data storage system, translated into different language, or transmitted by data communication system, without the consent of Moog.
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### 1.1.1 Document Version

The following table shows the version of this document and all other possible versions:

ES	DA	DE	EL	EN	FR	IT	NL	PT	FL	SV	CS	ET	LV	HU	MT	PL	SK	SL	BG	RO	GA
				X																	

The language of documents and drawings are subject to contractual negotiations with the Customer.

In case of "Translation of the Original Instructions", the manufacturer of the machinery supplies also the "Original Instructions".

### 1.1.2 Revision Record

The following table show the revision record:

Revision	Description	Prepared	Checked	Approved	Date
1.0	Initial version	Ravasio Davide			26-Oct-21

### 1.1.3 About this manual

This manual is valid only for MC600 family product. It contains the most important instruction that must be observed in order to operate with MC600 and his related product in a safe manner.

Every person responsible for machinery planning, mounting, and operation must read, understand, and follow all points covered in this manual. This applies especially to the safety instructions. Following the safety instructions helps to avoid accidents, faults, and material damage!

The following items must be observed as fundamental elements of safety when using MC600 and his related products:

- All safety instructions contained in this manual
- All safety instructions contained in the product related hardware and software documentation required for the relevant application
- All relevant national and international applicable safety and accident prevention regulations and standards

### 1.1.4 Reservation of Changes and Validity

The information contained in this manual is valid at the release time of this version. See footer for version number and release date of this manual. Moog reserves the right to make changes to this manual at any time without specified reasons.

### 1.1.5 Exclusion of Liability

This manual was prepared with great care and the contents reflect the author's best knowledge. However, the possibility of errors and improvements are possible.

Please feel free to submit any comments regarding errors or incomplete information to Moog.

Moog does not offer any guarantee that the contents conform to applicable legal regulations nor does Moog accept any liability for incorrect or incomplete information and the consequences thereof.

### 1.1.6 Completeness

This manual is complete only when used in conjunction with the product related hardware and software documentation required for the relevant application.

### 1.1.7 Place of Storage

This manual and all other associated documentation for hardware and software must always be kept in a location where they will be readily accessible and close to MC600 or the equipment in which it is installed.

## 1.2 About Moog

Moog's Industrial Group designs and manufactures high performance motion control solutions combining electric, hydraulic, and hybrid technologies with expert consultative support in a range of applications including test, simulation, plastics, metal forming, and power generation.

Moog customers include leading automotive manufacturers, aerospace manufacturers, testing labs and global automotive racing teams.

We help performance-driven companies design and develop their next generation machines.

Moog's industrial group is part of Moog Inc.

For more information please visit [www.moog.com/industrial](http://www.moog.com/industrial).

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## 1.3 Reader Instructions

The following information show typographic elements used inside the documentations:

Symbol	Explainations
	DANGER! Used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	ATTENTION! Notes about important operations and other useful information that could cause machine unexpected behavior or damage to product.
•	This is a bullet list
DarkRed text	Identify an hyperlink within the PDF file or to an external url

The following table shows the abbreviations adopted in Moog Documents:

Abbreviation	Explanation
AG	Analog Ground (Ground for the analog inputs and outputs)
CAN	Controller Area Network
CE	Communauté Européenne (European Community)
CiA	CAN in Automation, the international users' and manufacturers' group for CAN
CPU	Central Processing Unit
DC	Direct Current
DG	Digital Ground (Ground for the digital sensor interface)
DIN	Deutsches Institut für Normung e. V. (German Institute for Standardization; <a href="http://www.din.de">http://www.din.de</a> )
EEPROM	Electrically Erasable Programmable Read Only Memory
EIA	Electronic Industries Alliance ( <a href="http://www.eia.org">http://www.eia.org</a> )
EMC	Electromagnetic Compatibility
EN	Europa-Norm (European Standard)
ESrD	Electrostatic Discharge
IDE	Integrated Development Environment
IEC	International Electrotechnical Commission ( <a href="http://www.iec.ch">http://www.iec.ch</a> )
IP	International Protection (protection type)
ISO	International Organization for Standardizing ( <a href="http://www.iso.org">http://www.iso.org</a> )
LED	Light Emitting Diode
LSB	Least Significant Bit
LVDS	Low Voltage Differential Signaling
MASS	Moog Application Software Suite: An IEC 61131 development environment based on CODESYS 3

MB	Mega Byte
Mb	Mega bit
MC600	PLC System developed by Moog Italy based on processor modules IMI220-6000A001, IMI220-6001A001 and IMI220-6010A001
MC600plus	PLC System developed by Moog Italy based on processor modules IMI220-6031A001, IMI220-6032A001, IMI220-6033A001 and IMI220-6034A001
NC	Not Connected
NVRAM	Non-volatile Random Access Memory
PLC	Programmable Logic Controller
RAM	Random Access Memory
SSI	Synchronous Serial Interface
TBD	Field to be defined
TIA	Telecommunications Industry Association ( <a href="http://www.tiaonline.org">http://www.tiaonline.org</a> )
TÜV	Technischer Überwachungsverein (German agency performing technical inspections)
USB	Universal Serial Bus
VDC	Volt Direct Current
VDE	Verband der Elektrotechnik Elektronik Informationstechnik (Association for Electrical, Electronic & Information Technologies; <a href="http://www.vde.de">http://www.vde.de</a> )

## 1.4 Identification

The nameplate of every module of MC600 product family is located on the back side of the component.

### 1.4.1 Nameplate and Type designation

The following figure show an example of MC600 nameplate:



The next table show details about the information can be found on MC600 nameplate:

Characteristic	Description
Description	Model number of MC600 product series
P/N	Part Number
R	Moog Reserved identification code
Mfg. Date	Manufacturing date in the format YYYY-MM-DD
S/N	Serial Number

### 1.4.2 Manufacturer Name and Address

The next table show contact information about MC600 manufacturer.

Info	Description
Company	Moog Italiana S.r.l.
Address	Via G. Pastore, 4, Malnate (VA) 21046 - Italy
Phone	+39 0332 421 111
Fax	+39 0332 429 233
E-Mail	info@moog.com

### 1.4.3 Declaration of Conformity

A copy of the EC Declaration of Conformity is available on request from [mass-support@moog.com](mailto:mass-support@moog.com).

## 1.5 Safety Information

This chapter summarizes the most important safety instructions. Follow the safety instructions to avoid accidents, faults, and material damage.

### 1.5.1 General notes

The information in this manual is subject to change and is in no way binding upon Moog Italiana srl.

Moog Italiana srl is not responsible for technical errors or other omissions in the manual, and shall not accept any responsibility deriving from its use.

### 1.5.2 Qualified Personnel

Only qualified users may work with and on MC600 family products.

Qualified users are properly trained experts with the required knowledge and experience. In particular, these experts must have the authorization to bring into operation, ground, and label devices, systems, and power circuits in accordance with safety engineering standards.

Those people must be familiar with common safety concepts in automation.

Moog products may be operated only by personnel qualified in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions.

With qualified personnel is intent person with the following skills:

- Transport: personnel must have knowledge of handling components sensitive to electrostatic charges
- Unpacking: only by specialized technicians with knowledge of handling sensitive components
- Installation only by qualified technicians experienced in installing electrical equipment
- Start-up: only by technicians with extensive knowledge of electric PLC technology

The personnel must also know and observe the following standards: IEC60364, IEC60664 and the national accident prevention regulations.

The operator must ensure that the detailed safety instructions in the User Manual are observed and that all personnel responsible for operation have read and understood the Manual.

### 1.5.3 Basic knowledge required

To understand operating instructions a general knowledge of automation technology is needed.

### 1.5.4 Proper use of the product

Moog products may only be used for the applications described in the catalogue and in the technical documentation.

Proper transport, assembly, installation, storage, commissioning, operation and maintenance are required to ensure that the product operates safely.

The indicated environmental conditions must be observed.

The information in this user's manual must be observed.

### 1.5.5 Scope of the operating instructions

The operating instructions apply to the MC600 Moog products family.

The MC600 product family is composed by the hardware specified in the "[Modules](#)" chapter.

### 1.5.6 Safety related system

	<p>DANGER!</p> <p>As with any electronic automation system, the failure of certain components when using MC600 family products might lead to an uncontrolled and/or unpredictable operational condition.</p> <p>There is a danger of uncontrolled behavior of the connected system.</p> <p>You have to take into consideration the system level effects of all types of failures and implement corresponding safety measures.</p>
--	---

Special measures are required to use MC600 family products in safety related systems.

When planning to use MC600 family products in a safety related system, you must observe the applicable regulations and standards for safety related systems.

### 1.5.7 Hazardous areas

In the following cases, the MC600 family products must not be used without taking additional measures:

At sites with difficult operating conditions, like those caused by:

- Large amounts of dust
- Elevated air humidity
- Aggressive vapours or gases
- Corrosive atmospheres
- Potentially explosive environments

In these cases, the suitable additional measures to be taken may include, for example, installation in specially designed cabinets.

### 1.5.8 Notes about usage

The product has been manufactured according to generally accepted standards of good engineering practice.

Nevertheless, if these safety instructions are not adhered to, there is a risk of personal injury and damage to property when using the product.

	<b>DANGER!</b> Before start any work with the product, be sure to read the product documentation carefully and completely.
	<b>WARNING!</b> Make sure these safety instructions and the product documentation are always accessible to all users.
	<b>WARNING!</b> When passing the product on to third parties, always include these safety instructions and all the required documentation.
	<b>WARNING!</b> The product may only be mounted, started up and maintained in accordance with these safety instructions and the information given in the product documentation.

### 1.5.9 Working on the control cabinet

Open equipment:

The Moog Panels are open equipment. This means that the Moog Panels may only be integrated in housings or cabinets, where it can be operated from the front panel.

The cabinet in which Moog Panel is installed may only be accessed with a key or tool and only by trained and authorized personnel.

Dangerous voltage:

Opening the cabinet may expose high voltage parts. Before opening the cabinet always disconnect the power.

### 1.5.10 Project planning

The following instructions must be observed in order to ensure that the MC600 products family will be safely integrated into the application environment:

- **IEC 61131:** Especially the information contained in IEC 61131-4.
- **Safety:** All safety and accident prevention regulations applicable to the specific application (such as machinery directives, safety instructions contained in documentation, etc.) must be observed.
- **Emergency stop:** The emergency stop devices (EN 60204) must remain in effect during all operational modes of the system or facility.
- **Restarting:** Unlocking of the emergency stop devices must not lead to uncontrolled or undefined restarting. Dangerous operational conditions of any kind must not arise following interruption or failure of the power supply.

- **Voltage:** Deviations and fluctuations of the supply and load voltages must not fall below or exceed the specified tolerances. Deviations outside the specified operating range might lead to dangerous conditions and functional disturbances in the automation system.
- **Wire fault:** A cable or wire fault must not lead to undefined conditions. All necessary safety precautions must be taken in the hardware and software.
- **Connection:** All connection and signal cables must be installed in such a way that inductive or capacitive interferences will not impair the MC600 products family.

### 1.5.11 Installation, Commissioning and maintenance

- Do not expose the device to undue stress (mechanical loads, temperature, moisture, corrosive atmospheres, etc.)
- Installation must be performed according to this documentation using suitable equipment and tools
- Only qualified personnel are permitted to perform installation, commissioning and maintenance activity on the device
- Installation, commissioning and maintenance activity have to be done following ESD procedure (i.e. ESD shoes and ESD bracelet)
- Electrical installation must be carried out in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections)
- Observe the applicable accident prevention regulations to avoid damages and personal injuries
- No work of any kind, such as mounting, removing, wiring or repairs maybe performed while the MC600 or connected devices are in operation there is a danger of
  - Uncontrolled movements
  - Permanent damage
  - Malfunctions
- Before you perform any work on the MC600 or the connected devices, you have to stop the system and disconnect the power supply
- Avoid polarity reversal of the data and supply cables as this may cause defects and malfunction of MC600 and the connected devices
- Ensure proper wiring according to the relevant standards to avoid malfunctions of MC600 and the connected devices
- Ensure correct assignments of pins and connectors to avoid malfunctions of MC600 and the connected devices
- Protect MC600 products family and the license key from electrostatic discharges. Electrostatic discharges might damage the device's internal components

### 1.5.12 Connecting the power supply to MC600

- For details about power supply connection please refer to [Power Supply](#)
- The 24 V power supply terminals of MC600 are protected against reverse polarity. If the polarity of the power supply terminals is reversed, the module will not work.
- Protect MC600 from over voltage. There is a danger of:
  - Permanent damage by overheating or fire
  - Malfunctions
- Make sure that MC600 is supplied with the correct voltage and polarity.
- Make sure that the terminal assignments are correct.
- Each rack needs an external 24VDC power supply and must be powered from a power supply with SELV (Safety Extra-Low Voltage) according to EN 60950-1.
- Each rack starts with one of these types of power supply connection, see section "[Power Supply](#)".

### 1.5.13 Connecting the power supply to connected sensors

The internal electronics of MC600 and the connected sensors must be supplied with power from a permanently connected power supply that cannot be individually switched off, without switching off the MC600 module's power supply.

If a switched power supply is used, such as when there are intermediate switching devices (emergency stops, manual operators, etc.), the sensor data might be invalid.

MC600 Power supply status	Sensors Power supply	MC600 module and sensor status
ON	ON	Module and sensor are working
ON	OFF	Invalid sensor data
OFF	OFF	Sensor and module are not working



#### WARNING!

For information about protection from short circuit and polarity inversion please refers to every specific module technical indications.

### 1.5.14 Data security

Minimize the risk of data security breaches by the following organisational and technical measures:

- Do not connect the MC600 to open networks and the Internet without appropriate security measures (e.g. use of firewalls).
- Use appropriate security measures for remote access (e.g. VPN).
- Keep the software up to date (e.g. use the latest versions of MASS development environment (IDE) and the MASS firmware).
- Use the available security measures of the used software (e.g. security features of MASS and the MASS firmware like access control and encryption).

## 1.6 Software Copyrights

MASS firmware is licensed under the General Terms and Conditions for Software License of Moog Italiana S.r.l. available at: [https://www.moog.it/content/dam/moog/literature/Italy/MOOG\\_Italiana\(CG\)\\_Acquisto\\_Vendita\\_02.pdf](https://www.moog.it/content/dam/moog/literature/Italy/MOOG_Italiana(CG)_Acquisto_Vendita_02.pdf)

MASS Software may contain Open Source Software. If MASS Software contains Open Source Software, Licensee will receive with regard to such Open Source Software a license in accordance with the terms and conditions applicable to it.

Other products as part of an electrical system or subsystem may pre-equipped with software (e.g. operating system), which is licensed under the terms for software license of the manufacturer of that product. Please refer directly to these licenses.

The Open Source Software that is used as part of the MASS Software as well as the license terms and conditions applicable to it, are set out in the document "Open Source Software Licenses" available with MASS installation.

You may contact Moog, if you wish to receive the source code of the Open Source Software that is part of the Moog Software licensed to you. The contact details of Moog are as follows:

Info	Description
Company	Moog Italiana Srl
Department	Electronic & Software
Address	Via G.Pastore, 4, Malnate (VA) Italy
E-Mail	mass-support@moog.com

## 2 Information For Use

### 2.1 Information for use

MC600 is a freely programmable machine controller and motion controller that allow customers implement a rapid and precise control of process variables such as position, speed, and force.

### 2.2 Intended use

MC600 is a machine controller that include PLC and motion controls functionality for industrial applications. It is designed for closed loop control, open loop control and PLC applications in the medium to high end performance ranges.

MC600 is designed for use within the over voltage category defined by IEC 60364-4-44 for controlling machines and industrial processes in low voltage systems in which the rated supply voltage does not exceed 1,000 V alternating current(50/60 Hz) or 1,500 V direct current.

Qualified project planning and design, proper transportation, storage, installation, and use are required to ensure fault-free, reliable and safe operation of the MC600.

MC600 must not be brought into operation until it has been ensured that the equipment in which it is installed complies with the current version of the EU machinery directive.

MC600 may be used only under the conditions and situations specified in this manual. Any other or more extensive use is not permissible.

The following are also required for proper use:

- Adhere to the inspection and maintenance instructions from the customer for the plant of installation.
- Follow all of the corresponding relevant supplemental documentation in accordance with the application.
- Observe the relevant regulations applicable nationally and internationally, as well as applicable standards and directives (such as e.g. the EU Machinery Directive and the applicable regulations by the employer's Liability Insurance Association, TÜV or VDE) as applicable.
- Modification to the design, repairs, maintenance work and performance modifications are unauthorized.
- Adhere to all technical data during storage, transport, assembly, disassembly, connecting, start-up, con-figuring, operating, cleaning, repairing or resolving any possible failures, especially to the ambient conditions.
- Avoid improper storage, transport, assembly, disassembly, connection, start-up, configuration, operation, cleaning, repairing, resolving any possible failures or disposal.
- Avoid the use of unsuitable or defective accessories or unsuitable or defective spare parts.

### 2.3 Main features

MC600 is a machine control system, suited for closed or open loop control.

The MASS (Moog Application Software Suite) software is used to program MC600 family products. MASS is based on CODESYS 3.x, the proven IEC 61131-3 compliant programming system.

It offer the possibility to connect a local HMI device that take in charge the visualization of HMI page already processed inside the main CPU. MC600 is based on Linux OS.

### 2.4 Consumable parts

The only consumable part of MC600 is the battery.

For indication about how to maintain the battery please refers to:

MC600plus: see specific module section (i.e. Battery replacement chapter in module [IMI220-6031A001](#)).

### 2.5 Repair

No repair actions can be performed by customer on MC600 family products, in case of damage to the product please contact your Moog local reference.

The following anti-tamper label, if broken or removed, avoid the product warranty:



## 2.6 Applicable standards

### 2.6.1 CE Labeling

MC600 complies with the standards specified in the relevant declaration of conformity.

CE labeling of MC600 is based on proper installation of the automation system with proven electromagnetic compatibility (EMC).

CE label is applied on the anti-tamper label (See "[Repair](#)" section).

### 2.6.2 Electromagnetic compatibility (EMC)

MC600 is compliant with the requirements and protection targets of the EU directive 2014/30/EU "Electromagnetic Compatibility" (EMC directive) and complies with the harmonized European standards (EN) that were published in the Official Journals of the European Union for programmable controllers.

Especially important are the rules for proper EMC wiring in cabinets and buildings according to IEC 61131-4. Installation in metal, grounded cabinets is preferred.

MC600 is designed for use under normal operating conditions in industrial environments and complies with the following standards:

- EN 61131-2:2007

And the following test methods:

- EN 55016-2-3:2006
- EN 61000-4-2:1995
- EN 61000-4-3:2006
- EN 61000-4-4:2004
- EN 61000-4-5:2006
- EN 61000-4-6:2007 + EC:2007 + A1:2004 + A2:2006
- EN 61000-4-8:1993

EMC conformity may be presumed only under the following conditions:

- Sufficient shielding
- Mounting of the module onto an electrically conductive, grounded mounting plate or mounting of the module onto a DIN top-hat rail that is attached to an electrically conductive, grounded mounting plate
- The protective earth connection of MC600 housing has a low resistance connection to protective earth conductor (PE)

### 2.6.3 Environmental conditions

The following table show the environmental conditions of MC600 for normal operations, transportations and storage.

Environmental conditions	Limits
Ambient temperature for operation (IEC61131-2) when installed properly	-25°C to +70°C (248.15K to 343.15K)*
Ambient temperature for transportation and storage in the original packaging (IEC61131-2)	-25°C to +70°C (248.15K to 343.15K)*
Relative air humidity (IEC61131-2) for operation	10% to 100% non-condensing
Relative air humidity (IEC61131-2) for storage (in the original packaging)	10% to 95% non-condensing
Relative air humidity (IEC61131-2) for transportation (in the original packaging)	40% to 95% non-condensing
Resistance to corrosion (IEC 60068)	No protection

Maximum operation height	2000 m (6500 ft)
Maximum storage height	3000 m (9800 ft)
Air pressure for transportation (IEC 61131-2)	< 70kPa (corresponds to an elevation of <= 3000m (9800ft))

\* Specific for CPU, I/O modules and sockets, for HMIs and Keayboards see the table below

Environmental conditions	Limits (Specific for HMIs and Kerboards)
Ambient temperature for operation (IEC61131-2) when installed properly	+5°C to +60°C (278.15K to 333.15K)
Ambient temperature for transportation and storage in the original packaging (IEC61131-2)	+5°C to +60°C (278.15K to 333.15K)

## 2.6.4 Mechanical conditions and limits

The following table show the conditions of working for MC600 for normal operations and for transportations in original package:

Environmental conditions	Limits
Sinusoidal oscillations (IEC 60068-2-6) 5 Hz < f < 8.4 Hz:	3.5 mm constant displacement
Sinusoidal oscillations (IEC 60068-2-6) 8.4 Hz < f < 150 Hz:	10 m/s <sup>2</sup> (1g) constant acceleration
Sinusoidal oscillations (IEC 60068-2-6) f > 150Hz	Not defined
Shock (IEC 60068-2-27)	Random peaks up to 15g longer than 11ms, half-sine wave in each of the three orthogonal axes
Drop height (free-fall in the original packaging) (IEC 60068-2-31)	<= 300mm (0.98ft)

## 2.6.5 Chemical conditions

The MC600 product family can suffer damage to the mechanical fastening parts (such as plastics case, support hooks, sockets) if in contact or placed in environments with a high concentration of at least one of the following chemical agents:

Chemical agent	MC600 plastic affected
Acids	
Hydrochloric acid (36% by mass 23°C)	Polyamide, Polycarbonate
Nitric acid (40% by mass 23°C)	Polyamide, Polycarbonate
Sulfuric acid (38% by mass 23°C)	Polyamide, Polycarbonate
Sulfuric acid (5% by mass 23°C)	Polyamide
Chromic acid solution (40% by mass 23°C)	Polyamide
Bases	
Sodium hydroxide solution (35% by mass 23°C)	Polycarbonate
Sodium hydroxide solution (1% by mass 23°C)	Polycarbonate
Ammonium hydroxide solution (10% by mass 23°C)	Polycarbonate
Alcohols	
Methanol (23°C)	Polycarbonate
Hydrocarbons	
Toluene (23°C)	Polycarbonate

Ketones	
Acetone (23°C)	Polycarbonate
Ethers	
Diethyl ether (23°C)	Polycarbonate
Saline solutions	
Sodium hypochlorite solution (10% by mass 23°C)	Polyamide
Other	
Phenol solution (5% by mass) (23°C)	Polyamide, Polycarbonate
Hydrogen peroxide (23°C)	Polyamide

## 2.6.6 IP Protection code

For details about each module protection class please refer to single modules technical details at the following chapter: "[Modules](#)".

## 2.6.7 Reasonably foreseeable misuse

	<b>WARNING!</b> Use of the product in any other way than as described under "Intended use" is considered to be misuse and is therefore not permitted.
---	--

Misuse means operating with MC600 family products outside the specifically defined application and environmental conditions in relation to:

- Temperature, humidity, condensation
- Operation height
- Shock/vibration
- Protection class
- Electrical and electromagnetic connections
- Operation in explosion hazardous areas
- Use in safety related systems

## 2.7 MC600 Components

MC600 is composed by different components that allow customer create industrial automatic application and reach the target performances.

All those components can be divided in 3 different groups:

- Hardware components
- Software features
- MASS plugins

### 2.7.1 Hardware components

With hardware components we intend the list of hardware module that implements:

- Software processing
- I/O connections
- Fieldbus connections
- HMI connections
- Graphical visualization
- Other connectivity

For further details about hardware components please refers to "[Hardware](#)" section.

### 2.7.2 Software features

MC600 is a machine controllers that implements many different software features.

For more details please refers to the "[Software features](#)" chapter.

### 2.7.3 MASS

MC600 can be configured and programmed using MASS IDE.

For more details please refer to "[MASS](#)" section.

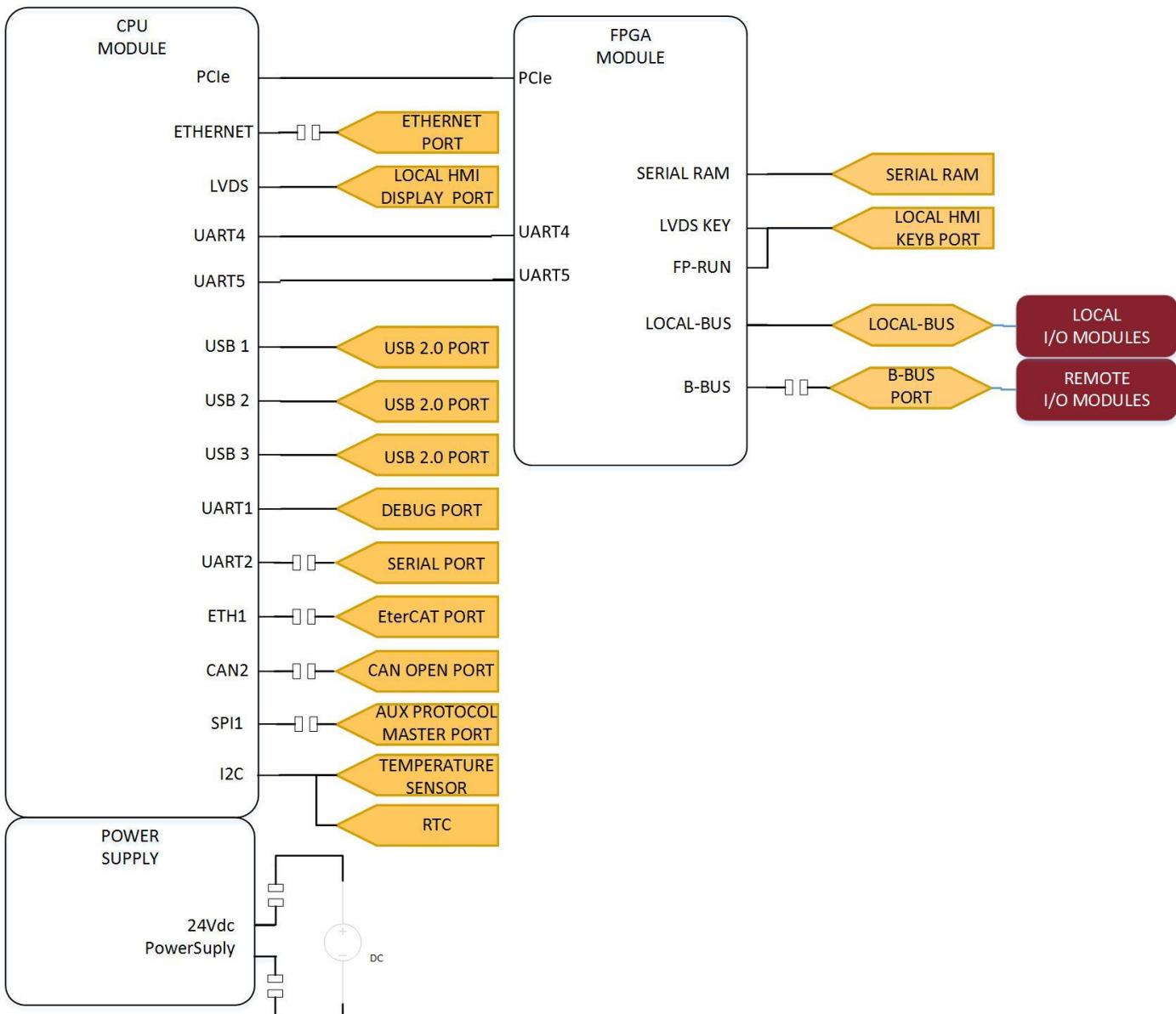
## 2.8 Architecture overview

MC600 offer a wide range of connectivity, depending on the CPU model that is selected.

For more specifications about each main CPU module connectivity, please refer to "[Modules](#)" section.

### 2.8.1 Block diagram

Here below you can find general block diagram related to MC600plus CPU models.



### 2.8.2 Available architecture

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.

### 2.8.3 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.

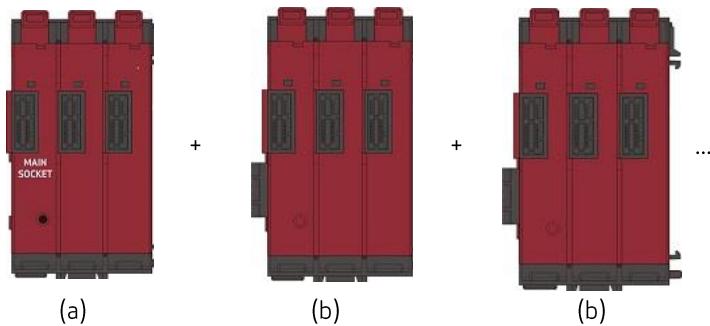
## 2.8.4 License keys

Every MC600 installation require a license key in order to run the application, different license keys are available.

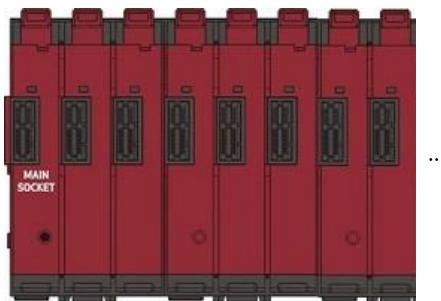
The type of license key affects the software functionality, see section "[License Keys](#)".

## 2.9 Combining sockets to racks

The MC600 Series 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)**.



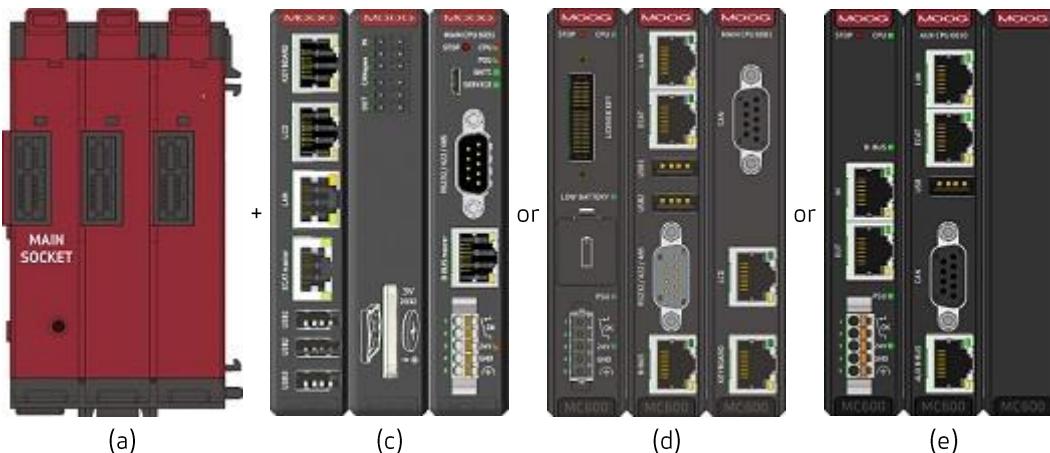
## 2.10 Combining sockets and modules

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.

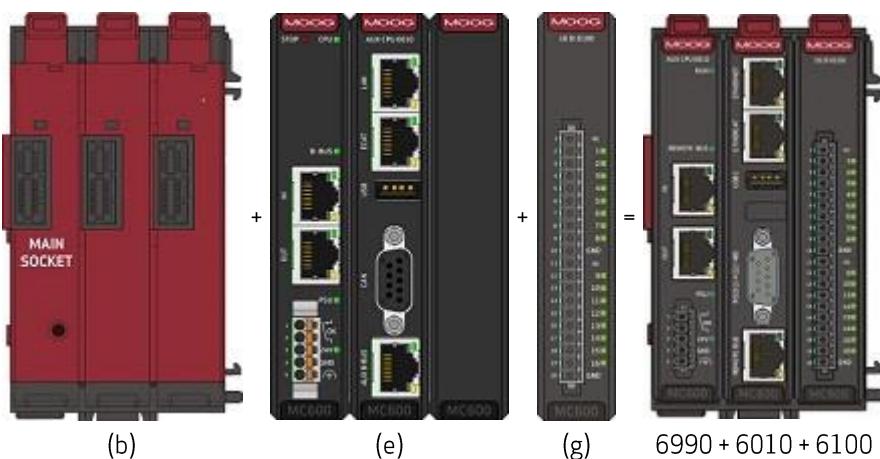
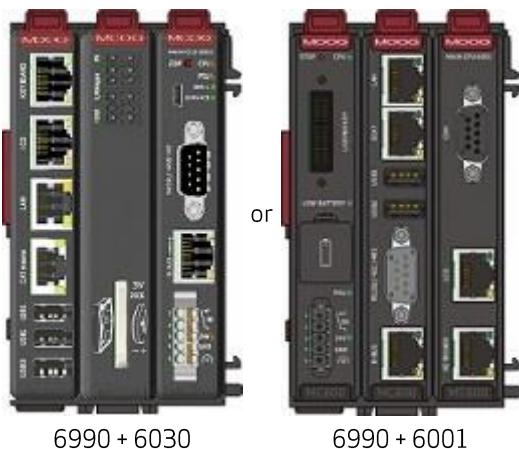
Socket 6990 for CPU and bus transceiver modules

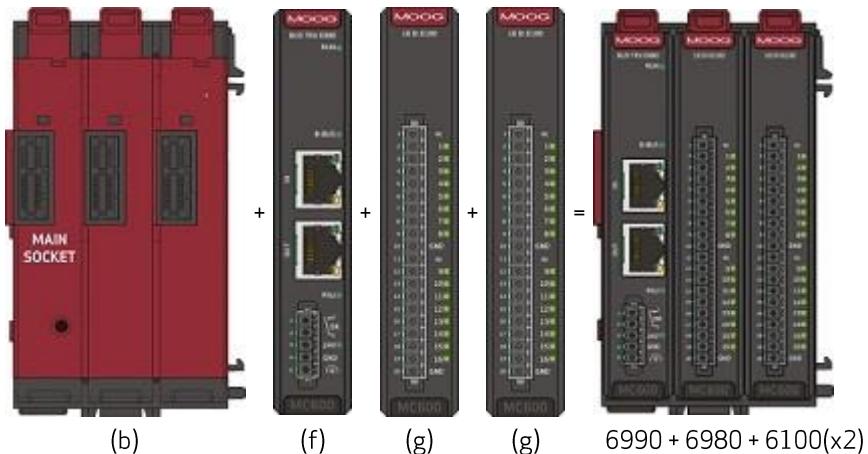
Socket 6990 (a) is used with a CPU module (c, d and e) or a bus transceiver module (f).

The bus transceiver module and CPU are put into the first slot, so up to one or two I/O modules can be inserted in the other one or two slots (g).



Possible results:





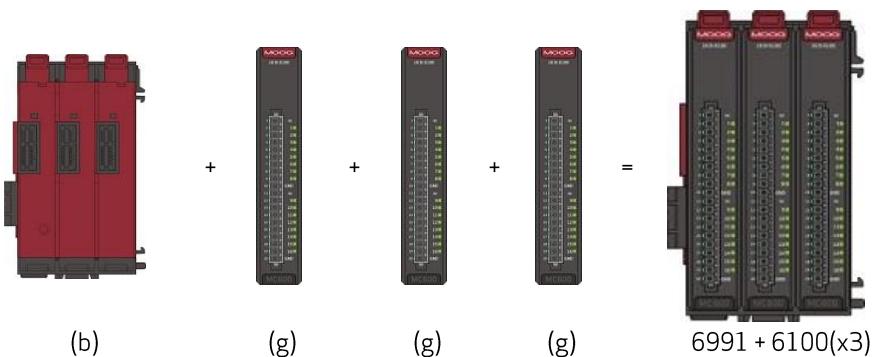
## WARNING!

ONLY the modules: 6000, 6001, 6010 and 6980 can be inserted on the MAIN SOCKET (6990) because these modules have a particular plastic pin that match with a Main Socket.



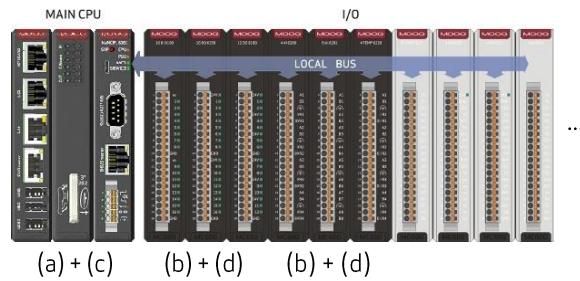
Socket 6991 for I/O modules

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



## 2.11 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):

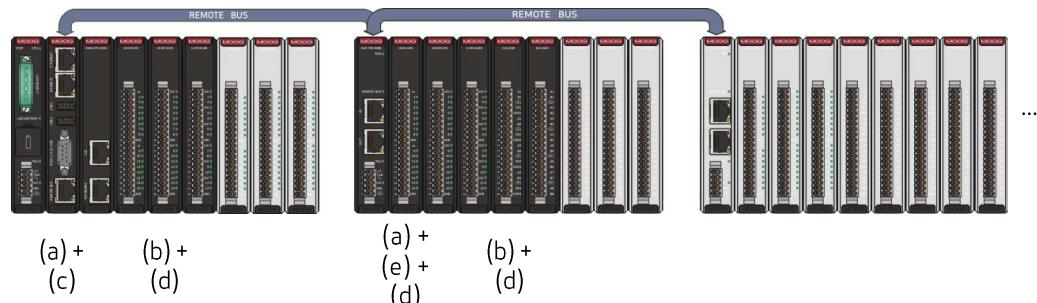
- 1 Socket 6990 **(a)**
- 2 Socket 6991 **(b)**
- 1 MAIN CPU 6000 or alternatively MAIN CPU 6001 **(c)**
- 6 I/O modules **(d)**
- 1 License key

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

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

## 2.12 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 or alternatively MAIN CPU 6001 **(c)**
- 1 BUS TRX 6980 **(e)**
- I/O modules **(d)**
- 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.

## 2.13 Commissioning of MC600


**WARNING!**

before to proceed with commissioning with MC600, a technical training about MC600 family products is required.  
For more information about technical training please refer to [About moog](#) section.


**WARNING!**

Before to proceed with commissioning of MC600 please read the related Safety Information at the following chapter [Safety Information](#)

### 2.13.1 Delivery state of MC600


**WARNING!**

MC600 is delivered without firmware loaded. You need to load the firmware to the controller before operation.

The firmware includes elementary functions of MC600. The firmware does not include any MASS application project. It enables the MC600 to run MASS application projects.

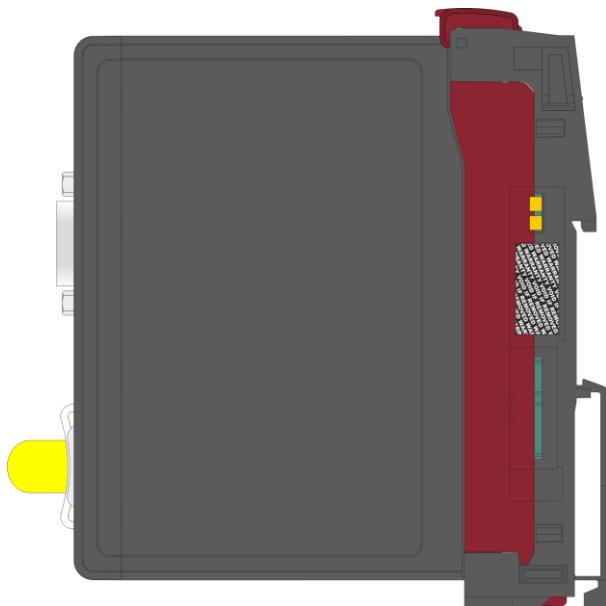
MC600 main CPU box contain:

- MC600 main CPU: specific models depending to customer order
- USB key: the USB key contain all the basic documentation for MC600 (User manual, commissioning procedure, etc..).

In order to proceed with MC600 commissioning proceed with the next steps.

### 2.13.2 Remove battery protection

In order to enable the battery connection proceed removing the plastic label that protect the battery case (yellow label indicated in the next image).



### 2.13.3 Power supply connection


**WARNING!**

For safety details about power supply connection refers to user manual safety indications.

For details about power supply connections please refers to the specific module technical documentation.

### 2.13.4 Load the firmware

In order to upload the firmware on MC600 please follow the chapter "[System update](#)".

## 2.14 Operating Instruction


**ATTENTION!**

Before to proceed with operating instruction, be sure you've complete the [commissioning](#) procedure.

### 2.14.1 Programming and configuration

MASS IDE is required in order configure and create IEC61131 application program with MC600.

For further details see [MASS](#) section.

#### 2.14.1.1 Communication between MC600 and MASS

In order to communicate and load application to MC600 with MASS, the Ethernet port is used.

#### 2.14.1.2 Device status


**ATTENTION!**

When MC600 switch from Stop status to Start status, the output can be driven in accordance with loaded application behavior.

The device status of the application on MC600 can be managed by MASS. The application can assume the following status:

- Stop
- Start

For more details about IO behavior depending from the CPU status please refer to the related Codesys help online.

Application project can be downloaded to RAM memory (will be lost at the next reboot) or stored as boot project in the flash EEPROM memory.

#### 2.14.1.3 Behavior of switching off or power supply failure

If the module power supply is switched OFF or fall below +18V voltage, the following power down procedure is executed:

- The application execution stop immediately.
- The variables declared as RETAIN inside MASS application, are automatically copied from the fast RAM to the NVRAM (non volatile RAM).
- System is stopped in order to reach the complete stop


**ATTENTION!**

If the power switch on again, before that shutdown procedure is terminated, the following action happen:

- the shutdown sequence continue until is completely finished
- then                      the                      power                      on                      sequence                      start

#### 2.14.1.4 Behavior at power on

At the power on, the following procedure is executed:

- Firmware is started
- Communication with MASS is possible
- Web server is available
- If a boot application is available in internal flash memory, it will be loaded into RAM memory
- If retain variables are existing, the value are retained
- Boot project start

## 2.15 Decommissioning of MC600

Before to dismount MC600 switch off the power supply,

### 2.15.1 Dismount MC600

In order to dismount MC600, proceed as follow:

- Remove the cable connected to MC600 main CPU and MC600 IO module.
- Remove IO and main CPU module from socket
- Separate socket from each other
- Remove socket from DIN rail

### 2.15.2 Disposal

Please observe the locally valid regulation for disposal of electronic components.

In accordance with directive 2012/19 / EC electronic devices are "special waste" (WEEE) and must be subjected to treatment and professional elimination.

MC600 family products may contain environmentally regulated materials, such as lead solder and circuit boards. It is the user's sole responsibility to dispose of the motors in accordance with specific local and national regulations. Be sure to send the material to authorized disposal facilities under controlled conditions. If it is possible to recycle the component materials, always do so with the support of authorized professionals.

## 3 Hardware

### 3.1 MC600 Hardware

Main Processors available:

- [IMI220-6031A001: MC600plus POWER SUPPLY - MAIN CPU - HMI DRIVER](#)

Remote Bus available:

- [IMI220-6980A001: BUS TRANSCEIVER \(TRX + PSU\)](#)

Digital I/O available:

Inputs:

- [IMI220-6100A001: 16DI 24VDC](#)
- [IMI220-6100B001: 16DI 24VDC](#)

Outputs:

- [IMI220-6150A001: 16DO 24VDC 0.5A](#)
- [IMI220-6161A001: 8DO RELAY](#)
- [IMI220-6180A001: 12DO 24VDC 2A](#)

Analog I/O available:

Inputs:

- [IMI220-6200A001: 4AI 16BIT](#)
- [IMI220-6201A001: 8AI 16BIT](#)
- [IMI220-6201A002: 8AI 16BIT](#)
- [IMI220-6204A001: 3 LVDT](#)
- [IMI220-6501A001: 4 Encoder SSI/Quad](#)

Outputs:

- [IMI220-6250A001: 4AO 16BIT](#)
- [IMI220-6251A001: 8AO 16BIT](#)
- [IMI220-6260A001: 4AO I/V 16BIT](#)
- [IMI220-6262A001: 4AO I/V 16Bit 100mA](#)

Temperature:

- [IMI220-6220A001: 4TEMPERATURE 16BIT](#)
- [IMI220-6221A001: 8TEMPERATURE 16BIT](#)

Others:

Sockets:

- [IMI220-6990A001: 3 SLOT SOCKET - MAIN](#)
- [IMI220-6991A001: 3 SLOT SOCKET - I/O](#)

Accessories:

- [License Key](#)
- [C46665: Power Supply Connector](#)
- [C46666: I/O Connector](#)

PSU Booster:

- [IMI220-6970A001: POWER SUPPLY BOOSTER](#)

#### HMI:

Direct HMI:

- [IMI220-7000A001: HMI TOUCH PANEL 7"](#)

- [IMI220-7001A001: HMI TOUCH PANEL 10.4"](#)
- [IMI220-7002A001: HMI TOUCH PANEL 12"](#)
- [IMI220-123B002: Local Graphic Panel Color LCD - Touch screen - Keyboard - LVDS Communication - USB - Rotary Knob](#)

Keyboards:

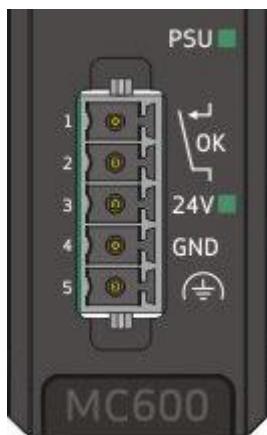
- [IMI220-7100A001: HMI AUTOMATION KEYBOARD 7x3](#)
- [IMI220-7101A001: HMI AUTOMATION KEYBOARD 10x2](#)
- [IMI220-7102A001: HMI AUTOMATION KEYBOARD 10x4](#)
- [IMI220-7103A001: HMI AUTOMATION KEYBOARD 12x4](#)

Accessories:

- [C46668: Remote Keyboard](#)
- [C46670: LVDS Splitter/Repeater](#)

## 3.2 Power Supply

Each unit requires an external +24VDC to connect to a CPU Module Transceiver, and always begins with one of these modules. The power connector is configured as follows:



Pin n.	Function
Pin 1	Ok Rely Normally open contact
Pin 2	Ok Rely Common
Pin 3	+ 24VDC
Pin 4	GND
Pin 5	Earth

The power is strictly provided to **+24VDC ± 20%**, the maximum input current is **2A**. There is a **reverse polarity protection** on, the fuse is internal and must be changed only by Moog. When the application switches to **RUN**, closes the rely OK, when switches to **STOP**, opens. Contact can withstand up to **1A** at +30VDC.

### 3.3 IMI220-6031A001: POWER SUPPLY - MAIN CPU - HMI DRIVER


**ATTENTION!**

Before to operate with IMI220-6031A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

#### 3.3.1 General Information

Main CPU with PSU manages all modules mounted into the sockets (centralized configuration). This CPU permit to remote others modules through the B-BUS master connector.

To the B-BUS can be connected:

- [IMI220-6980A001: Bus Transceiver](#)

This option permit to realize different configuration. If we used a Bus transceiver (6980) we can realize a decentralized configuration mono processor. This means that have only a CPU with one application software. This CPU has the possibility to connect and manage a terminal type LVDS.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6031A001.**

#### 3.3.2 Technical Characteristics

Code	IMI220-6031A001
Controller	
Processor	iMX6Q 800MHz (Industrial temperature range) Quad core ARM Cortex A9
Cooling	Fan Cooling
Memory	
RAM	2GB DDR3
Flash Eprom	4GB
Retain Memory	2MB
Fastest task	100µs

Interfaces	
User Interface	B-Bus LAN ECAT Master Serial port USB CAN HMI Interface

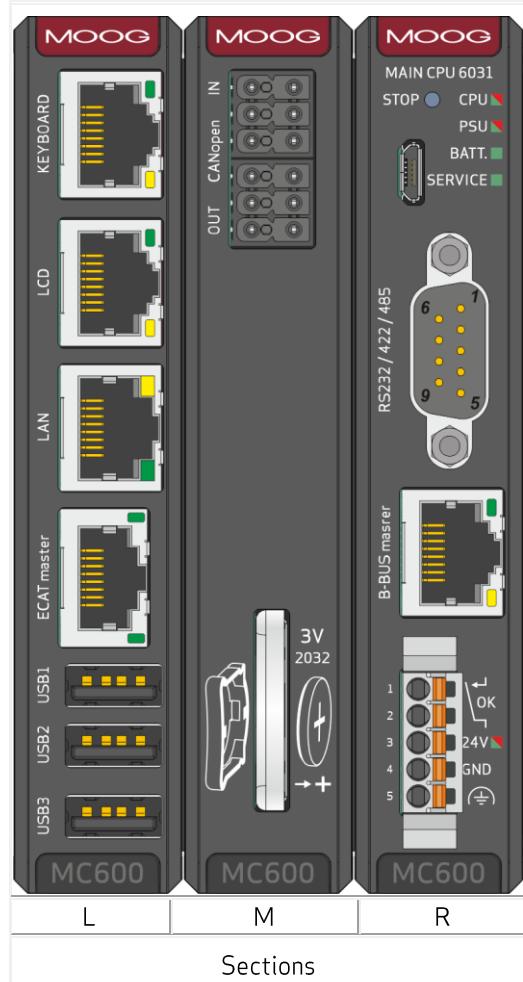
General power supply	
Battery	Standard CR2032 3V Lithium - User replaceable N.B. Use only battery with the same (or higher) temperature range supported by device
Power supply	Input voltage Input current Reverse polarity protection Isolation Fuse

General	
---------	--

Ok relay	Single contact N/O - 1A 30VDC
Diagnostics CPU LOW BATTERY PSU Service 24VDC	Bicolour led (run, stop, prog, halt) Red led (low battery) Bicolour led (fault, ok, stand-by) Green led (service on) Bicolour led (voltage presence)
Diagnostics on connector LAN  ECAT  B-BUS	Green led (Link) Yellow led (Activity) Green led (Link) Yellow led (Activity) Green led (Link) Yellow led (Activity)
Special features Stop user application Auto-power ON Auto-power OFF Advanced algorithms	Push button ON by internal clock OFF by user application License key
Frontal connector Type Mating connector	5 pins 3.5 mm pitch female 5 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	482g

Installation distances	
Up	100mm
Down	100mm
Left	100mm
Right	100mm (if no other MC600 modules are present)

### 3.3.3 Front View



### 3.3.3.1 L Section

- **LCD Connector:** LVDS connection for connect HMI Panel.
- **KEYBOARD Connector:** LVDS connection for connect the Panel.
- **LAN Connector:** Ethernet connection for programming the CPU or use the OPC server.
- **ECATmaster Connector:** EtherCAT Master connection for connect all the devices that use this field bus.
- **USB1/2/3 Connector:** USB host for make different operation with "USB stick generation" tool. One USB slot is dedicated to license key (position independent)

### 3.3.3.2 M Section

- **CANopen Connector:** connector for input/output of CANopen protocol
- **Battery:** battery slider for retain memory and RTC, please see Battery section below for more details

### 3.3.3.3 R Section

- **STOP Button:** Button for stop the application or make operation with "USB stick generation" tool.
- **CPU Led:** Bicolour led:
  - Red blink <sup>(3)</sup> = CPU boot
  - Orange blink <sup>(1)</sup> = CPU boot and stop button pressed
  - Red fixed/green pulse <sup>(3)</sup> = User application stop
  - Orange blink <sup>(3)</sup> = reprogramming the CPU firmware
  - Red fixed = CPU in halt
  - Orange fixed = CPU in stop or reset
  - Orange blink <sup>(2)</sup> = reprogramming the user application
  - Green fixed = CPU in run
  - Green blink <sup>(3)</sup> = CPU firmware update succedfully
- **BATTERY Led:** Red fixed = replace battery (please see Battery section below for battery replacements details).
- **PSU Led:** Bicolour led:
  - Red fixed = No power ok
  - Orange fixed = Stand by

- Green fixed = Power ok
- Orange blink <sup>(1)</sup> = Local bus 3V3 OFF in high temperature
- Green blink <sup>(1)</sup> = Local bus 3V3 OFF
- Green/orange blink <sup>(1)</sup> = Local bus 3V3 ON in high temperature
- Orange blink <sup>(2)</sup> = Peripheral power on
- Red blink <sup>(3)</sup> = Over current
- **SERVICE Led:** Green fixed = External 24VDC ok
- **Micro USB port:** Moog service use only
- **9 Poles Connector:** Programmable serial port connection.
- **B-BUS Connector:** Remote bus connection for connect transceiver module or auxiliary CPU.
- **5 Poles Connector:** Used to connect [power source](#)
- **24V Led:** Bicolour led:
  - Green fixed = External 24VDC ok
  - Orange fixed = Overvoltage
  - Red fixed = fuse error

blink (1) = 1.2 sec ON, 1.2 sec OFF

blink (2) = 0.6 sec ON, 0.6 sec OFF

blink (3) = 0.3 sec ON, 0.3 sec OFF

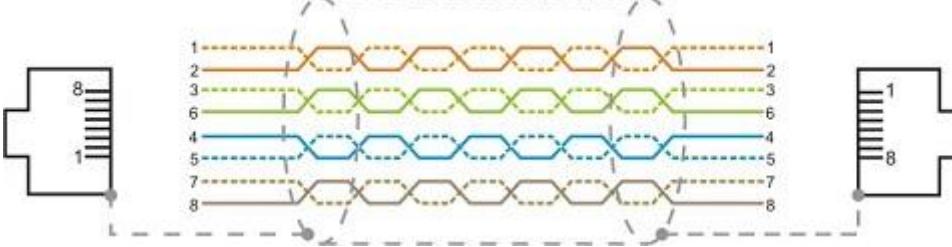
pulse (4) = min 1.2 sec; max 2.4 sec

### 3.3.4 Connections

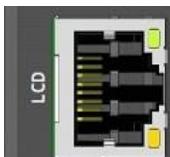
#### 3.3.4.1 L Section

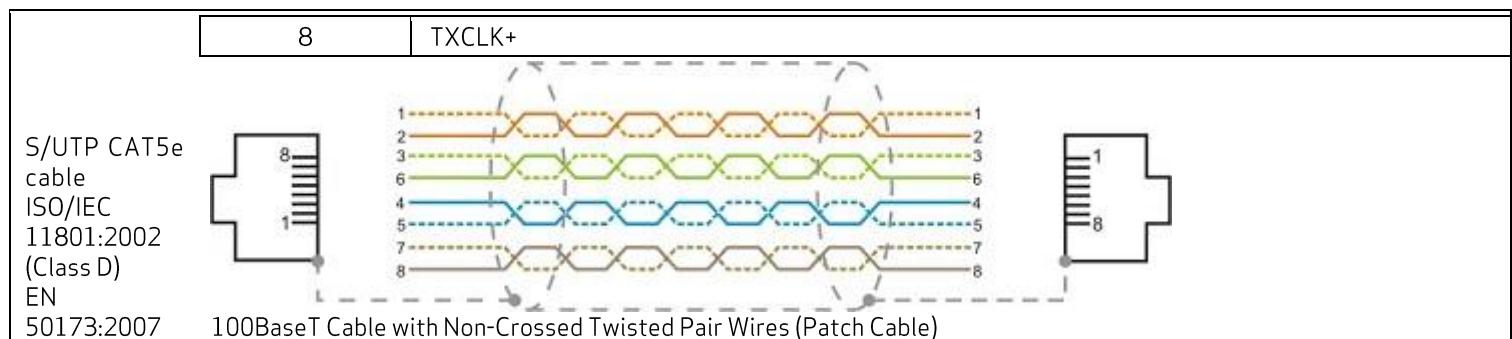
KEYBOARD pinout		
	Pin number	Signal description
	1	D0+
	2	D0-
	3	RIN+
	4	GND
	5	GND
	6	RIN-
	7	LINK-LVDS
	8	GND

S/UTP CAT5e cable  
ISO/IEC  
11801:2002  
(Class D)  
EN  
50173:2007

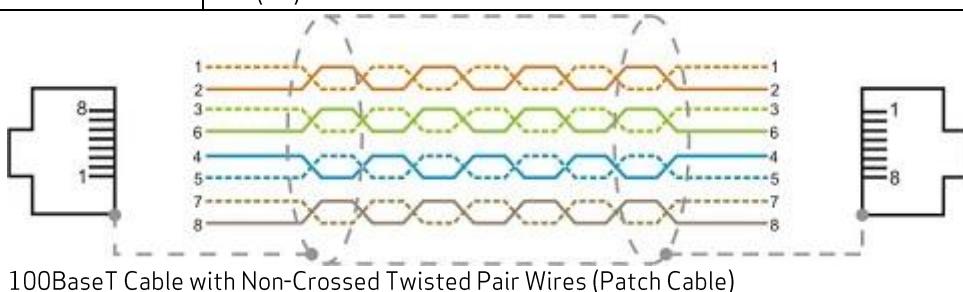


100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

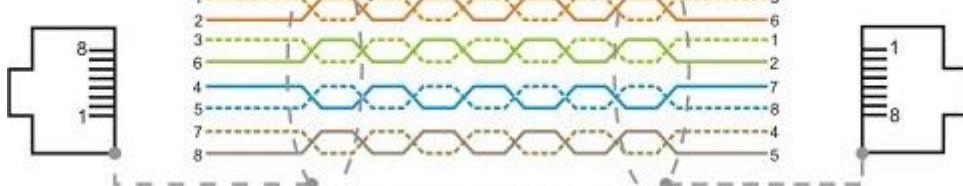
LCD Pinout		
	Pin number	Signal description
	1	TX0-
	2	TX0+
	3	TX1-
	4	TX2-
	5	TX2+
	6	TX1+
	7	TXCLK-

**LAN Pinout**

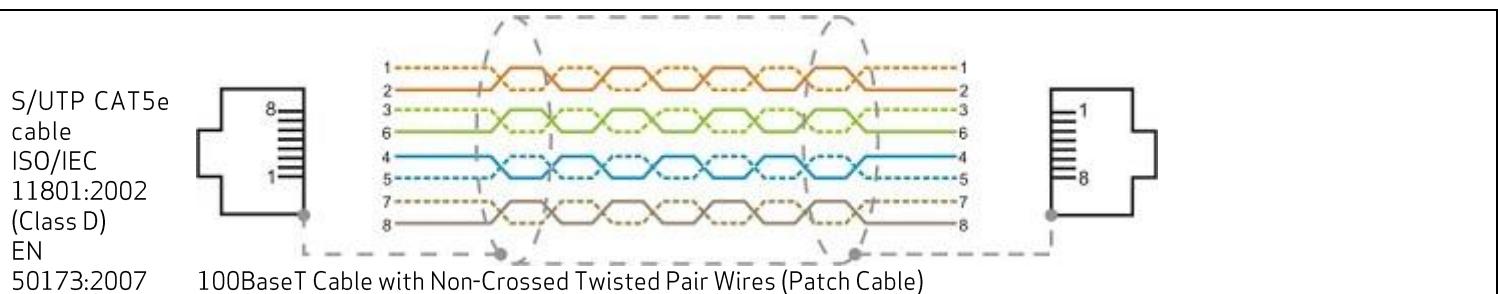
Pin number	Signal description
1	TD+
2	TD-
3	RD+
4	P4 (P5)
5	P4 (P5)
6	RD-
7	P7 (P8)
8	P7 (P8)



S/UTP CAT5e cable  
ISO/IEC 11801:2002 (Class D)  
EN 50173:2007

**ECAT Pinout**

Pin number	Signal description
1	TD+
2	TD-
3	RD+
4	P4 (P5)
5	P4 (P5)
6	RD-
7	P7 (P8)
8	P7 (P8)



## USB1, USB2 &amp; USB3 Pinout

	Pin number	Signal description
USB1	1	+5VDC Power supply
USB2	2	DATA -
USB3	3	DATA +
	4	GND

Mating Connector (socket contacts)

USB Type A

## 3.3.4.2 M Section

## CANopen Pinout

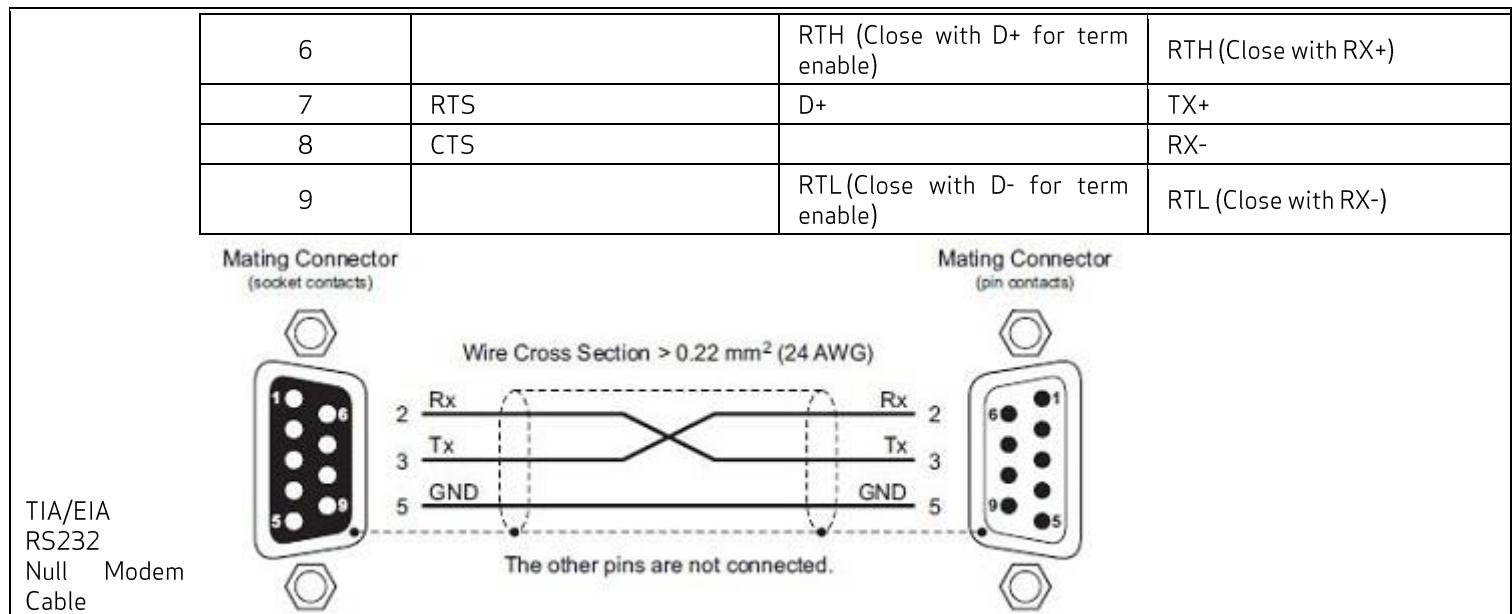
	Pin number	Signal description
IN	1	GND
CANopen	2	CAN L
OUT	3	3V3 CAN1
	4	GND CAN1
	5	RTH
	6	CAN H

TERMINATION RESISTANCE ACTIVATION

## 3.3.4.3 R Section

## RS232 / 422 / 485 Pinout

	Pin number	RS232	RS485	RS422
RS232 / 422 / 485	1	DCD		
	2	RX		RX+
	3	TX	D-	TX-
	4			
	5	GND	GND	GND

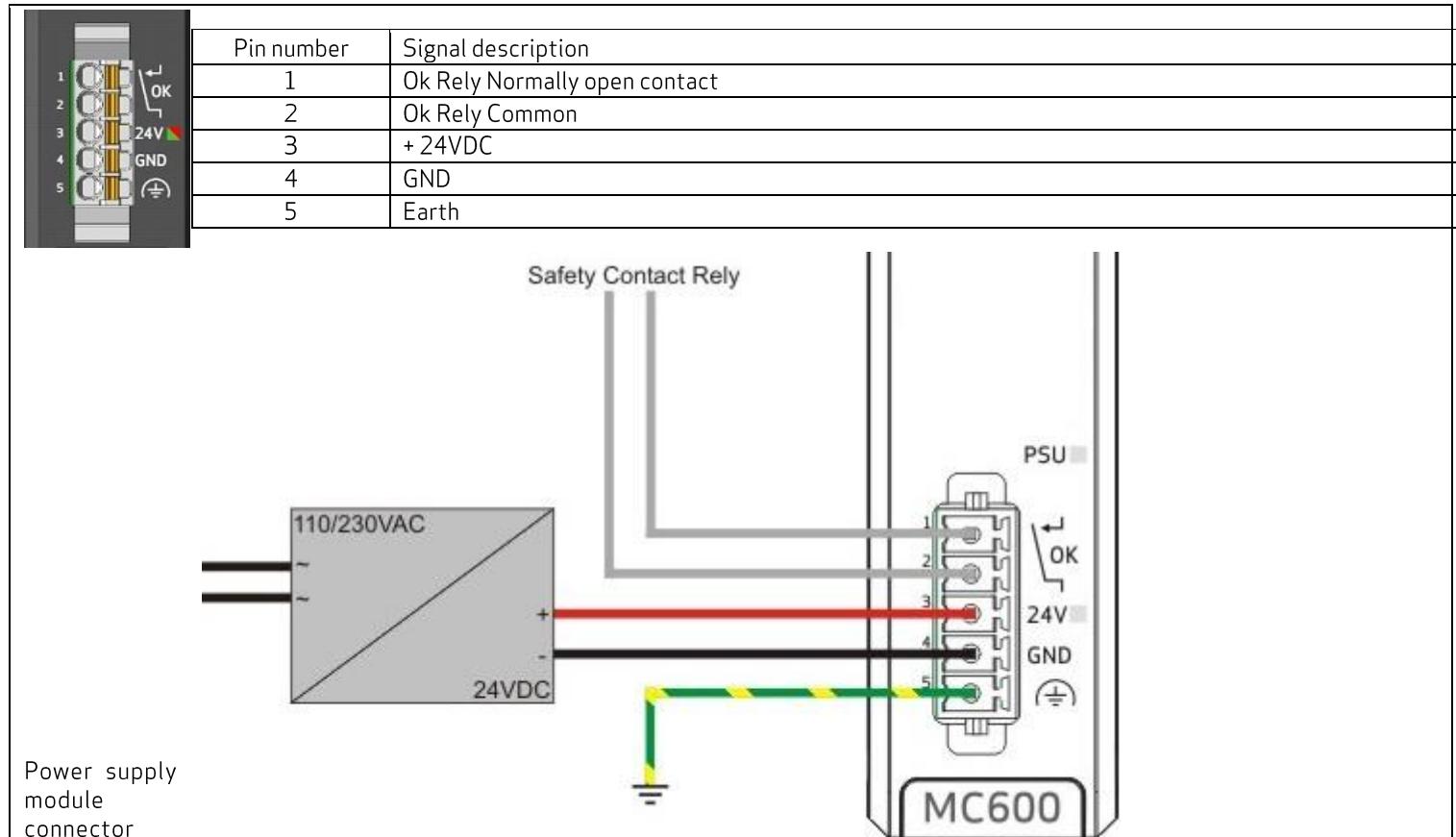
**B-BUS Pinout**

	Pin number	Signal description
	1	TOUT+
	2	TOUT-
	3	RIN+
S/UTP CAT5e cable ISO/IEC 11801:2002 (Class D) EN 50173:2007	4	RB GND1
	5	RB GND1
	6	RIN-
	7	RB ON
	8	NR ON

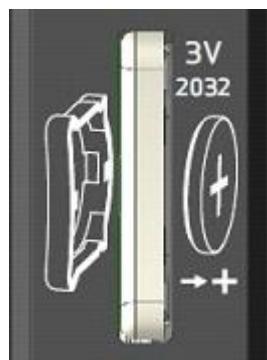
**100BaseT Cable with Non-Crossed Twisted Pairs (Patch Cable)**

<b>!</b>	<p><b>WARNING!</b> Where the 24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations. In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus. <b>CONSEQUENTLY, THE OK RELAY (INSTALLED ON POWER SUPPLY MODULE) MUST BE USED AS POWER CIRCUIT SAFETY CONTROL OF THE PLC-CONTROLLED EQUIPMENT.</b></p>
----------	--

**PSU Pinout**



### 3.3.5 Battery replacement



**WARNING!**

Don't insert the battery holder inside MC600plus without a battery! This could cause damage to the PLC battery case. If the battery is low, let the battery inside. Remove the battery only when you have a new one to replace.

The battery has to be replaced when "BATT" led on the main CPU, is red.

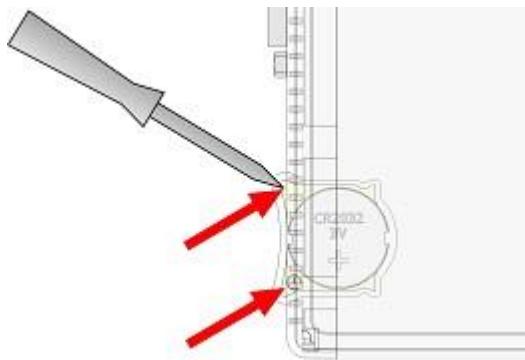
The battery is a standard Lithium battery mod. CR2032 3V, use only battery with the same (or higher) temperature range supported by device.



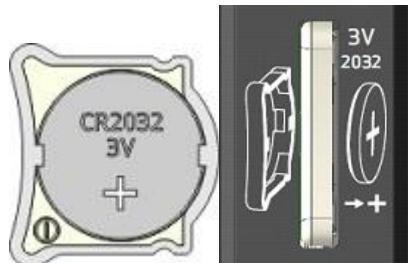
**WARNING!**

Use batteries compatible with device's environmental work conditions.

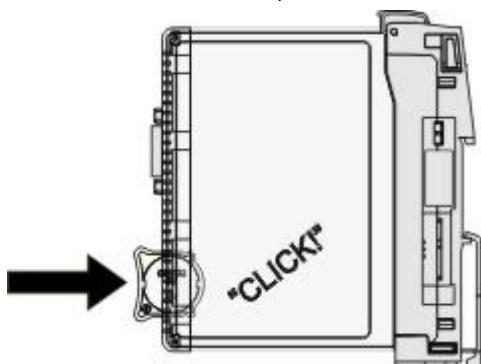
- Remove the battery case from the CPU by using a screw driver and inserting it in one of the two side indicated by the red arrow:



- Remove the battery from the battery holder and replace it with a new CR2032 3V standard battery, pay attention to insert the battery in the correct position



- Insert again the battery holder with new battery inside the CPU, pay attention to mount it in the correct direction and don't insert it without a battery mounted. Push the battery until you have a tactile "click" sensation:



- If the battery is working properly, the "BATT" led on the main CPU become green.
- Throw the old low battery in your local specific bins for used batteries.

## 3.4 IMI220-6980A001: BUS TRANSCEIVER (TRX + PSU)



### WARNING!

Before to operate with IMI220-6980A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.4.1 General Information

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 connectors (1 IN, 1 OUT).

### 3.4.2 Power supply

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

### 3.4.3 Additional information

Bus transceiver modules are connected to CPU module. For available CPU modules see section "Processor". I/O and temperature modules are connected to a bus transceiver module via local bus, see sections "Analog I/O and Digital I/O". For possible combinations of modules and application samples see section "[Concepts](#)".

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6980A001.**

### 3.4.4 Technical Characteristics

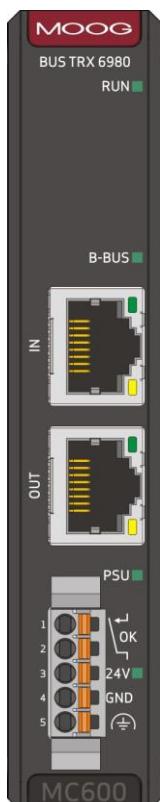
Code	IMI220-6980A001
Interfaces	
User Interface	
Remote Bus IN	RJ45 (Moog Proprietary Bus)
Remote Bus OUT	RJ45 (Moog Proprietary Bus)

General power supply	
Power supply	
Input voltage	24VDC ±20%
Input current	1A max
Reverse polarity protection	Yes
Isolation	Yes
Fuse	Integrated (cannot be exchanged)

General	
Ok relay	Single contact N/O - 1A 30VDC
Diagnostics	
RUN	Green led
B-BUS	Bicolour led (fault, ok, daisy chain)
PSU	Bicolour led (fault, ok, stand-by)
24VDC	Green led (voltage presence)
Diagnostics on connector	
Remote BUS IN	Green led (RX active) Yellow led (Node activity)

Remote BUS OUT	Green led (Cable link) Yellow led (Bus activity)
Frontal connector Type Mating connector	5 pins 3.5 mm pitch female 5 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.4.5 Front View



#### 3.4.5.1 TRANSCEIVER Section:

- **RUN Led:** Green fixed = CPU Run status
- **B\_BUS Led:** Bicolour led:

- Red fixed = Bus error
- Green blink <sup>(1)</sup> = Remote bus not initialized
- Green fixed = Remote bus initialized
- Red blink <sup>(1)</sup> = Local bus enumeration error
- **IN Connector:** Remote bus input.
- **OUT Connector:** Remote bus output.

### 3.4.5.2 PSU Section:

- **PSU Led:** Bicolour led:
  - Red fixed = No power ok
  - Green blink <sup>(1)</sup> = Local bus 3V3 OFF
  - Orange blink <sup>(1)</sup> = Local bus 3V3 OFF in high temperature
  - Green/Orange blink <sup>(1)</sup> = Local bus 3V3 ON in high temperature
  - Red blink <sup>(3)</sup> = Over current
  - Green fixed = Power ok
  - Orange fixed = Stand by
- **24V Led:** Green fixed = External 24VDC ok
- **5 Poles Connector:** Used to connect [power source](#).

blink (1) = 1.2 sec ON, 1.2 sec OFF

blink (2) = 0.6 sec ON, 0.6 sec OFF

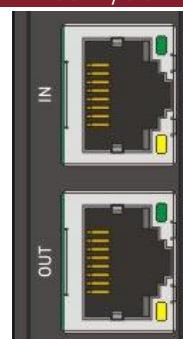
blink (3) = 0.3 sec ON, 0.3 sec OFF

pulse (4) = min 1.2 sec; max 2.4 sec

## 3.4.6 Connections

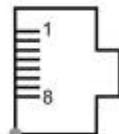
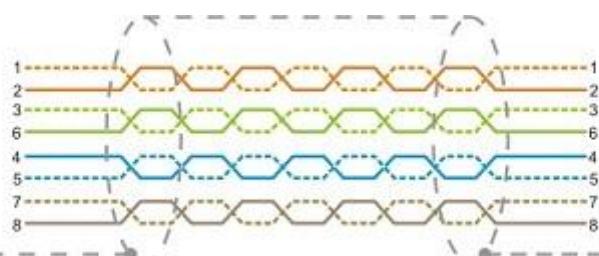
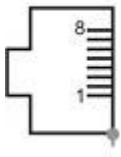
### 3.4.6.1 TRANSCEIVER Section:

B-BUS IN/OUT Pinout



Pin number	Signal description
1	TOUT+
2	TOUT-
3	RIN+
4	RB GND1
5	RB GND1
6	RIN-
7	RB ON
8	NR ON

S/UTP CAT5e  
cable  
ISO/IEC  
11801:2002  
(Class D)  
EN  
50173:2007



100BaseT Cable with Non-Crossed Pair Wires (Patch Cable)

### 3.4.6.2 PSU Section:



#### WARNING!

Where the +24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations.

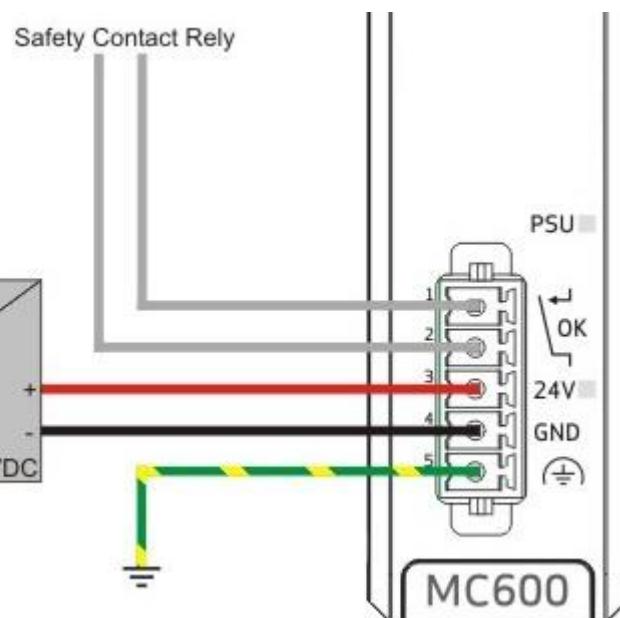
In all cases the +24VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus.

CONSEQUENTLY, THE OK RELAY (INSTALLED ON POWER SUPPLY MODULE) MUST BE USED AS POWER CIRCUIT SAFETY CONTROL OF THE PLC-CONTROLLED EQUIPMENT.

## PSU Pinout



Pin number	Signal description
1	Ok Rely Normally open contact
2	Ok Rely Common
3	+ 24VDC
4	GND
5	Earth



Power supply  
module  
connector

### 3.5 IMI220-6970A001: POWER SUPPLY BOOSTER

**WARNING!**

Before to operate with IMI220-6970A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

#### 3.5.1 General Information

When the hardware configuration need more power on the bus is necessary to include this module into a free place on the rack. For understand if is necessary or not, check the compile warning from MASS or ask directly on Moog support email: [MASS-Support@moog.com](mailto:MASS-Support@moog.com).

#### 3.5.2 Technical Characteristics

Code	IMI220-6970A001
General power supply	
Power supply	
Input voltage	9-36VDC
Input current	
Booster disabled	22mA @ 24VDC
Booster enabled	500mA @ 24VDC
Reverse polarity protection	Yes
Isolation	Yes
Fuse	Integrated (cannot be exchanged)

General	
Diagnostics	
V LB	Green led (Enable local bus)
V DC-DC	Green led (Enable DC/DC converter)
PSU	Green led (Enable booster)
24VDC	Green led (24VDC Voltage presence)
Special features	
Auto-power ON	ON/OFF by internal bus
Frontal connector	
Type	5 pins 3.5 mm pitch female
Mating connector	5 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	390g

### 3.5.3 Front View



- **V LB Led:** Green led = Local bus enabled.
- **V DC-DC Led:** Green led = DC/DC converter enabled.
- **PSU Led:** Green led = Booster enabled.
- **24V Led:** Green fixed = External 24VDC present.
- **5 Poles Connector:** Used to connect [power source](#).

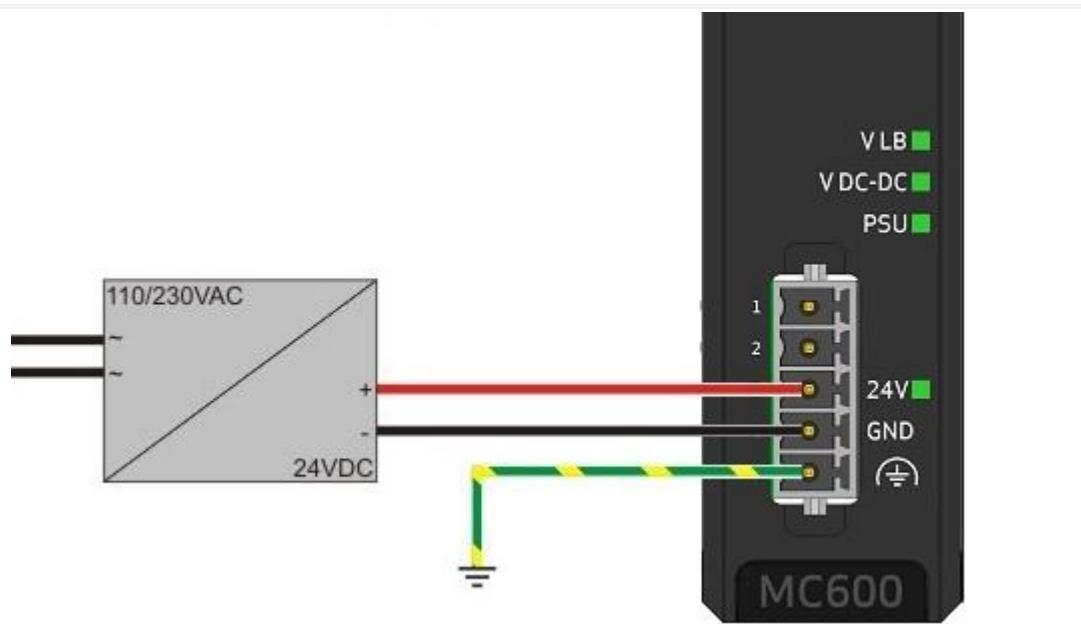
### 3.5.4 Connections

#### 3.5.4.1 PSU Section

	<b>WARNING!</b> Where the 24 VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations. In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus.
--	---

#### PSU Pinout

Pin number	Signal description
1	nc
2	nc
3	+ 24VDC
4	GND
5	Earth



## 3.6 IMI220-6100A001: 16DI 24VDC



WARNING!

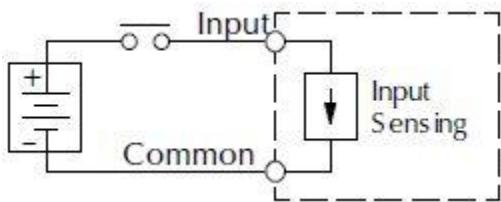
Before to operate with IMI220-6100A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

WARNING!

The module IMI220-6100A001 is fully replaceable with the module IMI220-6100B001.

### 3.6.1 General Information

Digital input module. This module permit to read the 16 external digital input. The inputs are sink type and are divided in 2 groups of 8. The green led show the actual status for each inputs.



For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6100A001.**

### 3.6.2 Technical Characteristics

Code	IMI220-6100A001
Digital Input	16 Sink (2 groups of 8)
Input type	IEC61131-2 type 3
Isolation	
Channel to channel	No
Channel to bus	100 Vpp
Input voltage	24VDC
ON level	> 9.5VDC
OFF level	< 7.7VDC
Frequency	2KHz (max)
Delay time	
From OFF to ON	150µs
From ON to OFF	300µs
Input current	6mA @ 24VDC
Diagnostics	
Input	Green led
Common points between channels	GND (0V24)
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16

Min/max AWG according to UL/CUL	
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.6.3 Front View



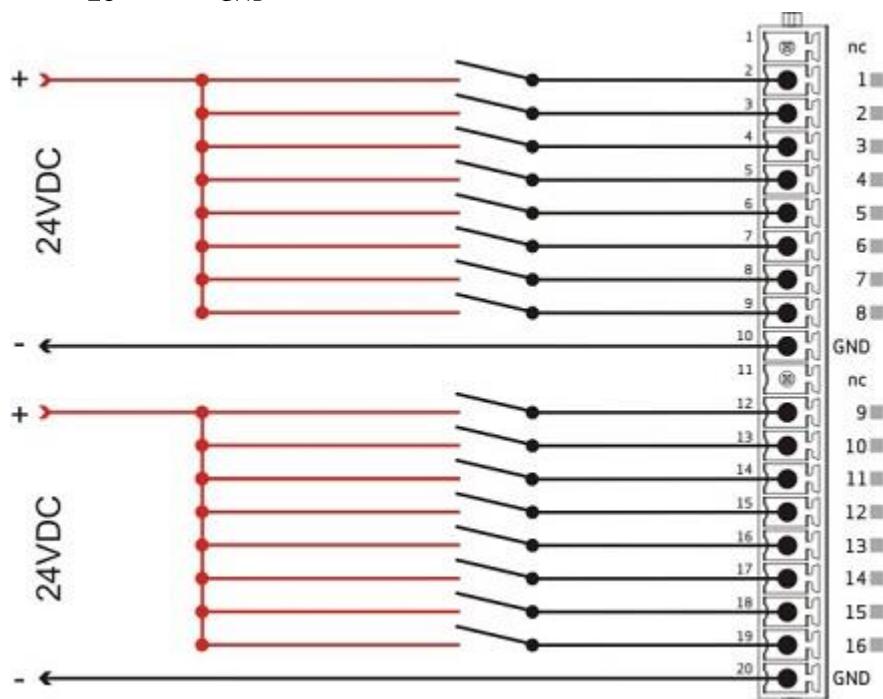
- **Green Led:** Indicate the state of the inputs (LED illuminated input TRUE, LED off input FALSE)
- **20 Poles Connector:** Used for connecting the 16 digital inputs to the module.

### 3.6.4 Connections

Digital Input Pinout



Pin number	Signal description
1	Not used
2	Digital input 1
3	Digital input 2
4	Digital input 3
5	Digital input 4
6	Digital input 5
7	Digital input 6
8	Digital input 7
9	Digital input 8
10	GND
11	Not used
12	Digital input 9
13	Digital input 10
14	Digital input 11
15	Digital input 12
16	Digital input 13
17	Digital input 14
18	Digital input 15
19	Digital input 16
20	GND



### 3.6.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.7 IMI220-6100B001: 16DI 24VDC



WARNING!

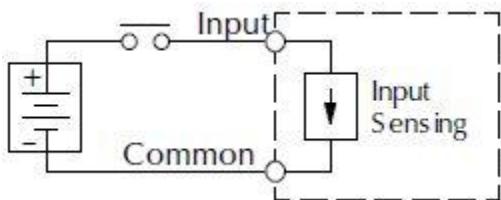
Before to operate with IMI220-6100B001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

WARNING!

The module IMI220-6100A001 is fully replaceable with the module IMI220-6100B001.

#### 3.7.1 General Information

Digital input module. This module permit to read the 16 external digital input. The inputs are sink type and are divided in 2 groups of 8. The green led show the actual status for each inputs.



This module permit to enable the counter functionality on n.2 digital input.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6100B001.**

#### 3.7.2 Technical Characteristics

Code	IMI220-6100B001
Digital Input	16 Sink (2 groups of 8)
Input type	IEC61131-2 type 3
Isolation	No
Channel to channel	100 Vpp
Channel to bus	
Input voltage	24VDC
ON level	> 9.5VDC
OFF level	< 7.7VDC
Frequency	2KHz (max)
Delay time	
From OFF to ON	150µs
From ON to OFF	300µs
Input current	6mA @ 24VDC

Counters	
Counter inputs	2 selectable (The counter functionality can be enabled on n.2 of the 16 digital input channels available on module)
Maximum counter frequency	
24Vdc Square wave	1700Hz
15Vdc Square wave	2100Hz
13Vdc Square wave	4000Hz
Minimum positive pulse width	
24Vdc	200µS
15Vdc	300µS
13Vdc	400µS

Minimum negative pulse width	
24Vdc	400µS
15Vdc	300µS
13Vdc	200µS

Generals	
Diagnostics	
Input	Green led
Common points between channels	GND (0V24)
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.7.3 Front View

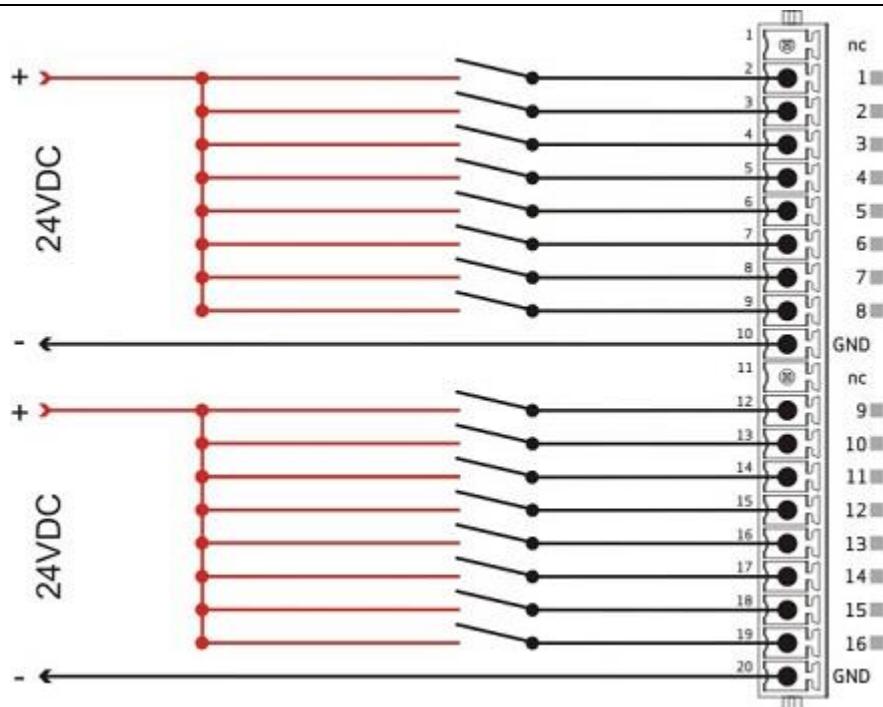


- **Green Led:** Indicate the state of the inputs (LED illuminated input TRUE, LED off input FALSE)
- **20 Poles Connector:** Used for connecting the 16 digital inputs to the module.

### 3.7.4 Connections

Digital Input Pinout

Pin number	Signal description
1	Not used
2	Digital input 1
3	Digital input 2
4	Digital input 3
5	Digital input 4
6	Digital input 5
7	Digital input 6
8	Digital input 7
9	Digital input 8
10	GND
11	Not used
12	Digital input 9
13	Digital input 10
14	Digital input 11
15	Digital input 12
16	Digital input 13
17	Digital input 14
18	Digital input 15
19	Digital input 16
20	GND



### 3.7.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.7.6 IO Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where FastBoolln is the fast input with counter functionality:

#### **MC600 and MC600plus Calibration Example:**

```
FastBoolln.Enable := TRUE;
FastBoolln.Configure.InputSelected := 1;
FastBoolln.Configure.Update := TRUE;
```

```
bCountValue := FastBoolln.Counter; //Counter value from 0 to 255
```

## 3.8 IMI220-6150A001: 16DO 24VDC 0.5A

**WARNING!**

Before to operate with IMI220-6150A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.8.1 General Information

Digital output module. This module permit to command 16 digital outputs at 24VDC. The outputs are source type (PNP) with a maximum current for each channels of 0.5A and are divided in 2 groups of 8. The green led show the actual status for each output. The red led show the malfunction of the 2 groups.

For understand better how to use this Module see the example:

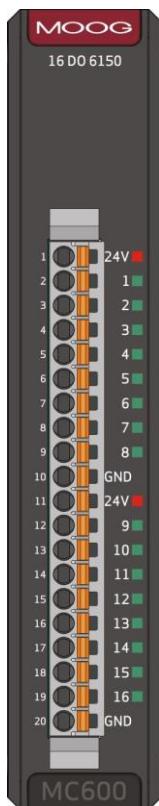
**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6150A001.**

### 3.8.2 Technical Characteristics

Code	IMI220-6150A001
Digital Output	16 Source (2 groups of 8)
Output type	PNP
Output current	
For each channel	0.5A
Total	8A
For group	4A
OFF level	10µA
Supply voltage	24VDC ± 20%
Protection with automatic restore	
Short circuit	Yes
Short circuit peak current	1.9A (max)
Short circuit current limit	1.1A
Over temperature	Yes
Inductive load switch off output clamp	-30VDC (VSupply - 54VDC)
Protection with fuse	Integrated (cannot be exchanged)
Reverse polarity	Yes
Over voltage	Yes > 35VDC
Max allowable load inductance	6H @ 500mA
Output delay time TQD	@ 24VDC resistive load 0.5A
From OFF to ON	70µs
From ON to OFF	210µs
Memory to output delay time TQT	
From OFF to ON	76µs
From ON to OFF	216µs
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Diagnostics	
Output	16 Green led
Faults	2 Red led
Common points between channels	GND (0V24)
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup>

Cross section stranded, with ferrule without plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	24/16
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.8.3 Front View



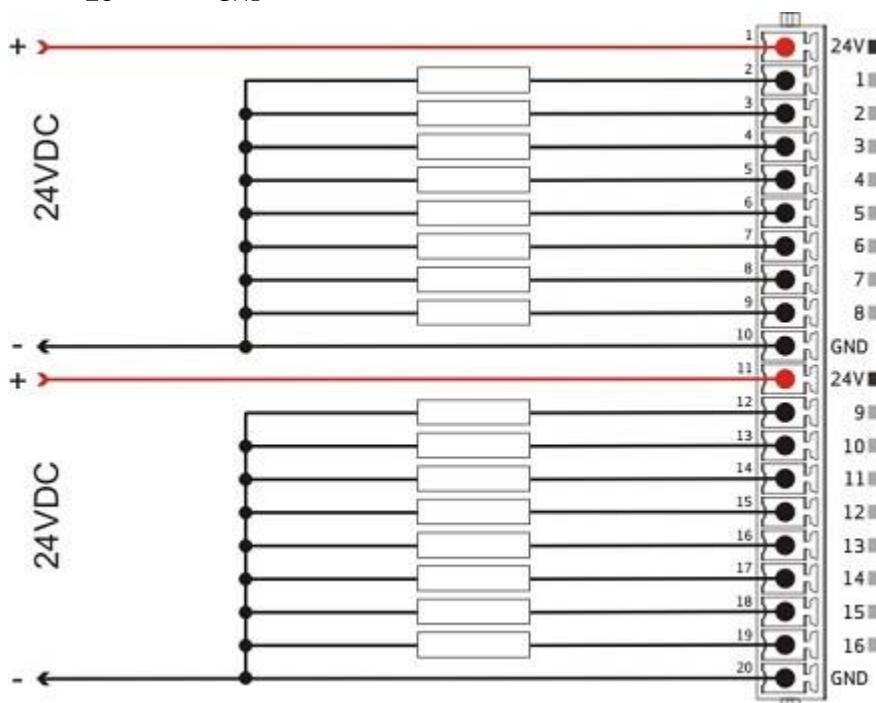
- **Green Led:** Indicates the state of the output (LED illuminated output TRUE, LED off output FALSE).
- **Red Led:** If on, indicates the failure of one or more outputs groups.
- **20 Poles Connector:** Used for connecting the 16 digital outputs to the module.

### 3.8.4 Connections

Digital Output Pinout



Pin number	Signal description
1	+24VDC
2	Digital output 1
3	Digital output 2
4	Digital output 3
5	Digital output 4
6	Digital output 5
7	Digital output 6
8	Digital output 7
9	Digital output 8
10	GND
11	+24VDC
12	Digital output 9
13	Digital output 10
14	Digital output 11
15	Digital output 12
16	Digital output 13
17	Digital output 14
18	Digital output 15
19	Digital output 16
20	GND



### 3.8.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

## 3.9 IMI220-6161A001: 8DO RELAY (TBD)



WARNING!

Before to operate with IMI220-6161A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.9.1 General Information

## 3.10 IMI220-6180A001:12DO 24VDC 2A

**WARNING!**

Before to operate with IMI220-6180A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.10.1 General Information

Digital output module. This module permit to command 12 digital outputs at 24VDC. The outputs are source type (PNP) with a maximum current for each channels of 2A and are divided in 6 groups of 2. The green led show the actual status for each output. The red led show the malfunction of the 6 groups.

For understand better how to use this Module see the example:

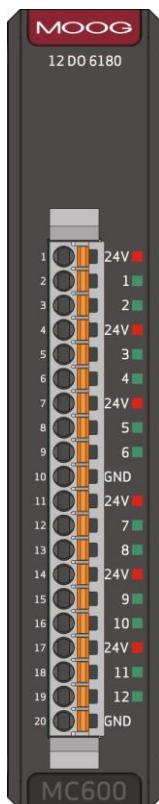
**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6180A001.**

### 3.10.2 Technical Characteristics

Code	IMI220-6180A001
Digital Output	12 Source (6 groups of 2)
Output type	PNP
Output current	
For each channel	2A
Total	24A
For group	4A
OFF level	5µA
Supply voltage	24VDC ± 20%
Protection with automatic restore	
Short circuit	Yes
Short circuit peak current	15A (max)
Short circuit current limit	12A
Over temperature	Yes
Inductive load switch off output clamp	-13VDC
Protection with fuse	Integrated (cannot be exchanged)
Reverse polarity	Yes
Over voltage	Yes > 35VDC
Max allowable load inductance	0.5H @ 2A
Output delay time TQD	@ 24VDC resistive load 2A
From OFF to ON	50µs
From ON to OFF	160µs
Memory to output delay time TQT	
From OFF to ON	56µs
From ON to OFF	166µs
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Diagnostics	
Output	12 Green led
Faults	6 Red led
Common points between channels	GND (0V24)
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup>

Cross section stranded, with ferrule without plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	24/16
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

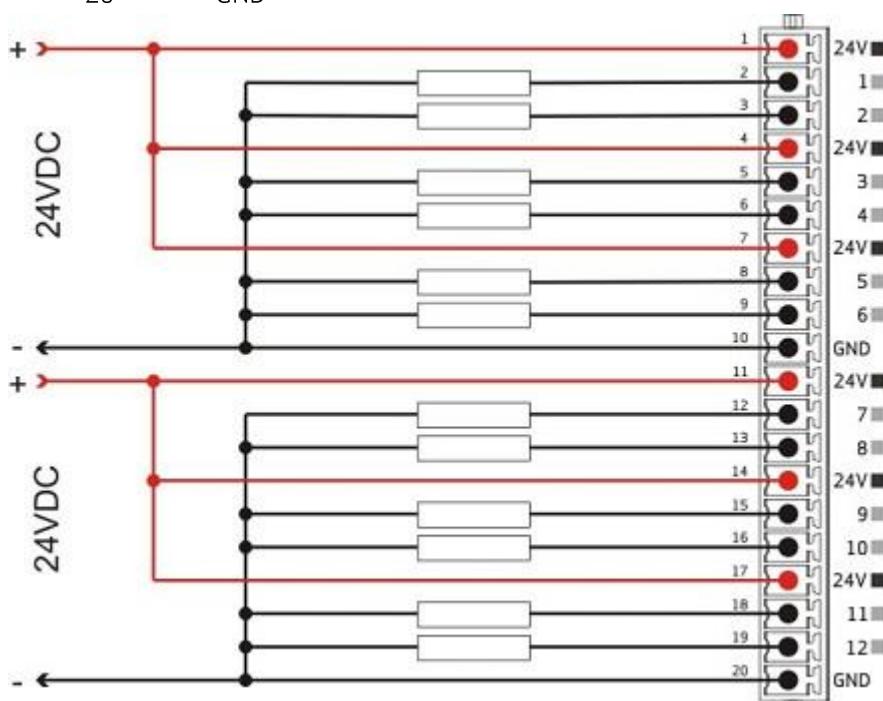
### 3.10.3Front View



- **Green Led:** Indicates the state of the output (LED illuminated output TRUE, LED off output FALSE).
- **Red LED:** If on, indicates the failure of one or more outputs groups.
- **20 Poles Connector:** Used for connecting the 12 digital outputs to the module.

### 3.10.4Connections

Digital Output Pinout



### 3.10.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

## 3.11 IMI220-6200A001: 4AI 16BIT


**ATTENTION!**

Before to operate with IMI220-6200A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.11.1 General Information

Analog input module. This module permit to read 4 analog inputs. The inputs are differential type with a **16 bit resolution**. For each channels this card provide a voltage reference of 10VDC at 10mA.

For understand better how to use this Module see the example:

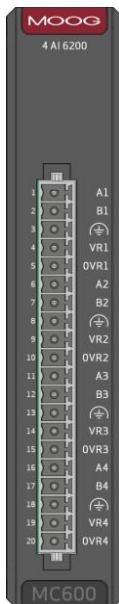
**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6200A001.**

### 3.11.2 Technical Characteristics

Code	IMI220-6200A001
Analog Input	4
Input type	Differential
Input range	
Voltage (nominal)	±10VDC
Current	4µA
Resolution	16BIT (15BIT + SIGN)
Vref outputs	4 independent
Voltage	10VDC
Precision	±0.1%
Current (max)	10mA
Short circuit protection	Yes
Over voltage	Yes (with PTC)
Analog input Error	
Maximum error @ 25°C	0.10%
Temperature coefficient	125ppm/°C
Maximum error over full temperature range	0.66% FS
Value of LSB	0.3mV
Maximum permanent allowed overload	30VDC
Common mode rejection ratio	80dB
Crosstalk between channels	63dB
Total input system transfer time	47µs
Input filter characteristics	
Type	Low Pass
Order	1°
Cut off frequency	800 Hz
Repeatability	0.02% @ FS
Common points between channels	OVR1 - OVR2 - OVR3 - OVR4
Conversion method	Successive approximation
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Common points between channels	GND (0V24)
Frontal connector	
Type	20 pins 3.5 mm pitch female

Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

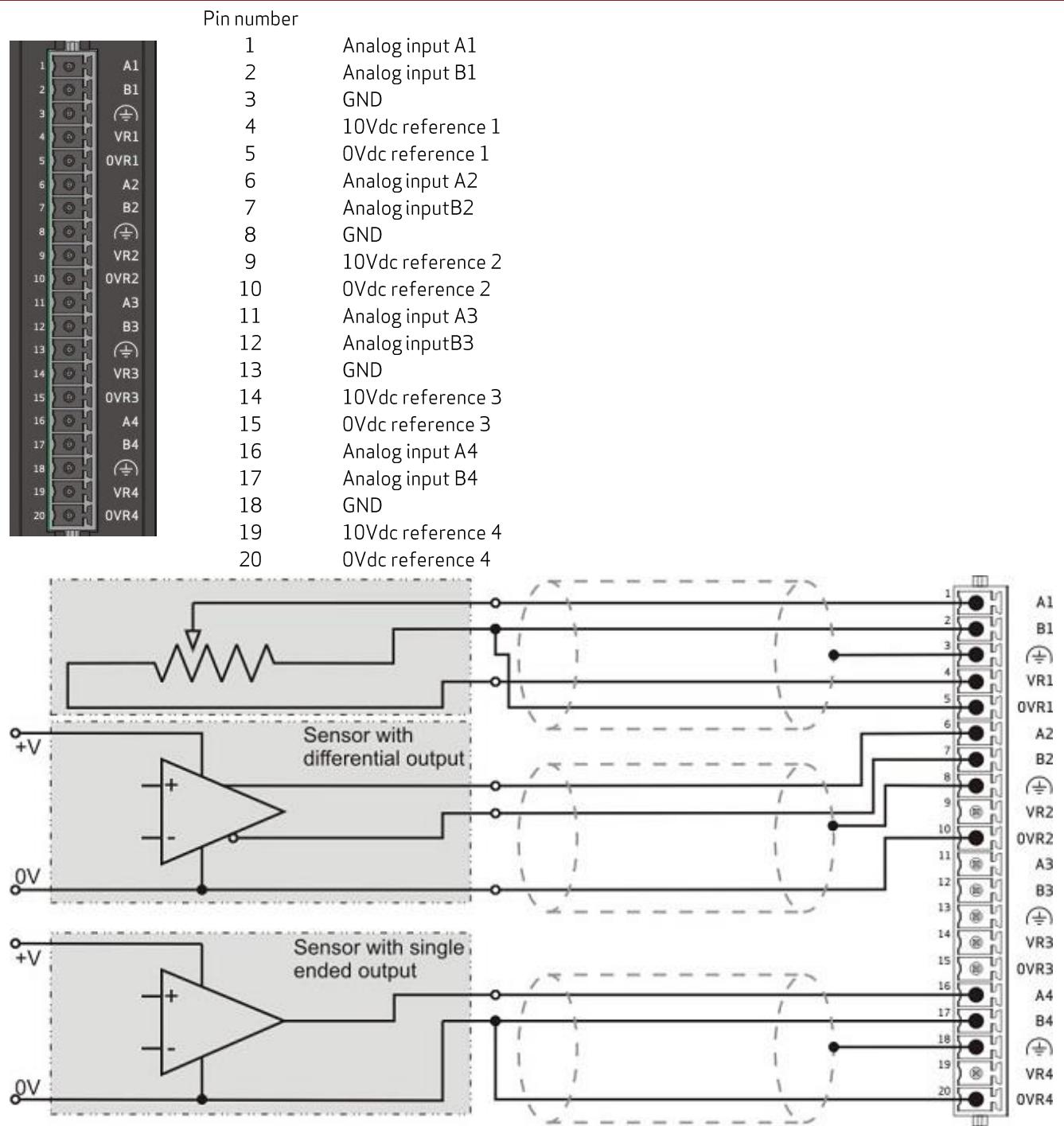
### 3.11.3 Front View



- **20 Poles Connector:** Used for connecting the 4 analog inputs to the module

### 3.11.4 Connections

#### Analog Input Pinout



### 3.11.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The information related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.11.6 IO Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where INP1 is the first input of analog input card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

**MC600plus Calibration Example:**

```
INP1.Configuration.InputType := M_Mc600plusTypes._MGenInType.INPUT_VOLTAGE_10V;  
INP1.Configuration.ScalingLevel := M_Mc600plusTypes._MGenScaling.ENGINEERING_SCALING;  
INP1.Configuration.E1 := -10;  
INP1.Configuration.E2 := +10;  
INP1.Configuration.P1 := -10;  
INP1.Configuration.P2 := +10;  
INP1.Configuration.Update := TRUE;
```

## 3.12 IMI220-6201A001: 8AI 16BIT

**WARNING!**

Before to operate with IMI220-6201A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.12.1 General Information

Analog input module. This module permit to read 8 analog inputs. The inputs are differential type with a 16 bit resolution.

For understand better how to use this Module see the example:

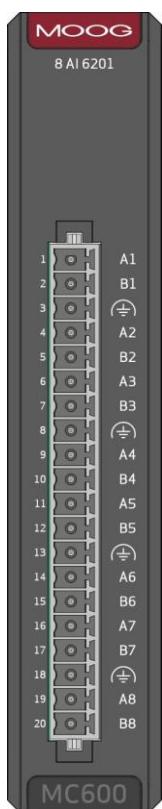
C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6201A001.

### 3.12.2 Technical Characteristics

Code	IMI220-6201A001
Analog Input	8
Input type	Differential
Input range	
Voltage (nominal)	$\pm 10VDC$
Current	$4\mu A$
Resolution	16BIT (15BIT + SIGN)
Analog input Error	
Maximum error @ 25°C	0.10%
Temperature coefficient	125ppm/°C
Maximum error over full temperature range	0.66% FS
Value of LSB	0.3mV
Maximum permanent allowed overload	30VDC
Common mode rejection ratio	80dB
Crosstalk between channels	63dB
Total input system transfer time	47μs
Input filter characteristics	
Type	Low Pass
Order	1°
Cut off frequency	800 Hz
Repeatability	0.02% @ FS
Conversion method	Successive approximation
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm²
Cross section stranded min/max	0.2/1.5 mm²
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm²
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm²
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16

Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.12.3Front View

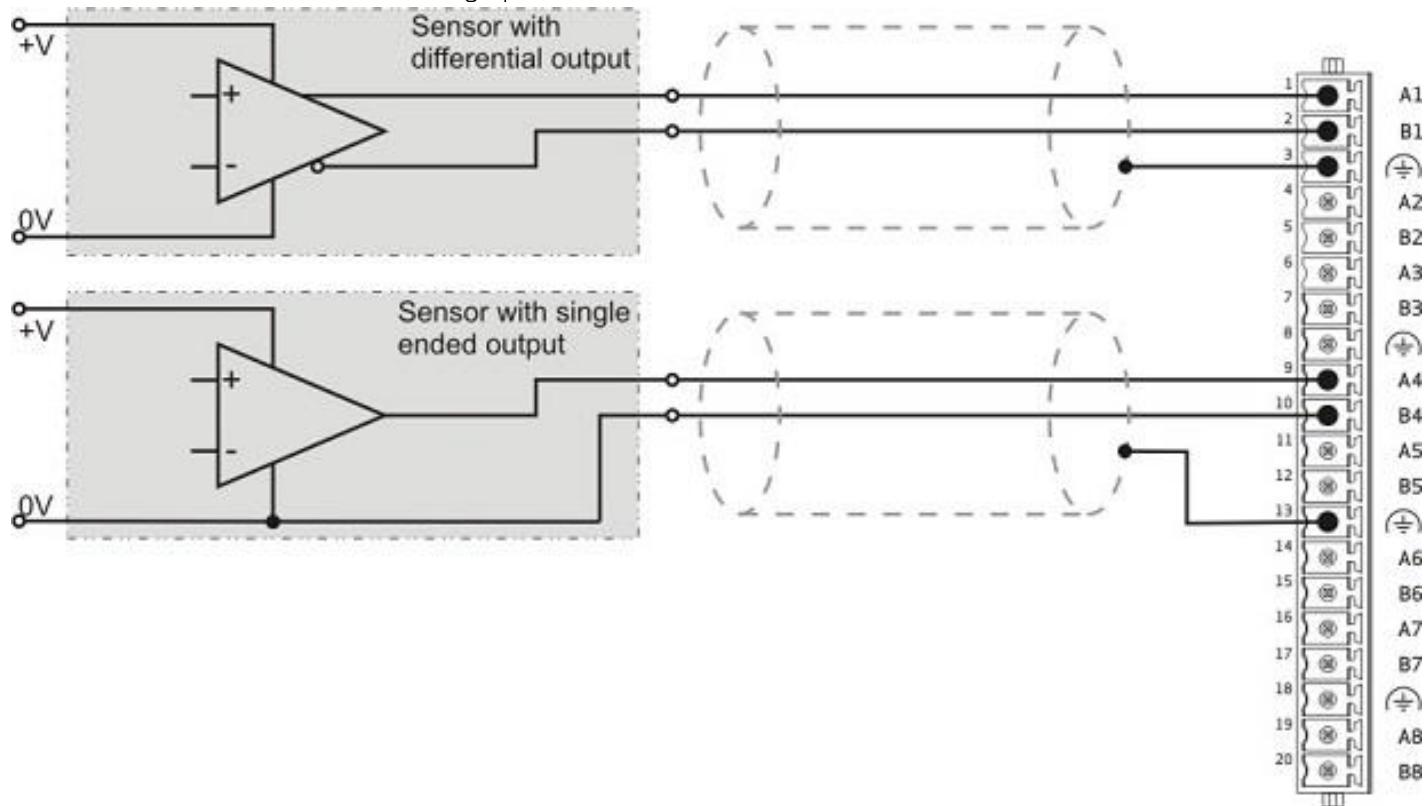
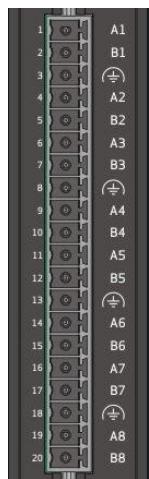


- **20 Poles Connector:** Used for connecting the 8 analog inputs to the module.

### 3.12.4Connections

Analog Input Pinout

Pin number	Signal description
1	Analog Input A1
2	Analog Input B1
3	Earth
4	Analog Input A2
5	Analog Input B2
6	Analog Input A3
7	Analog Input B3
8	Earth
9	Analog Input A4
10	Analog Input B4
11	Analog Input A5
12	Analog Input B5
13	Earth
14	Analog Input A6
15	Analog Input B6
16	Analog Input A7
17	Analog Input B7
18	Earth
19	Analog Input A8
20	Analog Input B8



### 3.12.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.12.6 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where INP1 is the first input of analog input card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration example:

```
INP1.Configuration.InputType := M_Mc600plusTypes._MGenInType.INPUT_VOLTAGE_10V;  
INP1.Configuration.ScalingLevel := M_Mc600plusTypes._MGenScaling.ENGINEERING_SCALING;  
INP1.Configuration.E1 := -10;  
INP1.Configuration.E2 := +10;  
INP1.Configuration.P1 := -10;  
INP1.Configuration.P2 := +10;  
INP1.Configuration.Update := TRUE;
```

## 3.13 IMI220-6201A002: 8AI 16 BIT ±20mA

**WARNING!**

Before to operate with IMI220-6201A002 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.13.1 General Information

Analog input module. This module permit to read 8 analog inputs in current. The inputs are differential type with a 16 bit resolution.

For understand better how to use this Module see the example:

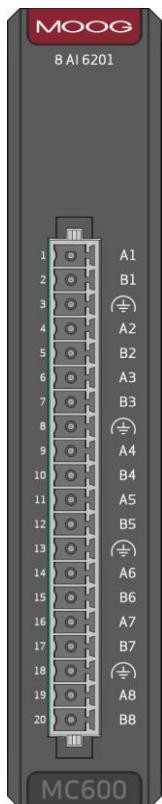
**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6201A002.**

### 3.13.2 Technical Characteristics

Code	IMI220-6201A002
Analog Input	8
Input type	Differential
Input range	
Voltage (nominal)	±10VDC
Current	±20mA
Internal resistance	240 Ohm
Resolution	16BIT (15BIT + SIGN)
Analog input Error	
Maximum error @ 25°C	0.10%
Temperature coefficient	125ppm/°C
Maximum error over full temperature range	0.66% FS
Value of LSB	0.3mV
Maximum permanent allowed overload	30VDC
Common mode rejection ratio	80dB
Crosstalk between channels	63dB
Total input system transfer time	47µs
Input filter characteristics	
Type	Low Pass
Order	1°
Cut off frequency	800 Hz
Repeatability	0.02% @ FS
Conversion method	Successive approximation
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16

Cross section stranded, with ferrule with plastic sleeve min/max	24/16
Cross section AWG/kcmil min/max	
Min/max AWG according to UL/CUL	
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.13.3Front View

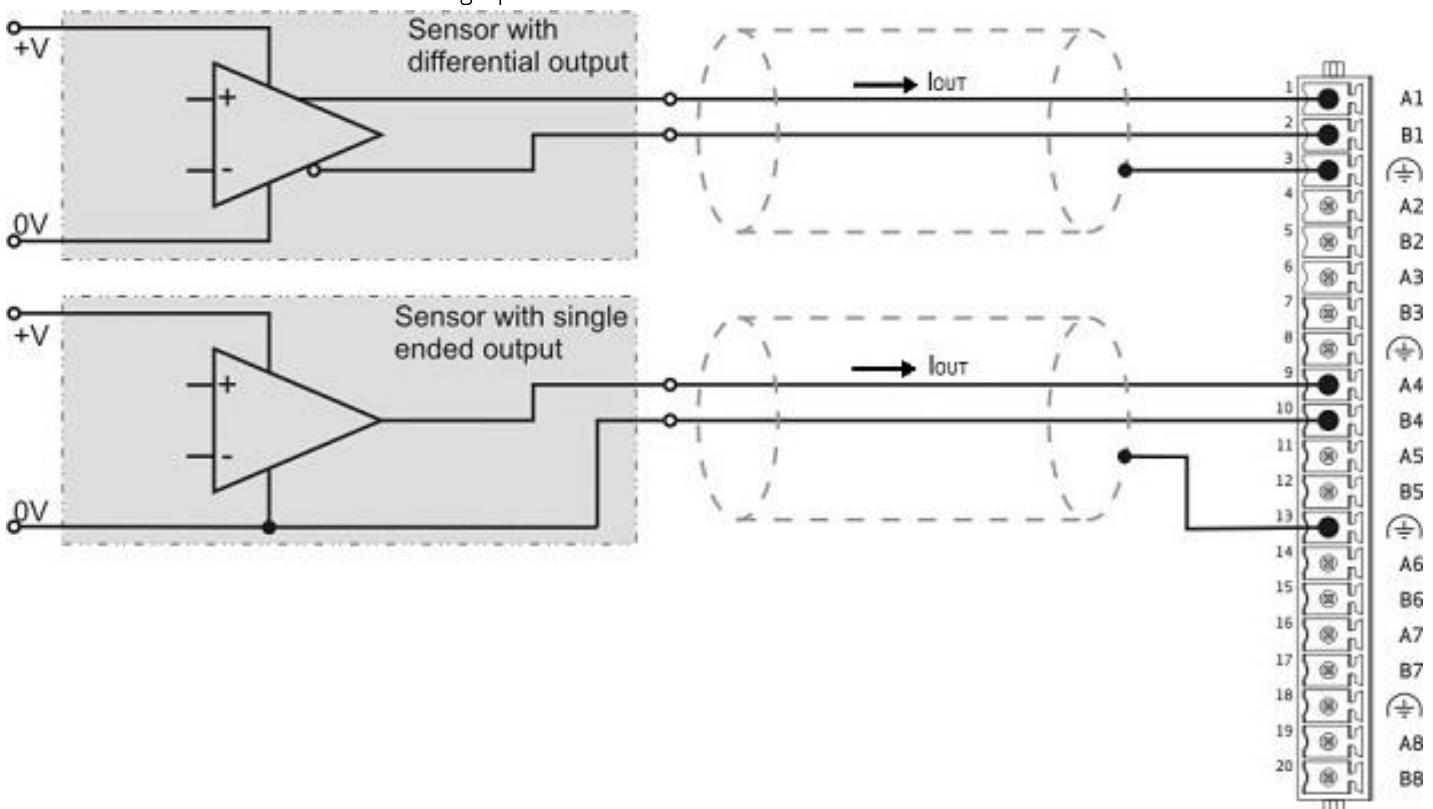
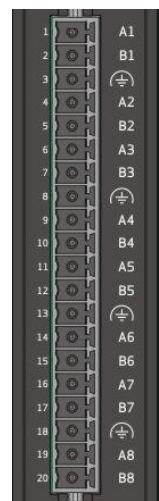


- **20 Poles Connector:** Used for connecting the 8 analog inputs to the module.

### 3.13.4Connections

Analog Input Pinout

Pin number	Signal description
1	Analog Input A1
2	Analog Input B1
3	Earth
4	Analog Input A2
5	Analog Input B2
6	Analog Input A3
7	Analog Input B3
8	Earth
9	Analog Input A4
10	Analog Input B4
11	Analog Input A5
12	Analog Input B5
13	Earth
14	Analog Input A6
15	Analog Input B6
16	Analog Input A7
17	Analog Input B7
18	Earth
19	Analog Input A8
20	Analog Input B8



### 3.13.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.13.6 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where INP1 is the first input of analog input card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

**MC600plus Calibration Example:**

```
//Calibration for Eng value input in %  
INP1.Configuration.InputType := M_Mc600plusTypes._MGenInType.INPUT_CURRENT_20mA;  
INP1.Configuration.E1 := 0;  
INP1.Configuration.E2 := 100;  
INP1.Configuration.P1 := -20;  
INP1.Configuration.P2 := +20;  
INP1.Configuration.Update := TRUE;
```

## 3.14 IMI220-6204A001:3 LVDT/Resolver

**WARNING!**

Before to operate with IMI220-6204A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.14.1 General Information

LVDT input module. This module permit to read 3 Lvdt inputs. This module shall be able to read LVDT position sensors through a specific input circuit and an analog-to-digital converter (ADC) which is managed by a local CPU. IMI220-6204A001 is able to read different LVDT sensor: 3wire (Rvdt), 4wire, 5wire and 6wire.

For understand better how to use this Module see the example:

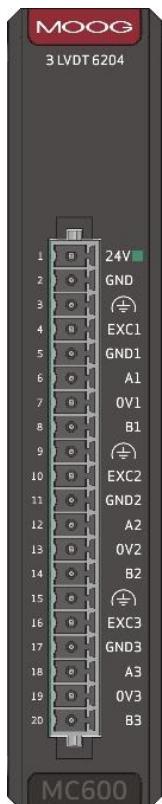
**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6204A001.**

### 3.14.2 Technical Characteristics

Code	IMI220-6204A001
Lvdt Input	3
Input type	Lvdt / Rvdt
3 wires	Yes
4 wires	Yes
5 wires	Yes
6 wires	Yes
Measurement method	Ratiometric
Input range	
Voltage (nominal)	6V Rms
Resolution	16BIT
Enob	13BIT
Excitation outputs	
Voltage	7.2V Rms
Frequency	1500 ÷ 3500Hz (User selectable)
Current (max)	60mA Rms
Short circuit protection	Yes
Over voltage	Yes (with PTC)
Analog input error	
Maximum error @ 25°C	0.10%
Temperature coefficient	125ppm/°C
Sampling rate	Same as excitation frequency
Maximum permanent allowed overload	30VDC
Crosstalk between channels	>80dB
Input filter characteristics	
Type	None, Bessel, Butterworth (User selectable)
Order	2nd
Cut off frequency	10 ÷ 400Hz (User selectable)
Isolation	
Channel to channel	No
Channel to 24VDC	Yes
Channel to bus	Yes
Common points between channels	0V1, 0V2, 0V3 (internal short circuit protected) GND1, GND2, GND3, (not protected)
Frontal connector	
Type	20 pins 3.5 mm pitch female
Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup>

Cross section stranded, with ferrule with plastic sleeve min/max	24/16
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	130g

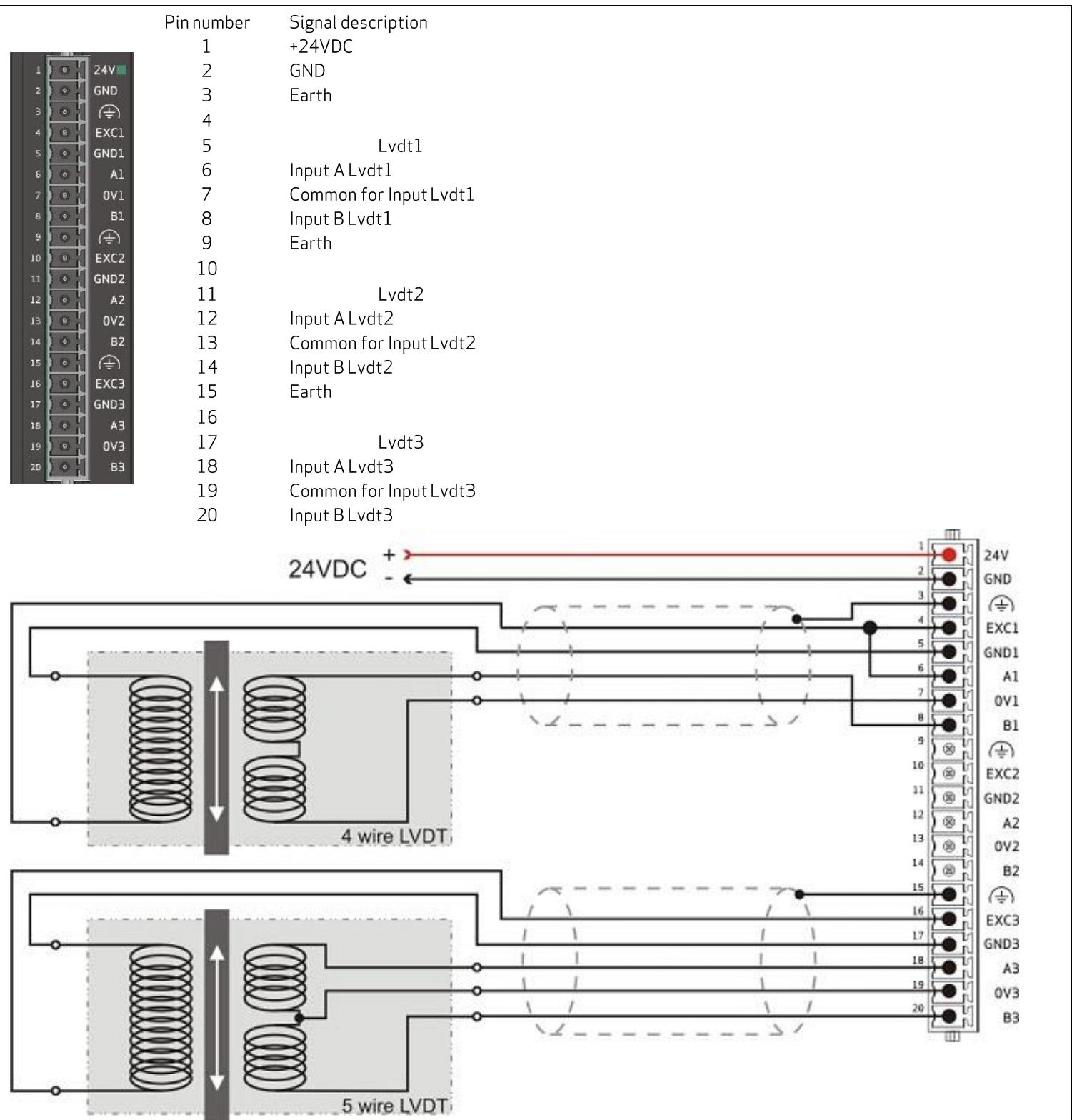
### 3.14.3Front View



- 24V Led:** Bicolour led:
  - Orange fixed = Standby from the CPU.
  - Red fixed = Flash CRC error.
  - Red blink = Internal voltage error.
  - Green fixed = Analog output stadium supplied.
  - Green blink = System initialization or CPU out of run.
- 20 Poles Connector:** Used for connecting the 3 Lvdt inputs to the module.

### 3.14.4Connections

Analog Input Pinout



### 3.14.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.14.6 LVDT IO Configuration in MASS

- LVDT 3 or 4 wires:

The physical value is calculated in this way:

$$PhysVal = 32768 \cdot \frac{Gain_B}{Gain_A} \cdot \frac{V_{Bx}}{V_{Ax}}$$

$$Gain_A = \frac{6.18}{LvdtAmplitude}$$

$$Gain_B = \frac{1}{LvdtKs \cdot LvdtStroke}$$

where:

$V_{Ax}$  is the rms voltage **input A**.

$V_{Bx}$  is the rms voltage **input B**.

$Gain_A$  is given from the previous formula and rounded down to a power of 2 (for LvdtAmplitude see the online help under Moog libraries - M\_Type).

$Gain_B$  is given from the previous formula and rounded down to a power of 2 (for LvdtKs and LvdtStroke see the online help under Moog libraries - M\_Type)

- LVDT 5 or 6 wires:

The physical value is calculated in this way:

$$PhysVal = 32768 \cdot \frac{V_{Bx} - V_{Ax}}{V_{Bx} + V_{Ax}}$$

where:

$V_{Ax}$  is the rms voltage **input A**.

$V_{Bx}$  is the rms voltage **input B**.

For use this card is necessary setting on the MASS application the following variables:

(Example) Where INP1 is the first input of lvdt card. Normally in the application is better initialize these parameters at startup of the PLC (Start1 task).

#### MC600plus Calibration Example:

```
// LVDT calibration
INP1.Configuration.P1 := -1.0;
INP1.Configuration.E1 := -470.0;
INP1.Configuration.P2 := +1.0;
INP1.Configuration.E2 := +470.0;

// Input 6204A001 LVDT setup
INP1.Configuration.LvdtFrequency := 1500;
INP1.Configuration.LvdtAmplitude := 5;
INP1.Configuration.LvdtKs := 0.10;
INP1.Configuration.LvdtStroke := 10;
INP1.Configuration.LvdtType := M_Mc600Types._MLvdtType.LVDT_4_WIRES;
```

```
INP1.Configuration.LvdtFilterType := M_Mc600Types._MFilterType.FILTER_NONE;  
INP1.Configuration.LvdtFilterFrequency := 50;  
INP1.Configuration.InputType := M_Mc600Types._MGenInType.INPUT_LVDT;  
INP1.Configuration.Update := TRUE;
```

## 3.15 IMI220-6501A001: 4 Encoder SSI/Quad

**WARNING!**

Before to operate with IMI220-6501A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.15.1 General Information

This module permit to read 4 encoders. Each channel can be individually configured to read incremental encoders (quadrature) or absolute (SSI or Start / Stop). In the case of Start / Stop is possible to read up to 4 magnets with a single encoder, in this case each magnet occupies a channel encoder. For all encoders communication interface is differential (RS422 5V). The LED associated with each channel displays the status of the count (LSB), and provides the encoder type set.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6501A001.**

### 3.15.2 Technical Characteristics

Code	IMI220-6501A001
Encoder number	4
Isolation	
Channel to channel	No
Channel to bus	100Vpp
Interface	
Driver type	Differential RS422
Receiver type	Texas Semiconductors ISL3295E
Input voltage	
Max voltage in common mode	±7V
Differential input	125mV
Encoder managed	
Relative	Quadrature (A and B = inputs) line-driver RS422
Absolute	Start/Stop (A = output > Start; B = input > Stop) PWM (A = output > Polarization; B = input > Data) SSI (A = input > Clock; B = input > Data)
Special function	
Managing multi magnet for encoder Start/Stop	Yes
Automatically download parameters for encoder Start/Stop	Yes
Event comparators	Yes
Frequency	
Quadrature	400KHz MAX
SSI	7.5KHZ - 1MHz
Start/Stop	50MHz
PWM	50MHz
Counter resolution	32BIT
Comparators	
Number	1 for each channels
Resolution	32BIT
Event	Greater than, Less than
Protection	
Voltage on inputs/outputs	Yes
Protection type	Self-resetting fuse
Max voltage	36V Max
Diagnostic	
Broken wire sensor	Yes only for the input channels
Bicolour led	Encoder type, alarm counter
Common points between channels	0V1, 0V2, 0V3, 0V4
Frontal connector	

Type Mating connector	20 pins 3.5 mm pitch female 20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

### 3.15.3 Front View



- **4 Led:** Bicolour led:
  - OFF = Disabled channel
  - Green = Quadrature encoder
  - Yellow = Start/Stop encoder
  - Yellow = PWM encoder
  - Orange = SSI encoder
  - Red = Broken wire (only for inputs)
  - Red = Absence magnet (only Start/Stop and PWM)

- **20 Poles Connector:** Used for connecting the 4 encoder to the module.

### 3.15.4 Connections

CARD	QUADRATURE	START/STOP	PWM	SSI
A+	A+	START+	Bridge with B-	Clock+
A-	A-	START-	Libero	Clock-
B+	B+	STOP+	PWM	Data+
B-	B-	STOP-	Bridge with A+	Data-
OV	Common	Common	Common	Common

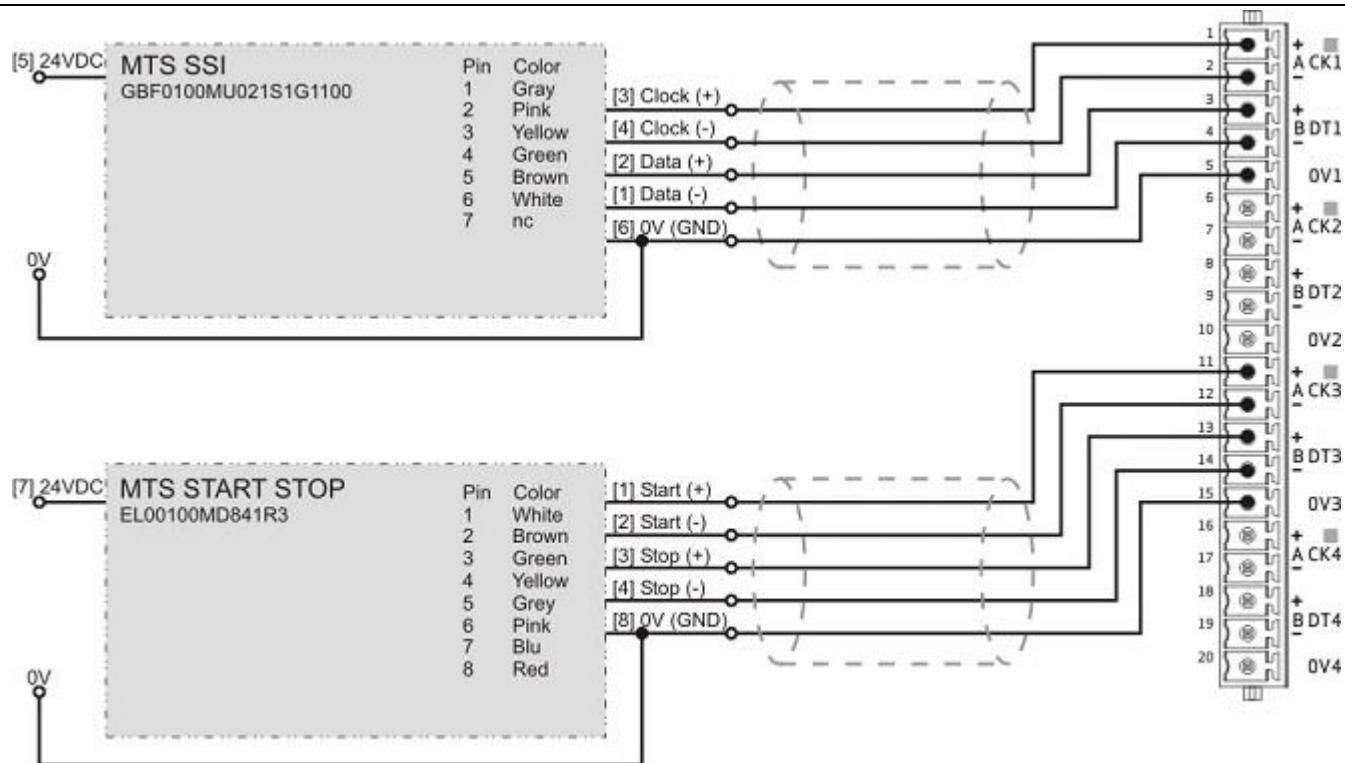
#### Encoder Pinout



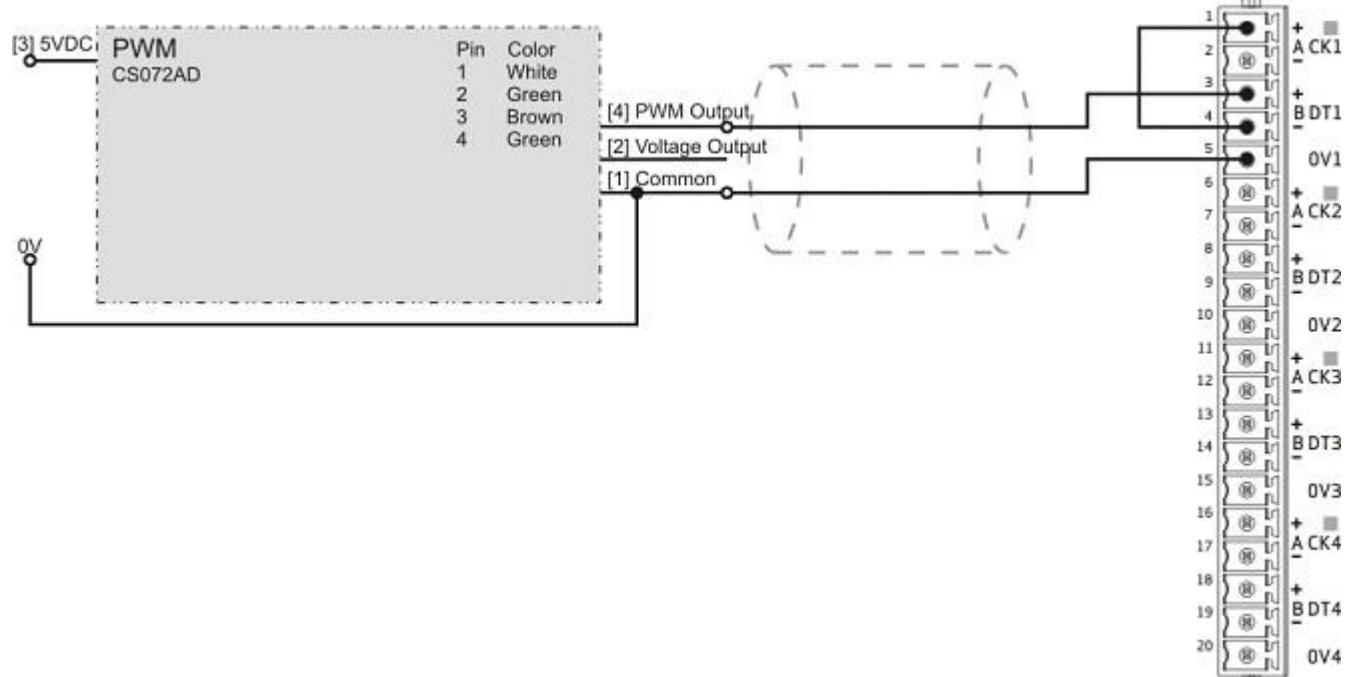
Pin number	Signal description
1	Channel 1 A+
2	Channel 1 A-
3	Channel 1 B+
4	Channel 1 B-
5	OV1
6	Channel 2 A+
7	Channel 2 A-
8	Channel 2 B+
9	Channel 2 B-
10	OV2
11	Channel 3 A+
12	Channel 3 A-
13	Channel 3 B+
14	Channel 3 B-
15	OV3
16	Channel 4 A+
17	Channel 4 A-
18	Channel 4 B+
19	Channel 4 B-
20	OV4

Encoder SSI

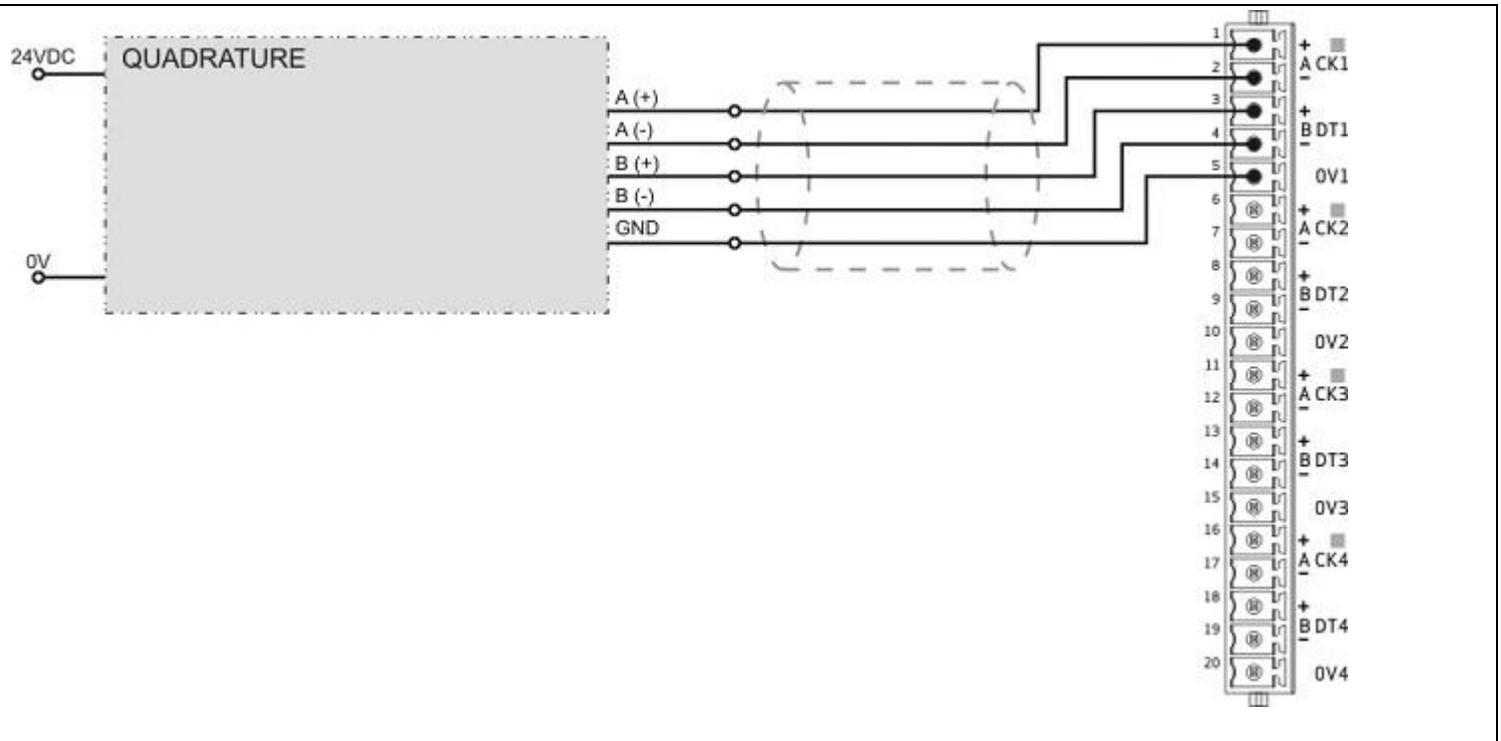
Encoder Start/Stop



## Encoder PWM



## Encoder Quadrature



### 3.15.5 Multi-magnets management

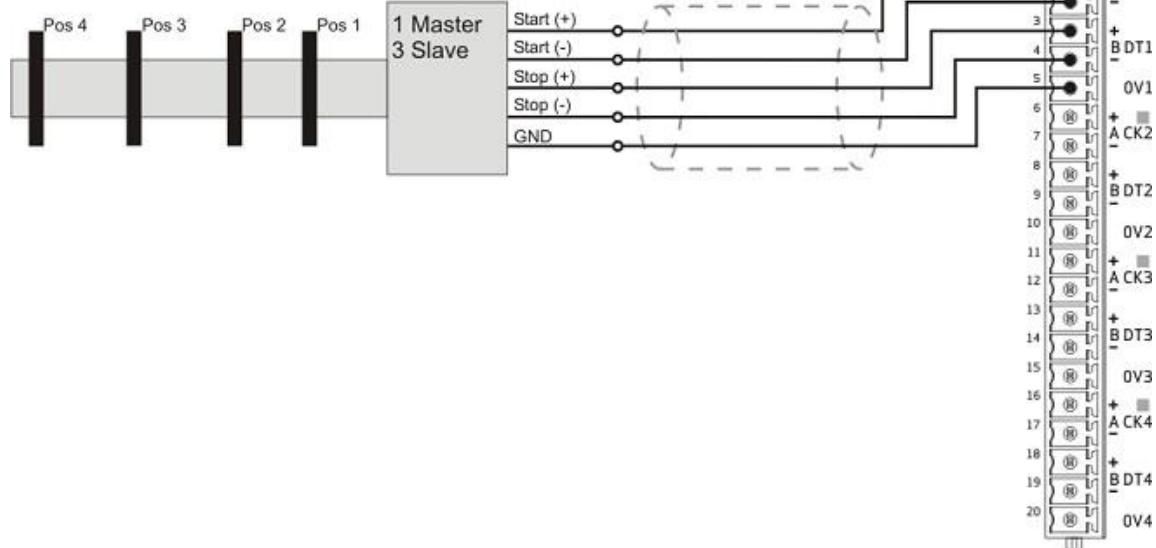
Possible combinations Master/Slave fore encoder Start/Stop. Rules of Usage:

- The encoder signals must be connected to the channel defined as Master.
- The connections of the slave must be left free.
- The Masters and the Slaves must be contiguous.

#### Connections examples

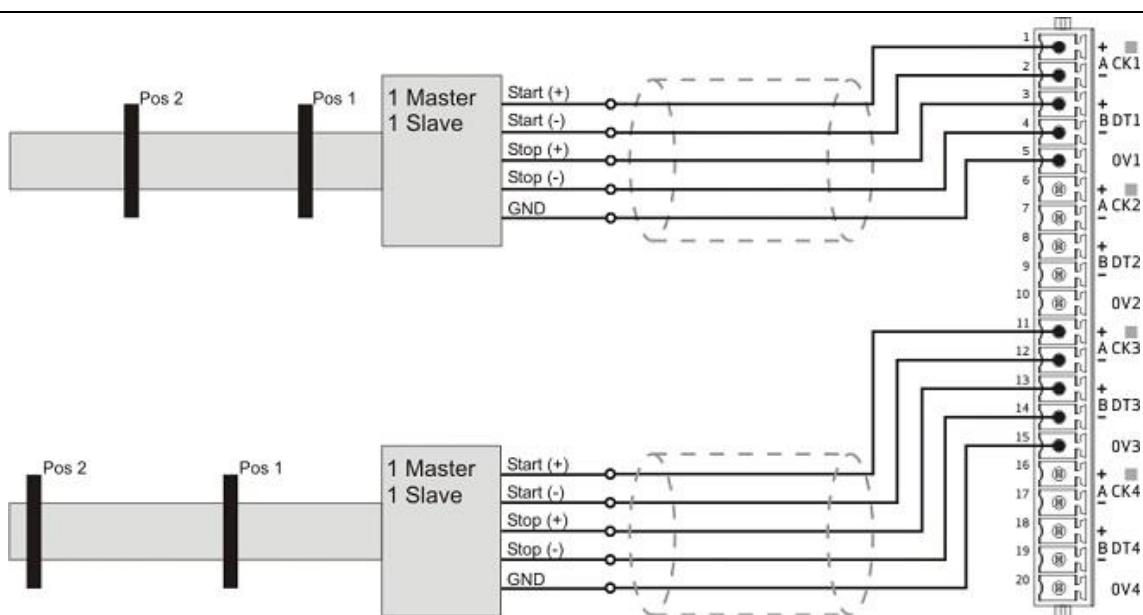
##### 1 Encoder Start/Stop with 4 magnets

- 1 Master + 3 Slave



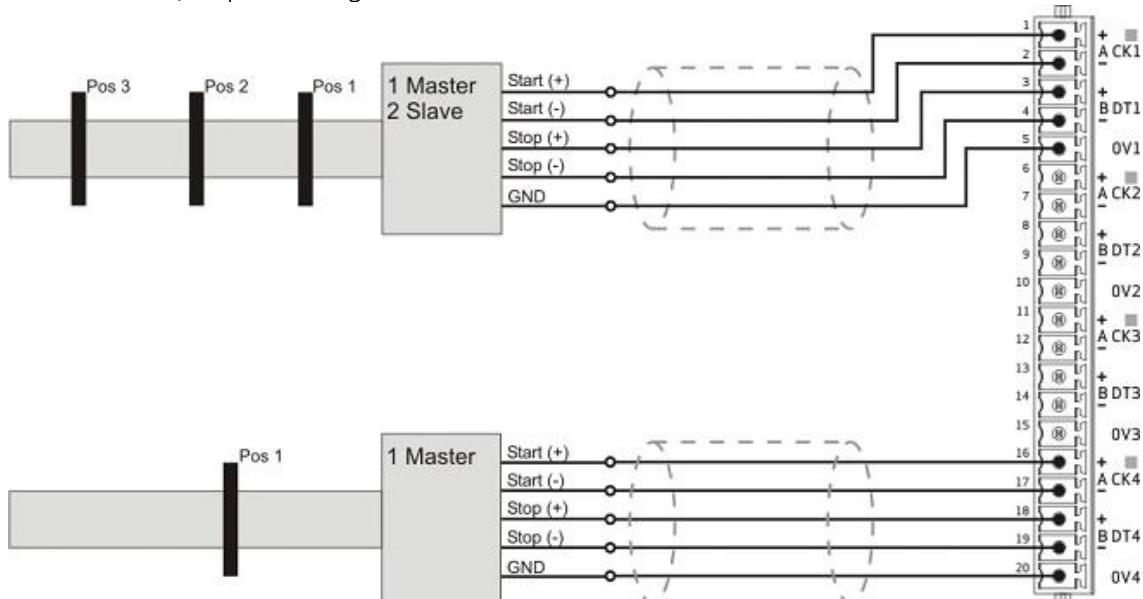
##### 2 Encoder Start/Stop with 2 magnets

- 1 Master + 1  
Slave  
- 1 Master + 1  
Slave

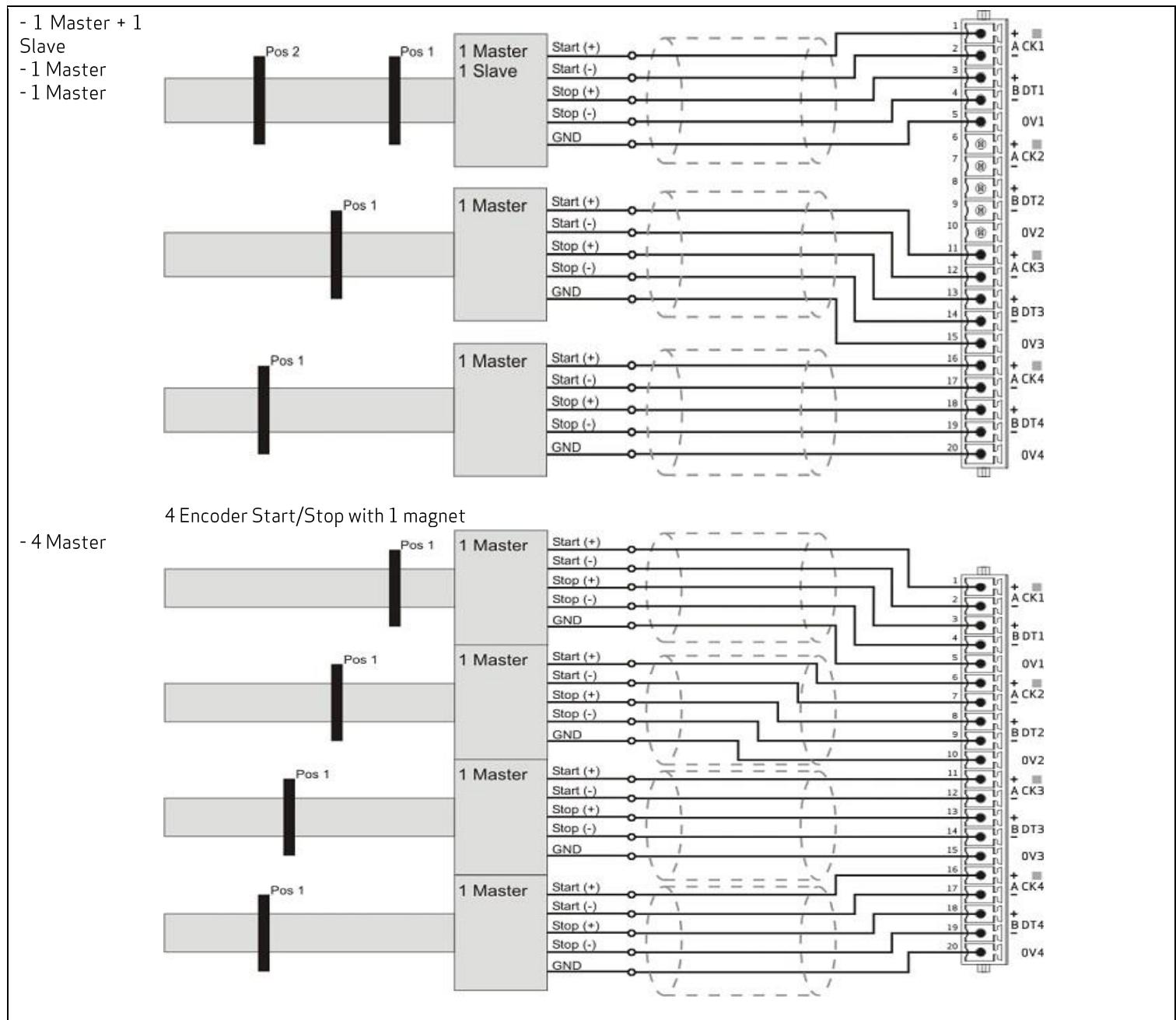


1 Encoder Start/Stop with 3 magnets  
1 Encoder Start/Stop with 1 magnet

- 1 Master + 2  
Slave  
- 1 Master



1 Encoder Start/Stop with 2 magnets  
1 Encoder Start/Stop with 1 magnet  
1 Encoder Start/Stop with 1 magnet



### 3.15.6 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.15.7 IO Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where INP1 is the first input of Encoder card. Normally in the application is better initialize these parameters at startup of the PLC (Start1 task).

### 3.15.8 MC600plus calibration example

- SSIBinaryMaster:

INP1.Configuration.InputType := M\_Mc600PlusTypes.\_MGenInType.INPUT\_ENCODER;

```

INP1.Configuration.EncoderType := M_Mc600PlusTypes._MEncType.SSI_BINARY;
INP1.Configuration.EncoderTimeBase := M_Mc600PlusTypes._MEncoderTimeBase.TIME_BASE_CLASS_0; (SSI Baudrate characteristics, see note 1. below)
INP1.Configuration.SsiBits := 24; (See the SSI characteristics)
INP1.Configuration.SsiMonoFlopTime := M_Mc600PlusTypes._MSsiMonoFlopTime.MONOFLOP_AUTO; (SSI Monoflop time, see note 2. below)
INP1.Configuration.Update := TRUE;

```

- SSIGrayMaster:

```

INP1.Configuration.InputType := M_Mc600PlusTypes._MGenInType.INPUT_ENCODER;
INP1.Configuration.EncoderType := M_Mc600PlusTypes._MEncType.SSI_GRAY;
INP1.Configuration.EncoderTimeBase := M_Mc600PlusTypes._MEncoderTimeBase.TIME_BASE_CLASS_0; (*SSI Baudrate characteristics, see note 1. below*)
INP1.Configuration.SsiBits := 24; (SSI data bit size characteristics)
INP1.Configuration.SsiMonoFlopTime := M_Mc600PlusTypes._MSsiMonoFlopTime.MONOFLOP_AUTO; (*SSI Monoflop time, see note 2. below*)
INP1.Configuration.Update := TRUE;

```

**Note 1.**

Set EncoderTimeBase value depending of encoder baudrate. Value will be clamped at the following lower value:

```

TIME_BASE_CLASS_0 := 1MHz
TIME_BASE_CLASS_1 := 500kHz
TIME_BASE_CLASS_2 := 250kHz
TIME_BASE_CLASS_3 := 125kHz
TIME_BASE_CLASS_4 := 62kHz
TIME_BASE_CLASS_5 := 31kHz
TIME_BASE_CLASS_6 := 15kHz
TIME_BASE_CLASS_7 := 7.5kHz

```

For intermediate value, set the next higher clamp value.

i.e.:

```

for SSI encoder with 70 kBd of baudrate, set Configuration.EncoderTimeBase := M_Mc600PlusTypes._MEncoderTimeBase.TIME_BASE_CLASS_3(125kHz);

```

**Note 2.**

Set SsiMonoFlopTime depending on encoder monoflop time (or transfer timeout): MONOFLOP\_64us = 64uS, MONOFLOP\_200us = 200uS, MONOFLOP\_600us = 600uS, MONOFLOP\_AUTO = 1.2ms(auto, use only with MTS encoder).

For intermediate value, set the next higher value.

i.e.:

```

for SSI encoder with Monoflop time 128uS, set Configuration.SsiMonoFlopTime := M_Mc600PlusTypes._MSsiMonoFlopTime.MONOFLOP_200us;

```

- StartStopMaster:

```

INP1.Configuration.InputType := M_Mc600PlusTypes._MGenInType.INPUT_ENCODER;
INP1.Configuration.EncoderType := M_Mc600PlusTypes._MEncType.START_STOP_MASTER
INP1.Configuration.EncoderTimeBase := M_Mc600PlusTypes._MEncoderTimeBase.TIME_BASE_CLASS_0; (Baudrate, this depending of the cable length)
INP1.Configuration.Update := TRUE;

```

## 3.16 IMI220-6250A001: 4AO 16BIT

**WARNING!**

Before to operate with IMI220-6250A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.16.1 General Information

Analog output module. This module permit to command 4 analog outputs. The outputs are single ended type with a 16 bit resolution. For each channels can be programmable via software the output range: +5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V. The maximum current for each channels is 10mA. These outputs are supply with an external PSU at 24VDC.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6250A001.**

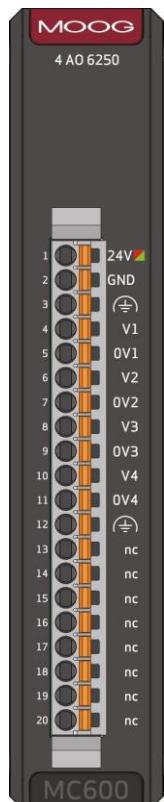
### 3.16.2 Technical Characteristics

Code	IMI220-6250A001
Analog Output	4
Output type	Single ended
Output resistance	0.5Ω
Output range	+5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V
Voltage (sw selectable)	+5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V
Current	±10mA
Short circuit protection	Yes
Over voltage	Yes (with PTC)
Resolution	16BIT
Analog output error	
Maximum error @ 25°C	0.46% <sup>(1)</sup>
Temperature coefficient	18ppm/°C
Maximum error over full temperature range	0.54% FS
Value of LSB	0.3mV (for ±10VDC output range)
Maximum permanent allowed overload	30VDC
Output control during power-up/brownout	Yes (0VDC clamped with 4KΩ resistor)
Crosstalk between channels	66dB
Total output system transfer time	20μs
Repeatability	0.02% @ FS
Conversion method	Successive approximation
Total Unadjusted Error (TUE)	±0.1% of FS
Offset Error	±6mV (max)
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Common points between channels	0V1, 0V2, 0V3, 0V4
Diagnostics	
24VDC	Bicolour led (fault, ok, stand-by)
Frontal connector	
Type	20 pins 3.5 mm pitch female

Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

1. @ I load = 10mA

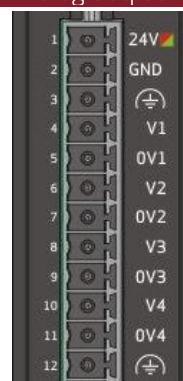
### 3.16.3Front View



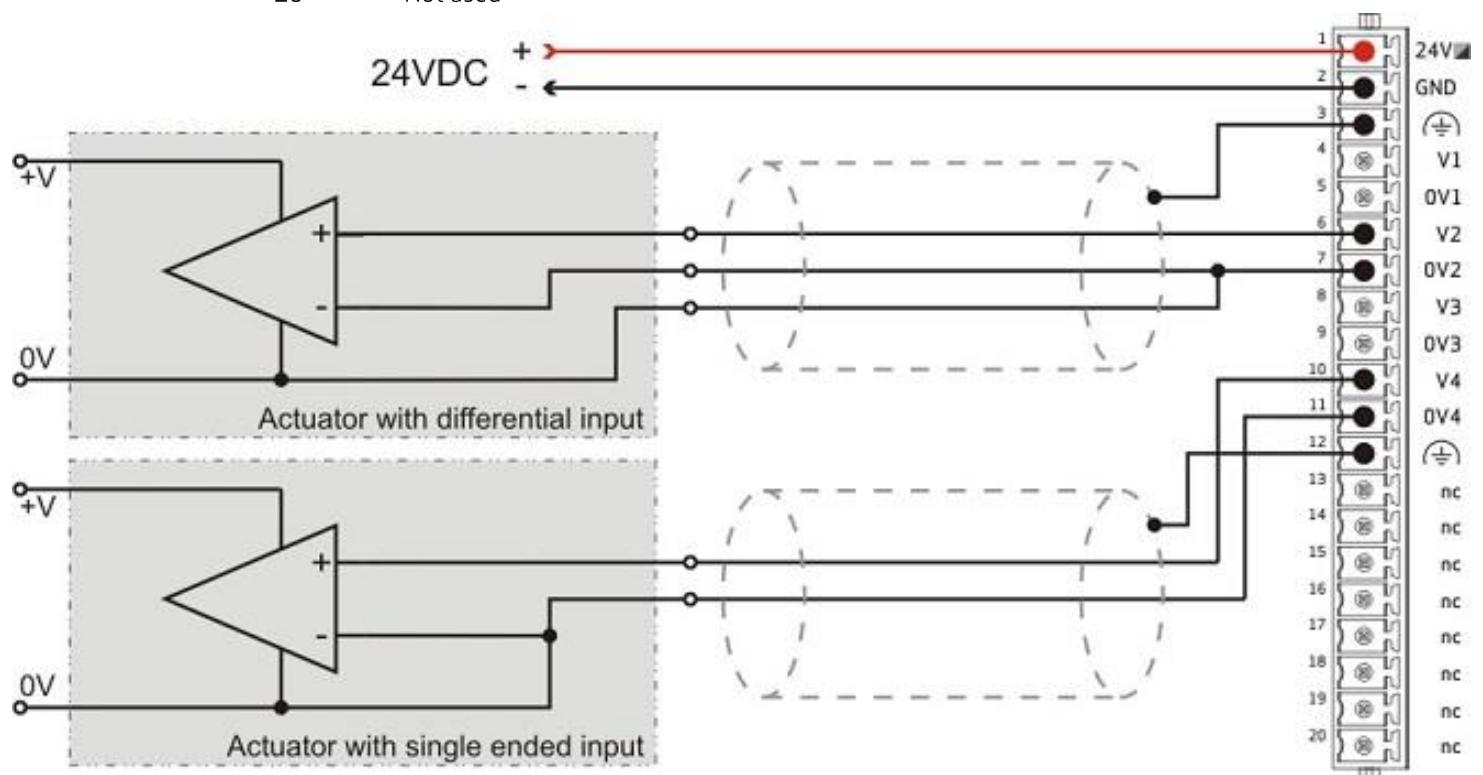
- **24V Led:** Bicolour led:
  - Orange fixed = Standby from the CPU
  - Red fixed = Analog output fault
  - Green fixed = Analog output stadium supplied
- **20 Poles Connector:** Used for connecting the 4 analog outputs to the module.

### 3.16.4 Connections

#### Analog Output Pinout



Pin number	Signal description
1	+24VDC
2	GND
3	Earth
4	Analog Output V1
5	Analog Output OV1
6	Analog Output V2
7	Analog Output OV2
8	Analog Output V3
9	Analog Output OV3
10	Analog Output V4
11	Analog Output OV4
12	Earth
13	Not used
14	Not used
15	Not used
16	Not used
17	Not used
18	Not used
19	Not used
20	Not used



### 3.16.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.16.6 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where OUT1 is the first output of analog output card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration Example:

```
// Calibration:  
OUT1.Configuration.OutputType := M_Mc600Types._MGenOutType.OUTPUT_VOLTAGE_10V;  
OUT1.Configuration.ScalingLevel := M_Mc600Types._MGenScaling.ENGINEERING_SCALING;  
OUT1.Configuration.E1 := -10;  
OUT1.Configuration.E2 := +10;  
OUT1.Configuration.P1 := -10;  
OUT1.Configuration.P2 := +10;
```

## 3.17 IMI220-6251A001: 8AO 16BIT

**WARNING!**

Before to operate with IMI220-6251A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.17.1 General Information

Analog output module. This module permit to command 8 analog outputs. The outputs are single ended type with a 16 bit resolution. For each channels can be programmable via software the output range: +5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V. The maximum current for each channels is 10mA. These outputs are supply with an external PSU at 24VDC.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6251A001.**

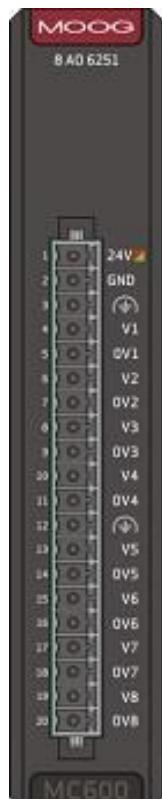
### 3.17.2 Technical Characteristics

Code	IMI220-6251A001
Analog Output	8
Output type	Single ended
Output resistance	0.5Ω
Output range	
Voltage (sw selectable)	+5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V
Current	±10mA
Short circuit protection	Yes
Over voltage	Yes (with PTC)
Resolution	16BIT
Analog output error	
Maximum error @ 25°C	0.46% <sup>1</sup>
Temperature coefficient	18ppm/°C
Maximum error over full temperature range	0.54% FS
Value of LSB	0.3mV (for ±10VDC output range)
Maximum permanent allowed overload	30VDC
Output control during power-up/brownout	Yes (0VDC clamped with 4KΩ resistor)
Crosstalk between channels	66dB
Total output system transfer time	20μs
Repeatability	0.02% @ FS
Conversion method	Successive approximation
Total Unadjusted Error (TUE)	±0.1% of FS
Offset Error	±6mV (max)
Isolation	
Channel to channel	No
Group to group	No
Channel to bus	Yes
Common points between channels	0V1, 0V2, 0V3, 0V4, 0V5, 0V6, 0V7, 0V8
Diagnostics	
24VDC	Bicolor led (fault, ok, stand-by)
Frontal connector	
Type	20 pins 3.5 mm pitch female

Mating connector	20 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

1. @ I load = 10mA

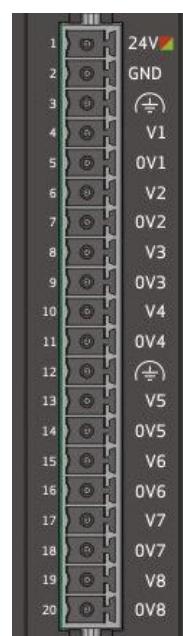
### 3.17.3Front View



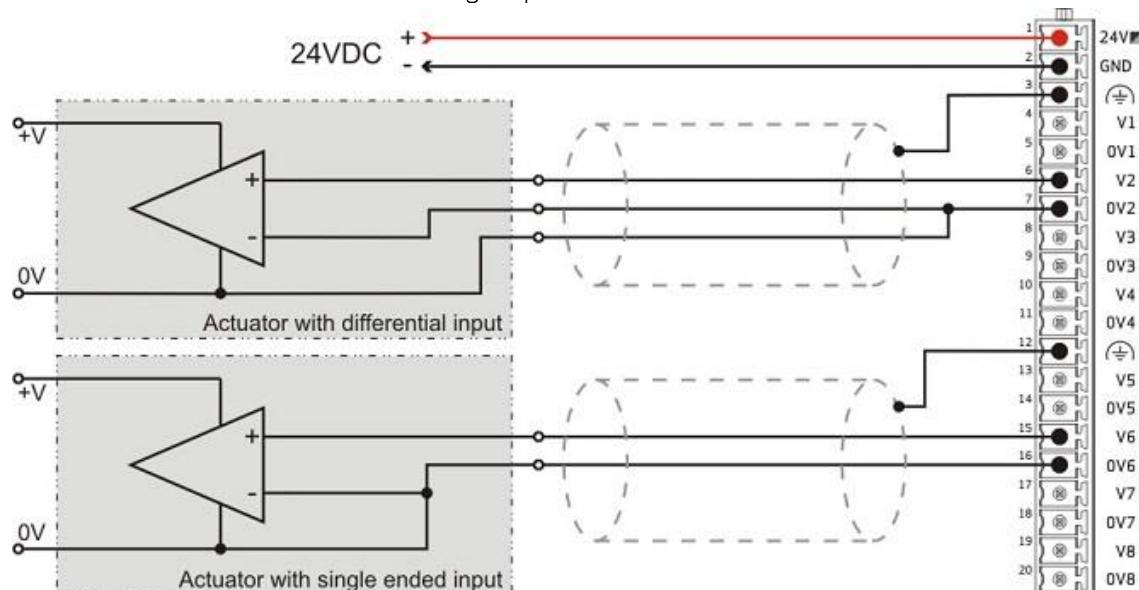
- **24V Led:** Bicolour led:
  - Orange fixed = Standby from the CPU
  - Red fixed = Analog output fault
  - Green fixed = Analog output stadium supplied
- **20 Poles Connector:** Used for connecting the 8 analog outputs to the module.

### 3.17.4 Connections

#### Analog Output Pinout



Pin number	Signal description
1	+24VDC
2	GND
3	Earth
4	Analog Output V1
5	Analog Output OV1
6	Analog Output V2
7	Analog Output OV2
8	Analog Output V3
9	Analog Output OV3
10	Analog Output V4
11	Analog Output OV4
12	Earth
13	Analog Output V5
14	Analog Output OV5
15	Analog Output V6
16	Analog Output OV6
17	Analog Output V7
18	Analog Output OV7
19	Analog Output V8
20	Analog Output OV8



### 3.17.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.17.6 IO Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where OUT1 is the first output of analog output card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

#### MC600plus Calibration Example:

```
// Calibration:
```

```
OUT1.Configuration.OutputType := M_Mc600Types._MGenOutType.OUTPUT_VOLTAGE_10V;  
OUT1.Configuration.ScalingLevel := M_Mc600Types._MGenScaling.ENGINEERING_SCALING;  
OUT1.Configuration.E1 := -10;  
OUT1.Configuration.E2 := +10;  
OUT1.Configuration.P1 := -10;  
OUT1.Configuration.P2 := +10;
```

## 3.18 IMI220-6260A001: 4AO I/V 16BIT

**WARNING!**

Before to operate with IMI220-6260A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.18.1 General Information

Analog output module. This module permit to command 4 analog outputs. The outputs are single ended type with a 16 bit resolution. For each channels can be programmable via software the output range: +5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V. The maximum current for each channels is -100mA..+100mA. These outputs are supply with an external PSU at 24VDC.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6260A001.**

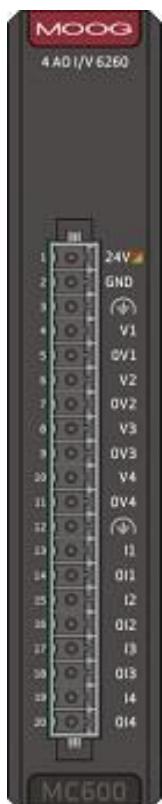
### 3.18.2 Technical Characteristics

Code	IMI220-6260A001	
Feedback	Voltage	Current
Analog Output	4	
Output type	Single ended	
Output resistance	0.5Ω	
Output range		
Voltage	Voltage out: +5 V, +10 V, +10.8 V, ±5 V, ±10 V, ±10.8 V (sw selectable)	12V
Current	±10mA	±100mA
Short circuit protection	Yes	
Over voltage	Yes (with PTC)	
Resolution	16BIT	
Analog output error		
Maximum error @ 25°C	0.46% <sup>(1)</sup>	
Temperature coefficient	18ppm/°C	
Maximum error over full temperature range	0.54% FS	
Value of LSB	0.3mV (for ±10VDC output range)	
Maximum permanent allowed overload	30VDC	
Output control during power-up/brownout	Yes (0VDC clamped with 4KΩ resistor)	
Crosstalk between channels	66dB	
Total output system transfer time	20µs	
Repeatability	0.02% @ FS	
Conversion method	Successive approximation	
Total Unadjusted Error (TUE)	±0.1% of FS	
Offset Error	±6mV (max)	
Isolation		
Channel to channel	No	
Group to group	No	
Channel to bus	Yes	
Common points between channels	0V1, 0V2, 0V3, 0V4 0I1, 0I2, 0I3, 0I4	

Diagnostics 24VDC	Bicolour led (fault, ok, stand-by)
Frontal connector Type Mating connector	20 pins 3.5 mm pitch female 20 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

1. @ I load = 10mA

### 3.18.3 Front View



- **24V Led:** Bicolour led:
  - Orange fixed = Standby from the CPU
  - Red fixed = Analog output fault

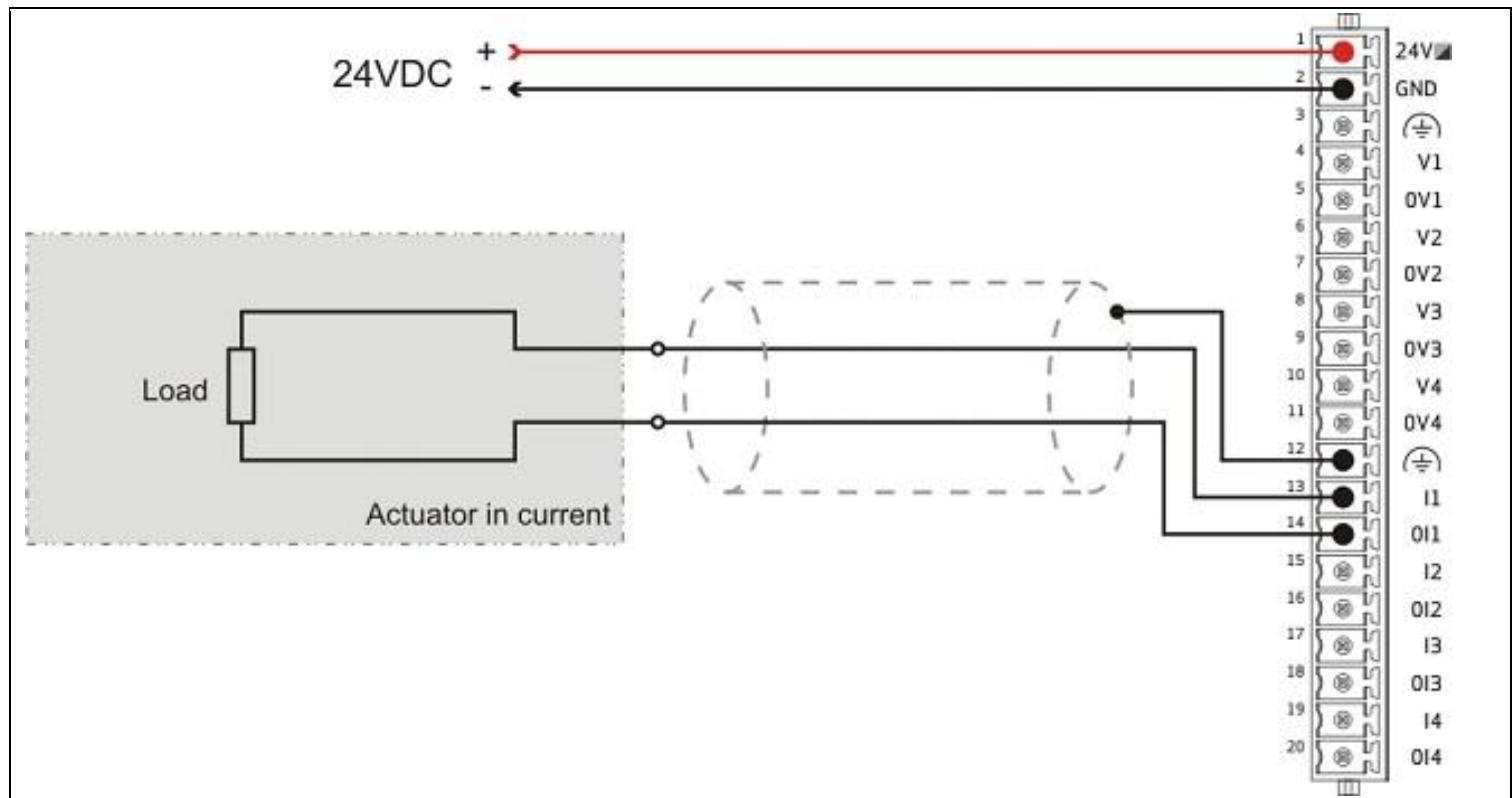
- Green fixed = Analog output stadium supplied
- **20 Poles Connector:** Used for connecting the 4 analog outputs to the module.

### 3.18.4 Connections

Analog Output Pinout

Pin number	Signal description
1	+24VDC
2	GND
3	Earth
4	Analog Output V1
5	Analog Output OV1
6	Analog Output V2
7	Analog Output OV2
8	Analog Output V3
9	Analog Output OV3
10	Analog Output V4
11	Analog Output OV4
12	Earth
13	Analog Output I1
14	Analog Output OI1
15	Analog Output I2
16	Analog Output OI2
17	Analog Output I3
18	Analog Output OI3
19	Analog Output I4
20	Analog Output OI4

The diagram illustrates the connection of two types of actuators to a 20-pole connector. The top section shows an actuator with differential input, where the positive supply (+V) is connected to pin 4 and the negative supply (0V) is connected to pin 5. The actuator's control signal is connected to pins 6 through 12. The bottom section shows an actuator with single ended input, where the positive supply (+V) is connected to pin 4 and the common ground (GND) is connected to pin 5. The actuator's control signal is connected to pins 6 through 12. Pin 1 is connected to the +24VDC power source, and pin 2 is connected to GND.



### 3.18.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.18.6 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where OUT1 is the first output of analog output card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration example:

```
// Calibration for Voltage feedback
INP1.Configuration.OutputType := M_Mc600Types._MGenOutType.OUTPUT_VOLTAGE_10V;
INP1.Configuration.ScalingLevel := M_Mc600Types._MGenScaling.PHYSICAL_SCALING;
INP1.Configuration.E1 := 0;
INP1.Configuration.E2 := 0;
INP1.Configuration.P1 := -10;
INP1.Configuration.P2 := +10;
```

// Calibration for current feedback

```
OUT1.Configuration.OutputType := M_Mc600Types._MGenOutType.OUTPUT_CURRENT_100mA;
OUT1.Configuration.ScalingLevel := M_Mc600Types._MGenScaling.PHYSICAL_SCALING;
OUT1.Configuration.E1 := 0;
OUT1.Configuration.E2 := 0;
OUT1.Configuration.P1 := -100;
OUT1.Configuration.P2 := +100;
```

## 3.19 IMI220-6262A001: 4AO I/V 16BIT 100mA

**WARNING!**

Before to operate with IMI220-6262A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.19.1 General Information

Analog output module for High impedance load. This module permit to command 4 analog outputs. The outputs are single ended type with a 16 bit resolution. For each channels can be programmable via software the output range and each out can be used with voltage feedback or current feedback. These outputs are supply with an external PSU at 24VDC.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6262A001.**

### 3.19.2 Technical Characteristics

Code	IMI220-6262A001	
Feedback	Voltage	Current
Analog Output	4	
Output type	Single ended	
Output resistance	- $\Omega$	- $\Omega$
Output range		
Voltage	+5 V, +10 V, +10.8 V, $\pm 5$ V, $\pm 10$ V, $\pm 10.8$ V (sw select)	$\pm 22$ V (max)
Current	$\pm 100$ mA (max)	+25mA, +50mA, +54mA, $\pm 25$ mA, $\pm 50$ mA,
Short circuit protection	Yes (120mA)	$\pm 54$ mA (sw select) Yes
Resolution	16BIT	
Output max offset	$\pm 3$ mV	$\pm 0.08$ mA
Analog output error		
Maximum error @ 25°C	- %	- %
Temperature coefficient	- ppm/ $^{\circ}$ C	- ppm/ $^{\circ}$ C
Maximum error over full temperature range	- %	- %
Value of LSB	0.3mV (for $\pm 10$ VDC output range)	0.15mA (for $\pm 50$ mA output range)
Maximum permanent allowed overload	$\pm 33$ VDC	$\pm 33$ VDC
Output control during power-up/brownout	Yes	Yes
Crosstalk between channels	66dB	
Total output system transfer time	20 $\mu$ s	
Repeatability	0.02% @ FS	
Conversion method	Successive approximation	
Total Unadjusted Error (TUE)	$\pm 0.1$ % of FS	
Isolation		
Channel to channel	No	
Group to group	No	
Channel to bus	Yes	
Common points between channels	0V1, 0V2, 0V3, 0V4 0I1, 0I2, 0I3, 0I4	
Diagnostics		
24VDC	Bicolour led	

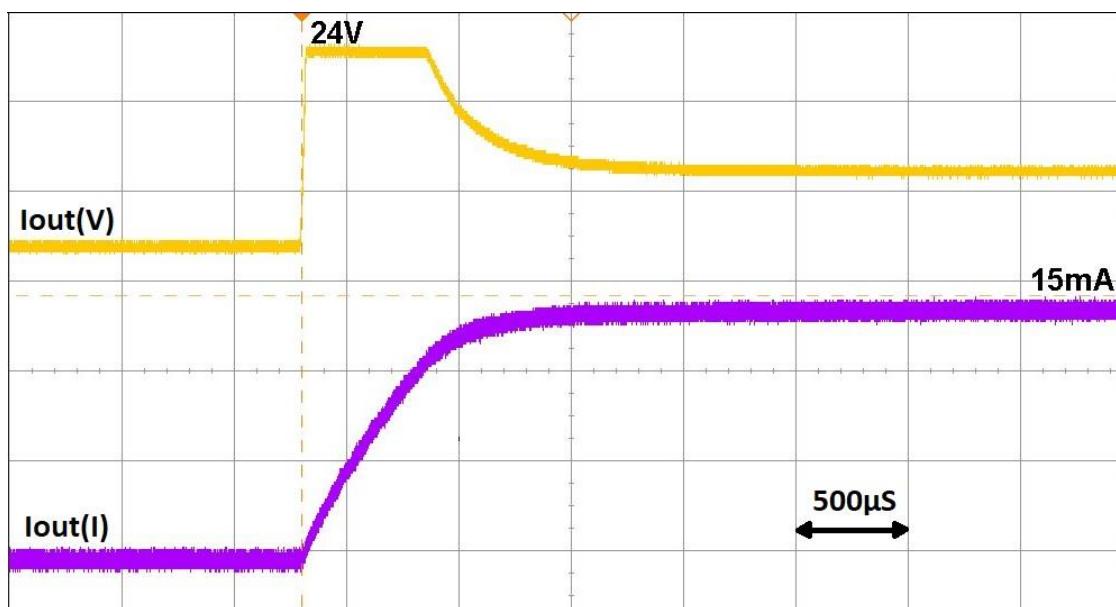
Frontal connector	20 pins 3.5 mm pitch female
Type	20 pins 3.5 mm pitch male
Mating connector	
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	- g

1. @ I load = 10mA

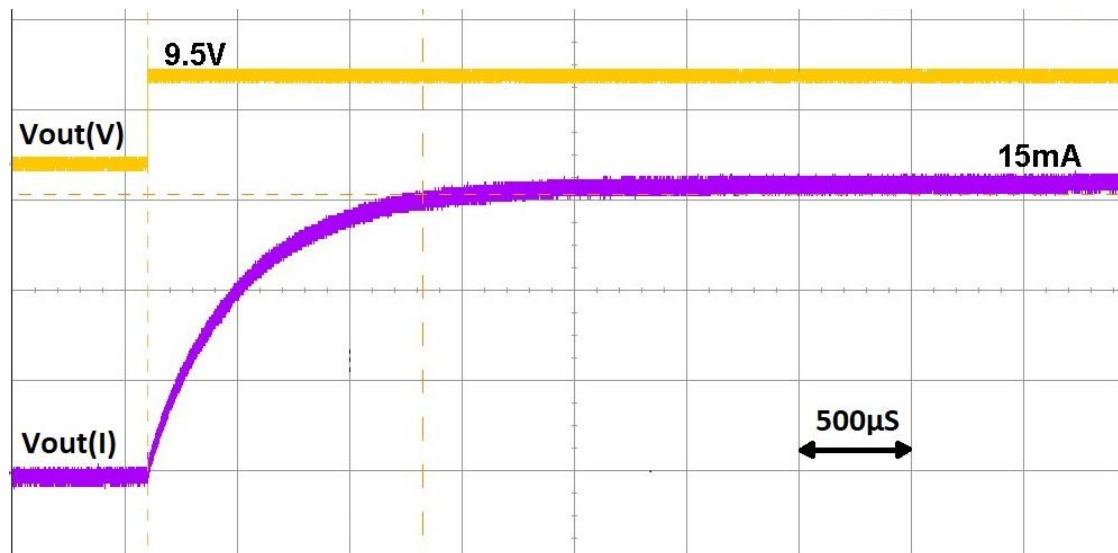
### 3.19.3 Performance Example

Load data	L: 772mH
	R: 612Ω
	I <sub>n</sub> : 15mA
	Windings connected in series
	R <sub>sense</sub> : 10Ω

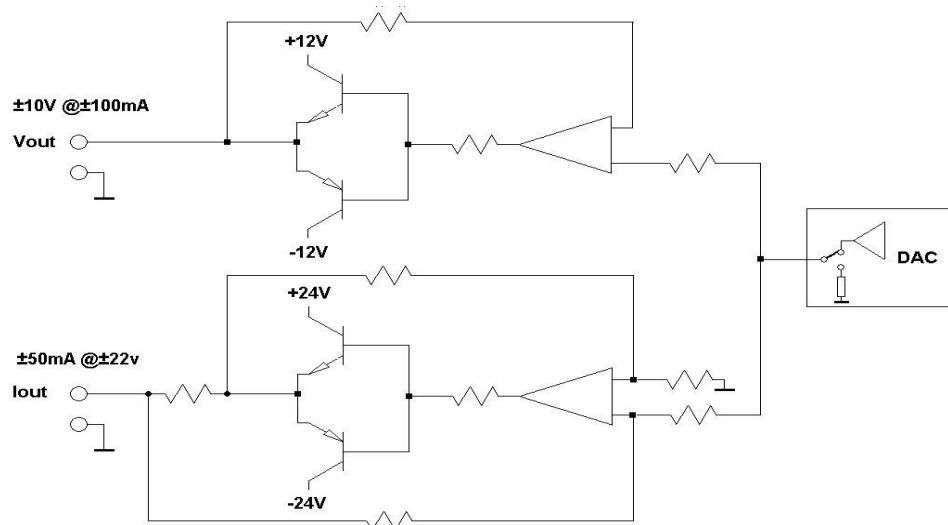
- Current feedback



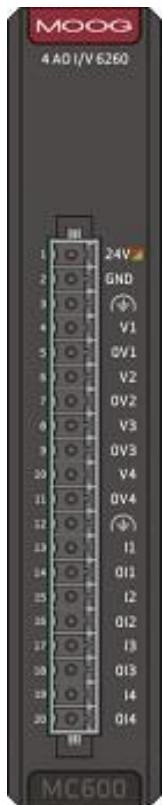
- Voltage feedback



3.19.4 Block Diagram



3.19.5 Front View

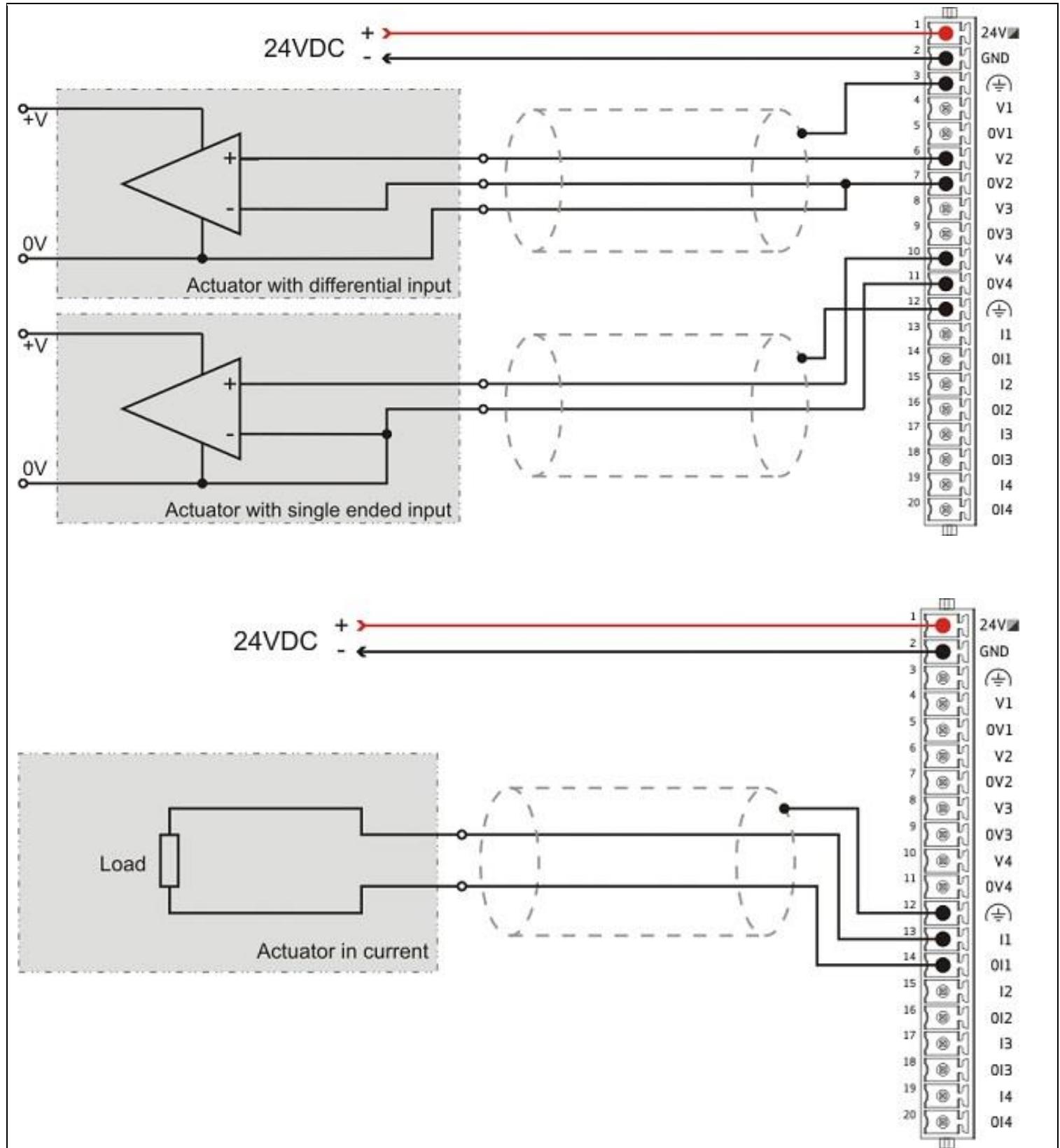


- 24V Led:** Bicolour led:
  - Red fix: internal power supply ko
  - Red flash: internal DAC overtemperature
  - Orange fix: local bus inactive or in boot
  - Orange flash: internal DAC overcurrent
  - Green fix: board ok
  - Green flash: application not running
- 20 Poles Connector:** Used for connecting the 4 analog outputs to the module.

### 3.19.6 Connections

Analog Output Pinout

Pin number	Signal description
1	+24VDC
2	GND
3	Earth
4	Analog Output V1
5	Analog Output OV1
6	Analog Output V2
7	Analog Output OV2
8	Analog Output V3
9	Analog Output OV3
10	Analog Output V4
11	Analog Output OV4
12	Earth
13	Analog Output I1
14	Analog Output OI1
15	Analog Output I2
16	Analog Output OI2
17	Analog Output I3
18	Analog Output OI3
19	Analog Output I4
20	Analog Output OI4



### 3.19.7 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.19.8 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where OUT1 is the first output of analog output card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration Example:

```
// Current feedback
OUT1.Configuration.ScalingLevel := M_Mc600plusTypes._MGenScaling.PHYSICAL_SCALING;
OUT1.Configuration.OutputType := M_Mc600plusTypes._MGenOutType.OUTPUT_CURRENT_50mA;
OUT1.Configuration.E1 := 0;
OUT1.Configuration.E2 := 0;
OUT1.Configuration.P1 := -50;
OUT1.Configuration.P2 := +50;
OUT1.Configuration.Update := TRUE;
```

## 3.20 IMI220-6220A001: 4TEMPERATURE 16BIT

**WARNING!**

Before to operate with IMI220-6220A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.20.1 General Information

Temperature module. This module permit to read 4 temperature inputs. The inputs are differential type with a 16 bit resolution. It's possible connect all the thermocouple type or PT100 2, 3, 4 wires and PT100 with neuter.

For understand better how to use this Module see the example:

**C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6220A001.**

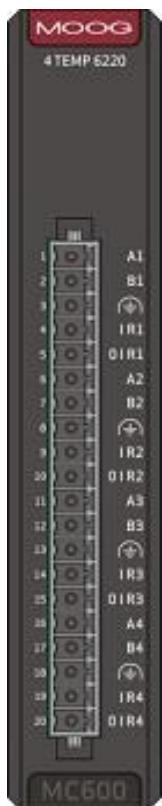
### 3.20.2 Technical Characteristics

Code	IMI220-6220A001
Temperature Input	4
Input type	Differential
Input resistance	> 2MΩ
Cold joint compensation	Yes
Interrupt	No
Analog input error Maximum error @ 25°C Temperature coefficient	0.1% <sup>1</sup> 125ppm/°C
Maximum error over full temperature range	0.54% FS
Digital resolution	16BIT
Value of LSB Maximum permanent allowed overload Iref out (for thermoresistance) Reading under overload condition Common mode characteristic	110VDC 102.4µA FS value (saturation) 100dB @ 60Hz
Temperature sensor Sensor type	4 Thermocouple or PT100 2, 3, 4 wires
Input range Voltage	±106mV
Total input system transfer time	10ms
Sample duration time	2.5ms
Sample repetition time	User programmable
Input filter characteristics Type Order Cut off frequency	Pass low 2nd order 1Hz
Conversion method	Delta sigma
Type of protection	RC
Crosstalk between channels	100dB
Total output system transfer time	20µs
Isolation Channel to channel Group to group	No No

Channel to bus	Yes
Frontal connector Type Mating connector	20 pins 3.5 mm pitch female 20 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

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

### 3.20.3Front View



- **20 Poles Connector:** Used for connecting the 4 temperature transducers to the module.

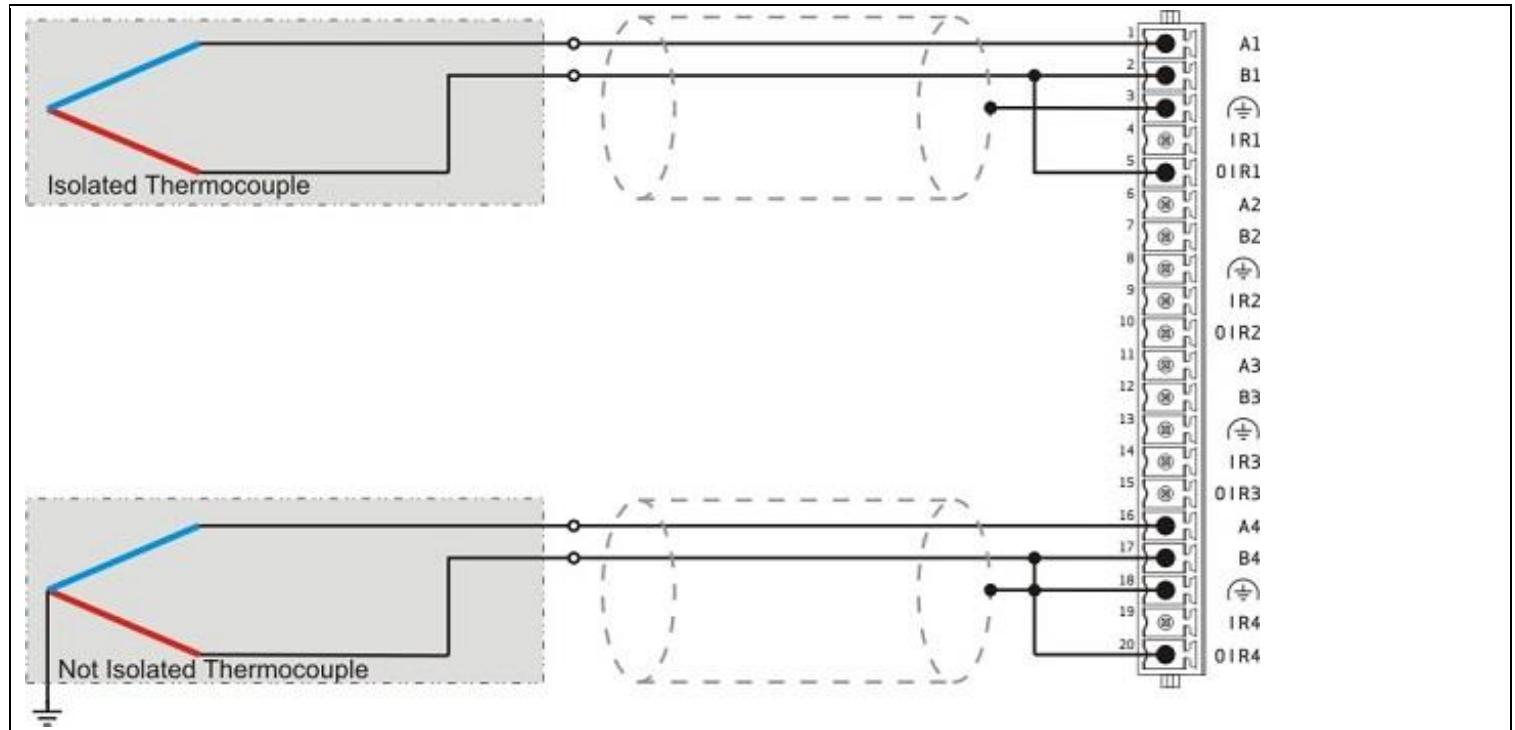
### 3.20.4Connections

## Temperature Input Pinout

Pin number	Signal description
1	Temperature Input A1+
2	Temperature Input B1-
3	Earth
4	Current Reference 1
5	0 Current Reference 1
6	Temperature Input A2+
7	Temperature Input B2-
8	Earth
9	Current Reference 2
10	0 Current Reference 2
11	Temperature Input A3+
12	Temperature Input B3-
13	Earth
14	Current Reference 3
15	0 Current Reference 3
16	Temperature Input A4+
17	Temperature Input B4-
18	Earth
19	Current Reference 4
20	0 Current Reference 4

The diagram illustrates three wiring configurations for Pt100 sensors:

- Pt100 - 4 wire:** The sensor is connected between pins 1 and 2, with its common reference junction connected to pin 10.
- Pt100 - 3 wire:** The sensor is connected between pins 1 and 2, with its common reference junction connected to pin 10.
- Pt100 - 2 wire:** The sensor is connected between pins 1 and 2, with its common reference junction connected to pin 10.



### 3.20.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

### 3.20.6 IO Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where TEMP1 is the first input of temperature input card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration Example:

```

TEMP1.Configuration.InputType := M_Mc600plusTypes._MGenInType.INPUT_COUPLER;
TEMP1.Configuration.CouplerType := M_Mc600plusTypes._MCouplerType.COUPLER_TJ;
TEMP1.Configuration.ScalingLevel := M_Mc600plusTypes._MGenScaling.ENGINEERING_SCALING;
TEMP1.Configuration.E1 := 0;
TEMP1.Configuration.E2 := 300;
TEMP1.Configuration.TemperatureScale := M_Mc600plusTypes._MTemperatureScale.CELSIUS;
TEMP1.Configuration.Update := TRUE;

```

## 3.21 IMI220-6221A001: 8TEMPERATURE 16BIT

**WARNING!**

Before to operate with IMI220-6221A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.21.1 General Information

Temperature module. This module permit to read 8 temperature inputs. The inputs are differential type with a 16 bit resolution. It's possible connect all the thermocouple type or PT100 2 wires.

For understand better how to use this Module see the example: **C:\Program Files (x86)\MASS\CoDeSys\Examples\M\_MC600Modules\IMI220-6221A001.**

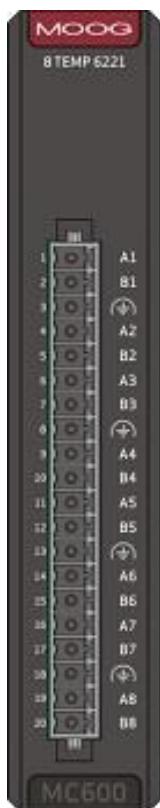
### 3.21.2 Technical Characteristics

<b>Code</b>	IMI220-6221A001
Temperature Input	8
Input type	Differential
Input resistance	> 2MΩ
Cold joint compensation	Yes
Interrupt	No
Analog input error Maximum error @ 25°C Temperature coefficient	0.1% <sup>1</sup> 125ppm/°C
Maximum error over full temperature range	0.57% FS
Digital resolution	16BIT
Value of LSB Maximum permanent allowed overload Iref out (for thermoresistance) Reading under overload condition Common mode characteristic	110VDC 102.4µA FS value (saturation) 100dB @ 60Hz
Temperature sensor Sensor type	8 Thermocouple or PT100 2 wires
Input range Voltage	±106mV
Total input system transfer time	20ms
Sample duration time	2.5ms
Sample repetition time	User programmable
Input filter characteristics Type Order Cut off frequency	Pass low 2nd order 1Hz
Conversion method	Delta sigma
Type of protection	RC
Crosstalk between channels	100dB
Total output system transfer time	20µs
Isolation Channel to channel Group to group	No No

Channel to bus	Yes
Frontal connector Type Mating connector	20 pins 3.5 mm pitch female 20 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Weight	90g

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

### 3.21.3Front View



- **20 Poles Connector:** Used for connecting the 8 temperature transducers to the module.

### 3.21.4Connections

## Temperature Input Pinout

Pin number	Signal description
1	Temperature Input A1+
2	Temperature Input B1-
3	Earth
4	Temperature Input A2+
5	Temperature Input B2-
6	Temperature Input A3+
7	Temperature Input B3-
8	Earth
9	Temperature Input A4+
10	Temperature Input B4-
11	Temperature Input A5+
12	Temperature Input B5-
13	Earth
14	Temperature Input A6+
15	Temperature Input B6-
16	Temperature Input A7+
17	Temperature Input B7-
18	Earth
19	Temperature Input A8+
20	Temperature Input B8-

## 3.21.5 Connections to the external

To wiring the module in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46666 I/O Connector](#)".

## 3.21.6 I/O Configuration in MASS

For use this card is necessary setting on the MASS application the following variables:

(Example) Where TEMP1 is the first input of temperature input card. Normally in the application is better initialize these parameters at startup of the PLC (**Start1** task).

MC600plus Calibration Example:

```
TEMP1.Configuration.InputType := M_Mc600plusTypes._MGenInType.INPUT_COUPLER;
TEMP1.Configuration.CouplerType := M_Mc600plusTypes._MCouplerType.COUPLER_TJ;
```

```
TEMP1.Configuration.ScalingLevel := M_Mc600plusTypes_MGenScaling_ENGINEERING_SCALING;  
TEMP1.Configuration.E1 := 0;  
TEMP1.Configuration.E2 := 300;  
TEMP1.Configuration.TemperatureScale := M_Mc600plusTypes_MTemperatureScale_CELSIUS;  
TEMP1.Configuration.Update := TRUE;
```

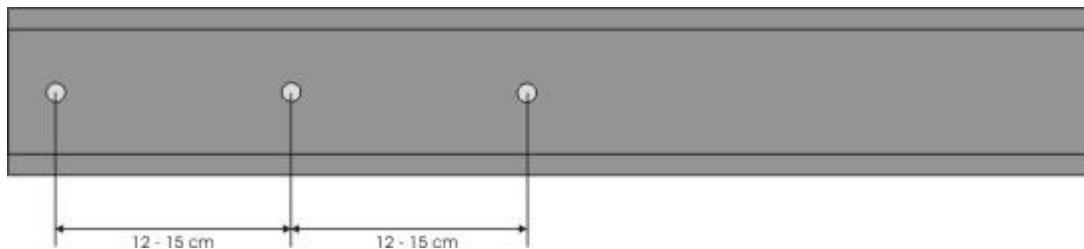
## 3.22 Installation distances

In order to guarantee a correct ventilation for the rack configuration, the following installation distances must be respected:

Rack side	Distances
Up	100mm
Down	100mm
Left	100mm
Right	100mm

### 3.23 Din Rail

MC600 series is organized in sockets that can be mounted on din rail. The din rail fixing is recommended placing the screws necessary to at least a distance between 12 cm and 15 cm. Compliance with this distance ensures excellent stability of the system is, during the operations of hooking and unhooking of modules from the socket, is to the vibrations of the machine.



#### ATTENTION:

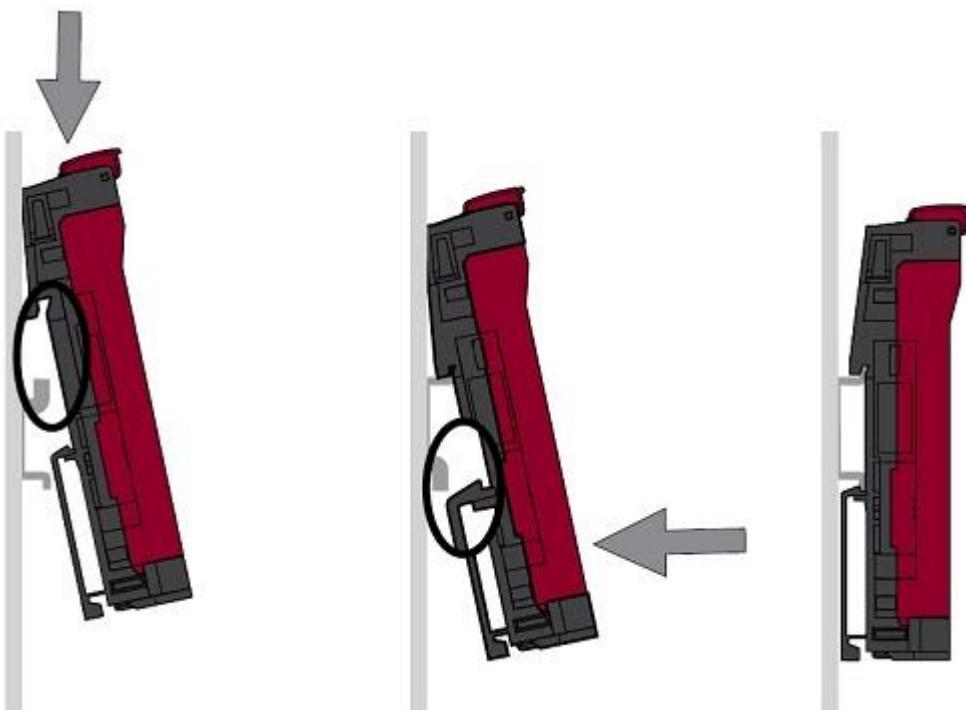
The DIN rail provided for the MC600 is a 35mm high with 7.5mm deep in according to EN-60715 Standard. On the market these guides are generally identified with different aliases though similar. Here are some examples:

- TS35x7.5
- TH35x7.5
- NS35x7.5

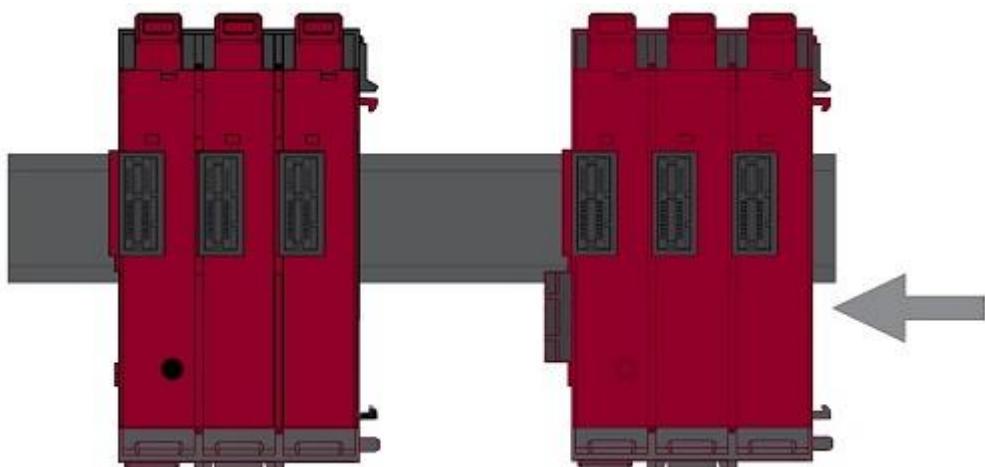
Where "x" is sometimes replaced with "/" or "-". Sometimes only the initials appear in different combinations and preceded by the regulations. However, the rule to follow is that, the MC600 sockets hook up to 35mm guides and 1mm thick.

### 3.24 Assembly

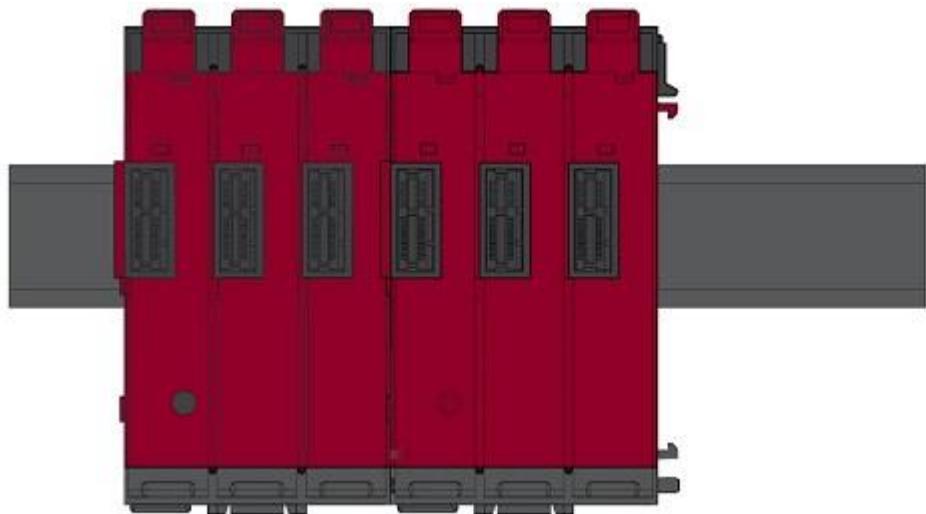
Step 1: Clip socket on DIN rail



Step 2: Push sockets together until...



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

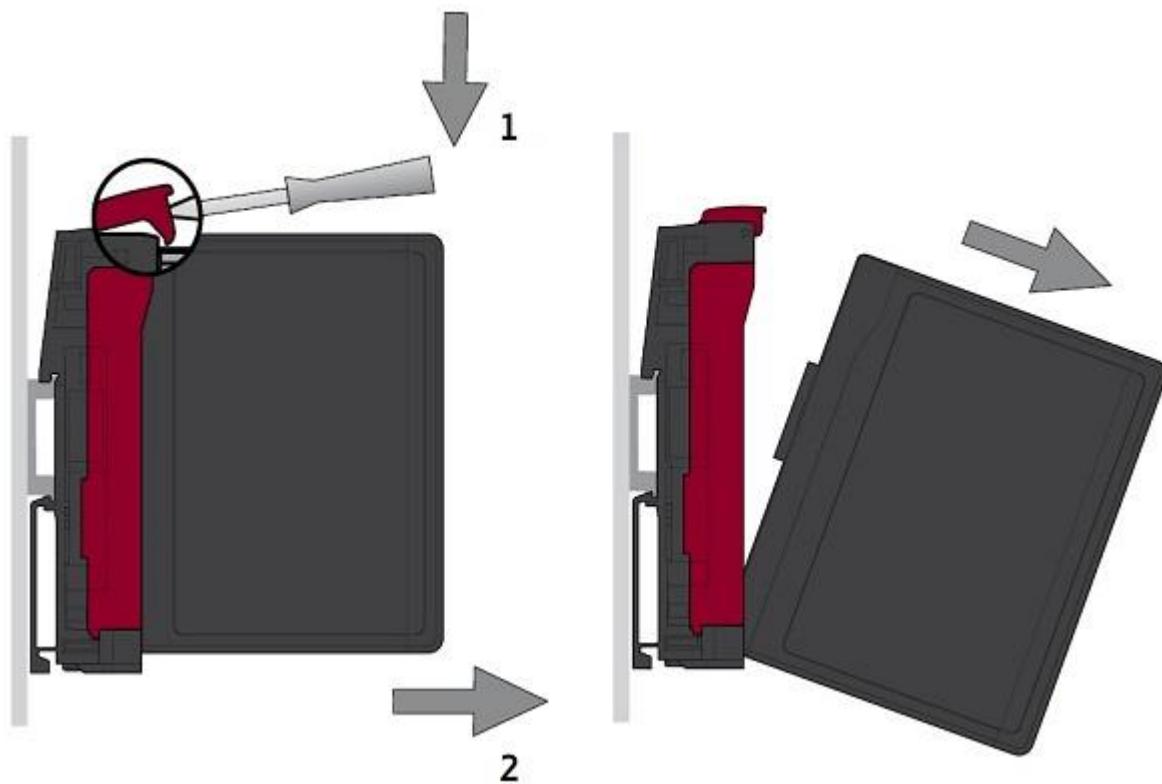


Step 4: Plug module into socket

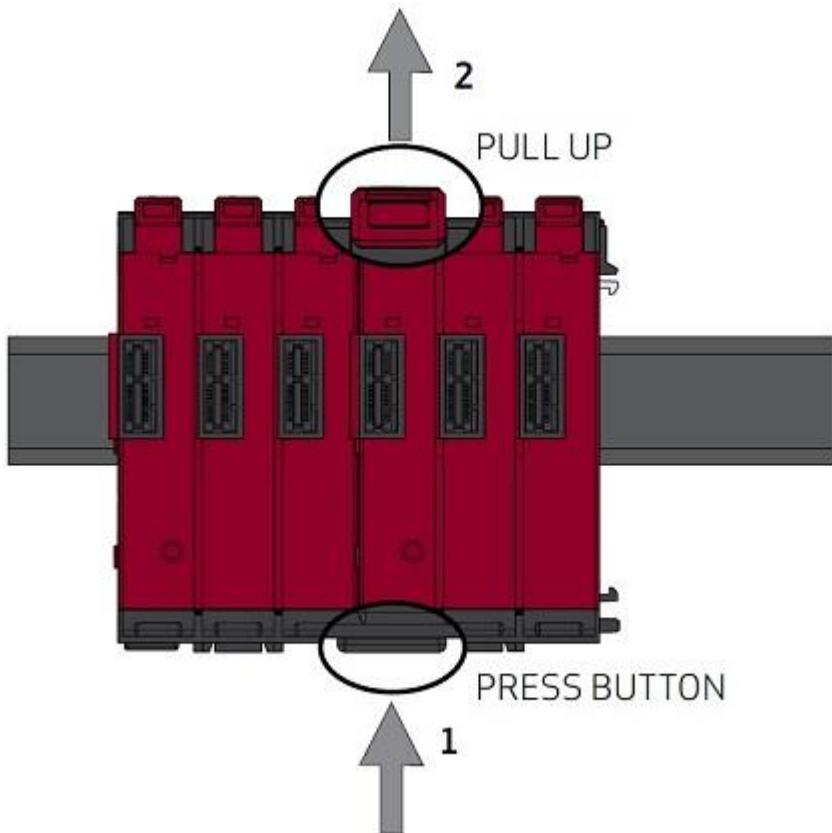


### 3.25 Disassembly

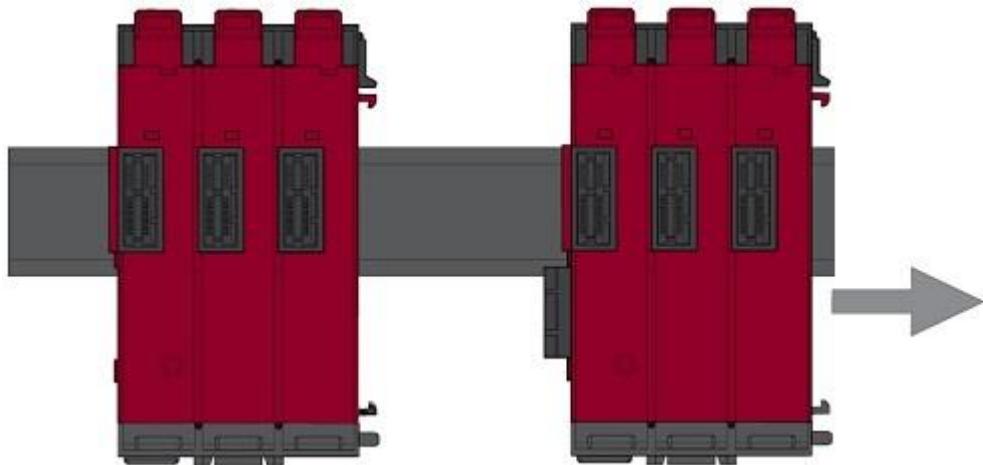
Step 1: Press button at bottom and pull up locking at top



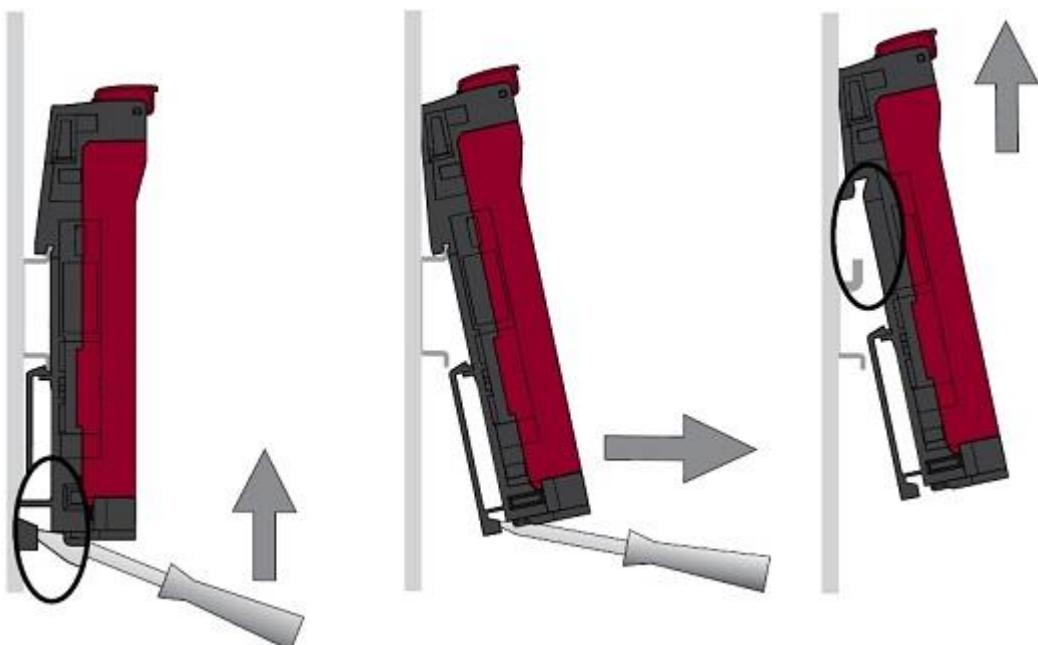
Step 2: Press button at bottom and pull up locking at top



Step 3: Move socket away



Step 4: Unclip socket from din rail



## 3.26 Processor Modules dimensions

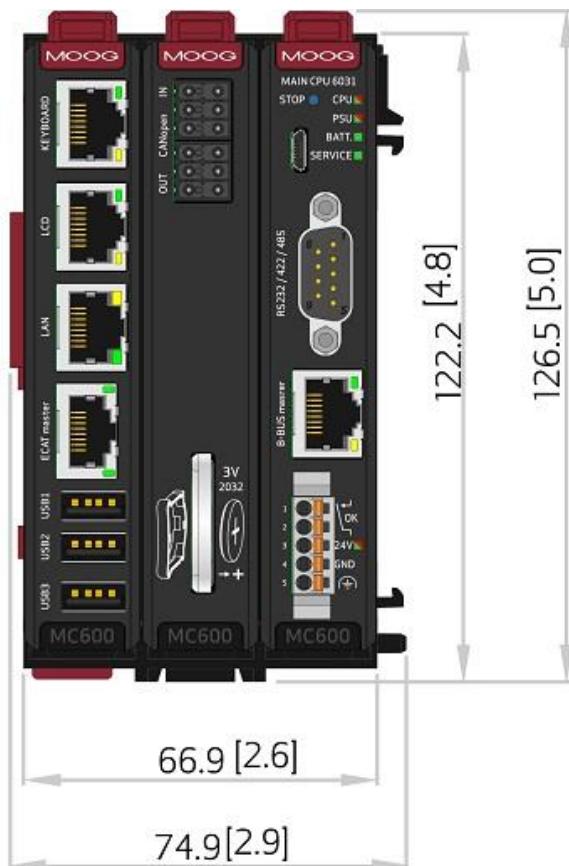
The MC600 series has very small size which can be summarized in the following figures (dimensions in mm and inches in parentheses):

**CPU lateral view including socket MC600plus**



1. Socket
2. CPU module
3. Licence Key
4. Power connection

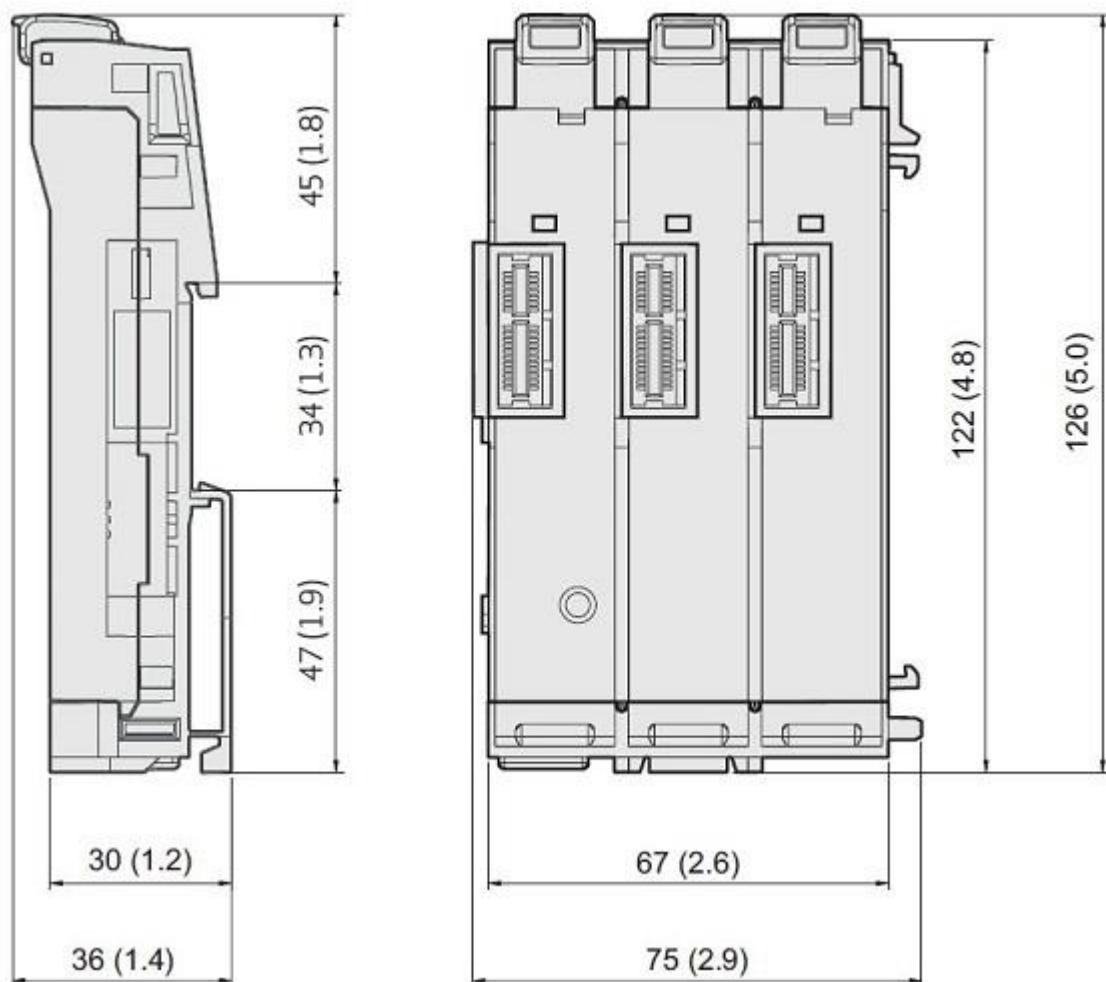
**CPU front view including socket MC600plus**





### 3.27 Main socket dimensions

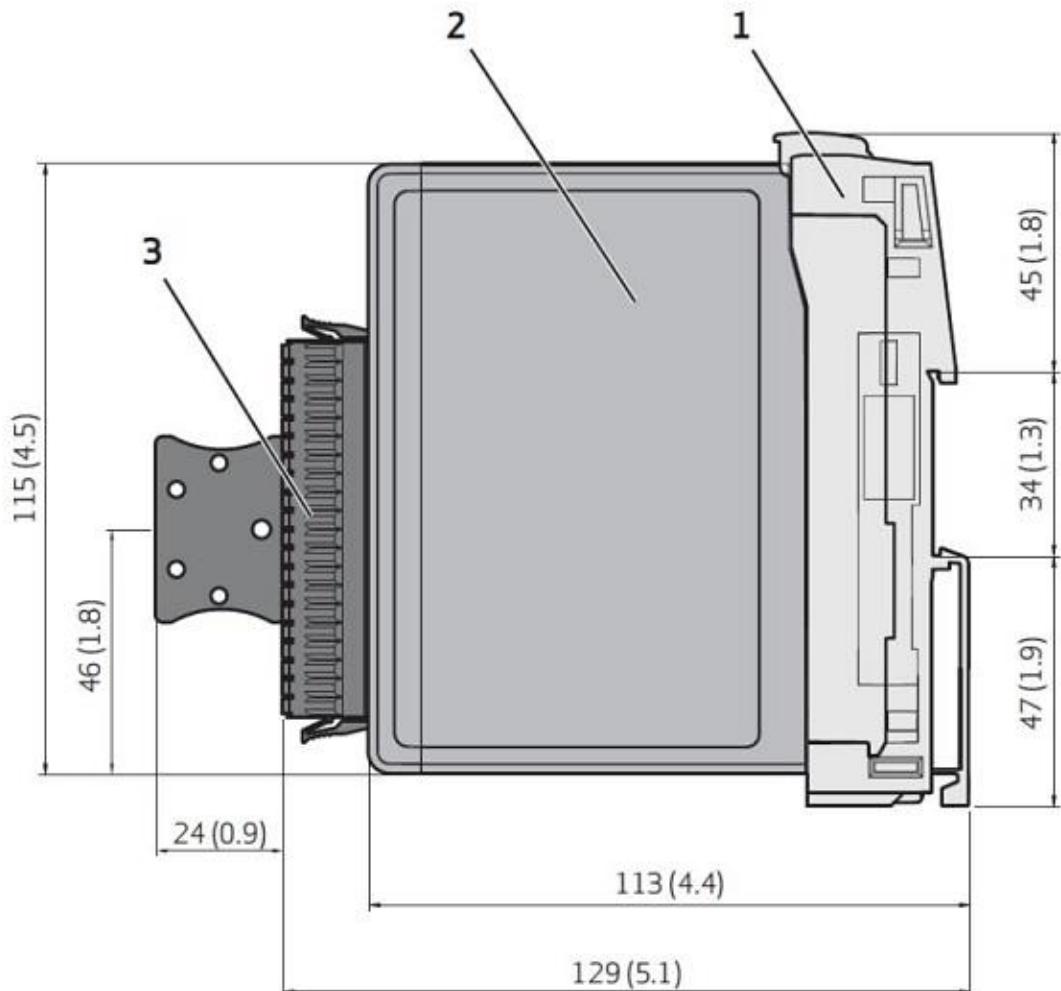
*Socket view for CPU module*



## 3.28 I/O Modules Dimensions

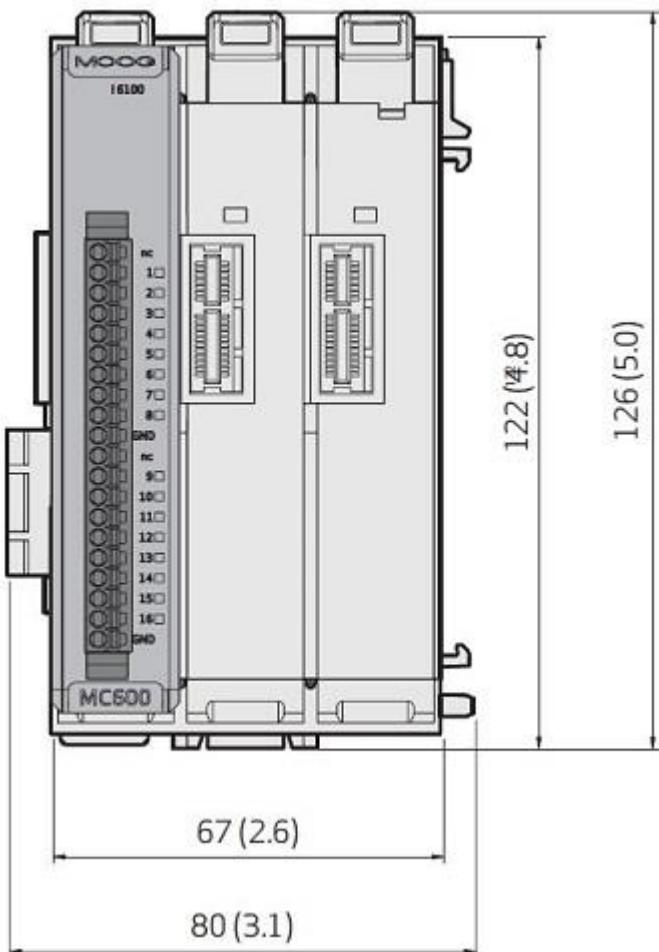
The MC600 series has very small size which can be summarized in the following figures (dimensions in mm and inches in parentheses):

### I/O module lateral view including socket



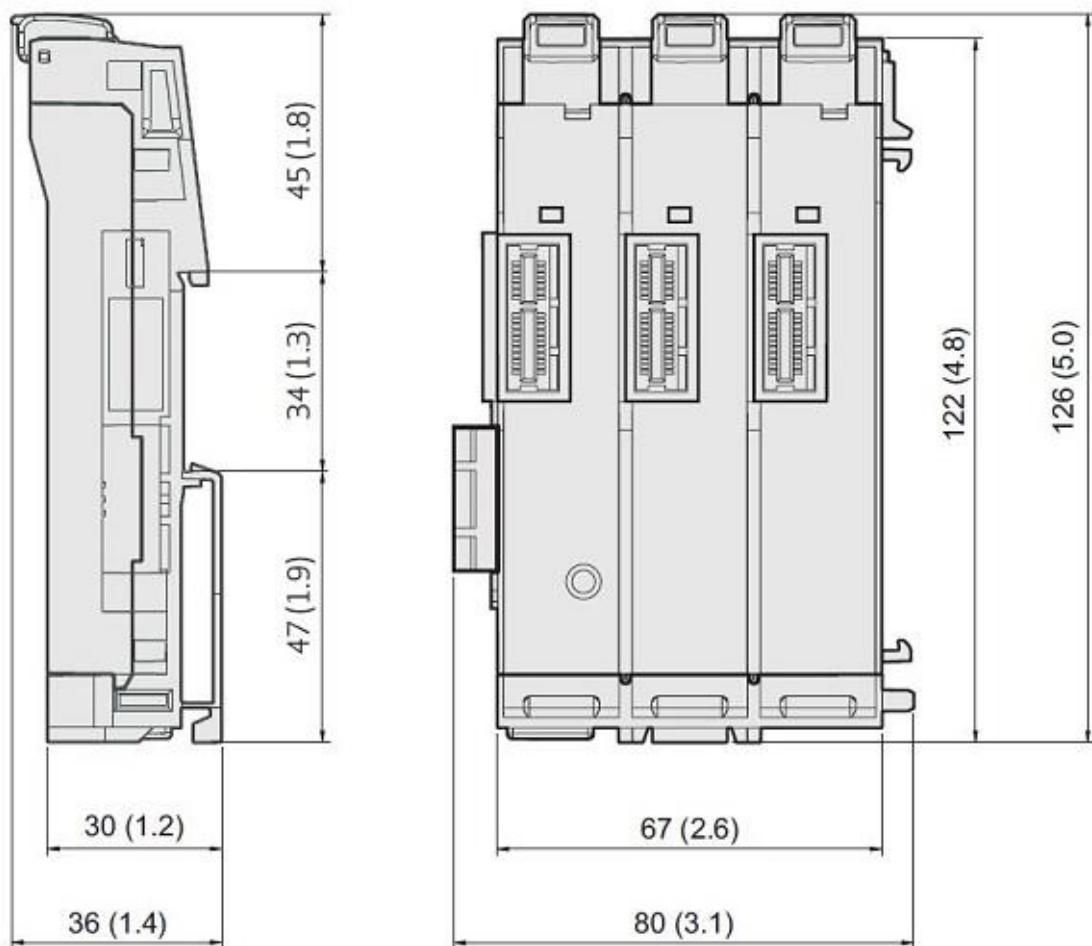
1. Socket
2. I/O module
3. Connection

### I/O module front view including socket



### 3.29 I/O Socket Dimensions

Socket view for I/O module



## 3.30 License Key

### 3.30.1 MC600plus license key



MC600plus require one of the following USB license key in order to execute the application.

Every license key enable a different feature level as described in the next table:

Key color	Ordering code	Included features
Level 1 White	D138-030-001	<ul style="list-style-type: none"> <li>• Target Visu</li> <li>• Local HMI</li> <li>• Basic M_BB features</li> <li>• Embedded OPC-UA server</li> </ul>
Level 2 Green	D138-030-002	Additional to Level 1: <ul style="list-style-type: none"> <li>• WebVisu</li> <li>• CANOpen master</li> <li>• CANOpen slave</li> <li>• EtherCAT master</li> <li>• Advanced M_BB features</li> <li>• Modbus RTU</li> <li>• Profinet slave (only with supported CPU)</li> <li>• EtherCAT slave (only with supported CPU)</li> </ul>
Level 3 Black	D138-030-003	Additional to Level 2: <ul style="list-style-type: none"> <li>• SoftMotion</li> <li>• Multicore</li> </ul>
Level 4 Red		Custom

## 3.31 C46665: Power Supply Connector

### 3.31.1 Technical Characteristics

Code	C46665
General	
Type of contact	Female connector
Number of positions	5
Connection method	Push-in spring connection
Insulating material group	I
Rated surge voltage (III/3)	2.5 kV
Rated surge voltage (III/2)	2.5 kV
Rated surge voltage (II/2)	2.5 kV
Rated voltage (III/3)	160 V
Rated voltage (III/2)	160 V
Rated voltage (II/2)	320 V
Connection in acc. with standard	EN-VDE
Nominal current IN	8:00 AM
Nominal cross section	1.5 mm <sup>2</sup>
Maximum load current	8:00 AM
Insulating material	PA
Flammability rating according to UL 94	V0
Internal cylindrical gage	A1
Stripping length	10 mm

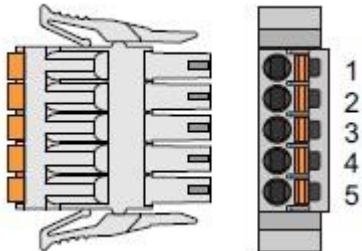
Connection data	
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	1.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve min.	0.25 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve max.	1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve min.	0.25 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve max.	0.75 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16

Minimum AWG according to UL/CUL	24
Maximum AWG according to UL/CUL	16

Specifications for ferrules	
Ferrules without insulating collar, according to DIN 46228-1	Cross section: 0.25 mm <sup>2</sup> ; Length: 5 mm ... 7 mm Cross section: 0.34 mm <sup>2</sup> ; Length: 7 mm Cross section: 0.5 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.75 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 1 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 1.5 mm <sup>2</sup> ; Length: 10 mm
Ferrules with insulating collar, according to DIN 46228-4	Cross section: 0.14 mm <sup>2</sup> ; Length: 8 mm Cross section: 0.34 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.5 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.75 mm <sup>2</sup> ; Length: 8 mm ... 10 mm

Standards and Regulations	
Connection in acc. with standard	EN-VDE CUL
Flammability rating according to UL 94	V0

### 3.31.2 Top/Side View



### 3.31.3 Connections

CPUs & Transceiver connection	
Pinout number	Description
Pin 1	Ok Rely Normally open contact
Pin 2	Ok Rely Common
Pin 3	+ 24VDC
Pin 4	GND
Pin 5	Earth

HMI Panels connection	
Pinout number	Description
Pin 1	NC
Pin 2	NC

Pin 3	+ 24VDC
Pin 4	GND
Pin 5	Earth

## 3.32 C46666: I/O Connector

### 3.32.1 Technical Characteristics

Code	C46665
General	
Type of contact	Female connector
Number of positions	20
Connection method	Push-in spring connection
Insulating material group	I
Rated surge voltage (III/3)	2.5 kV
Rated surge voltage (III/2)	2.5 kV
Rated surge voltage (II/2)	2.5 kV
Rated voltage (III/3)	160 V
Rated voltage (III/2)	160 V
Rated voltage (II/2)	320 V
Connection in acc. with standard	EN-VDE
Nominal current IN	8:00 AM
Nominal cross section	1.5 mm <sup>2</sup>
Maximum load current	8:00 AM
Insulating material	PA
Flammability rating according to UL 94	V0
Internal cylindrical gage	A1
Stripping length	10 mm

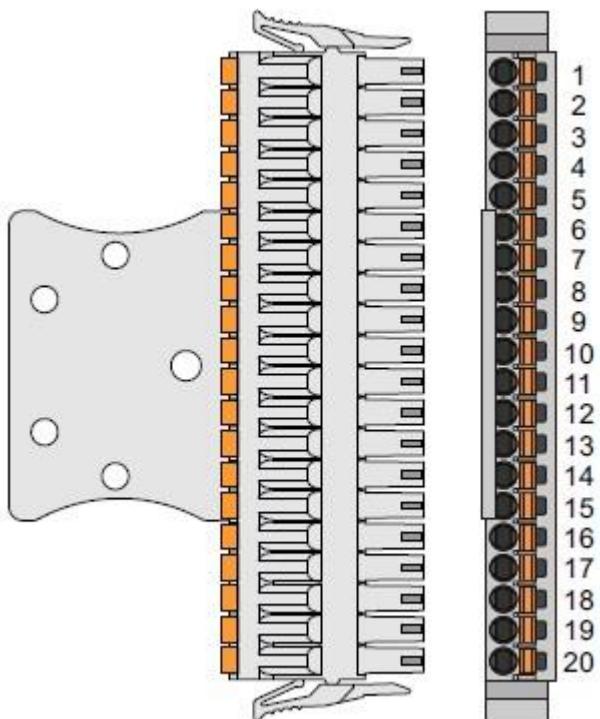
Connection data	
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	1.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve min.	0.25 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve max.	1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve min.	0.25 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve max.	0.75 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16

Minimum AWG according to UL/CUL	24
Maximum AWG according to UL/CUL	16

Specifications for ferrules	
Ferrules without insulating collar, according to DIN 46228-1	Cross section: 0.25 mm <sup>2</sup> ; Length: 5 mm ... 7 mm Cross section: 0.34 mm <sup>2</sup> ; Length: 7 mm Cross section: 0.5 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.75 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 1 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 1.5 mm <sup>2</sup> ; Length: 10 mm
Ferrules with insulating collar, according to DIN 46228-4	Cross section: 0.14 mm <sup>2</sup> ; Length: 8 mm Cross section: 0.34 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.5 mm <sup>2</sup> ; Length: 8 mm ... 10 mm Cross section: 0.75 mm <sup>2</sup> ; Length: 8 mm ... 10 mm

Standards and Regulations	
Connection in acc. with standard	EN-VDE CUL
Flammability rating according to UL 94	V0

### 3.32.2 Top/Side



## 3.33 IMI220-6990A001: 3 SLOT SOCKET - MAIN

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

### 3.33.1 Technical Characteristics

Code	IMI220-6990A001
Mounting rules Support Position	Din rail Always the first
Supported modules <a href="#">IMI220-6980A001</a> <a href="#">IMI220-6031A001</a>	BUS TRANSCEIVER (TRX + PSU) <sup>(1)</sup> MC600plus CPU + PSU + HMI driver
When using the transceiver module <a href="#">IMI220-6100A001</a> <a href="#">IMI220-6150A001</a> <a href="#">IMI220-6180A001</a> <a href="#">IMI220-6200A001</a> <a href="#">IMI220-6201A001</a> <a href="#">IMI220-6204A001</a> <a href="#">IMI220-6250A001</a> <a href="#">IMI220-6251A001</a> <a href="#">IMI220-6220A001</a> <a href="#">IMI220-6221A001</a> <a href="#">IMI220-6501A001</a>	16DI 24VDC 16DO 24VDC 0.5A 12DO 24VDC 2A 4AI 16BIT 8AI 16BIT 3 LVDT 4AO 16BIT 8AO 16BIT 4 Temperature 8 Temperature 4 Encoder SSI/Quad
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical only
Weight	100g

1. The 2 free slots are available for I/O modules

### 3.33.2 Front View



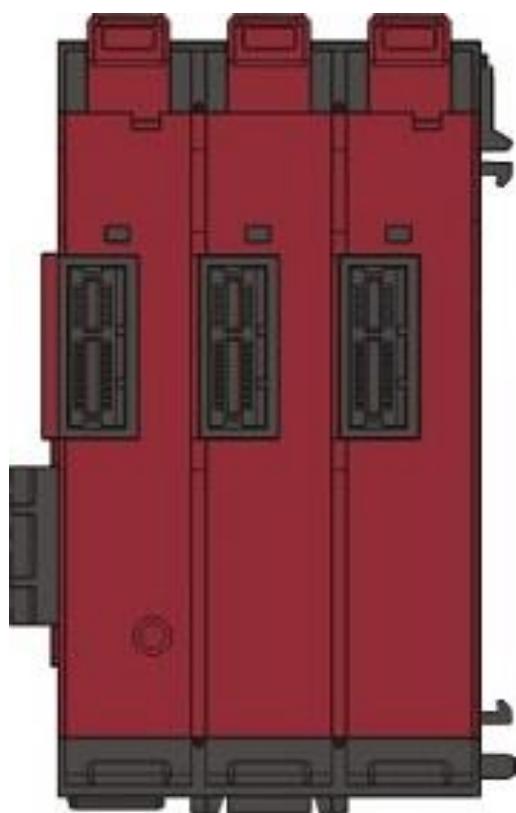
## 3.34 IMI220-6991A001: 3 SLOT SOCKET - I/O

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.

### 3.34.1 Technical Characteristics

Code	IMI220-6991A001
Mounting rules	
Support	Din rail
Position	After the first (IMI220-6990A001)
Supported modules	<a href="#">IMI220-6100A001</a> <a href="#">IMI220-6150A001</a> <a href="#">IMI220-6180A001</a> <a href="#">IMI220-6200A001</a> <a href="#">IMI220-6201A001</a> <a href="#">IMI220-6204A001</a> <a href="#">IMI220-6250A001</a> <a href="#">IMI220-6251A001</a> <a href="#">IMI220-6220A001</a> <a href="#">IMI220-6221A001</a> <a href="#">IMI220-6501A001</a>
Environment class	IP 30
Operating/storage temperature	-25°C to +70°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical only
Weight	100g

### 3.34.2 Front View



## 3.35 IMI220-7000A001: HMI TOUCH PANEL 7"

**WARNING!**

Before to operate with IMI220-7000A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.35.1 General Information

The terminal IMI220-7000A001 is a local panel endowed with a colour display LCD 800 x 480 pixels and Touch screen. The communication with the PLC happens through module dedicated to the LVDS direct drives HMI. On the panel can be visualized both maps video alphanumeric that graphics.

### 3.35.2 Technical Characteristics

<b>Code</b>	IMI220-7000A001
<b>Hardware characteristics</b>	
Power supply Input voltage Range	24VDC ± 20%
Input current	0.2A max
USB drive	Yes IMPORTANT: Using USB flash drive >= 2Gb dimension, please format with file system FAT32 and with "Allocation unit size" at 32 Kilobytes.
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Environment class Correctly mounted (Only front panel) Rear	IP 54 IP 20

<i>Interfaces characteristics</i>	
Video	<a href="#">IMI220-6031A001</a>
Keyboard	<a href="#">IMI220-6031A001</a>
External Keyboard	<a href="#">IMI220-7100A001</a>

<i>Display characteristics</i>	
Display type	Color LCD TFT
Touch screen	Yes
Backlight	LED
Resolution	800x 480 Pixel
Graphics	Yes

Inches	7" wide
Fonts type	User Programmable
Stand-by	User Programmable
Diagnostics Power	Green led (voltage presence)
Brightness regulation	Yes

<i>General characteristics</i>	
Programming software	MASS
Diagnostics on connector KEYBOARD	Green led (Keyboard active) Yellow led (Not used)
LCD	Green led (LCD active) Yellow led (Not used)
EXTERNAL KEYBOARD	Green led (LCD active) Yellow led (Not used)
User interface LCD	RJ45 LVDS MAX 15m
KEYBOARD	RJ45 LVDS MAX 15m
EXTERNAL KEYBOARD	RJ45 MAX 0.5m
Rear connector Type	5 pins 3.5 mm pitch female
Mating connector	5 pins 3.5 mm pitch male
Conductor Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup> 24/16
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	162.0 x 215.0 x 47.0 mm
Weight	1400 g

<i>Rack installation distances</i>	
Programming software	MASS

### 3.35.3Front View



- **Power led:** Green led= indicate the presence of the power supply.

### 3.35.4 Communication Mode

The Panel IMI220-7000A001 communicates with the PLC through two LVDS cables.

### 3.35.5 Connections



**WARNING!**

Where the 24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations.

In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus.

**PSU Pinout**

Pin number	Signal description
1	
2	
3	+ 24VDC
4	GND
5	Earth

**3.35.6 Connections to the supply**

To connect the power supply in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46665 PSU Connector](#)".

**EXTERNAL KEYBOARD Pinout**

Pin number	Signal description
1	SENB
2	3VR
3	SCLK
4	GND
5	SDIN
6	GND
7	SDOT
8	5VR

100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

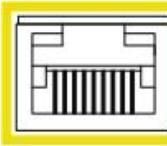
**USB Pinout**

Pin number	Signal description
1	+5VDC Power supply
2	DATA -
3	DATA +
4	GND

USB Type A

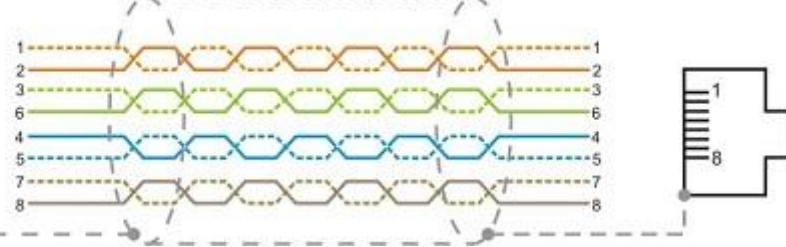
Mating Connector (socket contacts)

**KEYBOARD Pinout**

	Pin number	Signal description
	1	D0+
	2	D0-
	3	RIN+
	4	GND
	5	GND
	6	RIN-
	7	LINK-LVDS
	8	GND

KEYB

S/UTP CAT5e cable  
ISO/IEC 11801:2002 (Class D)  
EN 50173:2007

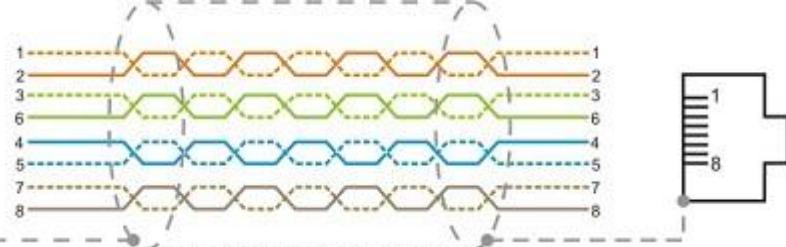


100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

LCD Pinout	Pin number	Signal description
	1	TX0-
	2	TX0+
	3	TX1-
	4	TX2-
	5	TX2+
	6	TX1+
	7	TXCLK-
	8	TXCLK+

LCD

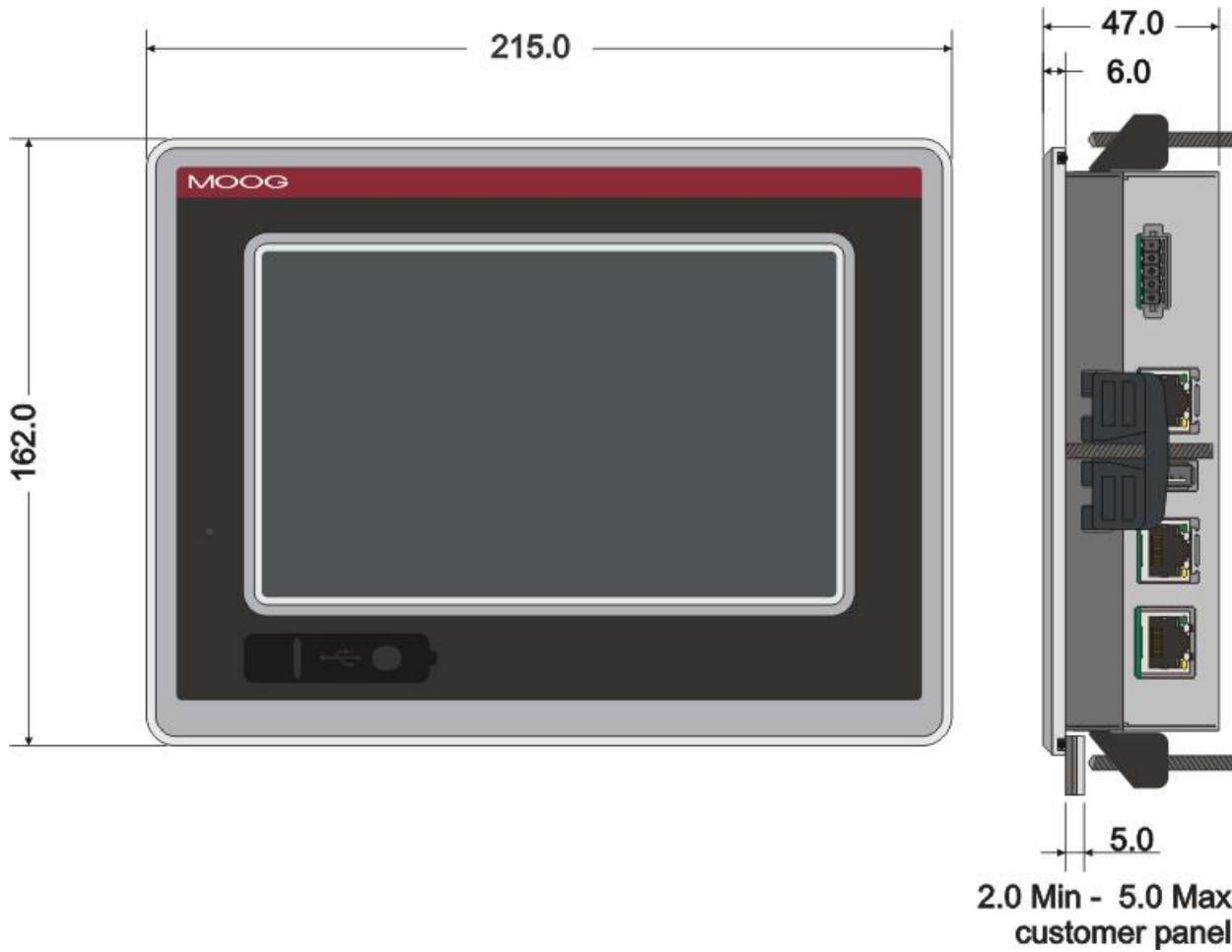
S/UTP CAT5e cable  
ISO/IEC 11801:2002 (Class D)  
EN 50173:2007



100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

### 3.35.7 Installation

They are now reported the spaces for the fixing of the panel. The panel is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the panel will be situated.



### Location:

The mounting location should comply with the following characteristics:

- Avoid direct sunlight exposure.
- Make sure that IMI220-7000A001 is properly (ergonomically) accessible to the operator.
- Choose a suitable mounting height.

IMI220-7000A001 panel is suitable for installation in:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles



#### WARNING!

The installer have to guarantee the quick access to the back of the panel in order to the operator can easily disconnect the power supply if needed.

### Mounting:

In order to ensure a proper mounting of the system, the material of the mounting cut-out must be sufficiently stable. To obtain the degree of protection described below, the material of the mounting panel must not deform due to the use of clamps on the operator panel.

The degree of protection of the system (IP) is intended only for the front panel of IMI220-7000A001 and is guaranteed only if the following conditions are satisfied:

- Material thickness at the mounting cut-out for IP54 protection: 2mm to 5 mm.
- Deviations of the plane of the mounting cut-out limits:  $\leq 0.5$  mm. This condition must be satisfied even when the IMI220-7000A001 is installed.

To ensure adequate installation it is necessary leaving the following open spaces around the system:

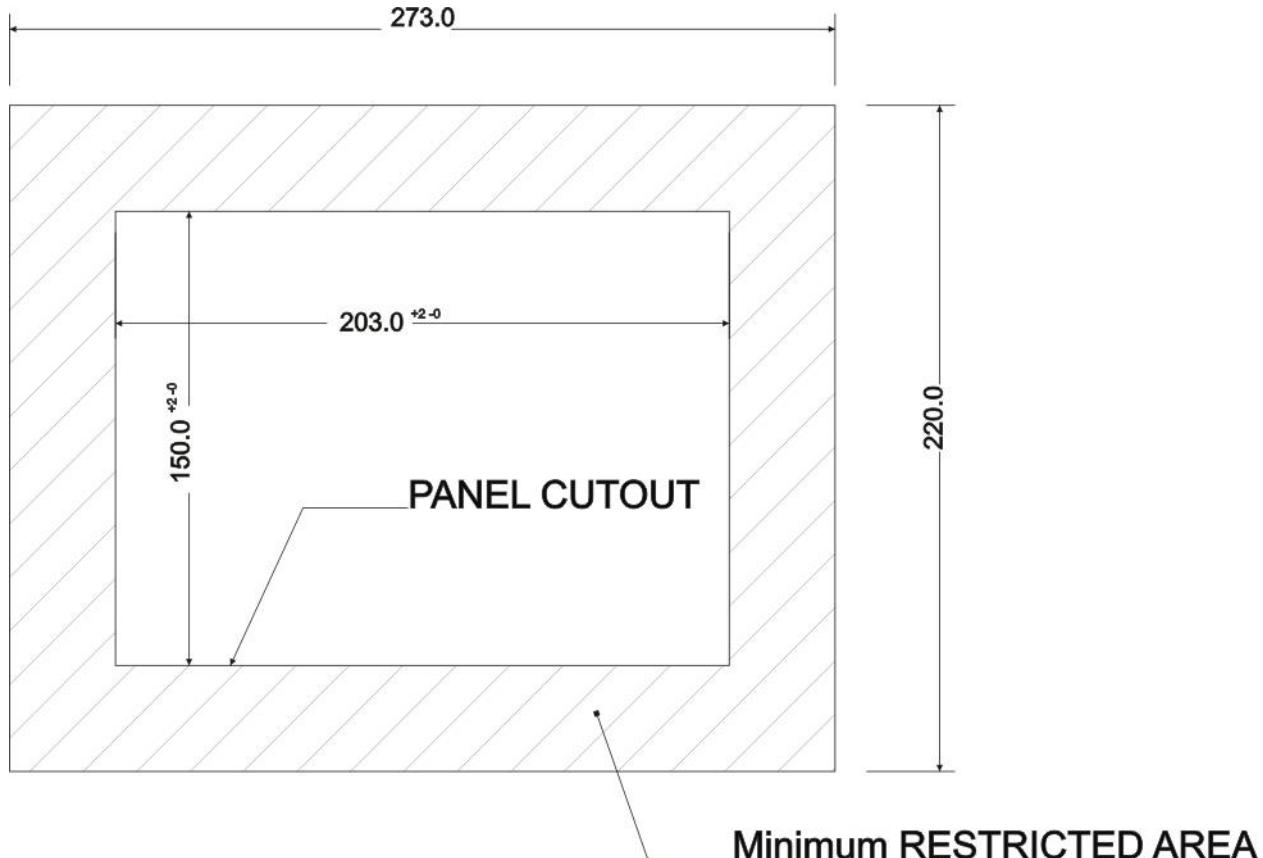
- 35 mm (minimum) for each side.

**Instructions:**

Insert IMI220-7000A001 into the mounting cut-out from the front.

Insert the fixing clamps (4pcs. provided) into the housings of the device.

Using 2 mm provided hexagonal key to tight the clamps's screw.



## 3.36 IMI220-7001A001: HMI TOUCH PANEL 10.4"

**WARNING!**

Before to operate with IMI220-7001A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.36.1 General Information

The terminal IMI220-7001A001 is a local panel endowed with a colour display LCD 800 x 600 pixels and Touch screen. The communication with the PLC happens through module dedicated to the LVDS direct drives HMI. On the panel can be visualized both maps video alphanumeric that graphics.

### 3.36.2 Technical Characteristics

<b>Code</b>	IMI220-7001A001
<b>Hardware characteristics</b>	
Power supply Input voltage Range	24VDC ± 20%
Input current	0.2A max
USB drive	Yes IMPORTANT: Using USB flash drive >= 2Gb dimension, please format with file system FAT32 and with "Allocation unit size" at 32 Kilobytes.
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Environment class Correctly mounted (Only front panel) Rear	IP 54 IP 20

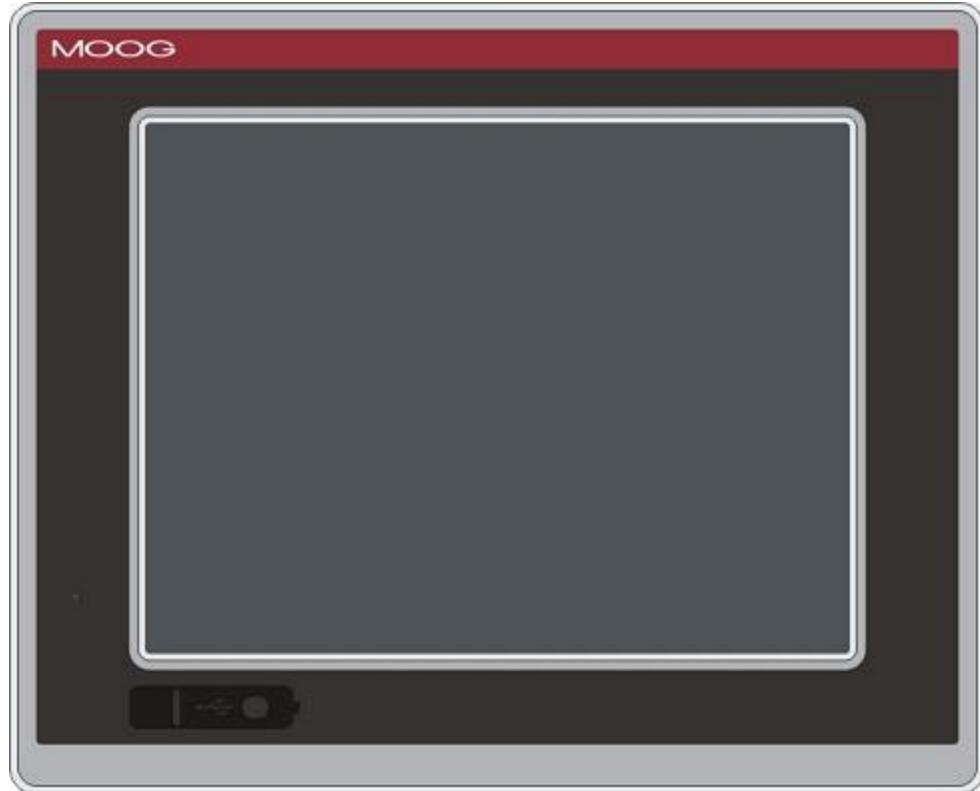
<i>Interfaces characteristics</i>	
Video	<a href="#">IMI220-6031A001</a>
Keyboard	<a href="#">IMI220-6031A001</a>
External Keyboard	<a href="#">IMI220-7101A001</a> <a href="#">IMI220-7102A001</a>

<i>Display characteristics</i>	
Display type	Color LCD TFT
Touch screen	Yes
Backlight	LED
Resolution	800x 600 Pixel
Graphics	Yes

Inches	10.4"
Fonts type	User Programmable
Stand-by	User Programmable
Diagnostics Power	Green led (voltage presence)
Brightness regulation	Yes

<i>General characteristics</i>	
Programming software	MASS
Diagnostics on connector KEYBOARD	Green led (Keyboard active) Yellow led (Not used)
LCD	Green led (LCD active) Yellow led (Not used)
EXTERNAL KEYBOARD	Green led (LCD active) Yellow led (Not used)
User interface LCD	RJ45 LVDS MAX 15m
KEYBOARD	RJ45 LVDS MAX 15m
EXTERNAL KEYBOARD	RJ45 MAX 0.5m
Rear connector Type	5 pins 3.5 mm pitch female
Mating connector	5 pins 3.5 mm pitch male
Conductor Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup> 24/16
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	239.0 x 295.0 x 47.0 mm
Weight	1900 g

### 3.36.3Front View



- **Power led:** Green led= indicate the presence of the power supply.

### 3.36.4 Communication Mode

The Panel IMI220-7001A001 communicates with the PLC through two LVDS cables.

### 3.36.5 Connections



**WARNING!**

Where the 24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations.

In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus.

**PSU Pinout**

Pin number	Signal description
1	+24V
2	0V24
3	+ 24VDC
4	GND
5	Earth

**3.36.6 Connections to the supply**

To connect the power supply in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46665 PSU Connector](#)".

**EXTERNAL KEYBOARD Pinout**

Pin number	Signal description
1	SENB
2	3VR
3	SCLK
4	GND
5	SDIN
6	GND
7	SDOT
8	5VR

100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

**USB Pinout**

Pin number	Signal description
1	+5VDC Power supply
2	DATA -
3	DATA +
4	GND

Mating Connector (socket contacts)

USB Type A

## KEYBOARD Pinout

	Pin number	Signal description
KEYB	1	D0+
	2	D0-
	3	RIN+
	4	GND
	5	GND
	6	RIN-
	7	LINK-LVDS
	8	GND

S/UTP CAT5e cable ISO/IEC 11801:2002 (Class D) EN 50173:2007 100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

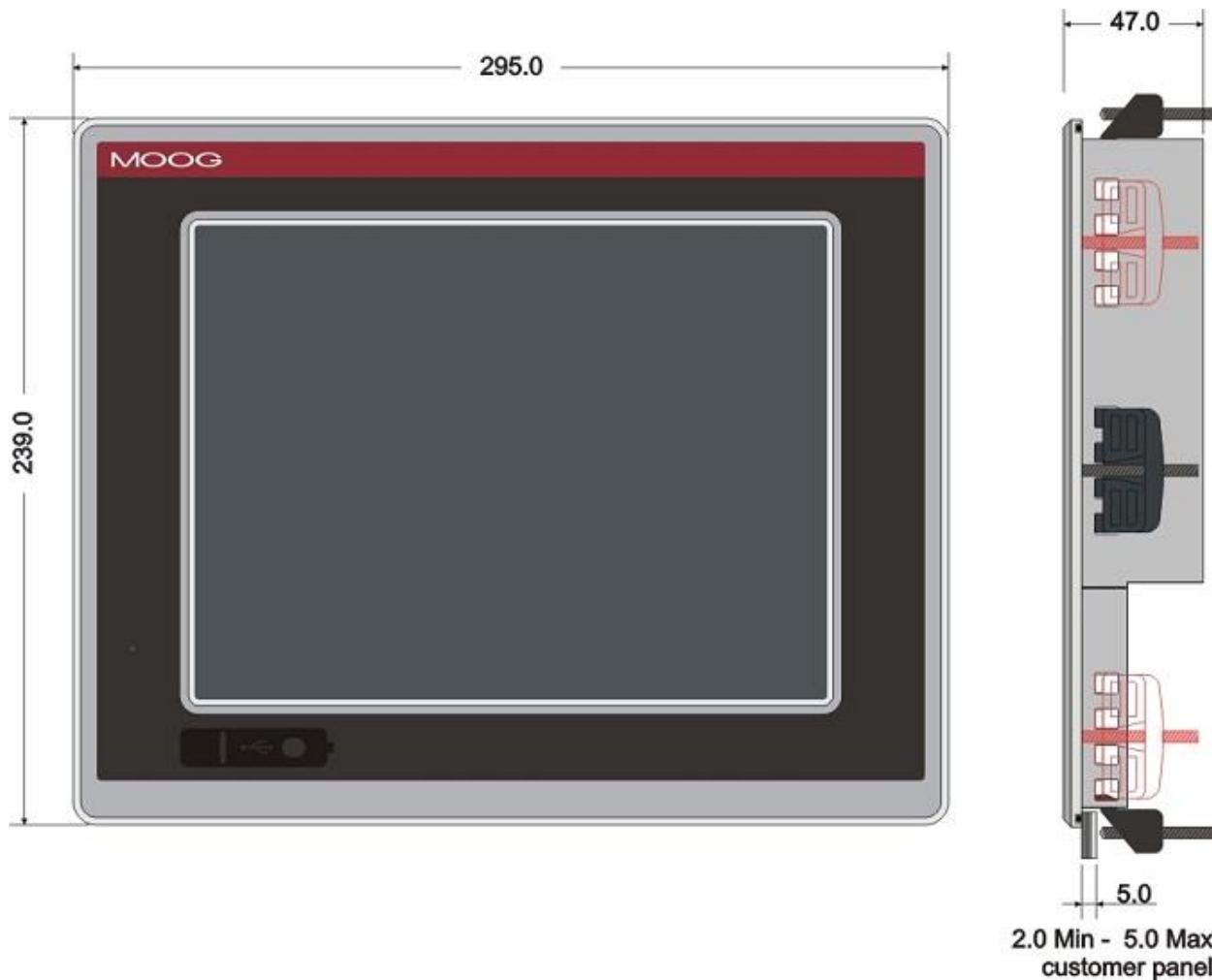
## LCD Pinout

	Pin number	Signal description
LCD	1	TX0-
	2	TX0+
	3	TX1-
	4	TX2-
	5	TX2+
	6	TX1+
	7	TXCLK-
	8	TXCLK+

S/UTP CAT5e cable ISO/IEC 11801:2002 (Class D) EN 50173:2007 100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)

### 3.36.7 Installation

They are now reported the spaces for the fixing of the panel. The panel is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the panel will be situated.

**Location:**

The mounting location should comply with the following characteristics:

- Avoid direct sunlight exposure.
- Make sure that IMI220-7001A001 is properly (ergonomically) accessible to the operator.
- Choose a suitable mounting height.

IMI220-7001A001 panel is suitable for installation in:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles

**WARNING!**

The installer have to guarantee the quick access to the back of the panel in order to the operator can easily disconnect the power supply if needed.

**Mounting:**

In order to ensure a proper mounting of the system, the material of the mounting cut-out must be sufficiently stable. To obtain the degree of protection described below, the material of the mounting panel must not deform due to the use of clamps on the operator panel.

The degree of protection of the system (IP) is intended only for the front panel of IMI220-7001A001 and is guaranteed only if the following conditions are satisfied:

- Material thickness at the mounting cut-out for IP54 protection: 2mm to 5 mm.
- Deviations of the plane of the mounting cut-out limits:  $\leq 0.5$  mm. This condition must be satisfied even when the IMI220-7001A001 is installed.

To ensure adequate installation it is necessary leaving the following open spaces around the system:

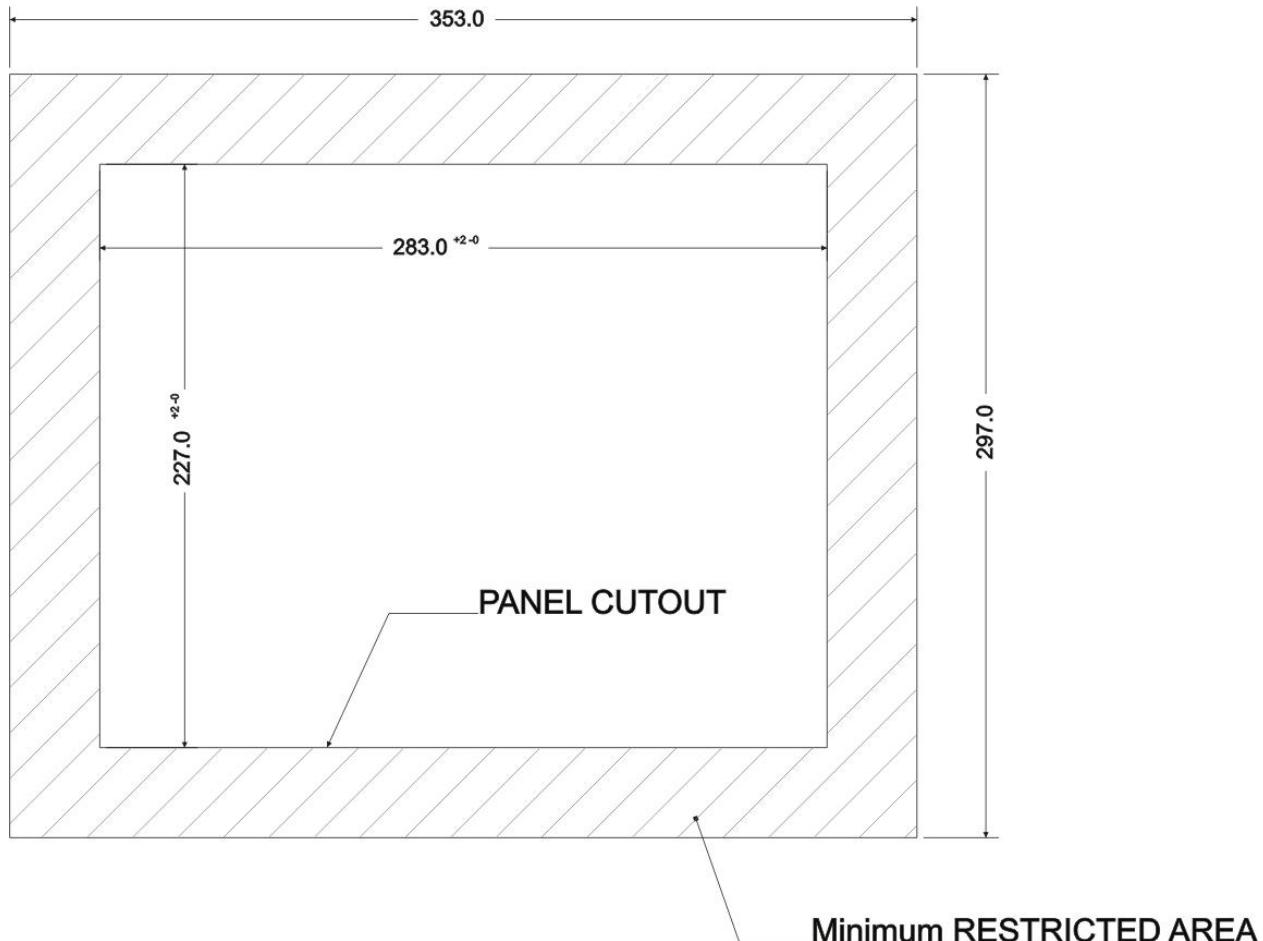
- 35 mm (minimum) for each side.

**Instructions:**

Insert IMI220-7001A001 into the mounting cut-out from the front.

Insert the fixing clamps (6pcs. provided) into the housings of the device.

Using 2 mm provided hexagonal key to tight the clamps's screw.



## 3.37 IMI220-7002A001: HMI TOUCH PANEL 12.1"

**WARNING!**

Before to operate with IMI220-7002A001 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.37.1 General Information

The terminal IMI220-7002A001 is a local panel endowed with a colour display LCD 800 x 600 pixels and Touch screen. The communication with the PLC happens through module dedicated to the LVDS direct drives HMI. On the panel can be visualized both maps video alphanumeric that graphics.

### 3.37.2 Technical Characteristics

<b>Code</b>	IMI220-7002A001
<b>Hardware characteristics</b>	
Power supply Input voltage Range	24VDC ± 20%
Input current	0.2A max
USB drive	Yes IMPORTANT: Using USB flash drive >= 2Gb dimension, please format with file system FAT32 and with "Allocation unit size" at 32 Kilobytes.
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Environment class Correctly mounted (Only front panel) Rear	IP 54 IP 20

<i>Interfaces characteristics</i>	
Video	<a href="#">IMI220-6031A001</a>
Keyboard	<a href="#">IMI220-6031A001</a>
External Keyboard	<a href="#">IMI220-7103A001</a>

<i>Display characteristics</i>	
Display type	Color LCD TFT
Touch screen	Yes
Backlight	LED
Resolution	800x 600 Pixel
Graphics	Yes

Inches	12"
Fonts type	User Programmable
Stand-by	User Programmable
Diagnostics Power	Green led (voltage presence)
Brightness regulation	Yes

<i>General characteristics</i>	
Programming software	MASS
Diagnostics on connector KEYBOARD	Green led (Keyboard active) Yellow led (Not used)
LCD	Green led (LCD active) Yellow led (Not used)
EXTERNAL KEYBOARD	Green led (LCD active) Yellow led (Not used)
User interface LCD KEYBOARD EXTERNAL KEYBOARD	RJ45 LVDS MAX 15m RJ45 LVDS MAX 15m RJ45 MAX 0.5m
Rear connector Type Mating connector	5 pins 3.5 mm pitch female 5 pins 3.5 mm pitch male
Conductor Cross section solid min/max Cross section stranded min/max Cross section stranded, with ferrule without plastic sleeve min/max Cross section stranded, with ferrule with plastic sleeve min/max Cross section AWG/kcmil min/max Min/max AWG according to UL/CUL	0.2/1.5 mm <sup>2</sup> 0.2/1.5 mm <sup>2</sup> 0.25/1.5 mm <sup>2</sup> 0.25/0.75 mm <sup>2</sup> 24/16 24/16
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	266.0 x 335.0 x 47.0 mm
Weight	2500 g

### 3.37.3Front View

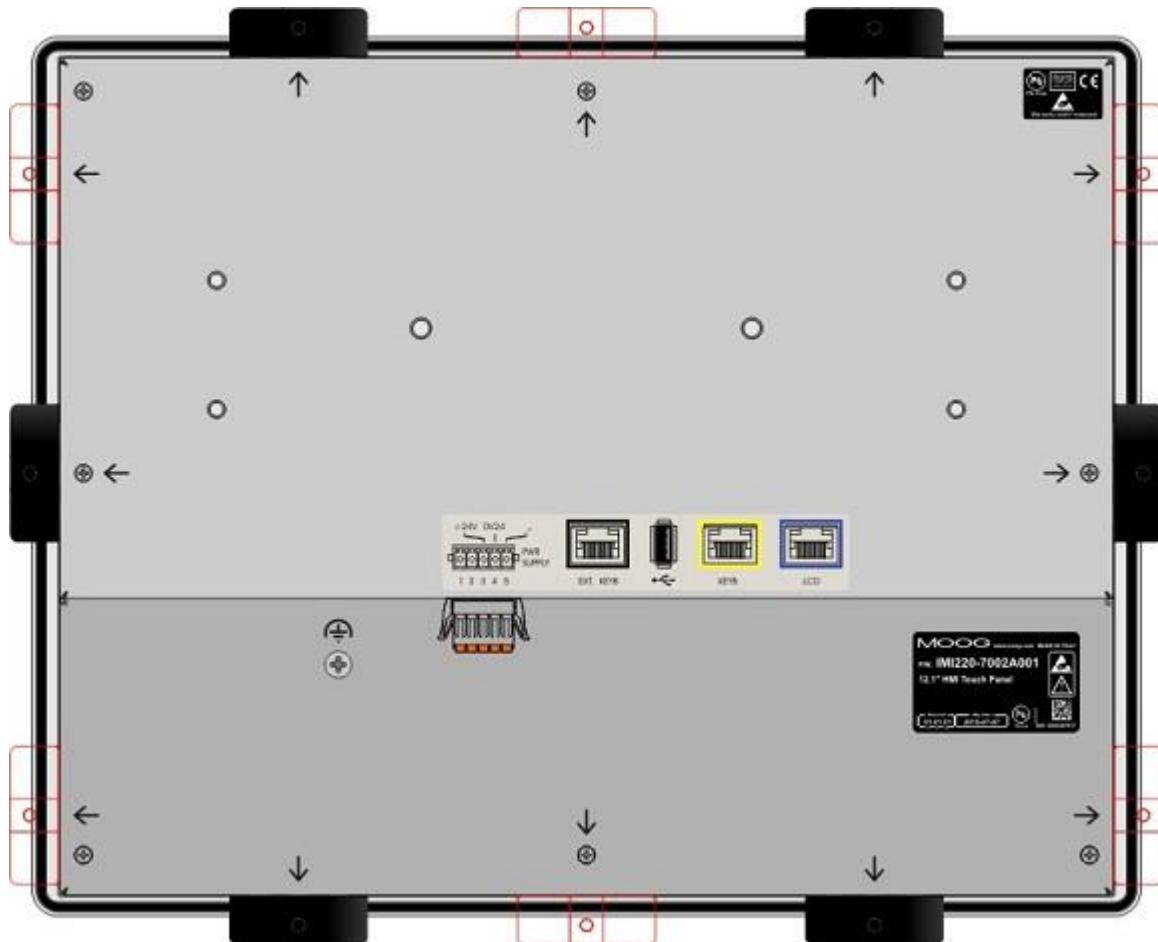


- **Power led:** Green led= indicate the presence of the power supply.

### 3.37.4 Communication Mode

The Panel IMI220-7002A001 communicates with the PLC through two LVDS cables.

### 3.37.5 Connections

**WARNING!**

Where the 24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations.

In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the PLC, which is calculated as the sum of the absorbed power of each module on the bus.

**PSU Pinout**

Pin number	Signal description
1	
2	
3	+ 24VDC
4	GND
5	Earth

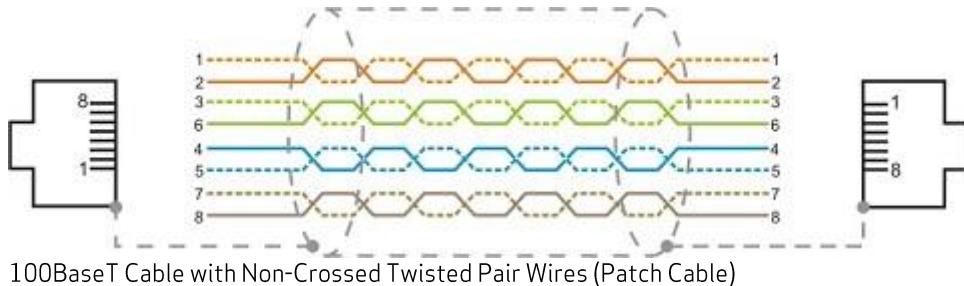
**3.37.6 Connections to the supply**

To connect the power supply in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46665 PSU Connector](#)".

**EXTERNAL KEYBOARD Pinout**

Pin number	Signal description
1	SENB
2	3VR
3	SCLK
4	GND

5 SDIN  
6 GND  
7 SDOT  
8 5VR



## USB Pinout

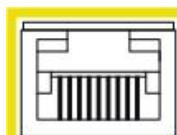


Pin number	Signal description
1	+5VDC Power supply
2	DATA -
3	DATA +
4	GND

Mating Connector  
(socket contacts)

## USB Type A

## KEYBOARD Pinout



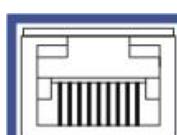
KEYB

Pin number	Signal description
1	D0+
2	D0-
3	RIN+
4	GND
5	GND
6	RIN-
7	LINK-LVDS
8	GND

S/UTP CAT5e  
cable  
ISO/IEC  
11801:2002  
(Class D)  
EN  
50173:2007

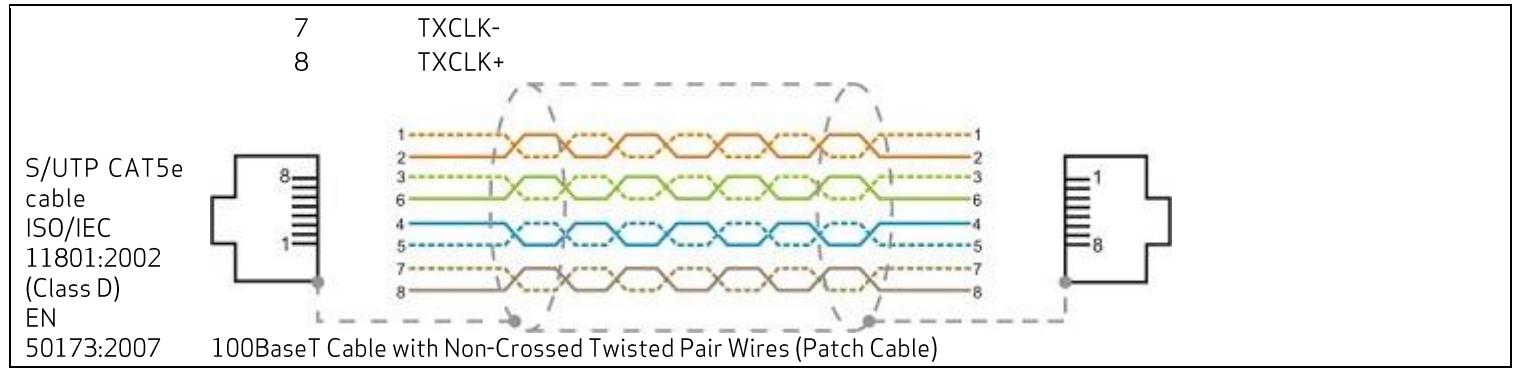


## LCD Pinout



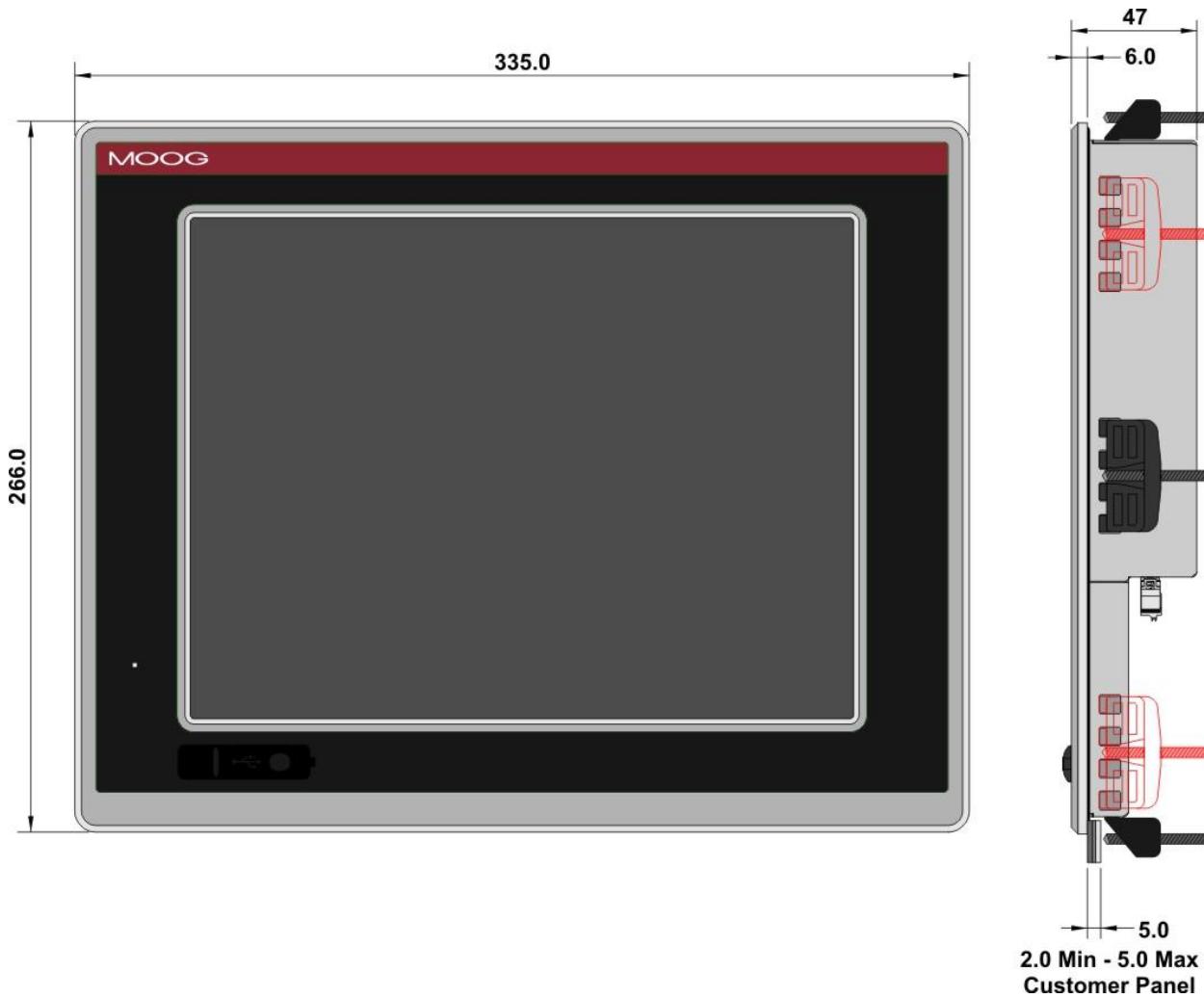
LCD

Pin number	Signal description
1	TX0-
2	TX0+
3	TX1-
4	TX2-
5	TX2+
6	TX1+



### 3.37.7 Installation

They are now reported the spaces for the fixing of the panel. The panel is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the panel will be situated.



#### Location:

The mounting location should comply with the following characteristics:

- a) Avoid direct sunlight exposure.
- b) Make sure that IMI220-7002A001 is properly (ergonomically) accessible to the operator.
- c) Choose a suitable mounting height.

IMI220-7002A001 panel is suitable for installation in:

- Mounting cabinets

- Control cabinets
- Switchboards
- Consoles

**WARNING!**

The installer have to guarantee the quick access to the back of the panel in order to the operator can easily disconnect the power supply if needed.

**Mounting:**

In order to ensure a proper mounting of the system, the material of the mounting cut-out must be sufficiently stable. To obtain the degree of protection described below, the material of the mounting panel must not deform due to the use of clamps on the operator panel.

The degree of protection of the system (IP) is intended only for the front panel of IMI220-7002A001 and is guaranteed only if the following conditions are satisfied:

- Material thickness at the mounting cut-out for IP54 protection: 2mm to 5 mm.
- Deviations of the plane of the mounting cut-out limits:  $\leq 0.5$  mm. This condition must be satisfied even when the IMI220-7002A001 is installed.

To ensure adequate installation it is necessary leaving the following open spaces around the system:

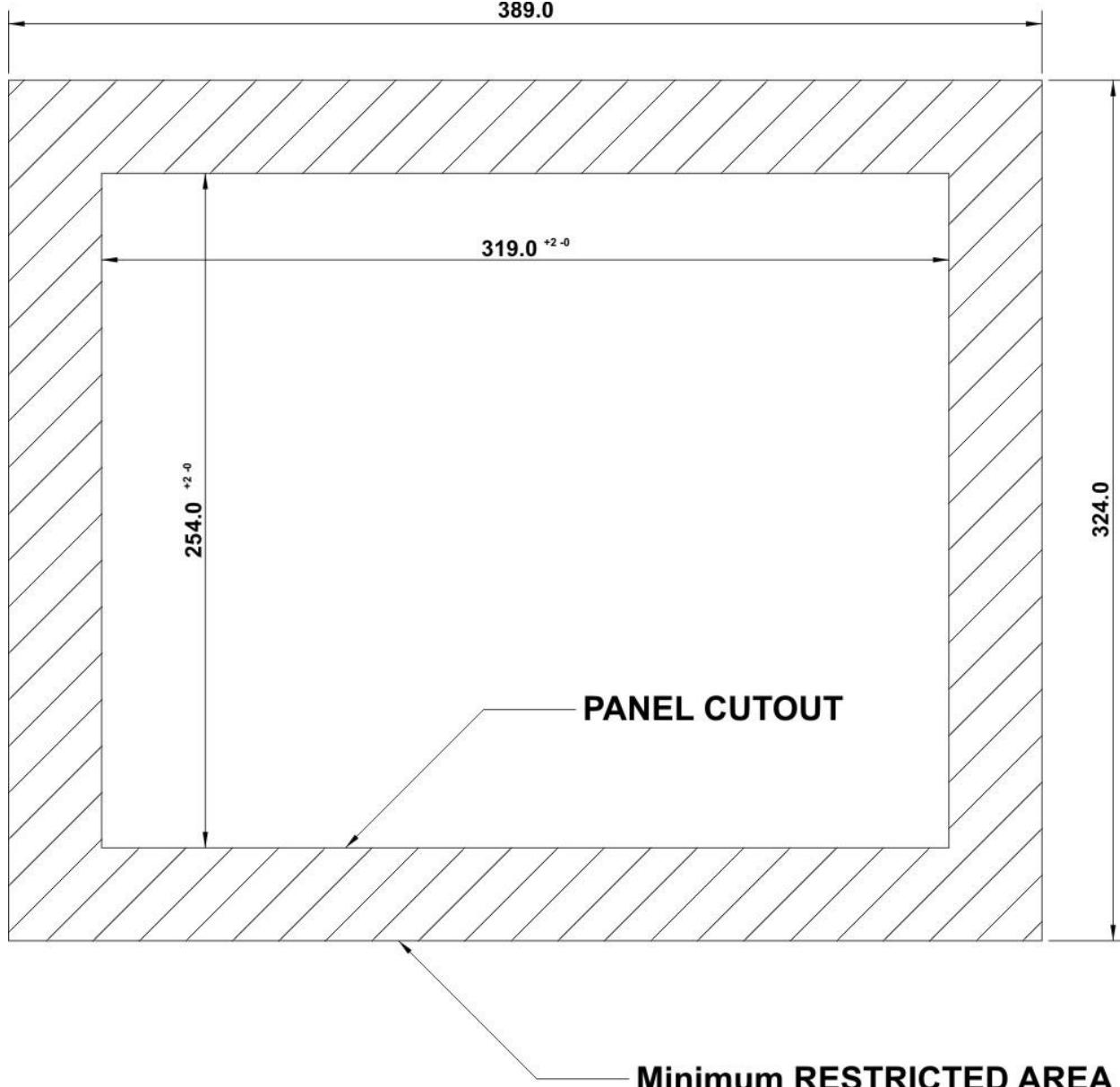
- 35 mm (minimum) for each side.

**Instructions:**

Insert IMI220-7002A001 into the mounting cut-out from the front.

Insert the fixing clamps (6pcs. provided) into the housings of the device.

Using 2 mm provided hexagonal key to tight the clamps's screw.



## 3.38 IMI220-123B002: Local Graphic Panel Color LCD - Touch screen - Keyboard - LVDS Communication - USB - Rotary Knob

**WARNING!**

Before to operate with IMI220-123B002 please referred to the "[Preliminary Information](#)" chapter on User Manual.

### 3.38.1 General Information

The Panel IMI220-123B002 is a local terminal endowed with a color display LCD 800 x 600 pixels Touch screen and a keyboard of 73 keys + Rotary knob. The communication with the PLC happens through module dedicated to the LVDS local terminals. On the terminal can be visualized both maps video alphanumeric that graphics.

### 3.38.2 Technical Characteristics

Code	IMI220-123B002
HW characteristics	
Power supply Input voltage Range	24VDC ± 15%
Current consumption Nominal value	1A
USB drive	Yes IMPORTANT: Using USB flash drive >= 2Gb dimension, please format with file system FAT32 and with "Allocation unit size" at 32 Kilobytes.
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Environment class Correctly mounted (Only front panel) Rear	IP 44 IP 20

Keyboard characteristics	
Video	<a href="#">IMI220-6031A001</a>
Keyboard	<a href="#">IMI220-6031A001</a>

Display characteristics	
Display type	Color LCD TFT
Touch screen	Yes
Backlight	Neon lamp
Resolution	800 x 600 Pixel
Graphics	Yes

Inches	12"
Fonts type	User programmable
Stand by	User programmable
Led	
Power	Green led
2ndF	Green led
Enter	Green led
Set	Green led
X10	Green led
36 keys	Green led
Brightness regulation	Yes (programmable)

<b>Keyboard characteristics</b>	
Keys	
Total keys	73 + Rotary knob
Functional keys	12
Programmable keys	36
Programmable led	36

<b>General characteristics</b>	
Programming software	MASS
Connectors	
Power supply	5 pole M, 3.5 mm
Display	RJ45
Keyboard	RJ45
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Minimum cable temperature	67.1°C
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	428.0 x 335.0 x 54.5 mm
Weight	3580 g

### 3.38.3Front View



**figure 1:** frontal view of the terminal IMI220-123B002.

- **Power led:** Green led = indicate the presence of the power supply.
- **2ndF led:** Green led=indicate when the key second function is enable.
- **X10led:** Green led=indicate the function x10 is enable.
- **Setled:** Green led =indicate that the data is variation.
- **Entered:** Green led =indicate that the data is variation.

### 3.38.4 Keys Management

The present keys on the terminal IMI220-123B002 are so used:

- 12 functional keys.
- 36 programmable keys + 36 programmable led.
- 10 numeric and alphanumeric keys.

The functional keys are used for the usual programming of the programmable functional keys with the MASS.

To insert the alphabetical keys needs to enable the key **2ndF** and to press the desired numerical key so many times up to when the desired letter doesn't appear. To recall the system pages to contemporarily press the keys **Shift** and **Enter**.

Referred to the structures `_MTermIn` and `_MTermOut` contained in the `M_MC600HMI` library:

F1	<code>_MTermOut.FKeys[1]</code>	F7	<code>_MTermOut.FKeys[7]</code>
F2	<code>_MTermOut.FKeys[2]</code>	F8	<code>_MTermOut.FKeys[8]</code>
F3	<code>_MTermOut.FKeys[3]</code>	F9	<code>_MTermOut.FKeys[9]</code>
F4	<code>_MTermOut.FKeys[4]</code>	F10	<code>_MTermOut.FKeys[10]</code>
F5	<code>_MTermOut.FKeys[5]</code>	F11	<code>_MTermOut.FKeys[11]</code>
F6	<code>_MTermOut.FKeys[6]</code>	F12	<code>_MTermOut.FKeys[12]</code>

Led X10	<code>_MTermIn.Led[1]</code>	Led SET	<code>_MTermIn.Led[2]</code>
Led ENT	<code>_MTermIn.Led[4]</code>		

Button 1	_MTermOut.Button[1]	Button 19	_MTermOut.Button[19]
Button 2	_MTermOut.Button[2]	Button 20	_MTermOut.Button[20]
Button 3	_MTermOut.Button[3]	Button 21	_MTermOut.Button[21]
Button 4	_MTermOut.Button[4]	Button 22	_MTermOut.Button[22]
Button 5	_MTermOut.Button[5]	Button 23	_MTermOut.Button[23]
Button 6	_MTermOut.Button[6]	Button 24	_MTermOut.Button[24]
Button 7	_MTermOut.Button[7]	Button 25	_MTermOut.Button[25]
Button 8	_MTermOut.Button[8]	Button 26	_MTermOut.Button[26]
Button 9	_MTermOut.Button[9]	Button 27	_MTermOut.Button[27]
Button 10	_MTermOut.Button[10]	Button 28	_MTermOut.Button[28]
Button 11	_MTermOut.Button[11]	Button 29	_MTermOut.Button[29]
Button 12	_MTermOut.Button[12]	Button 30	_MTermOut.Button[30]
Button 13	_MTermOut.Button[13]	Button 31	_MTermOut.Button[31]
Button 14	_MTermOut.Button[14]	Button 32	_MTermOut.Button[32]
Button 15	_MTermOut.Button[15]	Button 33	_MTermOut.Button[33]
Button 16	_MTermOut.Button[16]	Button 34	_MTermOut.Button[34]
Button 17	_MTermOut.Button[17]	Button 35	_MTermOut.Button[35]
Button 18	_MTermOut.Button[18]	Button 36	_MTermOut.Button[36]

Led 1	_MTermIn.Led[5]	Led 19	_MTermIn.Led[23]
Led 2	_MTermIn.Led[6]	Led 20	_MTermIn.Led[24]
Led 3	_MTermIn.Led[7]	Led 21	_MTermIn.Led[25]
Led 4	_MTermIn.Led[8]	Led 22	_MTermIn.Led[26]
Led 5	_MTermIn.Led[9]	Led 23	_MTermIn.Led[27]
Led 6	_MTermIn.Led[10]	Led 24	_MTermIn.Led[28]
Led 7	_MTermIn.Led[11]	Led 25	_MTermIn.Led[29]
Led 8	_MTermIn.Led[12]	Led 26	_MTermIn.Led[30]
Led 9	_MTermIn.Led[13]	Led 27	_MTermIn.Led[31]
Led 10	_MTermIn.Led[14]	Led 28	_MTermIn.Led[32]
Led 11	_MTermIn.Led[15]	Led 29	_MTermIn.Led[33]
Led 12	_MTermIn.Led[16]	Led 30	_MTermIn.Led[34]
Led 13	_MTermIn.Led[17]	Led 31	_MTermIn.Led[35]
Led 14	_MTermIn.Led[18]	Led 32	_MTermIn.Led[36]
Led 15	_MTermIn.Led[19]	Led 33	_MTermIn.Led[37]
Led 16	_MTermIn.Led[20]	Led 34	_MTermIn.Led[38]
Led 17	_MTermIn.Led[21]	Led 35	_MTermIn.Led[39]
Led 18	_MTermIn.Led[22]	Led 36	_MTermIn.Led[40]

For manage X10 led: `_MTermIn.Led[1] := _MTermOut.Multiplier10;`

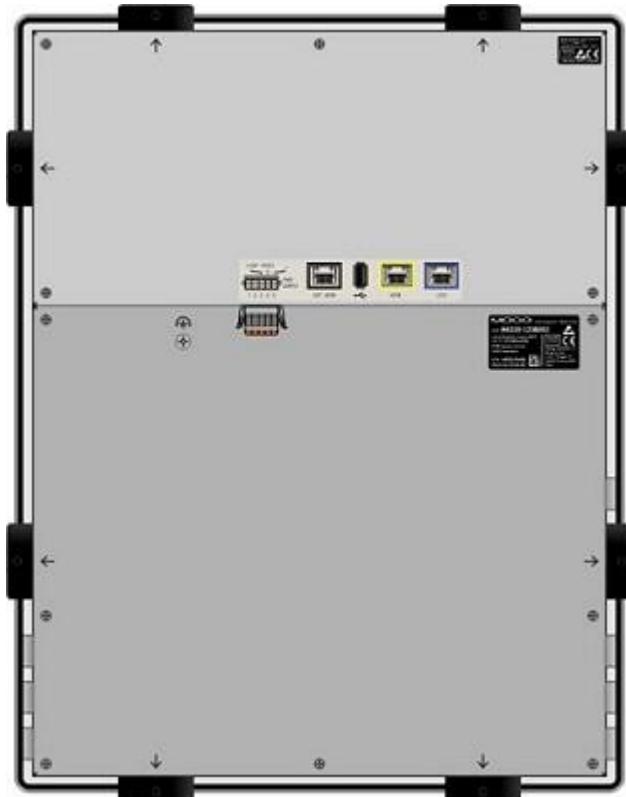
For manage SET led: `_MTermIn.Led[2] := _MTermOut.ChangePending;`

For manage ENT led: `_MTermIn.Led[4] := _MTermOut.ChangePending;`

### 3.38.5 Communication Mode

The panel IMI220-123B002 communicates with the PLC through two LVDS cables.

### 3.38.6 Connections

**WARNING!**

Where the 24VDC is generated through a transformer and rectifier, the transformer being used must conform to CEI-EN 60742 safety regulations.

In all cases the 24 VDC power supply must be dimensioned in function of the total absorbed power of the panel plus the systems (PLC).

**Male connector Panel side (PSU Pinout)**

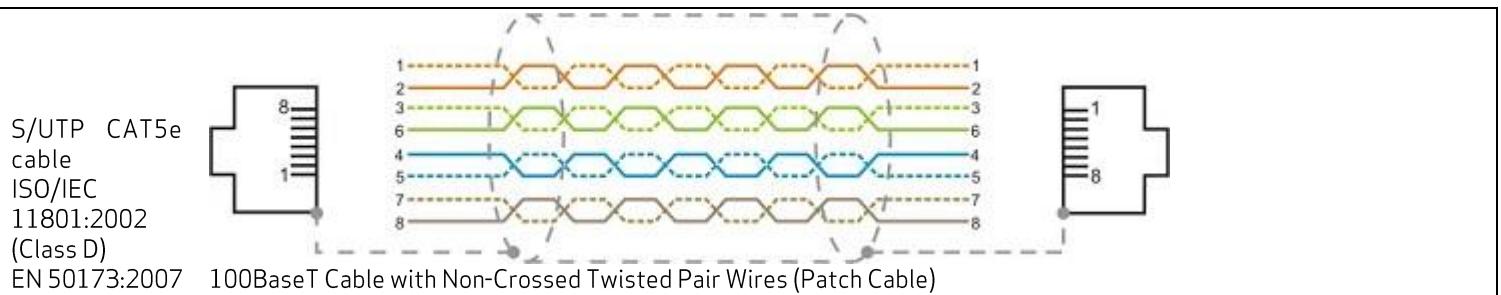
	Pin number	Signal description
+24V	1	not used
0V24	2	not used
	3	24VDC
	4	0V24
PWR SUPPLY	5	Earth

**3.38.7 Connections to the supply**

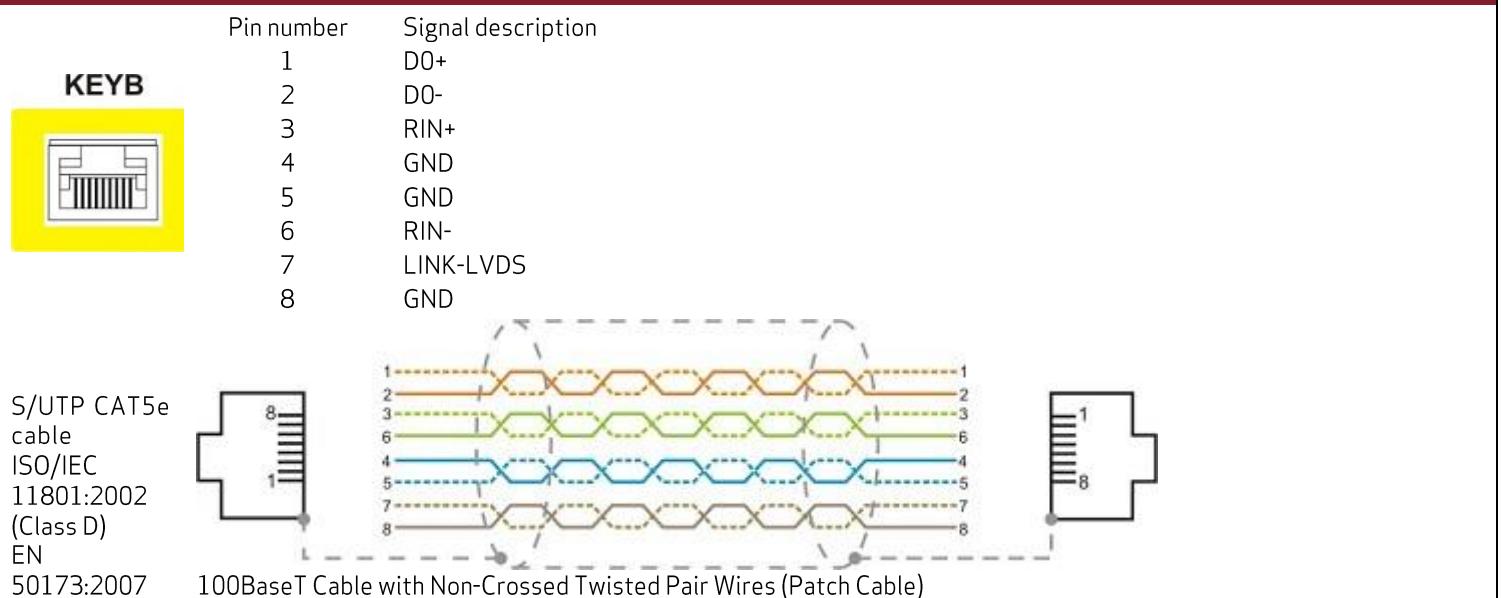
To connect the power supply in a correct mode please referred to the previous drawing. In order to avoid a risk of short circuit or contact less we suggest to use a wire with ferrule instead of the wire without ferrule. The informations related to the female connector are written in the chapter "[C46665 PSU Connector](#)".

**LCD Pinout**

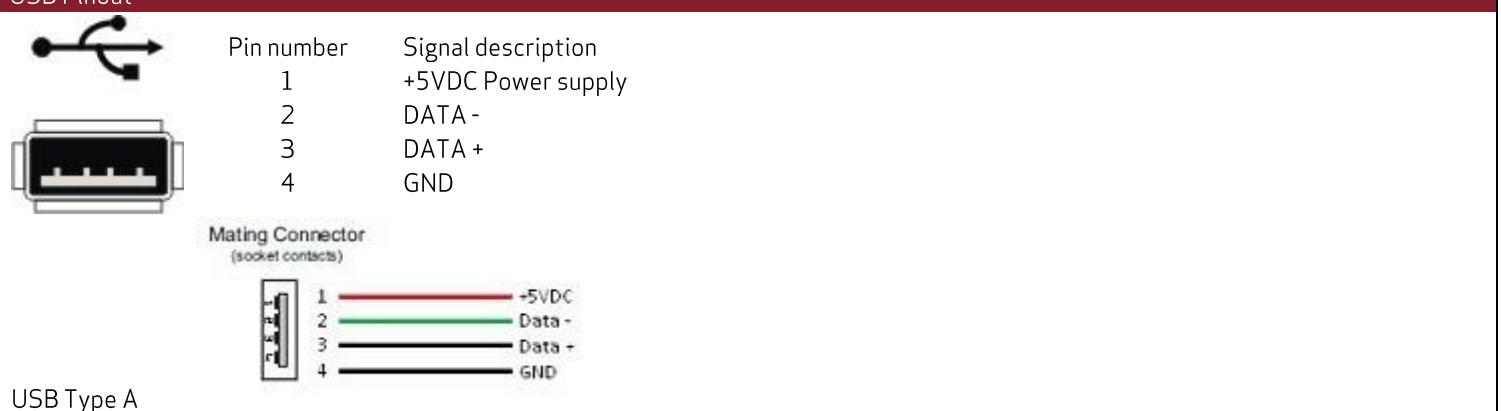
	Pin number	Signal description
	1	TX0-
	2	TX0+
	3	TX1-
	4	TX2-
	5	TX2+
	6	TX1+
	7	TXCLK-
	8	TXCLK+



## KEYBOARD Pinout



## USB Pinout



## 3.38.8 Installation

They are now reported the spaces for the fixing of the panel. The panel is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the panel will be situated.

**Location:**

The mounting location should comply with the following characteristics:

- Avoid direct sunlight exposure.
- Make sure that IMI220-123B002 is properly (ergonomically) accessible to the operator.
- Choose a suitable mounting height.

IMI220-123B002 panel is suitable for installation in:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles

**WARNING!**

The installer have to guarantee the quick access to the back of the panel in order to the operator can easily disconnect the power supply if needed.

**Mounting:**

In order to ensure a proper mounting of the system, the material of the mounting cut-out must be sufficiently stable. To obtain the degree of protection described below, the material of the mounting panel must not deform due to the use of clamps on the operator panel.

The degree of protection of the system (IP) is intended only for the front panel of IMI220-123B002 and is guaranteed only if the following conditions are satisfied:

- Material thickness at the mounting cut-out for IP44 protection: 2mm to 5 mm.
- Deviations of the plane of the mounting cut-out limits:  $\leq 0.5$  mm. This condition must be satisfied even when the IMI220-123B002 is installed.

To ensure adequate installation it is necessary leaving the following open spaces around the system:

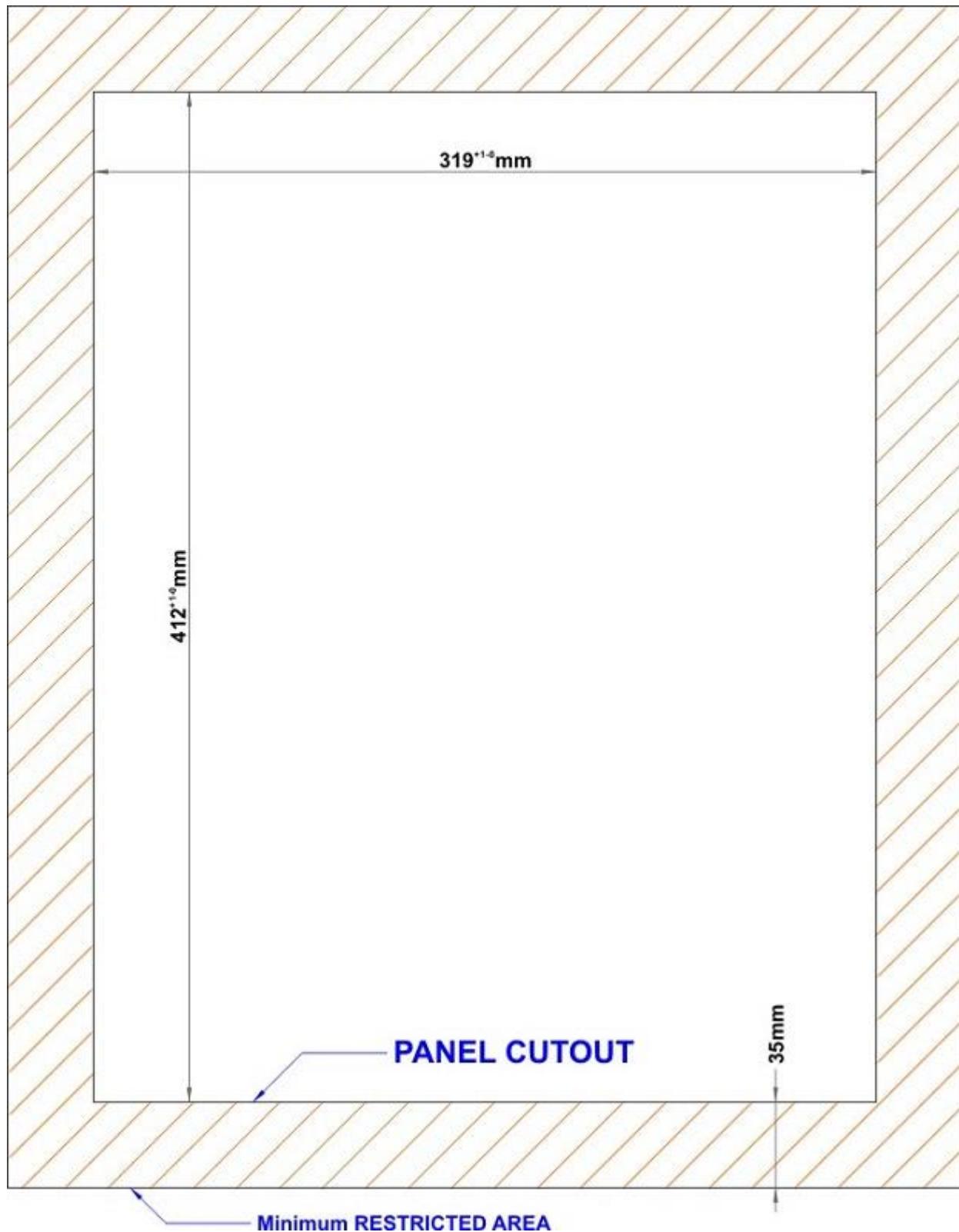
- 35 mm (minimum) for each side.

**Instructions:**

Insert IMI220-123B002 into the mounting cut-out from the front.

Insert the fixing clamps (8pcs. provided) into the housings of the device.

Using 2 mm provided hexagonal key to tight the clamps's screw.



### 3.38.9UL certification

The IMI220-123B002 product has reached the authorization to apply the following UL mark:



**LISTED**

**PROG. CNTLR.**

**E494120**

## 3.39 C46670: LVDS Splitter/Repeater

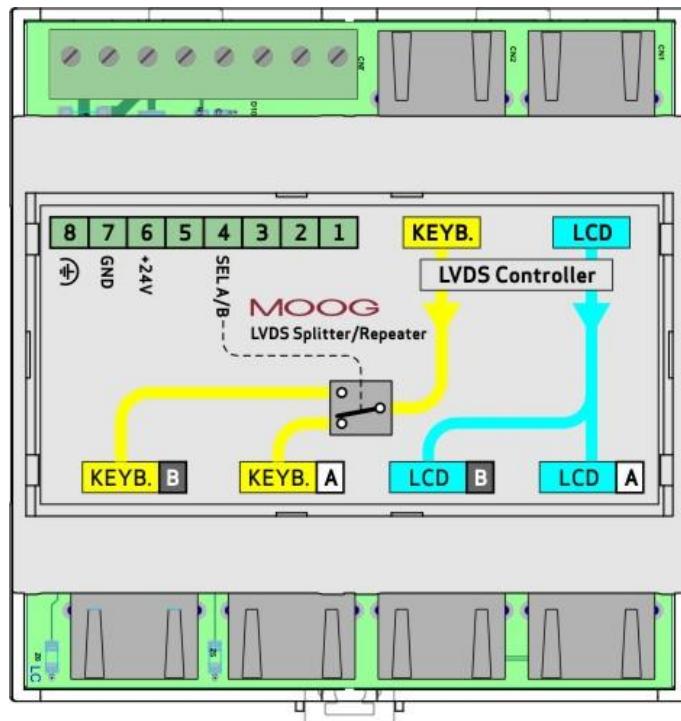
### 3.39.1 General Information

Scope of this module is the possibility to connect 2 Panel HMI like T123 series or T7000 series at unique PLC like M400 series or MC600 series. The HMIs connected can be enabled only one per time (see Pin 4 SEL A/B).

### 3.39.2 Technical Characteristics

Code	C46670
Power supply	
Input voltage	24VDC
Range	± 20%
HMI Selector	
HMI A	Input 4 @ 0VDC
HMI B	Input 4 @ 24VDC
Diagnostics on connector	
LVDS Controller LCD	Green led (Powered) Yellow led (Activity)
LVDS Controller KEYB	Green led (Powered) Yellow led (Activity)
LVDS LCD A	Green led (Powered when Selector is A) Yellow led (Powered when Selector is A)
LVDS KEYB A	Green led (Powered when Selector is A) Yellow led (Powered when Selector is A)
LVDS LCD B	Green led (Powered when Selector is B) Yellow led (Powered when Selector is B)
LVDS KEYB B	Green led (Powered when Selector is B) Yellow led (Powered when Selector is B)
Panel HMI supported	<a href="#">IMI220-123B002</a> <a href="#">IMI220-145H001</a> <a href="#">IMI220-7000A001</a> <a href="#">IMI220-7001A001</a> <a href="#">IMI220-7002A001</a>
Connector	
Type	8 pins 3.5 mm pitch female
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	0.0 x 0.0 x 0.0 mm
Weight	300 g

### 3.39.3 Front View

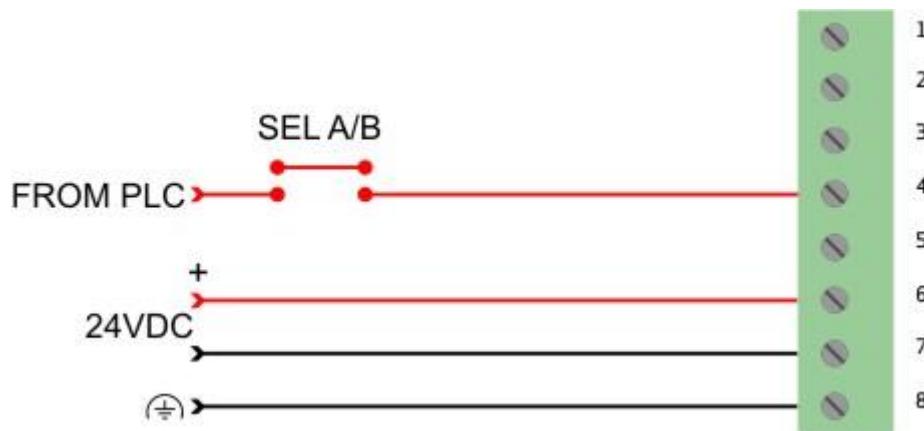


### 3.39.4 Connections

#### REMOTE KEYBOARD Pinout



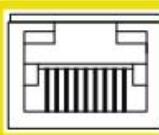
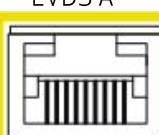
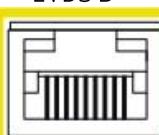
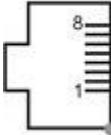
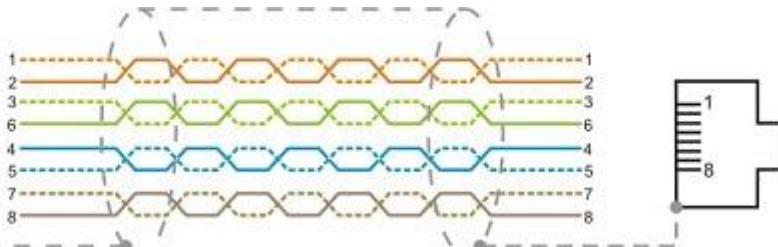
Pin number	Signal description
1	
2	
3	
4	SEL A/B
5	
6	+24VDC
7	GND
8	Earth



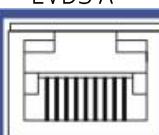
#### KEYBOARD Pinout

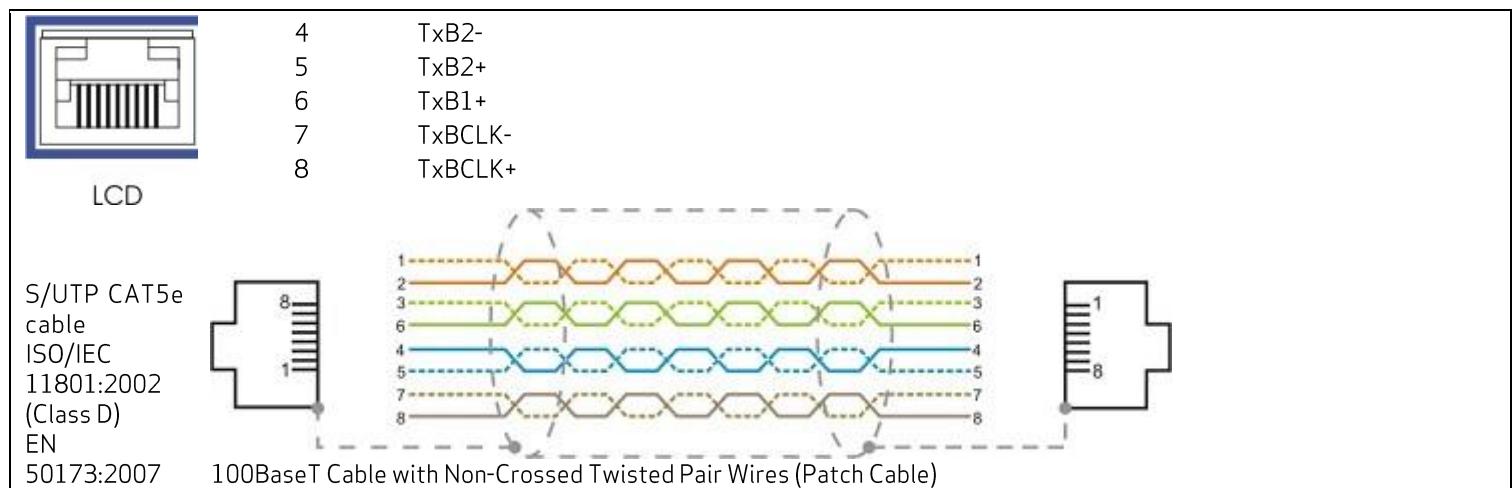


Pin number	Signal description
1	RIN+
2	RIN-

	3	D0+
KEYB	4	GND
	5	GND
	6	D0-
	7	LINK-LVDS
	8	GND
LVDS A	Pin number	Signal description
	1	D0A+
	2	D0A-
	3	RINA+
	4	GNDA
	5	GNDA
	6	RINA-
KEYB	7	LINKA-LVDS
	8	GNDA
LVDS B	Pin number	Signal description
	1	DOB+
	2	DOB-
	3	RINB+
	4	GNDB
	5	GNDB
	6	RINB-
KEYB	7	LINKB-LVDS
	8	GNDB
S/UTP CAT5e cable ISO/IEC 11801:2002 (Class D) EN 50173:2007		
	100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)	

## LCD Pinout

LVDS IN	Pin number	Signal description
	1	RxIN0-
	2	RxIN0+
	3	RxIN1-
	4	RxIN2-
	5	RxIN2+
	6	RxIN1+
LCD	7	RxCLK-
	8	RxCLK+
LVDS A	Pin number	Signal description
	1	TxA0-
	2	TxA0+
	3	TxA1-
	4	TxA2-
	5	TxA2+
	6	TxA1+
LCD	7	TxACLK-
	8	TxACLK+
LVDS B	Pin number	Signal description
	1	TxB0-
	2	TxB0+
	3	TxB1-



### 3.39.5 Dimensions

## 3.40 IMI220-7100A001: HMI AUTOMATION KEYBOARD 7x3

### 3.40.1 General Information

The external keyboard IMI220-7100A001 allow to manage 21 keys and 21 led.

### 3.40.2 Technical Characteristics

Code	IMI220-7100A001
General characteristics	
Programming software	MASS
Diagnostics on connector EXTERNAL KEYBOARD	Green led (3.3V) Yellow led (Activity)
User interface EXTERNAL KEYBOARD	RJ45
Keys	
Programmable keys	21
Programmable led	21
External Keyboard	<a href="#">IMI220-7000A001</a>
Remote Keyboard	<a href="#">C46668 Remote Keyboard Module</a>
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	
Correctly mounted (Only front panel)	IP 54
Rear	IP 20
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Dimensions (H x W x D)	115.0 x 215.0 x 47.0 mm
Weight	660 g

### 3.40.3 Front View



- **21 Green Led:** Indicate the state of the buttons.

### 3.40.4 Keys Management

The present keys on the keyboard IMI220-7100A001 are so used:

- 21 programmable keys + 21 programmable led.

Referred to the structures `_MTermln` and `_MTermOut` contained in the `M_MC600HMI` library:

Button 1	<code>_MTermOut.Button[1]</code>
Button 2	<code>_MTermOut.Button[2]</code>
Button 3	<code>_MTermOut.Button[3]</code>
Button 4	<code>_MTermOut.Button[4]</code>
Button 5	<code>_MTermOut.Button[5]</code>
Button 6	<code>_MTermOut.Button[6]</code>
Button 7	<code>_MTermOut.Button[7]</code>
Button 8	<code>_MTermOut.Button[8]</code>
Button 9	<code>_MTermOut.Button[9]</code>
Button 10	<code>_MTermOut.Button[10]</code>
Button 11	<code>_MTermOut.Button[11]</code>
Button 12	<code>_MTermOut.Button[12]</code>
Button 13	<code>_MTermOut.Button[13]</code>
Button 14	<code>_MTermOut.Button[14]</code>
Button 15	<code>_MTermOut.Button[15]</code>
Button 16	<code>_MTermOut.Button[16]</code>
Button 17	<code>_MTermOut.Button[17]</code>
Button 18	<code>_MTermOut.Button[18]</code>
Button 19	<code>_MTermOut.Button[19]</code>
Button 20	<code>_MTermOut.Button[20]</code>
Button 21	<code>_MTermOut.Button[21]</code>

Led 1	<code>_MTermln.Led[1]</code>
Led 2	<code>_MTermln.Led[2]</code>
Led 3	<code>_MTermln.Led[3]</code>
Led 4	<code>_MTermln.Led[4]</code>

Led 5	_MTermln.Led[5]
Led 6	_MTermln.Led[6]
Led 7	_MTermln.Led[7]
Led 8	_MTermln.Led[8]
Led 9	_MTermln.Led[9]
Led 10	_MTermln.Led[10]
Led 11	_MTermln.Led[11]
Led 12	_MTermln.Led[12]
Led 13	_MTermln.Led[13]
Led 14	_MTermln.Led[14]
Led 15	_MTermln.Led[15]
Led 16	_MTermln.Led[16]
Led 17	_MTermln.Led[17]
Led 18	_MTermln.Led[18]
Led 19	_MTermln.Led[19]
Led 20	_MTermln.Led[20]
Led 21	_MTermln.Led[21]

### 3.40.5 Communication Mode

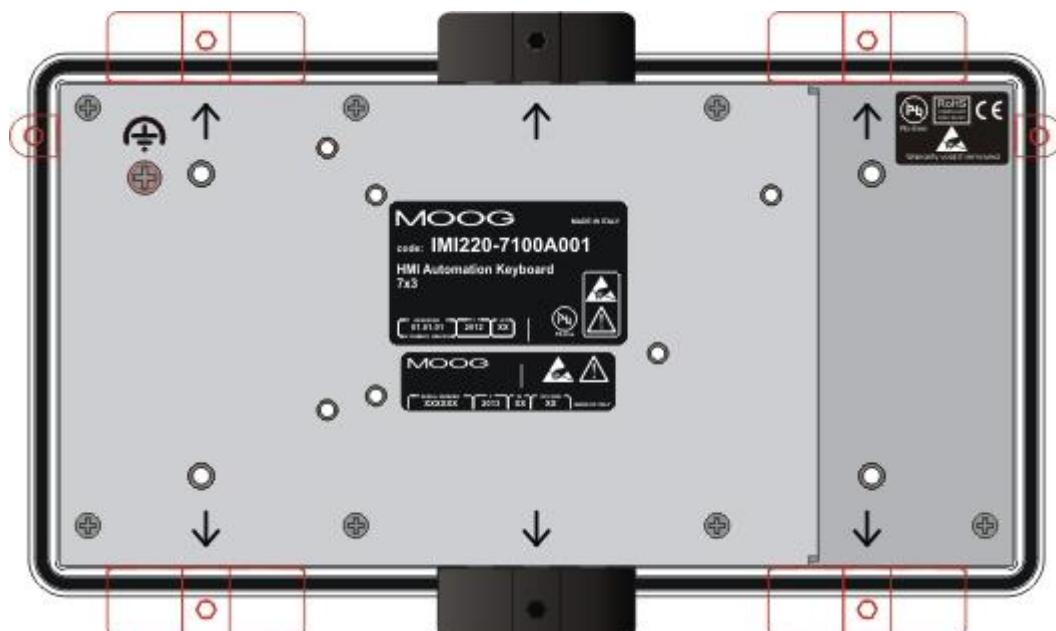
#### Local mode:

The Keyboard IMI220-7100A001 communicates with the PLC through Ethernet cables (length max 50cm) connected to the panel [IMI220-7000A001](#).

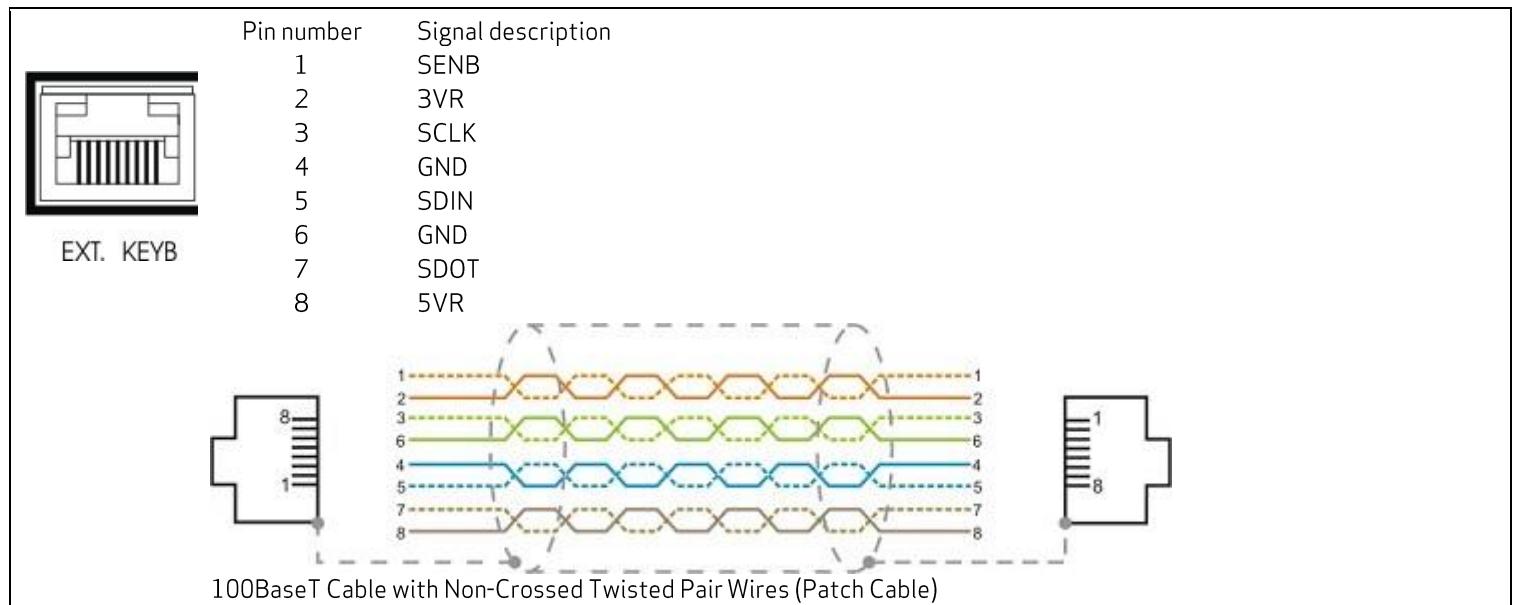
#### Remote mode:

The Keyboard IMI220-7100A001 communicates with the PLC through the remote module called "[C46668 Remote Keyboard Module](#)" using RS232 serial communication.

### 3.40.6 Connections

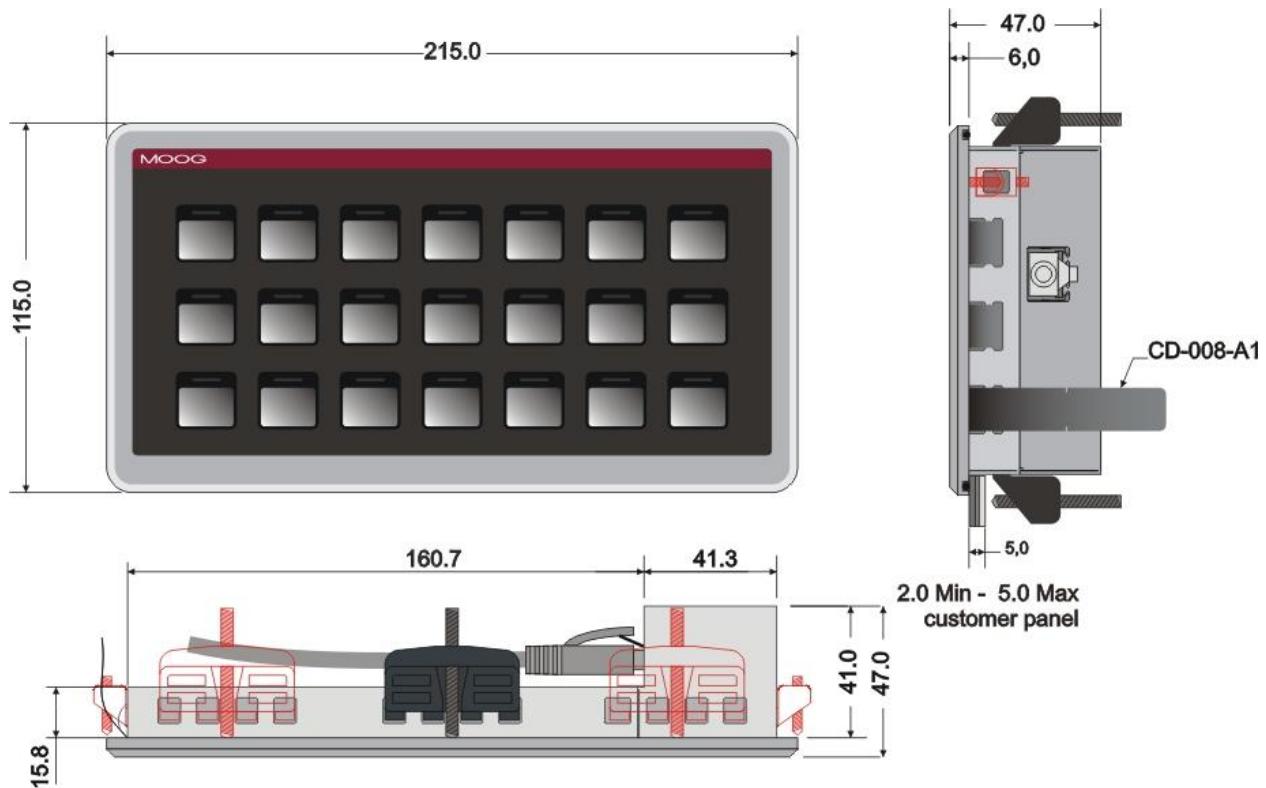


EXTERNAL KEYBOARD Pinout

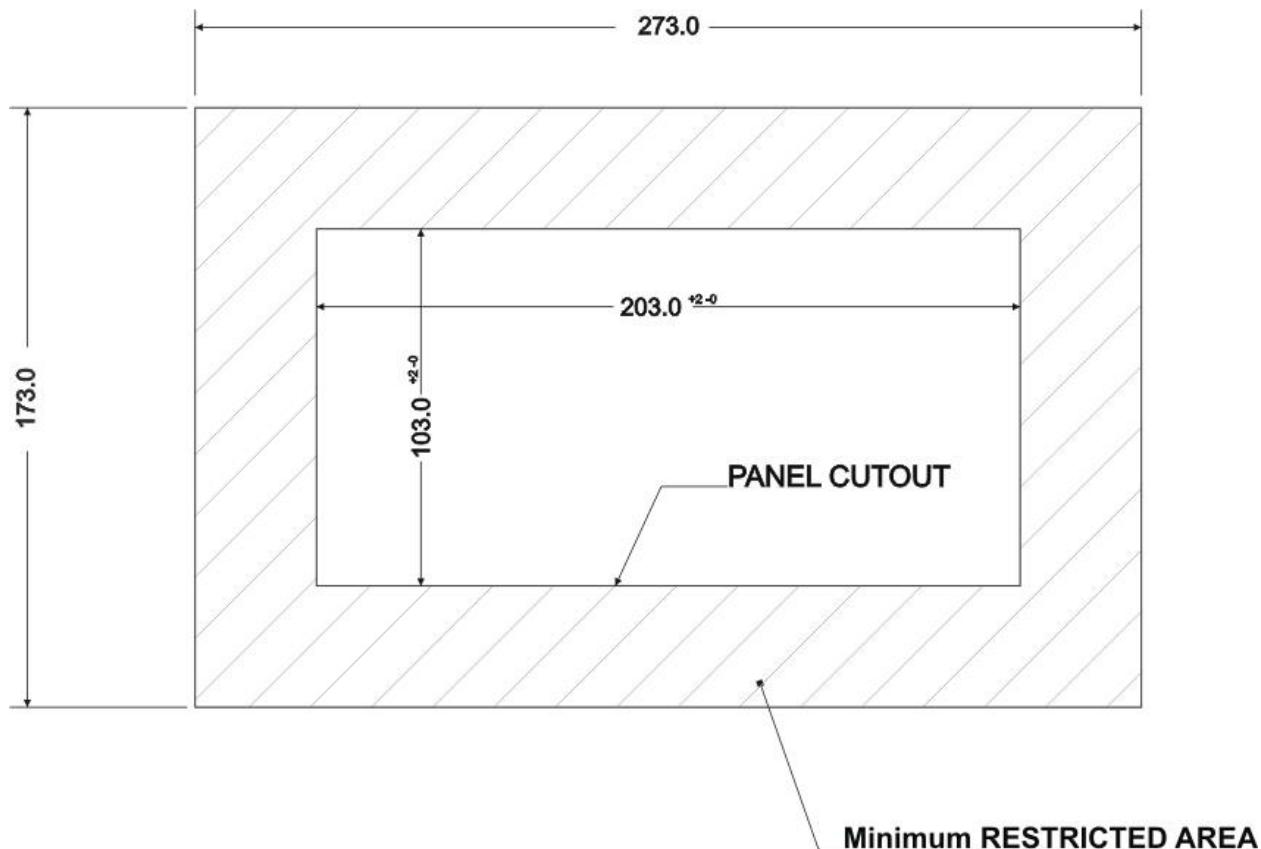


### 3.40.7 Dimensions

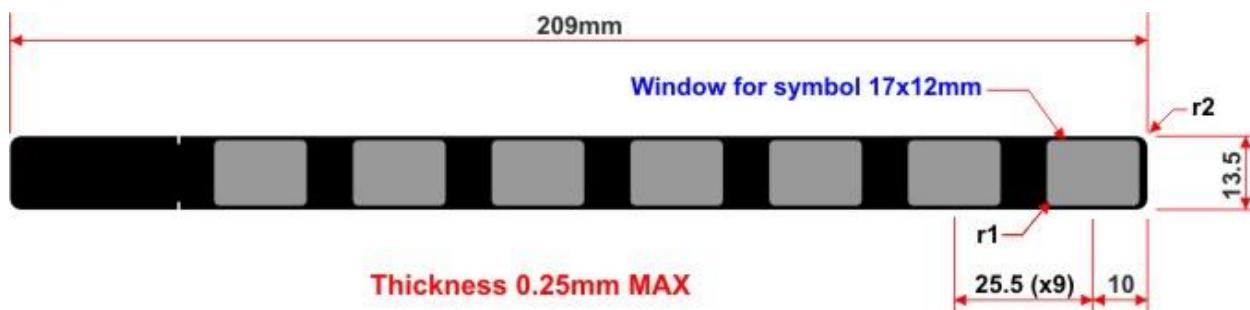
They are now reported the spaces for the fixing of the keyboard. The keyboard is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the terminal will be situated.



### 3.40.8 Cut Out



### 3.40.9 Strips



## 3.41 IMI220-7101A001: HMI AUTOMATION KEYBOARD 10x2

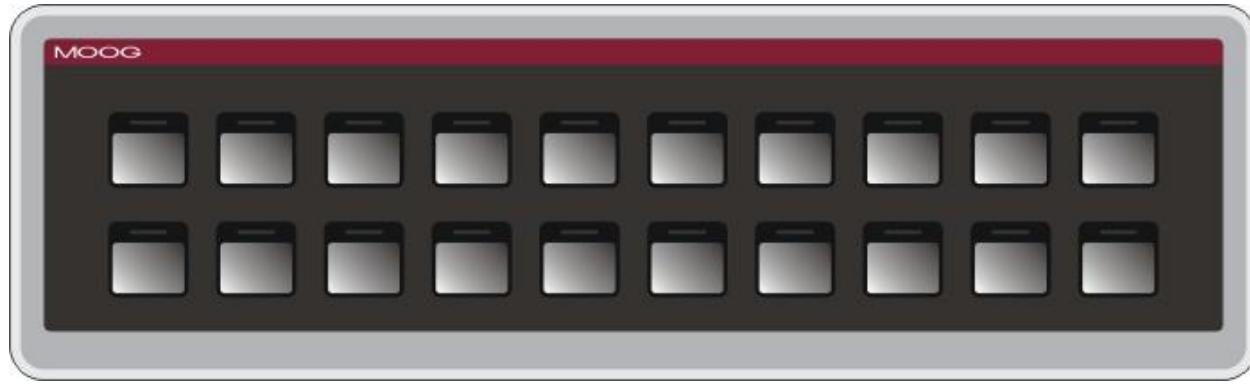
### 3.41.1 General Information

The external keyboard IMI220-7101A001 allow to manage 20 keys and 20 led.

### 3.41.2 Technical Characteristics

Code	IMI220-7101A001
General characteristics	
Programming software	MASS
Diagnostics on connector EXTERNAL KEYBOARD	Green led (3.3V) Yellow led (Activity)
User interface EXTERNAL KEYBOARD	RJ45
Keys	
Programmable keys	20
Programmable led	20
External Keyboard	<a href="#">IMI220-7001A001</a>
Remote Keyboard	<a href="#">C46668 Remote Keyboard Module</a>
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	
Correctly mounted (Only front panel)	IP 54
Rear	IP 20
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Dimensions (H x W x D)	89.0 x 295.0 x 47.0 mm
Weight	700 g

### 3.41.3 Front View



- **20 Green Led:** Indicate the state of the buttons.

### 3.41.4 Keys Management

The present keys on the keyboard IMI220-7101A001 are so used:

- 20 programmable keys + 20 programmable led.

Referred to the structures `_MTermIn` and `_MTermOut` contained in the `M_MC600HMI` library:

Button 1	<code>_MTermOut.Button[1]</code>
Button 2	<code>_MTermOut.Button[2]</code>
Button 3	<code>_MTermOut.Button[3]</code>
Button 4	<code>_MTermOut.Button[4]</code>
Button 5	<code>_MTermOut.Button[5]</code>
Button 6	<code>_MTermOut.Button[6]</code>
Button 7	<code>_MTermOut.Button[7]</code>
Button 8	<code>_MTermOut.Button[8]</code>
Button 9	<code>_MTermOut.Button[9]</code>
Button 10	<code>_MTermOut.Button[10]</code>
Button 11	<code>_MTermOut.Button[11]</code>
Button 12	<code>_MTermOut.Button[12]</code>
Button 13	<code>_MTermOut.Button[13]</code>
Button 14	<code>_MTermOut.Button[14]</code>
Button 15	<code>_MTermOut.Button[15]</code>
Button 16	<code>_MTermOut.Button[16]</code>
Button 17	<code>_MTermOut.Button[17]</code>
Button 18	<code>_MTermOut.Button[18]</code>
Button 19	<code>_MTermOut.Button[19]</code>
Button 20	<code>_MTermOut.Button[20]</code>

Led 1	<code>_MTermIn.Led[1]</code>
Led 2	<code>_MTermIn.Led[2]</code>
Led 3	<code>_MTermIn.Led[3]</code>
Led 4	<code>_MTermIn.Led[4]</code>
Led 5	<code>_MTermIn.Led[5]</code>
Led 6	<code>_MTermIn.Led[6]</code>
Led 7	<code>_MTermIn.Led[7]</code>
Led 8	<code>_MTermIn.Led[8]</code>
Led 9	<code>_MTermIn.Led[9]</code>

Led 10	_MTermln.Led[10]
Led 11	_MTermln.Led[11]
Led 12	_MTermln.Led[12]
Led 13	_MTermln.Led[13]
Led 14	_MTermln.Led[14]
Led 15	_MTermln.Led[15]
Led 16	_MTermln.Led[16]
Led 17	_MTermln.Led[17]
Led 18	_MTermln.Led[18]
Led 19	_MTermln.Led[19]
Led 20	_MTermln.Led[20]

### 3.41.5 Communication Mode

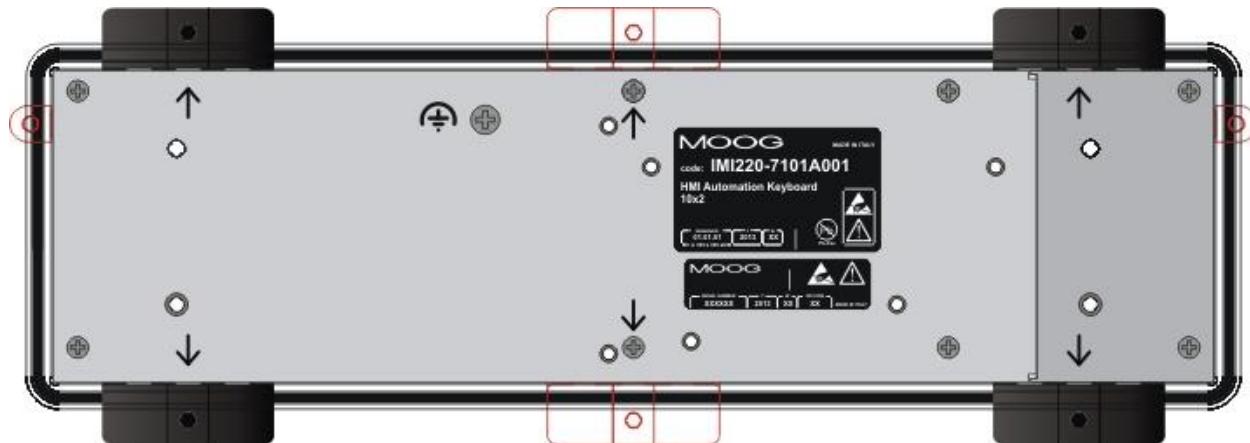
Local mode:

The Keyboard IMI220-7101A001 communicates with the PLC through Ethernet cables (length max 50cm) connected to the panel [IMI220-7001A001](#).

Remote mode:

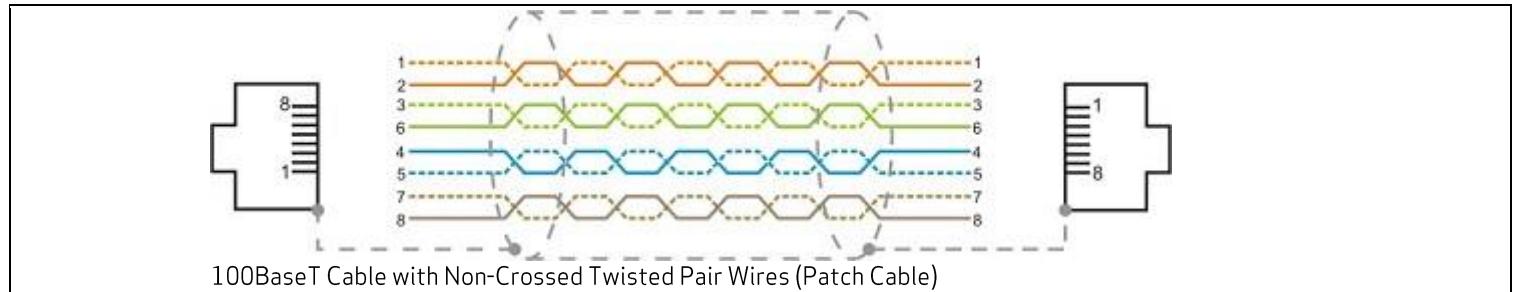
The Keyboard IMI220-7101A001 communicates with the PLC through the remote module called "[C46668 Remote Keyboard Module](#)" using RS232 serial communication.

### 3.41.6 Connections



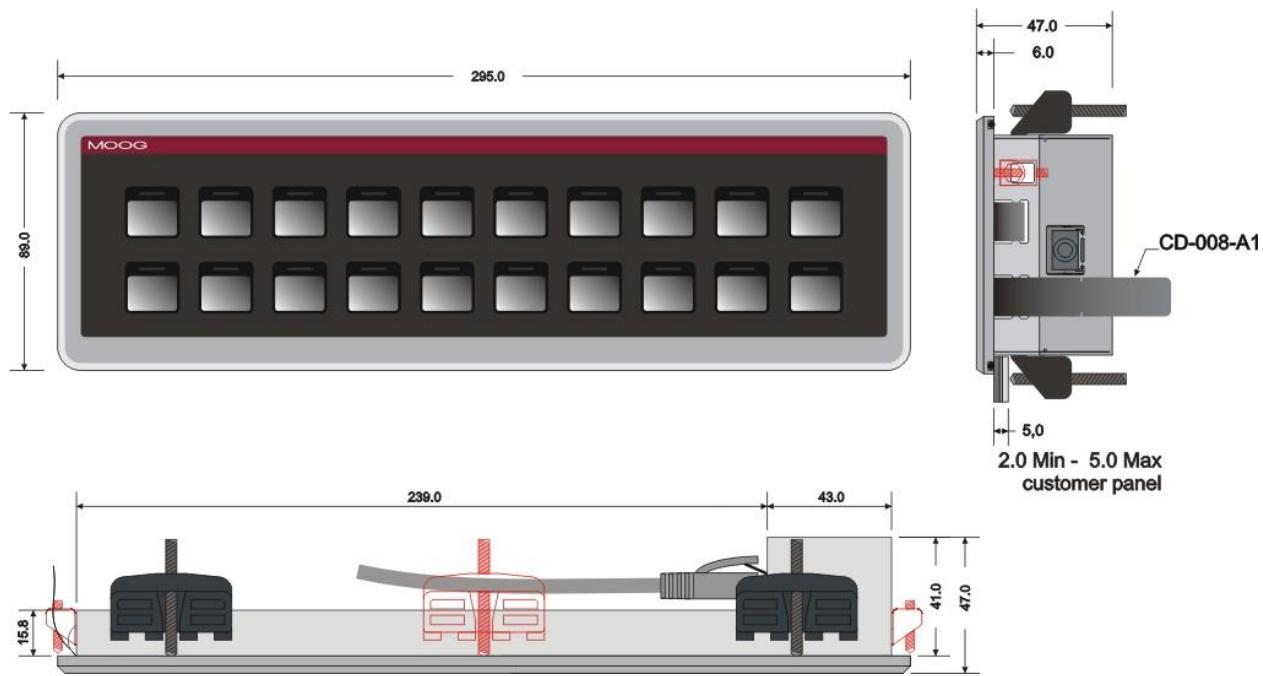
EXTERNAL KEYBOARD Pinout

Pin number	Signal description
1	SENB
2	3VR
3	SCLK
4	GND
5	SDIN
6	GND
7	SDOT
8	5VR

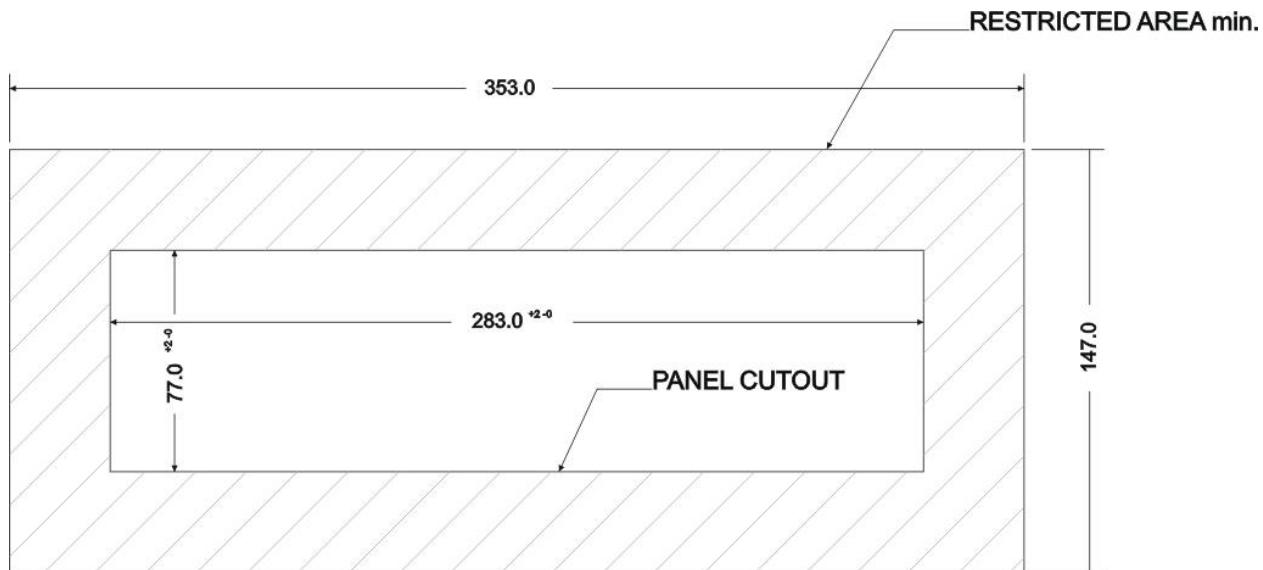


### 3.41.7 Dimensions

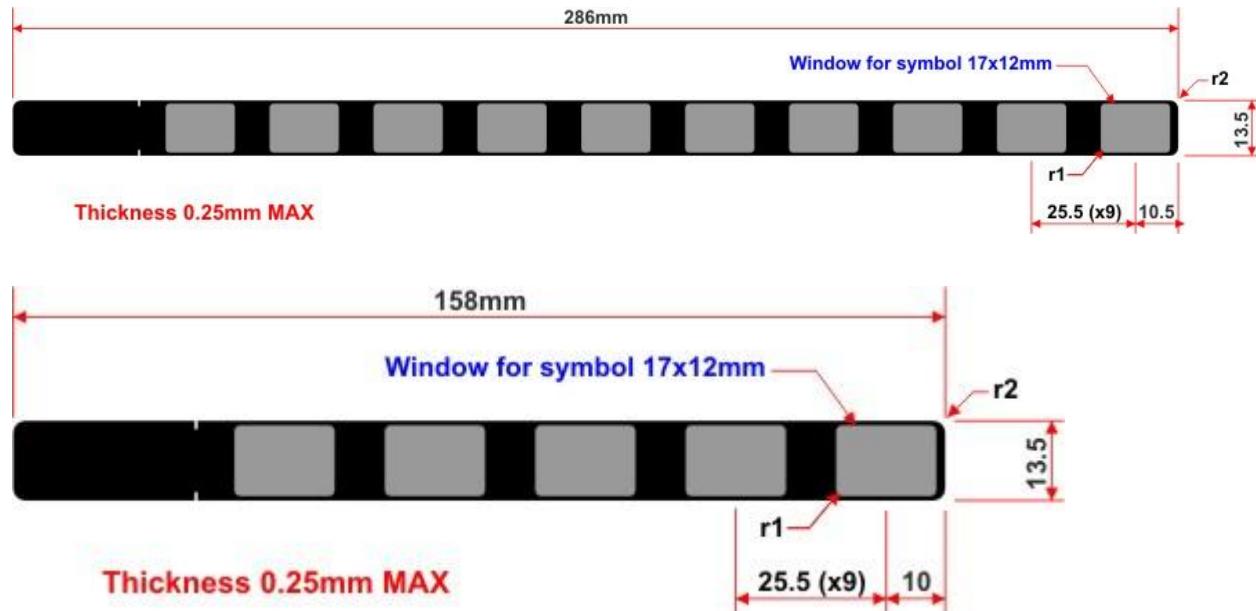
They are now reported the spaces for the fixing of the keyboard. The keyboard is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the terminal will be situated.



### 3.41.8 Cut Out



### 3.41.9 Strips



## 3.42 IMI220-7102A001: HMI AUTOMATION KEYBOARD 10x4

### 3.42.1 General Information

The external keyboard IMI220-7102A001 allow to manage 40 keys and 40 led.

### 3.42.2 Technical Characteristics

Code	IMI220-7102A001
General characteristics	
Programming software	MASS
Diagnostics on connector EXTERNAL KEYBOARD	Green led (3.3V) Yellow led (Activity)
User interface EXTERNAL KEYBOARD	RJ45
Keys	
Programmable keys	40
Programmable led	40
External Keyboard	<a href="#">IMI220-7001A001</a>
Remote Keyboard	<a href="#">C46668 Remote Keyboard Module</a>
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	
Correctly mounted (Only front panel)	IP 54
Rear	IP 20
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +80°C
Relative humidity	20% to 90% (without condensation)
Mounting orientation	Vertical
Dimensions (H x W x D)	141.0 x 295.0 x 47.0 mm
Weight	1000 g

### 3.42.3 Front View



- **40 Green Led:** Indicate the state of the buttons.

### 3.42.4Keys Management

The present keys on the keyboard IMI220-7102A001 are so used:

- 40 programmable keys + 40 programmable led.

Referred to the structures `_MTermIn` and `_MTermOut` contained in the `M_MC600HMI` library:

Button 1	<code>_MTermOut.Button[1]</code>	Button 21	<code>_MTermOut.Button[21]</code>
Button 2	<code>_MTermOut.Button[2]</code>	Button 22	<code>_MTermOut.Button[22]</code>
Button 3	<code>_MTermOut.Button[3]</code>	Button 23	<code>_MTermOut.Button[23]</code>
Button 4	<code>_MTermOut.Button[4]</code>	Button 24	<code>_MTermOut.Button[24]</code>
Button 5	<code>_MTermOut.Button[5]</code>	Button 25	<code>_MTermOut.Button[25]</code>
Button 6	<code>_MTermOut.Button[6]</code>	Button 26	<code>_MTermOut.Button[26]</code>
Button 7	<code>_MTermOut.Button[7]</code>	Button 27	<code>_MTermOut.Button[27]</code>
Button 8	<code>_MTermOut.Button[8]</code>	Button 28	<code>_MTermOut.Button[28]</code>
Button 9	<code>_MTermOut.Button[9]</code>	Button 29	<code>_MTermOut.Button[29]</code>
Button 10	<code>_MTermOut.Button[10]</code>	Button 30	<code>_MTermOut.Button[30]</code>
Button 11	<code>_MTermOut.Button[11]</code>	Button 31	<code>_MTermOut.Button[31]</code>
Button 12	<code>_MTermOut.Button[12]</code>	Button 32	<code>_MTermOut.Button[32]</code>
Button 13	<code>_MTermOut.Button[13]</code>	Button 33	<code>_MTermOut.Button[33]</code>
Button 14	<code>_MTermOut.Button[14]</code>	Button 34	<code>_MTermOut.Button[34]</code>
Button 15	<code>_MTermOut.Button[15]</code>	Button 35	<code>_MTermOut.Button[35]</code>
Button 16	<code>_MTermOut.Button[16]</code>	Button 36	<code>_MTermOut.Button[36]</code>
Button 17	<code>_MTermOut.Button[17]</code>	Button 37	<code>_MTermOut.Button[37]</code>
Button 18	<code>_MTermOut.Button[18]</code>	Button 38	<code>_MTermOut.Button[38]</code>
Button 19	<code>_MTermOut.Button[19]</code>	Button 39	<code>_MTermOut.Button[39]</code>
Button 20	<code>_MTermOut.Button[20]</code>	Button 40	<code>_MTermOut.Button[40]</code>

Led 1	<code>_MTermIn.Led[1]</code>	Led 21	<code>_MTermIn.Led[21]</code>
Led 2	<code>_MTermIn.Led[2]</code>	Led 22	<code>_MTermIn.Led[22]</code>
Led 3	<code>_MTermIn.Led[3]</code>	Led 23	<code>_MTermIn.Led[23]</code>
Led 4	<code>_MTermIn.Led[4]</code>	Led 24	<code>_MTermIn.Led[24]</code>

Led 5	_MTermIn.Led[5]	Led 25	_MTermIn.Led[25]
Led 6	_MTermIn.Led[6]	Led 26	_MTermIn.Led[26]
Led 7	_MTermIn.Led[7]	Led 27	_MTermIn.Led[27]
Led 8	_MTermIn.Led[8]	Led 28	_MTermIn.Led[28]
Led 9	_MTermIn.Led[9]	Led 29	_MTermIn.Led[29]
Led 10	_MTermIn.Led[10]	Led 30	_MTermIn.Led[30]
Led 11	_MTermIn.Led[11]	Led 31	_MTermIn.Led[31]
Led 12	_MTermIn.Led[12]	Led 32	_MTermIn.Led[32]
Led 13	_MTermIn.Led[13]	Led 33	_MTermIn.Led[33]
Led 14	_MTermIn.Led[14]	Led 34	_MTermIn.Led[34]
Led 15	_MTermIn.Led[15]	Led 35	_MTermIn.Led[35]
Led 16	_MTermIn.Led[16]	Led 36	_MTermIn.Led[36]
Led 17	_MTermIn.Led[17]	Led 37	_MTermIn.Led[37]
Led 18	_MTermIn.Led[18]	Led 38	_MTermIn.Led[38]
Led 19	_MTermIn.Led[19]	Led 39	_MTermIn.Led[39]
Led 20	_MTermIn.Led[20]	Led 40	_MTermIn.Led[40]

### 3.42.5 Communication Mode

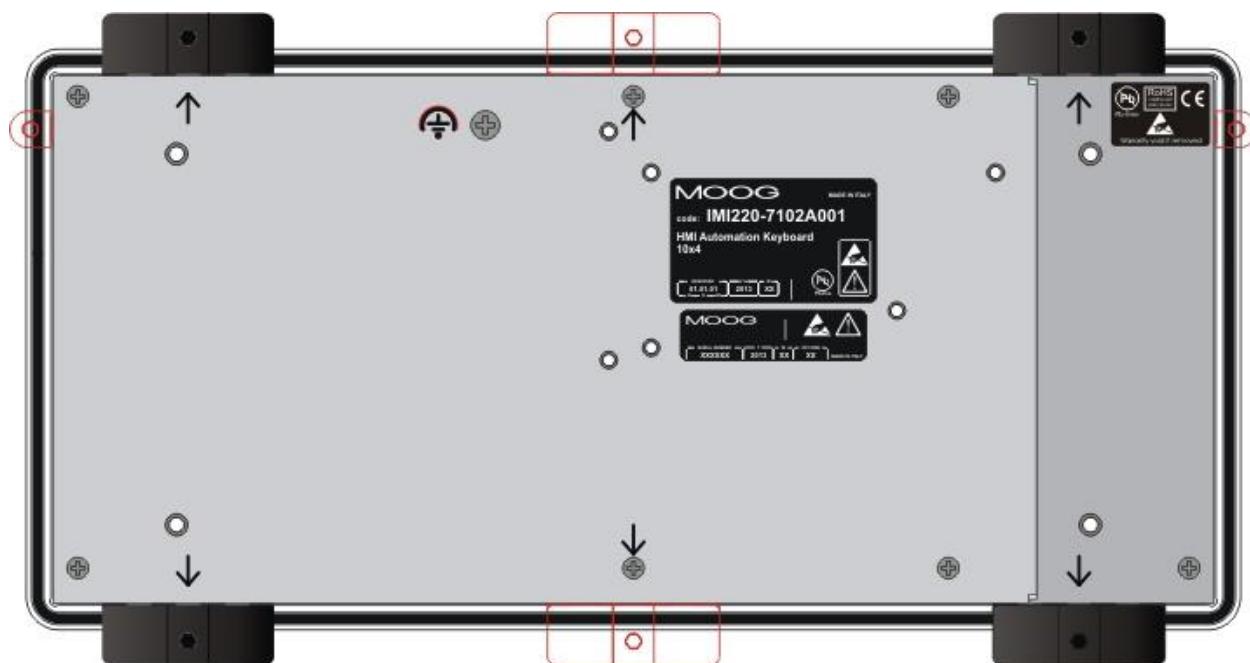
Local mode:

The Keyboard IMI220-7102A001 communicates with the PLC through Ethernet cables (length max 50cm) connected to the panel [IMI220-7001A001](#).

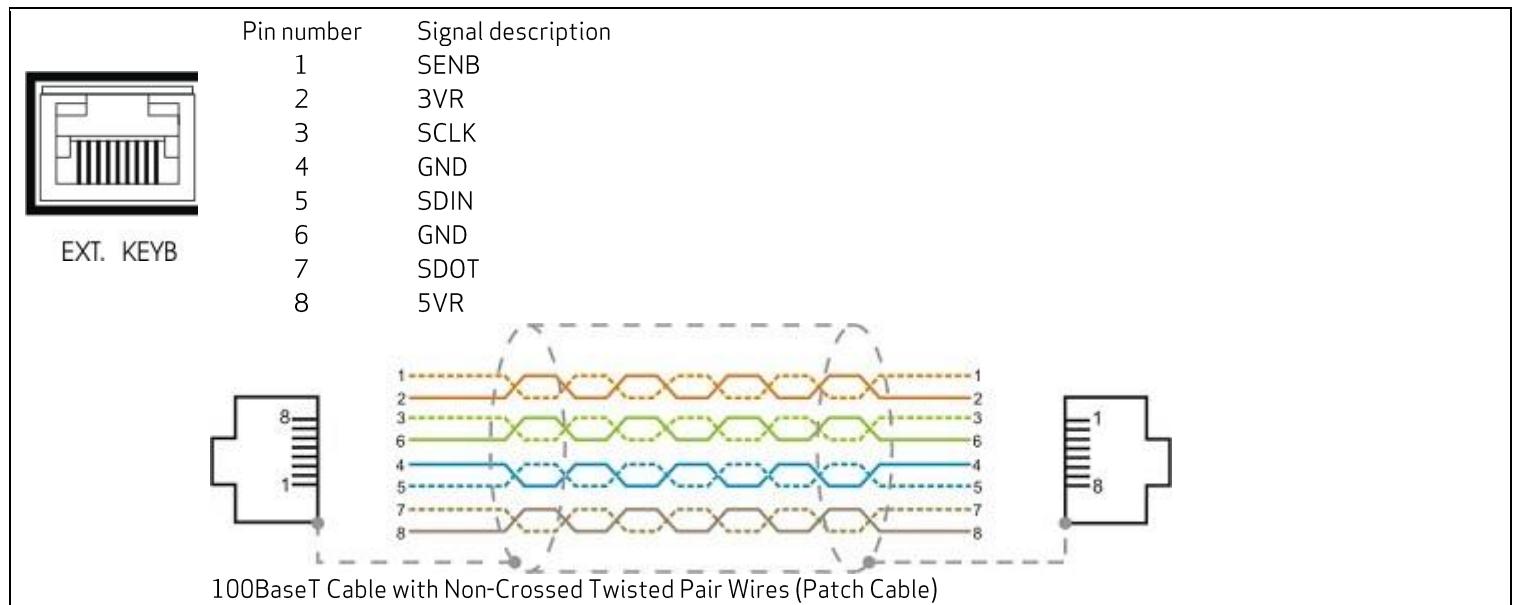
Remote mode:

The Keyboard IMI220-7102A001 communicates with the PLC through the remote module called "[C46668 Remote Keyboard Module](#)" using RS232 serial communication.

### 3.42.6 Connections

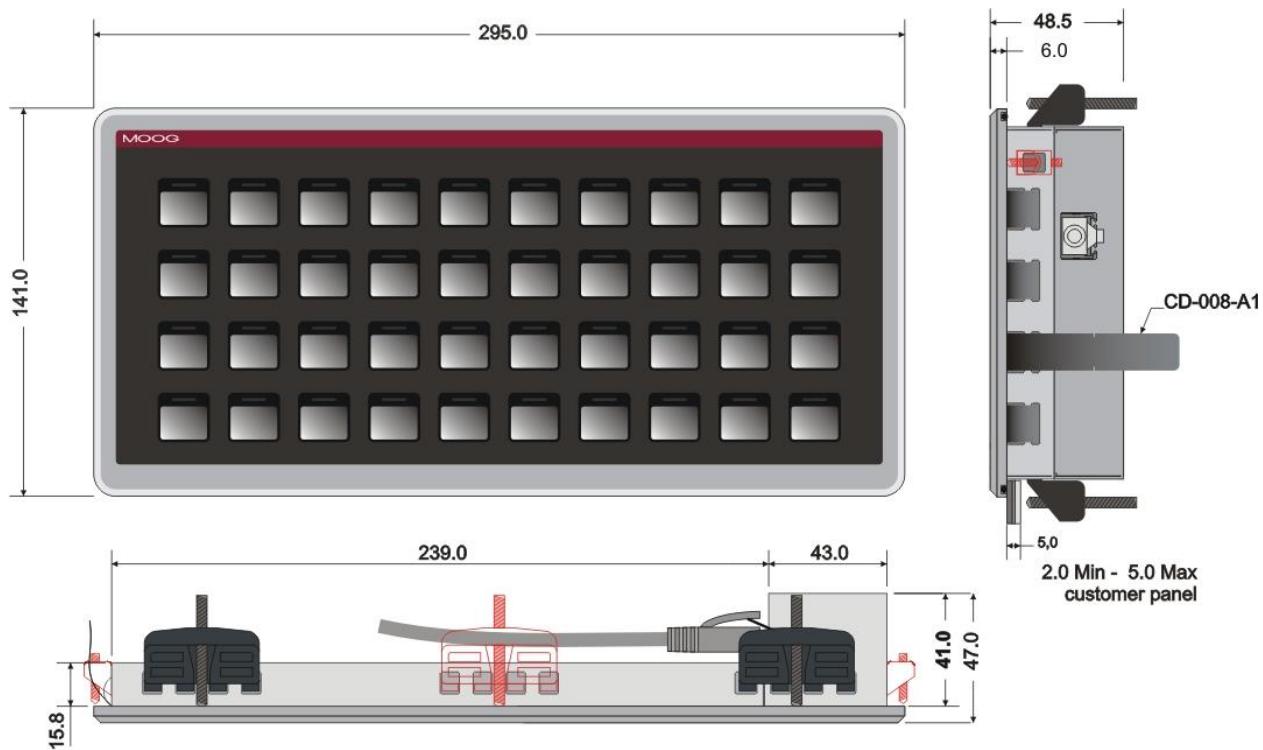


EXTERNAL KEYBOARD Pinout

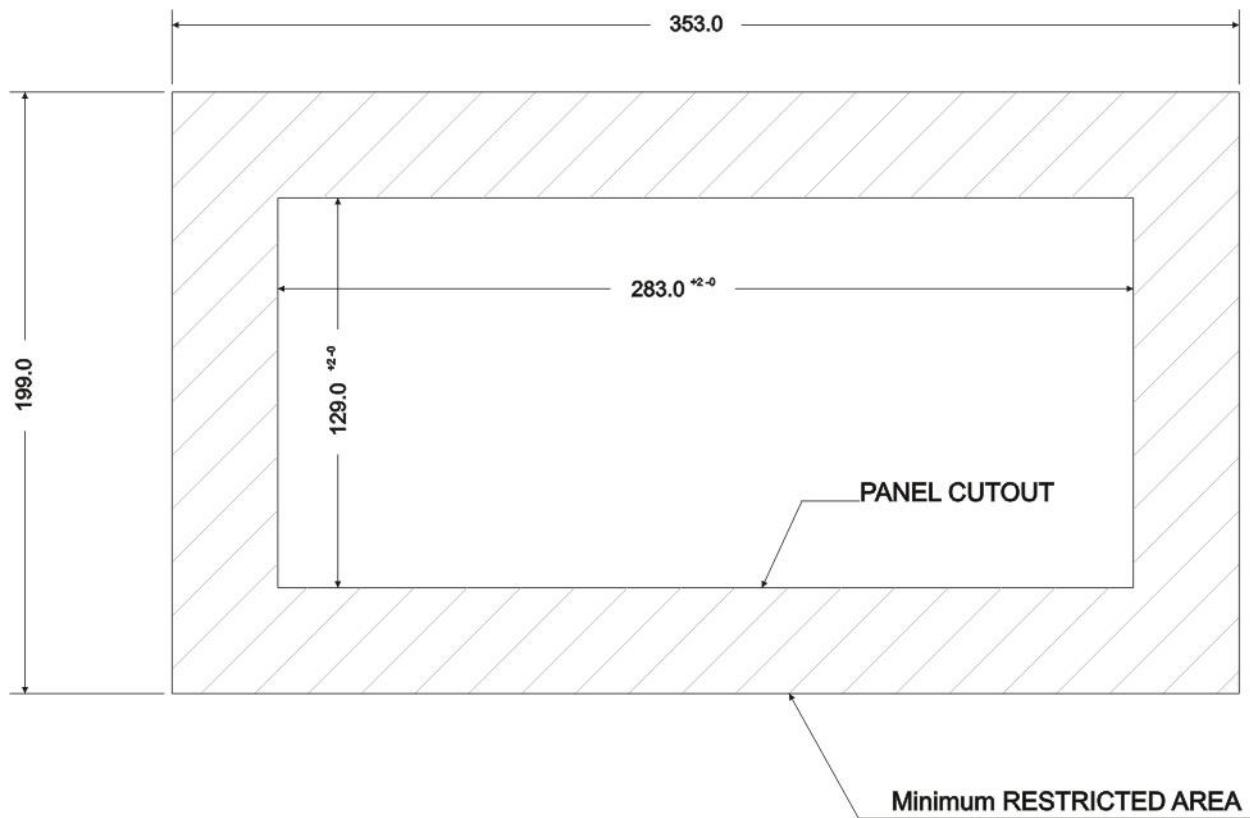


### 3.42.7 Dimensions

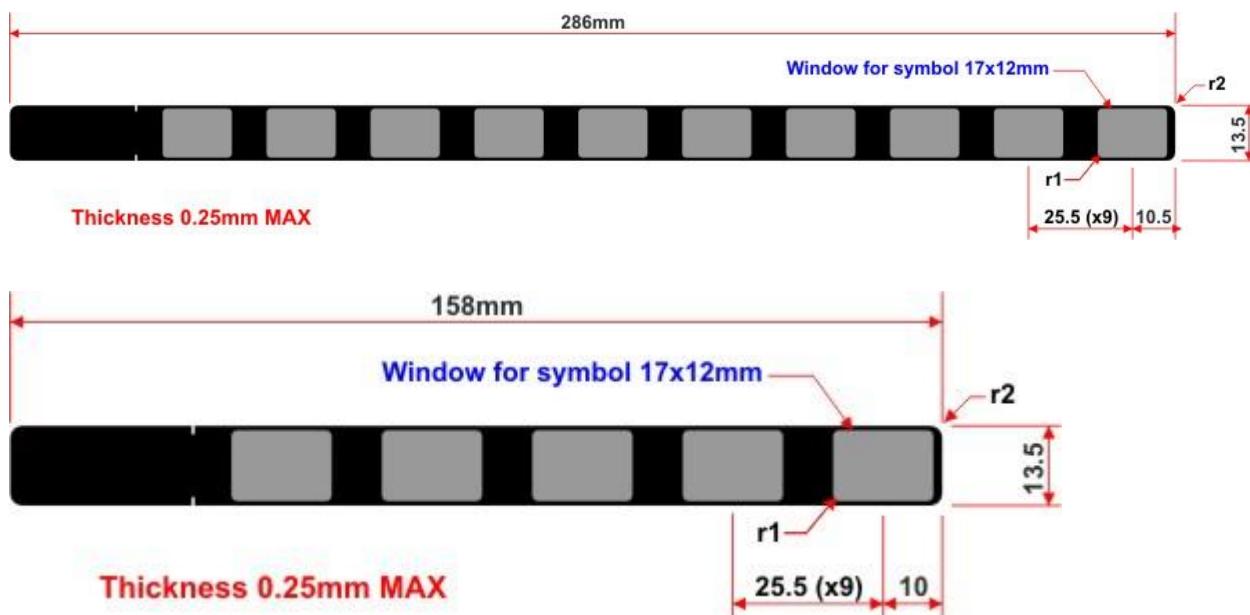
They are now reported the spaces for the fixing of the keyboard. The keyboard is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the terminal will be situated.



### 3.42.8 Cut Out



### 3.42.9 Strips



## 3.43 IMI220-7103A001: HMI AUTOMATION KEYBOARD 12x4

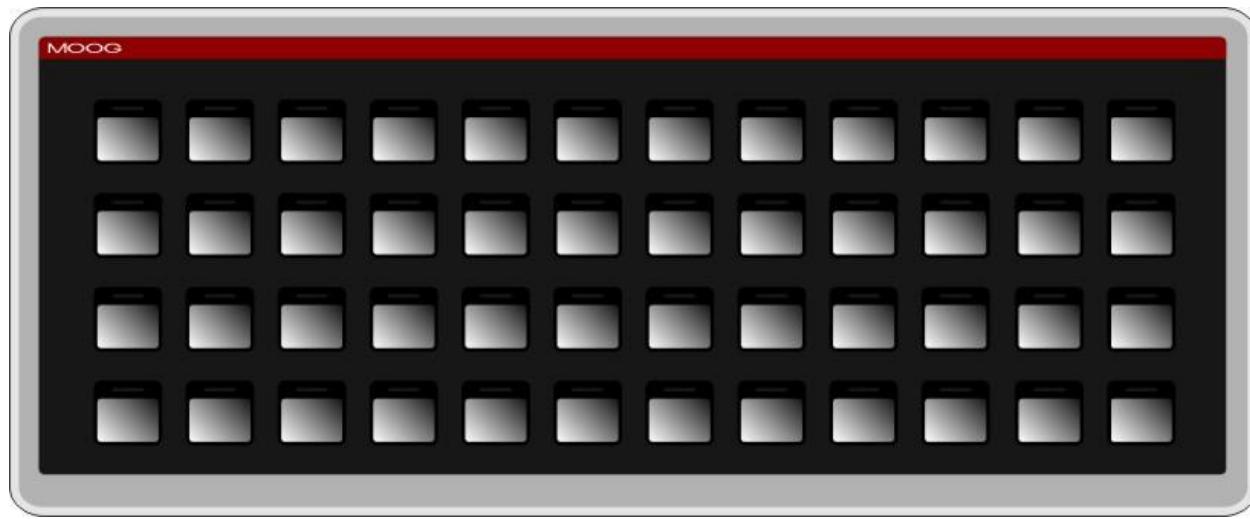
### 3.43.1 General Information

The external keyboard IMI220-7103A001 allow to manage 48 keys and 48 led.

### 3.43.2 Technical Characteristics

Code	IMI220-7103A001
General characteristics	
Programming software	MASS
Diagnostics on connector EXTERNAL KEYBOARD	Green led (3.3V) Yellow led (Activity)
User interface EXTERNAL KEYBOARD	RJ45
Keys	
Programmable keys	48
Programmable led	48
External Keyboard	<a href="#">IMI220-7002A001</a>
Remote Keyboard	<a href="#">C46668 Remote Keyboard Module</a>
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Environment class	
Correctly mounted (Only front panel)	IP 54
Rear	IP 20
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical
Dimensions (H x W x D)	0.0 x 0.0 x 0.0 mm
Weight	1200 g

### 3.43.3 Front View



- **48 Green Led:** Indicate the state of the buttons.

### 3.43.4 Keys Management

The present keys on the keyboard IMI220-7103A001 are so used:

- 48 programmable keys + 48 programmable led.

Referred to the structures `_MTermIn` and `_MTermOut` contained in the `M_MC600HMI` library:

Button 1	<code>_MTermOut.Button[1]</code>	Button 25	<code>_MTermOut.Button[25]</code>
Button 2	<code>_MTermOut.Button[2]</code>	Button 26	<code>_MTermOut.Button[26]</code>
Button 3	<code>_MTermOut.Button[3]</code>	Button 27	<code>_MTermOut.Button[27]</code>
Button 4	<code>_MTermOut.Button[4]</code>	Button 28	<code>_MTermOut.Button[28]</code>
Button 5	<code>_MTermOut.Button[5]</code>	Button 29	<code>_MTermOut.Button[29]</code>
Button 6	<code>_MTermOut.Button[6]</code>	Button 30	<code>_MTermOut.Button[30]</code>
Button 7	<code>_MTermOut.Button[7]</code>	Button 31	<code>_MTermOut.Button[31]</code>
Button 8	<code>_MTermOut.Button[8]</code>	Button 32	<code>_MTermOut.Button[32]</code>
Button 9	<code>_MTermOut.Button[9]</code>	Button 33	<code>_MTermOut.Button[33]</code>
Button 10	<code>_MTermOut.Button[10]</code>	Button 34	<code>_MTermOut.Button[34]</code>
Button 11	<code>_MTermOut.Button[11]</code>	Button 35	<code>_MTermOut.Button[35]</code>
Button 12	<code>_MTermOut.Button[12]</code>	Button 36	<code>_MTermOut.Button[36]</code>
Button 13	<code>_MTermOut.Button[13]</code>	Button 37	<code>_MTermOut.Button[37]</code>
Button 14	<code>_MTermOut.Button[14]</code>	Button 38	<code>_MTermOut.Button[38]</code>
Button 15	<code>_MTermOut.Button[15]</code>	Button 39	<code>_MTermOut.Button[39]</code>
Button 16	<code>_MTermOut.Button[16]</code>	Button 40	<code>_MTermOut.Button[40]</code>
Button 17	<code>_MTermOut.Button[17]</code>	Button 41	<code>_MTermOut.Button[41]</code>
Button 18	<code>_MTermOut.Button[18]</code>	Button 42	<code>_MTermOut.Button[42]</code>
Button 19	<code>_MTermOut.Button[19]</code>	Button 43	<code>_MTermOut.Button[43]</code>
Button 20	<code>_MTermOut.Button[20]</code>	Button 44	<code>_MTermOut.Button[44]</code>
Button 21	<code>_MTermOut.Button[21]</code>	Button 45	<code>_MTermOut.Button[45]</code>
Button 22	<code>_MTermOut.Button[22]</code>	Button 46	<code>_MTermOut.Button[46]</code>
Button 23	<code>_MTermOut.Button[23]</code>	Button 47	<code>_MTermOut.Button[47]</code>
Button 24	<code>_MTermOut.Button[24]</code>	Button 48	<code>_MTermOut.Button[48]</code>

Led 1	<code>_MTermIn.Led[1]</code>	Led 25	<code>_MTermIn.Led[25]</code>
Led 2	<code>_MTermIn.Led[2]</code>	Led 26	<code>_MTermIn.Led[26]</code>
Led 3	<code>_MTermIn.Led[3]</code>	Led 27	<code>_MTermIn.Led[27]</code>

Led 4	<u>_MTermIn.Led[4]</u>	Led 28	<u>_MTermIn.Led[28]</u>
Led 5	<u>_MTermIn.Led[5]</u>	Led 29	<u>_MTermIn.Led[29]</u>
Led 6	<u>_MTermIn.Led[6]</u>	Led 30	<u>_MTermIn.Led[30]</u>
Led 7	<u>_MTermIn.Led[7]</u>	Led 31	<u>_MTermIn.Led[31]</u>
Led 8	<u>_MTermIn.Led[8]</u>	Led 32	<u>_MTermIn.Led[32]</u>
Led 9	<u>_MTermIn.Led[9]</u>	Led 33	<u>_MTermIn.Led[33]</u>
Led 10	<u>_MTermIn.Led[10]</u>	Led 34	<u>_MTermIn.Led[34]</u>
Led 11	<u>_MTermIn.Led[11]</u>	Led 35	<u>_MTermIn.Led[35]</u>
Led 12	<u>_MTermIn.Led[12]</u>	Led 36	<u>_MTermIn.Led[36]</u>
Led 13	<u>_MTermIn.Led[13]</u>	Led 37	<u>_MTermIn.Led[37]</u>
Led 14	<u>_MTermIn.Led[14]</u>	Led 38	<u>_MTermIn.Led[38]</u>
Led 15	<u>_MTermIn.Led[15]</u>	Led 39	<u>_MTermIn.Led[39]</u>
Led 16	<u>_MTermIn.Led[16]</u>	Led 40	<u>_MTermIn.Led[40]</u>
Led 17	<u>_MTermIn.Led[17]</u>	Led 41	<u>_MTermIn.Led[41]</u>
Led 18	<u>_MTermIn.Led[18]</u>	Led 42	<u>_MTermIn.Led[42]</u>
Led 19	<u>_MTermIn.Led[19]</u>	Led 43	<u>_MTermIn.Led[43]</u>
Led 20	<u>_MTermIn.Led[20]</u>	Led 44	<u>_MTermIn.Led[44]</u>
Led 21	<u>_MTermIn.Led[21]</u>	Led 45	<u>_MTermIn.Led[45]</u>
Led 22	<u>_MTermIn.Led[22]</u>	Led 46	<u>_MTermIn.Led[46]</u>
Led 23	<u>_MTermIn.Led[23]</u>	Led 47	<u>_MTermIn.Led[47]</u>
Led 24	<u>_MTermIn.Led[24]</u>	Led 48	<u>_MTermIn.Led[48]</u>

### 3.43.5 Communication Mode

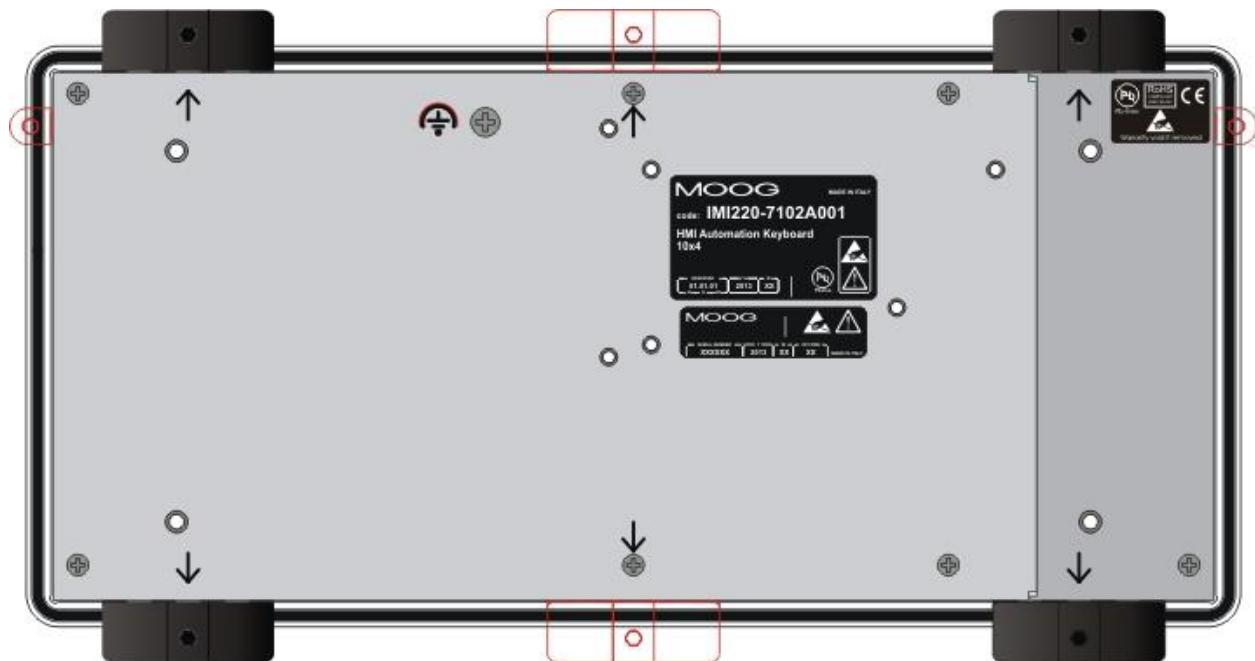
Local mode:

The Keyboard IMI220-7103A001 communicates with the PLC through Ethernet cables (length max 50cm) connected to the panel [IMI220-7002A001](#).

Remote mode:

The Keyboard IMI220-7103A001 communicates with the PLC through the remote module called "[C46668 Remote Keyboard Module](#)" using RS232 serial communication.

### 3.43.6 Connections



## EXTERNAL KEYBOARD Pinout

	Pin number	Signal description
EXT. KEYB	1	SENB
	2	3VR
	3	SCLK
	4	GND
	5	SDIN
	6	GND
	7	SDOT
	8	5VR

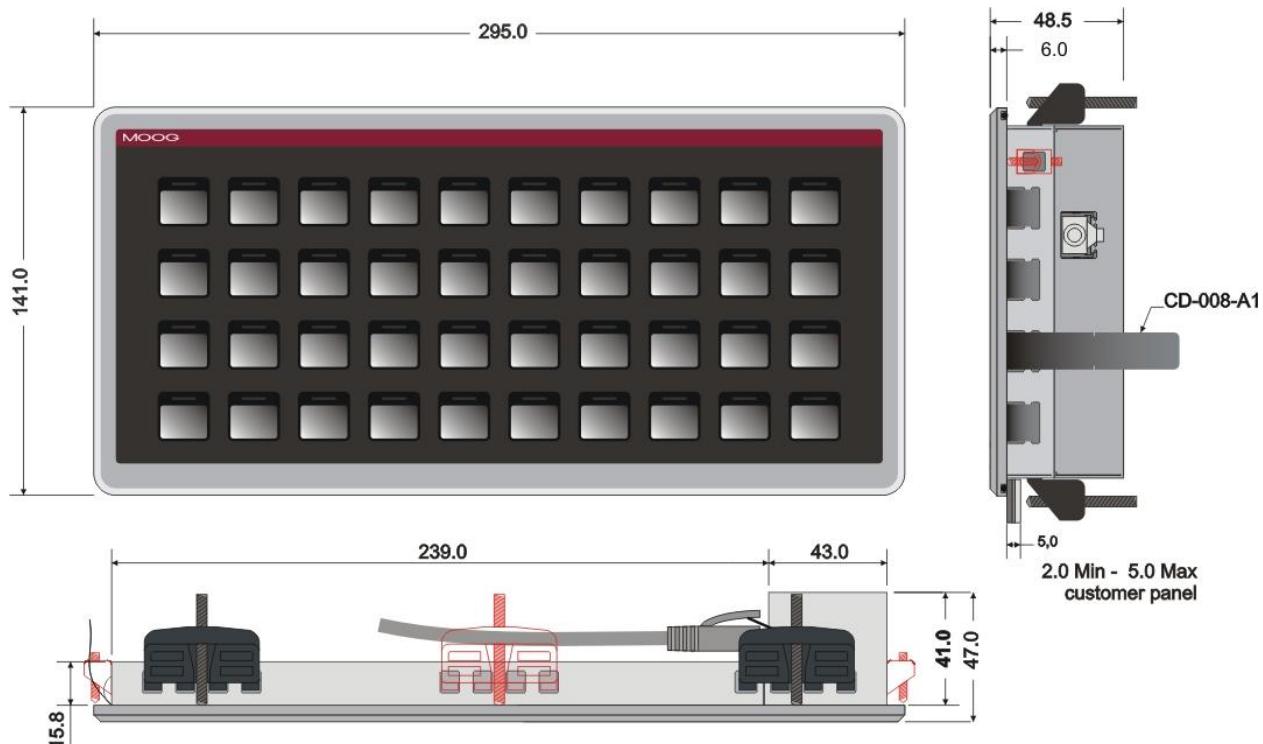
The diagram illustrates the connection between the external keyboard and a patch cable. On the left, a 100BaseT RJ45 port is shown with pins numbered 1 through 8. On the right, another RJ45 port is shown with pins numbered 1 through 8. Between them, a dashed line represents the cable. Eight colored lines (orange, green, blue, grey, orange, green, blue, grey) represent the twisted pairs. The wiring scheme follows the standard 100BaseT pinout:

- Pin 1: Orange (Tx+, SCLK)
- Pin 2: Green (Tx-, GND)
- Pin 3: Blue (Rx+, SDIN)
- Pin 4: Grey (Rx-, GND)
- Pin 5: Orange (Tx+, SCLK)
- Pin 6: Green (Tx-, GND)
- Pin 7: Blue (Rx+, SDIN)
- Pin 8: Grey (Rx-, GND)

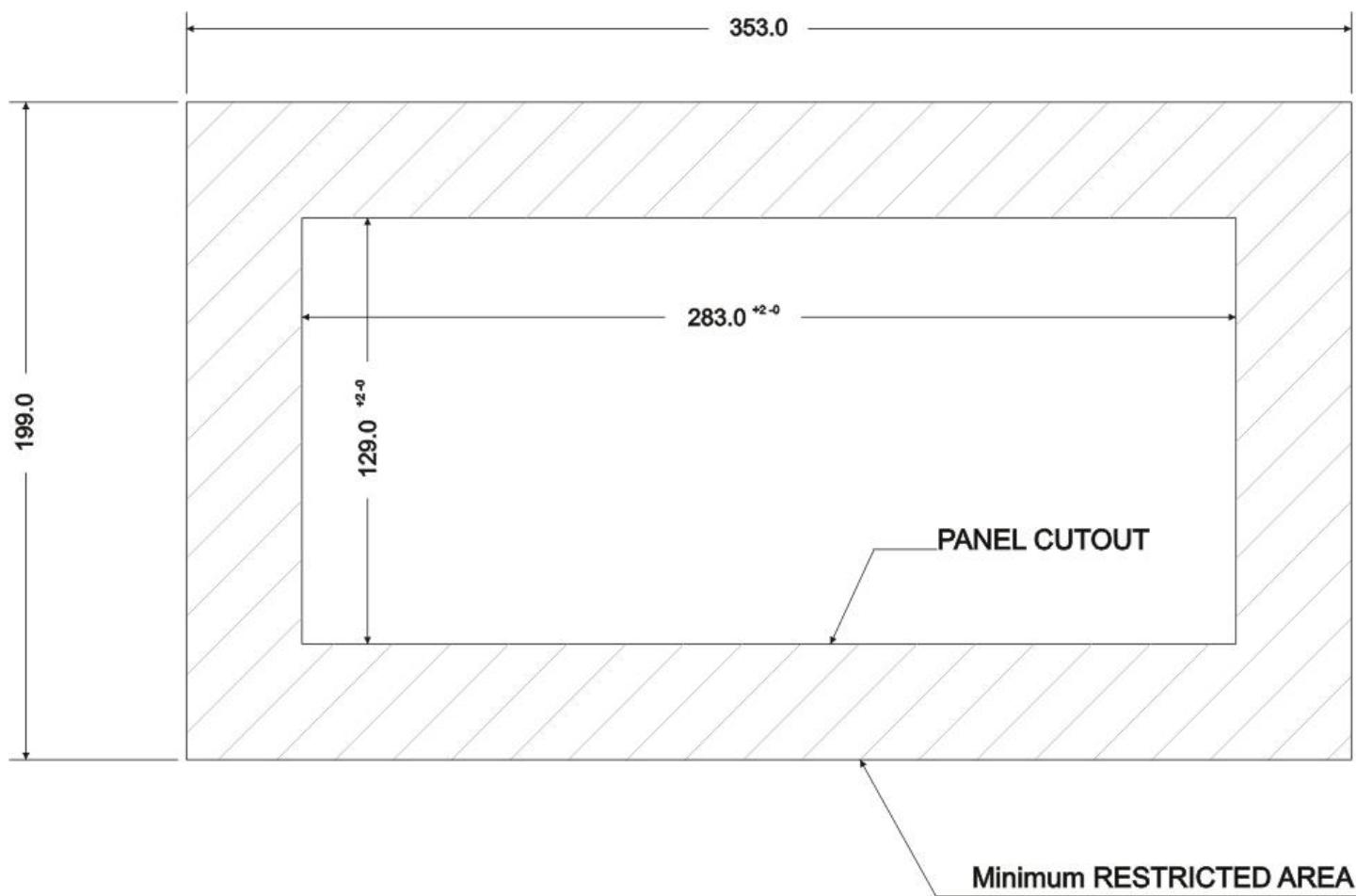
Below the diagram, the text reads: "100BaseT Cable with Non-Crossed Twisted Pair Wires (Patch Cable)".

## 3.43.7 Dimensions

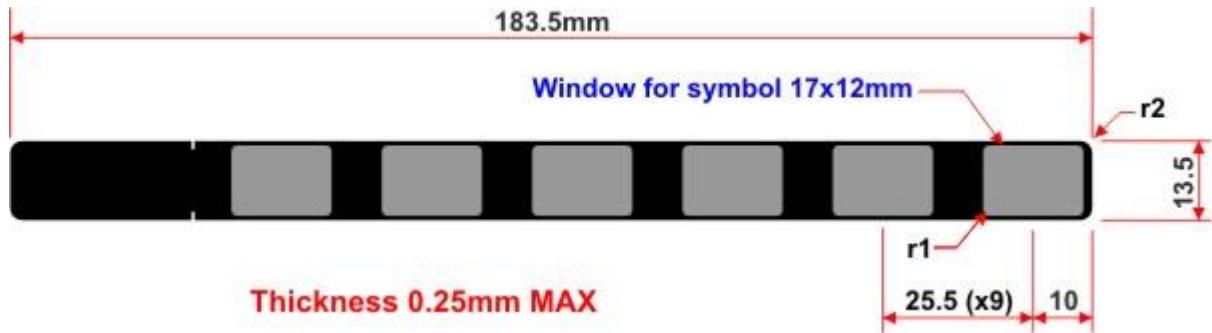
They are now reported the spaces for the fixing of the keyboard. The keyboard is fixed through of the screwed plates along the edge, so that to unite the frontal one toward the plate where the terminal will be situated.



### 3.43.8Cut Out



### 3.43.9Strip



## 3.44 C46668: Remote Keyboard module

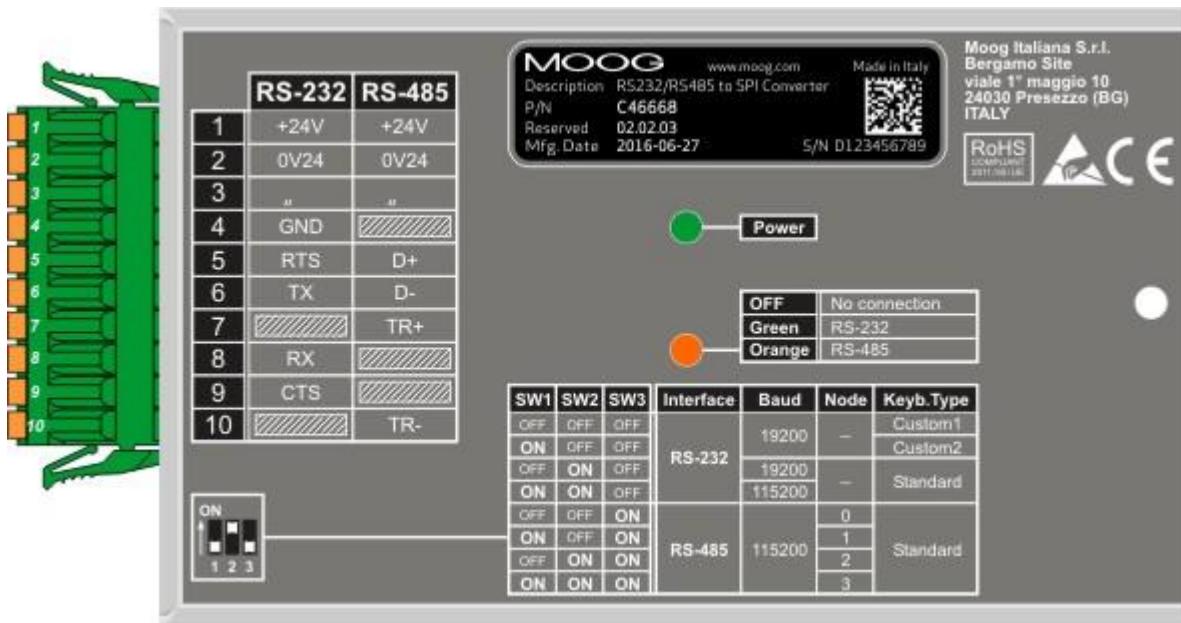
### 3.44.1 General Information

The module C46668 permit to remote every Automation Keyboards using serial protocol RS232.

### 3.44.2 Technical Characteristics

Code	C46668
General characteristics	
Diagnostics	
Power	Green led (3.3V)
Status	OFF = Missing serial line connection Green = Configured as RS232 and link OK Orange = Configured as RS485 and link OK * NOT IMPLEMENTED
External Keyboard supported	<a href="#">IMI220-7100A001</a> <a href="#">IMI220-7101A001</a> <a href="#">IMI220-7102A001</a> <a href="#">IMI220-7103A001</a>
Serial protocol configuration	3 way dip switch
Connector	
Type	10 pins 3.5 mm pitch female
Mating connector	10 pins 3.5 mm pitch male
Conductor	
Cross section solid min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded min/max	0.2/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule without plastic sleeve min/max	0.25/1.5 mm <sup>2</sup>
Cross section stranded, with ferrule with plastic sleeve min/max	0.25/0.75 mm <sup>2</sup>
Cross section AWG/kcmil min/max	24/16
Min/max AWG according to UL/CUL	24/16
Operating/storage temperature	+5°C to +60°C (248.15K to 343.15K)
Operating/storage relative humidity	10% to 100% (non-condensing) / 10% to 95% (non-condensing)
Mechanical conditions	See chapter <a href="#">Mechanical conditions and limits</a> on User Manual
EMC environment	See chapter <a href="#">Electromagnetic compatibility EMC</a> on User Manual A ferrite 'Wurth' model '74271112S' on LCD cable (1 turn) or similar is requested
Chemical conditions	See chapter <a href="#">Chemical conditions</a> on User Manual
Mounting orientation	Vertical / Horizontal
Dimensions (H x W x D)	66.0 x 110.0 x 22.0 mm
Weight	200 g

### 3.44.3 View



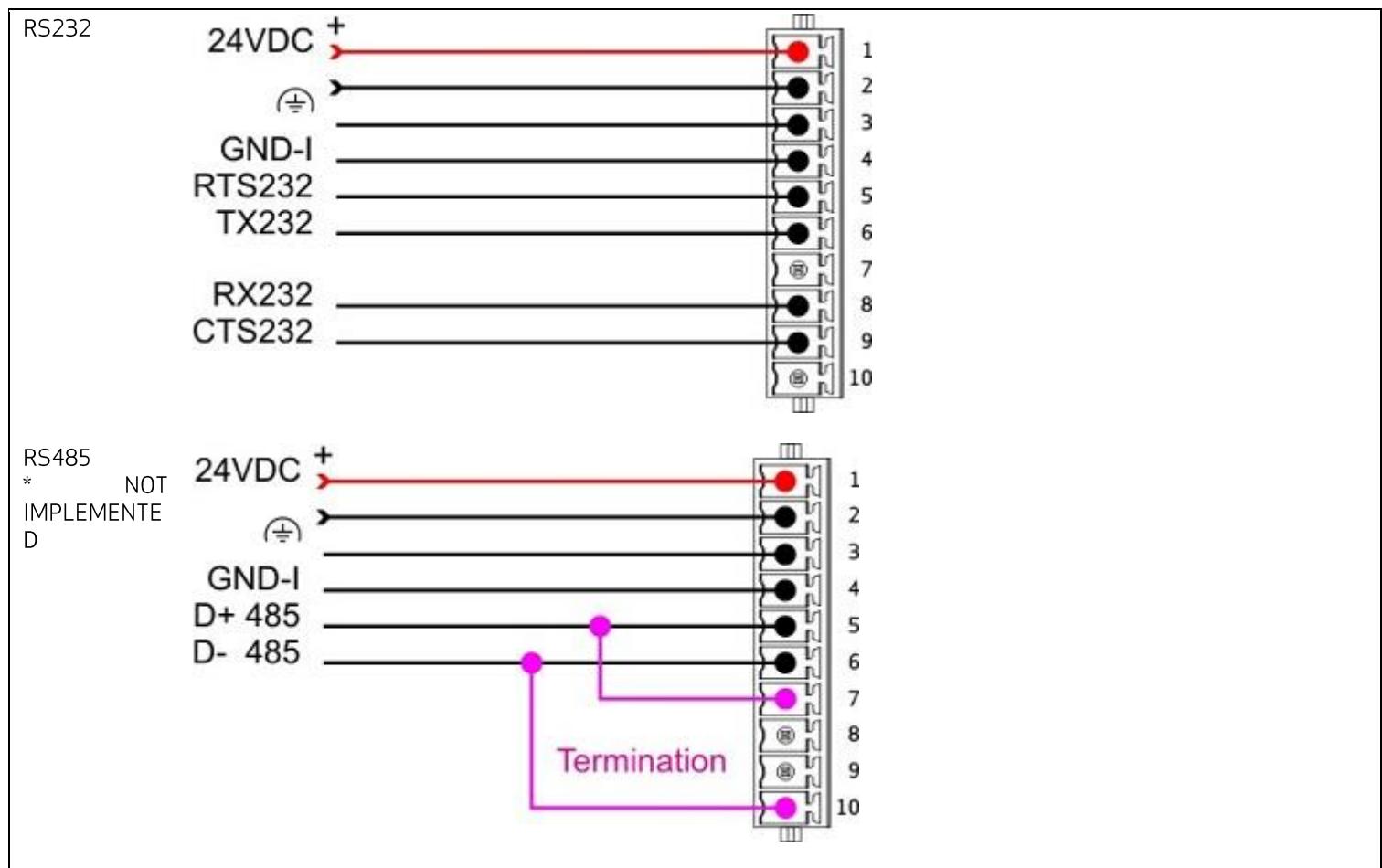
### 3.44.4 Configuration

SW1	SW2	SW3	Mode	Baud rate	Description
OFF	OFF	OFF	RS232	19200	Custom 1.
ON	OFF	OFF	RS232	19200	Custom 2.
OFF	ON	OFF	RS232	19200	Standard.
ON	ON	OFF	RS232	115200	Standard.
OFF	OFF	ON	RS485	115200	Node 0. Standard. * NOT IMPLEMENTED
ON	OFF	ON	RS485	115200	Node 1. Standard. * NOT IMPLEMENTED
OFF	ON	ON	RS485	115200	Node 2. Standard. * NOT IMPLEMENTED
ON	ON	ON	RS485	115200	Node 3. Standard. * NOT IMPLEMENTED

### 3.44.5 Connections

REMOTE KEYBOARD Pinout

Pin number	Signal description
1	+24VDC
2	GND
3	Earth
4	GND Signal
5	T+
6	T-
7	RC+
8	R+
9	R-
10	RC-



### 3.44.6 Dimensions

## 4 Software Features

### 4.1 Software features

MC600 is a machine controllers that implements many different software features.

Some features availability depends from:

- Main CPU hardware selected: see "[Modules](#)" chapter, inside processor section you can find details about each CPU's standard features like fieldbuses or connectivity.
- License key: for more details see "[License Key](#)" chapter here you can find the feature available for each with license key related i.e. to each fieldbus protocol availability

Others features available on MC600 CPU are:

- [WebServer](#)
- [VNC](#)
- [FTP](#)
- [EoE -FoE](#)

## 4.2 WebServer

MC600 implements a WebServer functionalities on ETH port.

You can access to MC600's WebServer page by insert the MC600's IP address in your browser web address section.

The MC600 WebServer home page will popup:



### 4.2.1 Information

In this section you have access to information about:

- Project information:** here you can find information about the actual project loaded on the CPU as Project name, last modification, MASS building version.
- System Information:** here you can find information about system configuration like Runtime version, license key version, ethernet address, Can address, specific CPU data.

### 4.2.2 Tasks

In this section you can find information about:

- PLC tasks: PLC configured tasks
- System tasks: PLC's system task

### 4.2.3 Diagnostic

Here you have information that could help with problem diagnostic as:

- Application: contain information related to application actual status
- System: contain information related to memory usage, disk usage or CPU load
- Integrated networks: contain information about integrated networks status

### 4.2.4 Support

In this section you can perform the following actions:

- Contacts:** is possible to send and report to Moog bug or request (require a internet connections from MC600 side). For contact please always refers to mass-support@moog.com
- Firmware update:** in the next section you will find details about firmware update from WebBrowser page.

#### 4.2.4.1 Firmware update

	<p><b>WARNING!</b></p> <p>Loading firmware on MC600 will delete all existing data, especially:</p> <ul style="list-style-type: none"> <li>the actually loaded firmware gets deleted from controller</li> <li>the stored boot application gets deleted from the controller</li> <li>the stored project archive gets deleted from the controller</li> <li><b>Retain and Persistent data gets deleted from controller</b></li> </ul>
--	---

it is possible to update the MC600 through the web browser. First of all the MC600 must be connected to a network reachable from the PC. Open a browser and digit the PLC address; this should open the PLC web administration page. Under the section Support, select the Firmware Update menu item:

Navigation	Support
<a href="#">Home</a> <a href="#">Information</a> <a href="#">Tasks</a> <a href="#">Diagnostic</a> <a href="#">Support</a> <a href="#">Contacts</a> <b>Firmware Update</b>	Username <input type="text"/> Password <input type="password"/> <input type="button" value="Submit"/>

The credentials to access to the firmware update functionalities are the following:

- Username: **firmware**
- Password: **moog2020**

Enter the credentials and click the **Submit** button.

Now you can select the firmware file to upload clicking the **Choose firmware file** button. The update file can be found on a generated USB stick and has the filename in the following form:

**mc600\_fwUpdate\_<version>.tar**.

After selecting the file, firmware update procedure can be started clicking the button **Update**. The web browser upload it on the MC600 and the firmware update procedure starts. Clicking the button **Cancel** undo the procedure.

Navigation	Support
<a href="#">Home</a> <a href="#">Information</a> <a href="#">Tasks</a> <a href="#">Diagnostic</a> <a href="#">Support</a> <a href="#">Contacts</a> <b>Firmware Update</b>	mc600_fwUpdate_1.10.3.0_r24369.24113.tar <input type="button" value="Update"/> <input type="button" value="Cancel"/> 

At the end of the update procedure, the system will be restarted:

Navigation	Support
<a href="#">Home</a> <a href="#">Information</a> <a href="#">Tasks</a> <a href="#">Diagnostic</a> <a href="#">Support</a> <a href="#">Contacts</a> <b>Firmware Update</b>	Update completed... Rebooting

If you select a wrong or not compatible firmware version file, an error message appear:

mc600_fwUpdate_1.10.3.1b1_r24369.24588M.tar	<input type="button" value="Update"/>	<input type="button" value="Cancel"/>
Check kernel error! Try updating firmware with USB key		

## 4.3 VNC

Please refer to "Moog Libraries > MC600 specific > M\_MC600Hmi Library > VNC" chapter.

## 4.4 FTP

Is possible to connect and share files with MC600, mainly for recipes backup and log files using MC600's ETH port.

In order to access to shared folder the MC600 must be connected to a network reachable from the PC.

The credentials to access to the shared folder with a FTP client software are the following:

- Username: **recipes**
- Password: **recipes**

In that way you access directly to the folder that contain recipes data files that i.e. can be saved as backup from server.

## 4.5 EoE - FoE

EoE and FoE are connection functionalities that allow you to:

- **EoE :** Ethernet over Ethercat allow customer directly connect to devices connected to EtherCAT port, that support EoE protocol. For more information please refer to the following online help chapter: "EtherCAT Configurator > EtherCAT Slave > EtherCAT Slave - EoE Settings".
- **FoE:** File over Ethercat is a functionalities that allow customer send files to devices connected to EtherCAT port and that support FoE protocol. For more information please refer to the following online help chapter: EtherCAT Configurator > EtherCAT Slave > Tab 'EtherCAT Slave - Online'

## 5 MASS

**WARNING!**

Before to proceed with commissioning with MC600, a technical training about MC600 family products is required.  
For more information about technical training please refer to [About moog](#) section.

MASS is the programming environment used for MC600 configuration and application load.

MASS allow customer to perform the following action with MC600:

- Define MC600 hardware configuration
- Write algorithm using IEC61131 PLC languages in order to reach the requested performance targets
- Connect to MC600, code debugging and loop tuning
- Design Moog HMI pages
- Design Web pages
- Design Codesys HMI pages
- etc..

MASS is a Codesys V3.X software based and is composed by:

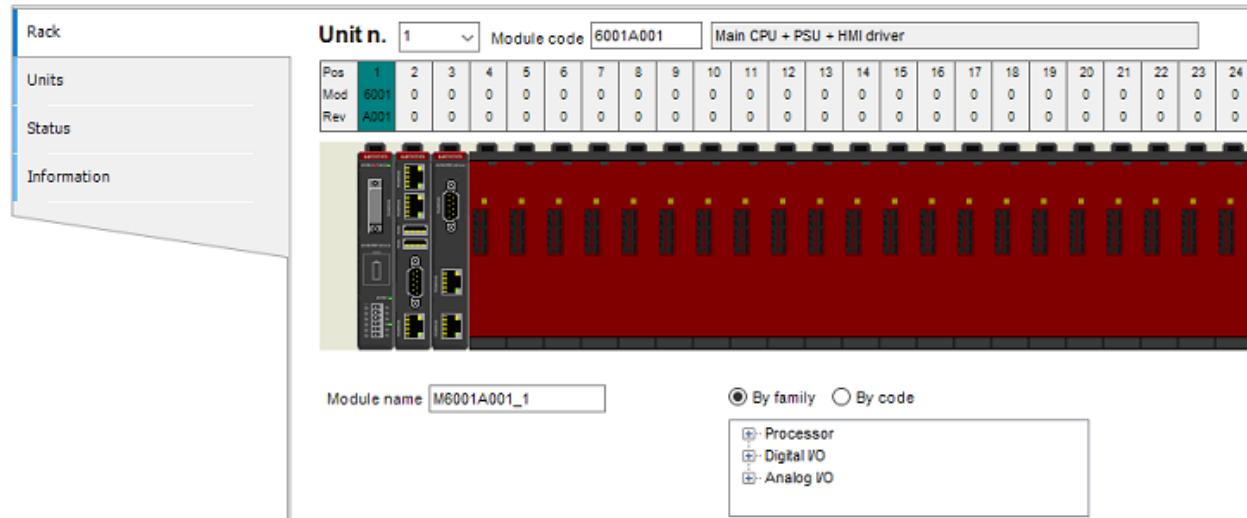
- Codesys standard feature : you can find information about standard Codesys V3.X features on Codesys help online (<https://help.codesys.com/>) or User manual.

and has also been added with the following Moog plugins:

- Device editor: is the Mass component that implements the configuration of MC600 rack. For further information refer to the "[Device editor](#)" chapter.
- MMI manager: is the Mass component that implements the Moog HMI visualization feature with specific Moog widgets that run on Moog Local HMI (MMI). For further information refer to the "[MMI manager](#)" chapter.
- Font editor: is the Mass component that enables the configuration of specific fonts different from standards to use inside the MMI pages. For further information refer to the "[Font editor](#)" chapter.
- USB Stick generator: is the Mass component that configures a USB device in order to execute different commands on MC600 such as a firmware update. For further information refer to the "[USB Stick Generator](#)" chapter.
- Wizard: is the Mass component that helps customers to easily configure the Moog system tasks dedicated to: Video control, Temperature control and analog Axis control. For further information refer to the "[Wizard](#)" chapter.

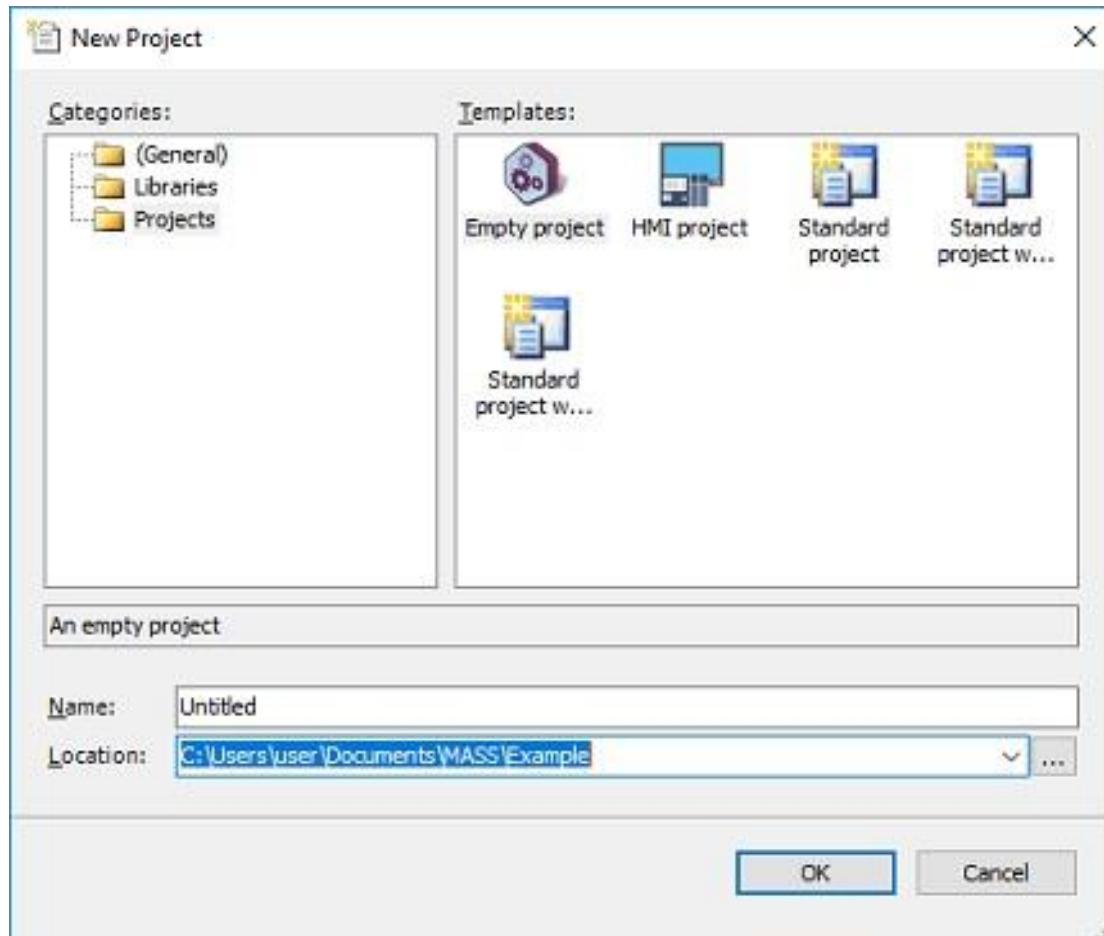
## 5.1 Device Editor (Rack)

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 "[Concept](#)".

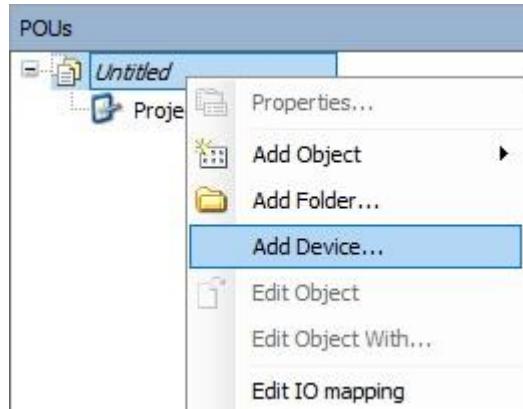


### 5.1.1 Add Device MC600

To create an empty project, select in the File menu, New Project and when open windows choose Empty Project. Enter the project name and location where it will be saved.

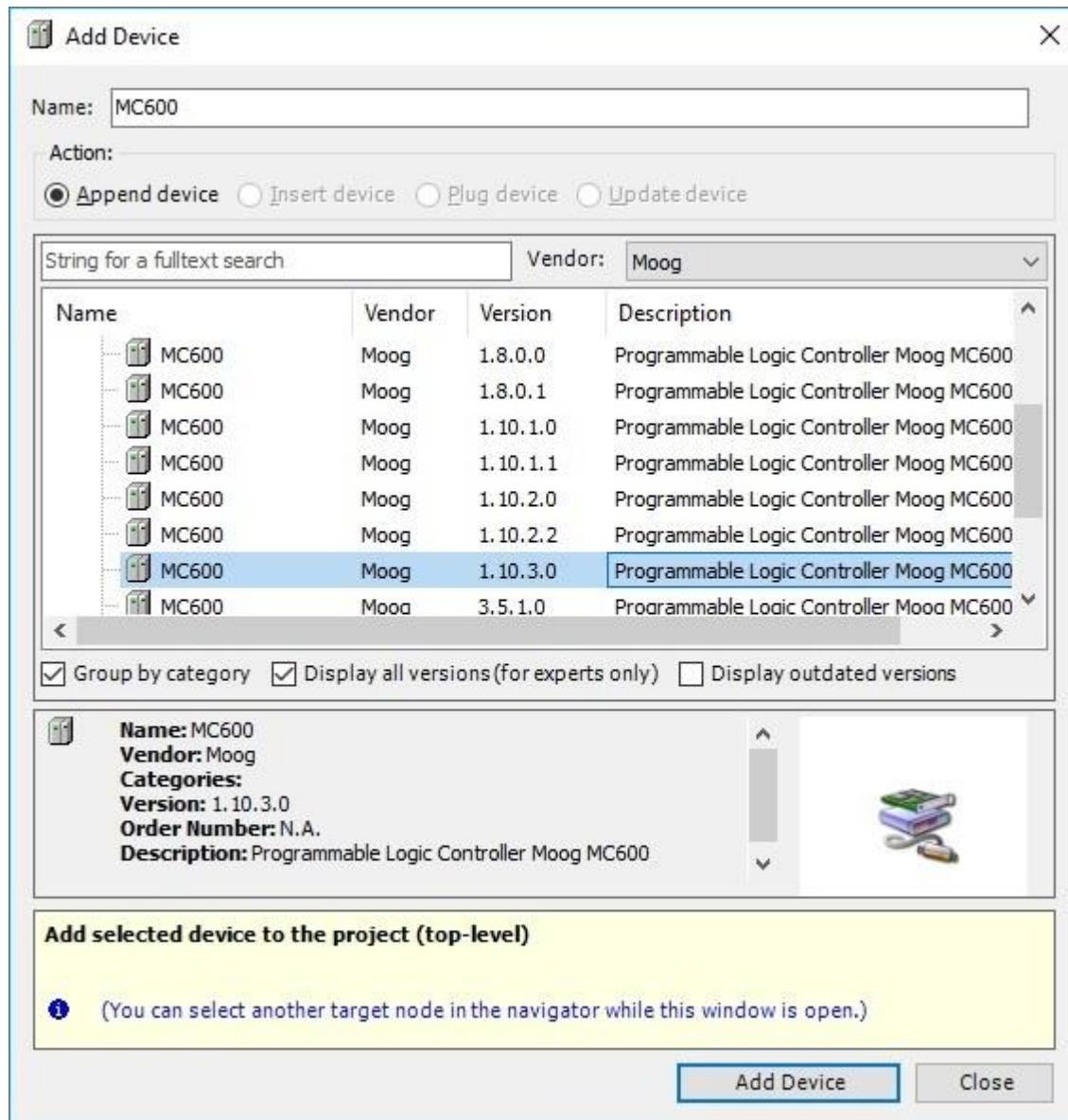


Insert a Device object by the command Add Device:



Select Vendor: Moog for filter the devices installed after that select MC600 and write down a name (e.g. PLC1). Press to proceed:

Add Device



at the end click close button

At this point will appear an object on the tree called "Rack":

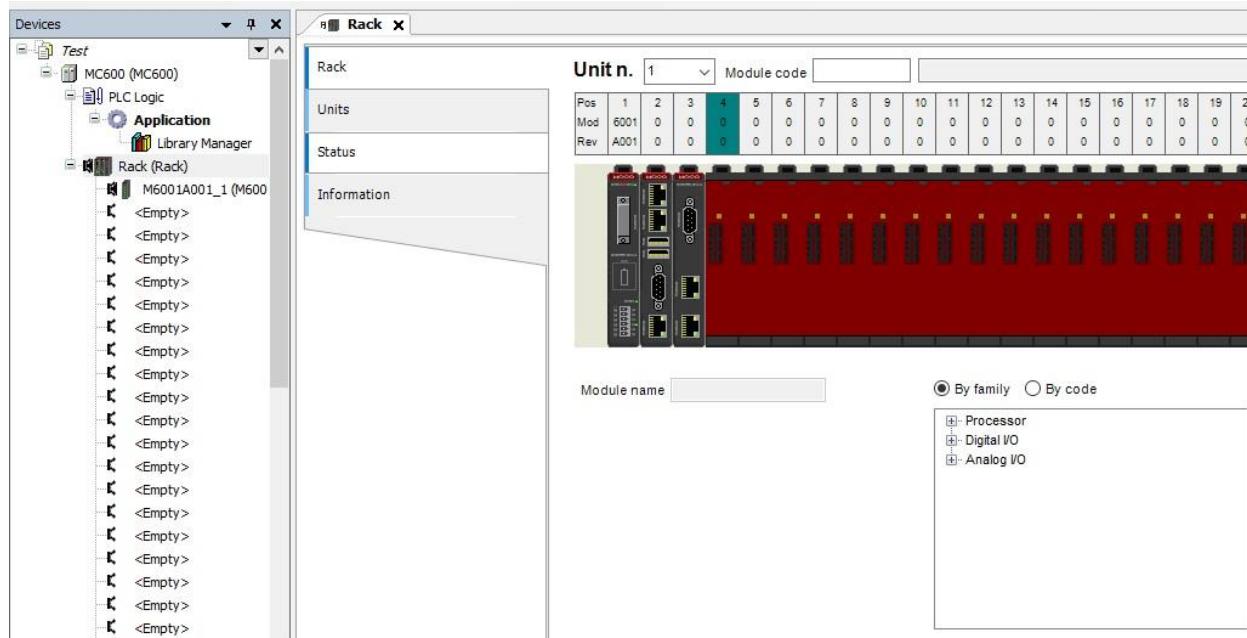


It's possible renamed the default name "Rack" with another name:  
(for rename press the space bar)



## 5.1.2 Module List

By double click on "Rack" position appear the Device Editor:



Here is possible insert the modules in two ways:

By family:

By family  By code

- Processor
  - 6000 Main CPU + PSU
  - 6001 Main CPU + PSU + HMI driver
  - 6010 AUX CPU + PSU
- Digital I/O
  - 6100 16 digital inputs, 24 Vdc
  - 6150 16 digital outputs 24Vdc 0.5A
  - 6161 8 digital outputs rele
  - 6180 12 digital outputs 24Vdc 2A
- Analog I/O



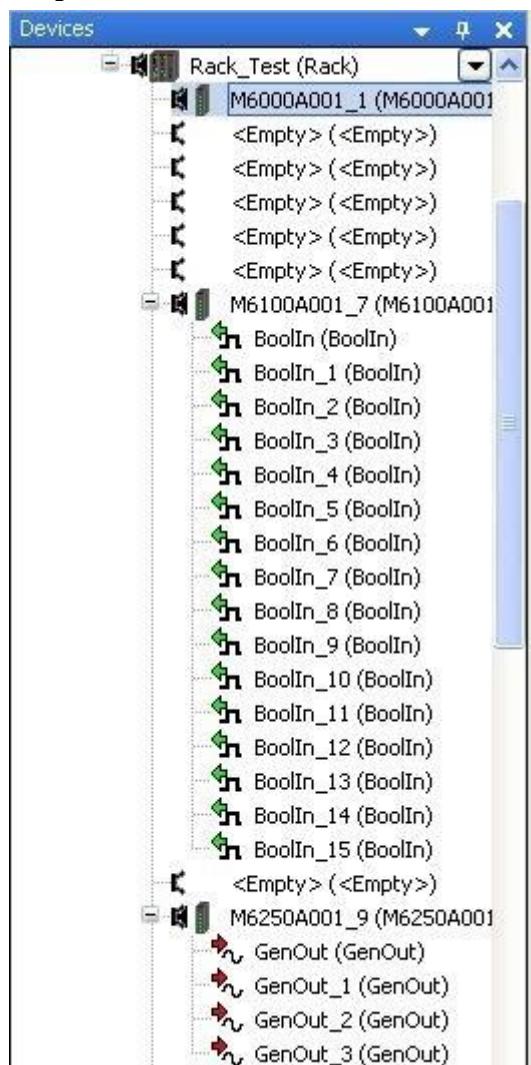
By code:

By family  By code

- 6000 Main CPU + PSU
- 6001 Main CPU + PSU + HMI driver
- 6010 AUX CPU + PSU
- 6100 16 digital inputs, 24 Vdc
- 6150 16 digital outputs 24Vdc 0.5A
- 6161 8 digital outputs rele
- 6180 12 digital outputs 24Vdc 2A
- 6200 4 analog inputs 16 bits
- 6201 8 analog inputs 16 bits
- 6204 3 LVDT inputs



When you select with a mouse click the desired module on the right of the window will show the image with the design of the faceplate. A double click on the desired module plugs into the socket of the previously selected position. The insertion of the module is visible in the tree navigation menu of MASS.

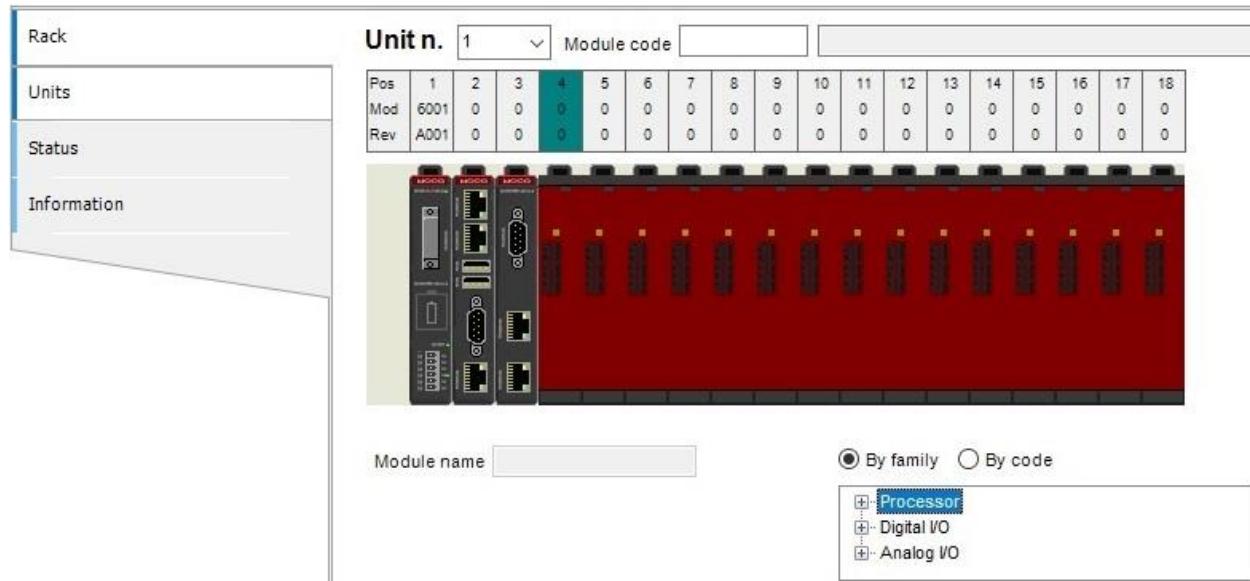


### 5.1.3 Inserting Main Processor Modules

Main processor modules:

- IMI220-6000A001: POWER SUPPLY - MAIN CPU
- IMI220-6001A001: POWER SUPPLY - MAIN CPU - HMI DRIVER
- IMI220-6010A001: POWER SUPPLY - AUXILIARY CPU
- [IMI220-6031A001](#)

(Main CPU) can only be inserted in position 1 Unit 1. This position is not available for others module type.



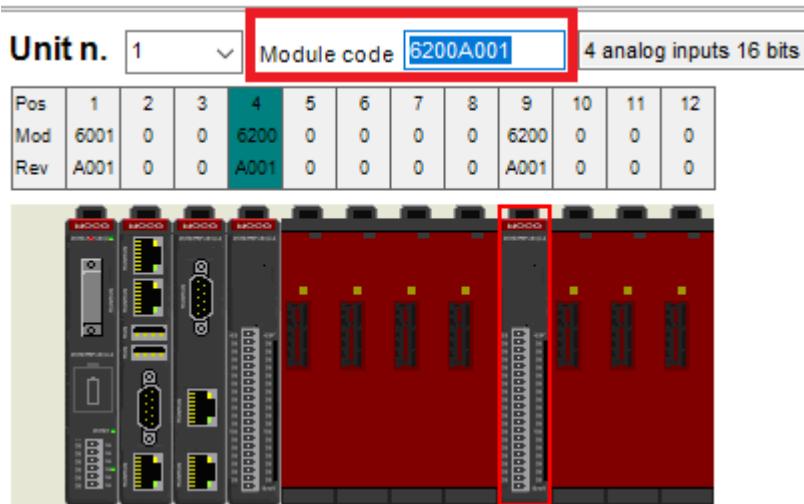
If you attempt to insert a module Main CPU at any other place or units, the operation would not be done and everything would remain unchanged.

### 5.1.4 Module Insertion

Is possible insert a module on the rack through:

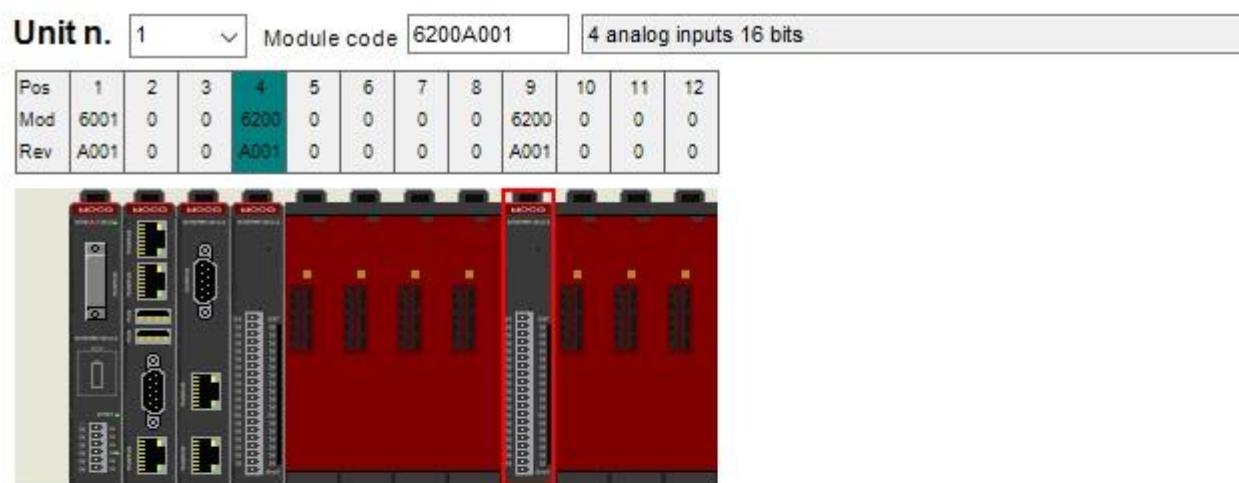
- by code:

Typing the code number of the module and press enter for insert it on the rack.



- by list:

Select the module from the list and by double click insert it on the rack.



I/O	Type	Name
1		GenIn_4
2		GenIn_5
3		GenIn_6
4		GenIn_7

By family
 By code

Analog I/O

- 6200 4 analog inputs 16 bits
  - 6200A001
  - 6201 8 analog inputs 16 bits
  - 6204 3 LVDT inputs
  - 6210 4 analog inputs for current measure
  - 6220 4 temperature inputs
  - 6221 8 temperature inputs
  - 6250 4 analog outputs 16 bits
  - 6251 8 analog outputs 16 bits

In case of inserting the module from the list, you can insert modules in two ways:

By family:

By family  By code

- Processor
  - 6000 Main CPU + PSU
  - 6001 Main CPU + PSU + HMI driver
  - 6010 AUX CPU + PSU
- Digital I/O
  - 6100 16 digital inputs, 24 Vdc
  - 6150 16 digital outputs 24Vdc 0.5A
  - 6161 8 digital outputs relé
  - 6180 12 digital outputs 24Vdc 2A
- Analog I/O



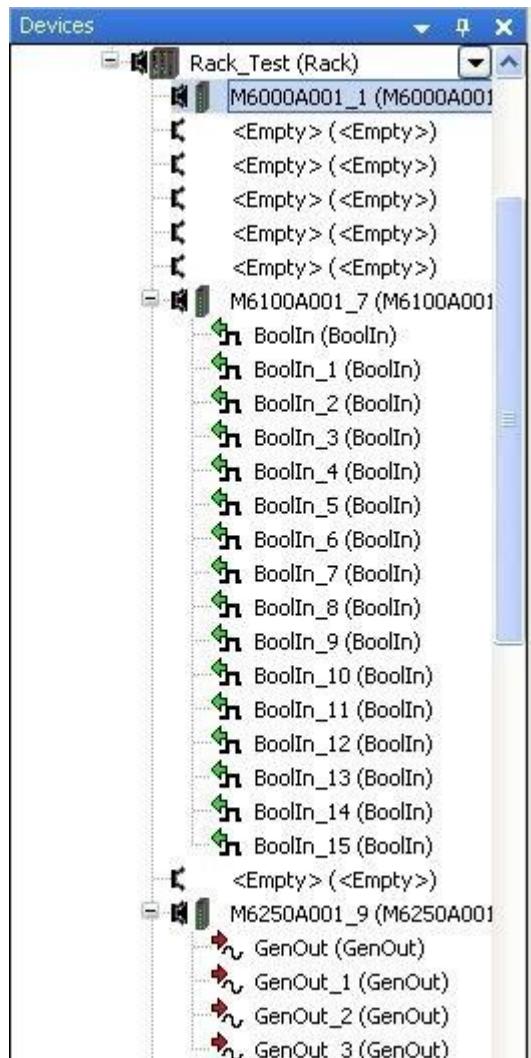
By code:

By family  By code

- 6000 Main CPU + PSU
- 6001 Main CPU + PSU + HMI driver
- 6010 AUX CPU + PSU
- 6100 16 digital inputs, 24 Vdc
- 6150 16 digital outputs 24Vdc 0.5A
- 6161 8 digital outputs relé
- 6180 12 digital outputs 24Vdc 2A
- 6200 4 analog inputs 16 bits
- 6201 8 analog inputs 16 bits
- 6204 3 LVDT inputs

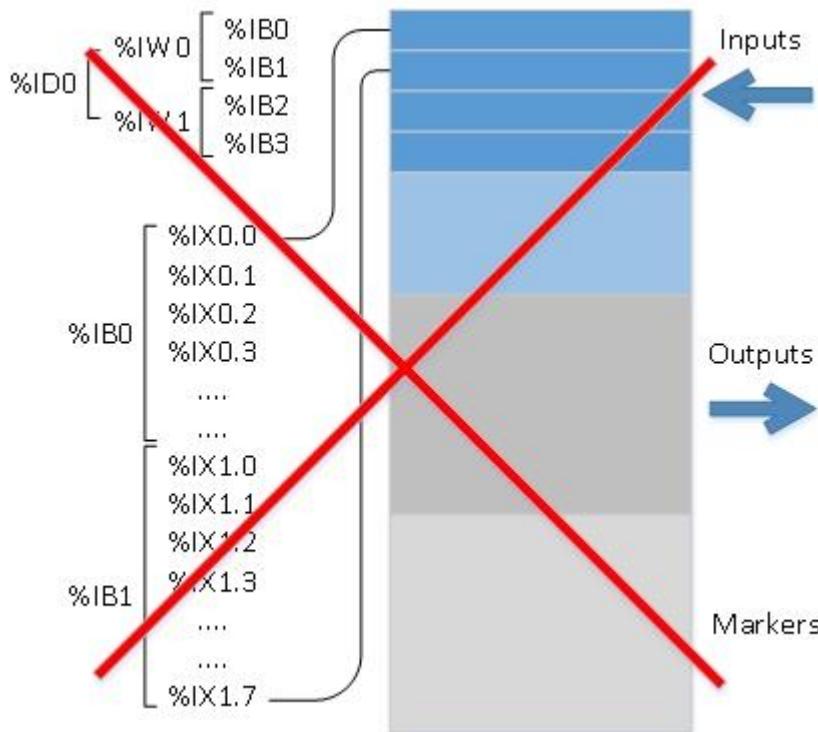


When a module is selected from a list, will appear a specific image on the right side. With double click on the module code inserts it on the rack. Inserted module appear on the MASS tree.



### 5.1.5 Moog Unified I/O

Moog unified I/O is a new system to manage the I/O points present on the rack. Usually the points of the I/O in a control system are associated with the physical addresses. In the system Moog unified I/O there is no need to associate the physical address of the point of I/O with a global variable.



Through the library **M\_Type** (see the Moog libraries help) the system associates the name defined in the editor of the rack with a specific structure.

**M\_Type** library is automatically included (grey color) when MC600 device is used. The structures available are:

<a href="#">MBoolIn</a>	<a href="#">Digital Inputs</a>
<a href="#">MBoolOut</a>	<a href="#">Digital Outputs</a>
<a href="#">MGenIn</a>	<a href="#">Analog Inputs</a>
<a href="#">MGenOut</a>	<a href="#">Analog Outputs</a>

When a new module is inserted into the rack, each point of I/O assumes a default name. The initial part of the name depends on the I/O type:

- **BoolIn** for digital input
- **BoolOut** for digital output
- **GenIn** for analog input
- **GenOut** for analog output
- **TempIn** for thermocouple input

The final part of the name is numbered consecutively. These names are associated with different symbols depending on the I/O type:

Module name		
I/O	Type	Name
1		Templn_4
2		Templn_5
3		Templn_6
4		Templn_7
5		Templn_8
6		Templn_9
7		Templn_10
8		Templn_11

- **I/O:** is the progressive number of the I/O points on the selected module.
- **Type:** is the graphic symbol that show the I/O type:

Digital input



Digital output



Analog input



Analog output



Temperature input



- **Name:** is the default name applied automatically by the system.

This name can be modified by the user with double click:

I/O	Type	Name
1		Indresso Digitale_1
2		Boolln_1
3		Boolln_2
4		Boolln_3
5		Boolln_4
6		Boolln_5
7		Boolln_6
8		Boolln_7
9		Boolln_8

Every I/O name are automatically addressed to the global variables. These global variables are located in a specific object called "**\_GlobalIOVariables**".

The screenshot shows a software interface for managing PLC configurations. On the left, a tree view labeled 'Devices' shows a project named 'Test' containing an 'MC600 (MC600)' module, which includes a 'PLC Logic' section with an 'Application' icon and a '\_GlobalIOVariables' icon. Below this are 'Rack (Rack)' sections for 'M6001A001\_1 (M600)' and 'M6100A001\_4 (M610)'. The 'M6100A001\_4' section contains numerous 'BoolIn (BoolIn)' entries, each with a green checkmark icon. On the right, a tab labeled '\_GlobalIOVariables' displays the following code:

```
1  (* these lines are automatically created, don't change them,
2   any changes will be lost at next creation *)
3
4
5  (* variables mapped from I/Os *)
6 VAR_GLOBAL RETAIN
7   BoolIn : _MBoolIn;
8   BoolIn_1 : _MBoolIn;
9   BoolIn_10 : _MBoolIn;
10  BoolIn_11 : _MBoolIn;
11  BoolIn_12 : _MBoolIn;
12  BoolIn_13 : _MBoolIn;
13  BoolIn_14 : _MBoolIn;
14  BoolIn_15 : _MBoolIn;
15  BoolIn_2 : _MBoolIn;
16  BoolIn_3 : _MBoolIn;
17  BoolIn_4 : _MBoolIn;
18  BoolIn_5 : _MBoolIn;|
19  BoolIn_6 : _MBoolIn;
20  BoolIn_7 : _MBoolIn;
21  BoolIn_8 : _MBoolIn;
22  BoolIn_9 : _MBoolIn;
23 END_VAR
24
25 (* Array elements number *)
26 VAR_GLOBAL CONSTANT
27 END_VAR
```

When the I/O name is changed automatically is updated in the **\_GlobalIOVariables**. When a module is deleted all the variables used for the I/O are deleted from the **\_GlobalIOVariables**.

### 5.1.5.1 Digital inputs

When a digital input module is inserted the name of digital input is assigned inside the rack editor page:

Module name M6100A001_4		
IO	Type	Name
1	BoolIn	BoolIn
2	BoolIn	BoolIn_1
3	BoolIn	BoolIn_2
4	BoolIn	BoolIn_3
5	BoolIn	BoolIn_4
6	BoolIn	BoolIn_5
7	BoolIn	BoolIn_6
8	BoolIn	BoolIn_7
9	BoolIn	BoolIn_8

In order to read the inputs is necessary the "name" + the variables defined in the structure contained in the library **M\_Type**. In case digital inputs the structure is **\_MBoolIn**.

The screenshot shows the library browser with the path `m_type \ STRUCTS \ _MBoolIn`. The `STRUCT _MBoolIn` is selected, and its details are shown in a table:

Name	Type	Inherited from	Address	Initial	Comment
I	BOOL			FALSE	Boolean input
Present	BOOL			FALSE	Boolean input is present

The `_GlobalIOVariables` will be automatically updated with the digital input definition adding all the input points defined with the struct `_MBoolIn`.

- `BoolIn_1 : _MBoolIn;`

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

IF BoolIn.
  I Boolean input
  Present Boolean input

```

- **BoolIn.I**: Digital input.
- **BoolIn.Present**: Presence of the I/O point.

If the name fits the keyword `_array_xx` the variable defined in the `_GlobalIOVariables` will be an array:

Module name M6100A001_4		
I/O	Type	Name
1	DI	DI_array_1
2	DI	DI_array_2
3	DI	DI_array_3
4	DI	DI_array_4
5	DI	DI_array_5
6	DI	BoolIn_5
7	DI	BoolIn_6
8	DI	BoolIn_7
9	DI	BoolIn_8

The \_GlobalIOVariables will be automatically update with the array digital input definition.

- BoolIn : [1..5] OF \_MBoolIn;

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

IF DI[1].
    I Boolean input
    Present

```

- **DI[1].I**: Digital input.
- **DI[1].Present**: Presence of the I/O point.

### 5.1.5.2 Digital outputs

When a digital output module is inserted the name of digital output is assigned inside the rack editor page:

Module name M6150A001_4		
IO	Type	Name
1	BoolOut	BoolOut
2	BoolOut	BoolOut_1
3	BoolOut	BoolOut_2
4	BoolOut	BoolOut_3
5	BoolOut	BoolOut_4
6	BoolOut	BoolOut_5
7	BoolOut	BoolOut_6
8	BoolOut	BoolOut_7
9	BoolOut	BoolOut_8

In order to writing the outputs value is necessary the "name" + the variables defined in the structure contained in the library **M\_Type**.

In case digital outputs the structure is **\_MBoolOut**.

The screenshot shows the library browser with the path `m_type` selected. Under `STRUCTS`, the `_MBoolOut` structure is highlighted. The structure definition is shown in a table:

Name	Type	Inherited from	Address	Initial	Comment
Q	BOOL			FALSE	Boolean Output
Present	BOOL			FALSE	Boolean output is present
Error	BOOL			FALSE	Error on boolean output
Config	_MBoolOutConfig				Configuration parameters

The `_GlobalIOVariables` will be automatically update with the digital output definition adding all the digital output points defined as `_MBoolOut`, i.e.:

- `BoolOut_1 : _MBoolOut;`

In our program we can write:

The screenshot shows a ladder logic editor with a program block named `PROGRAM Main`. Below it is a variable block for `BoolOut`. The variable block has four points: `Config`, `Error`, `Present`, and `Q`. The `Q` point is highlighted.

- **BoolOut.Q**: Digital output.
- **BoolOut.Present**: Presence of the I/O point.
- **BoolOut.Error**: Missing 24 volts to the output module.
- **BoolOut.Config**: I/O configuration.

If the name fits the keyword `_array_xx` the variable defined in the `_GlobalIOVariables` will be an array:

Module name M6150A001_4		
IO	Type	Name
1		DOut_array_1
2		DOut_array_2
3		DOut_array_3
4		DOut_array_4
5		DOut_array_5
6		DOut_array_6
7		BoolOut_6
8		BoolOut_7
9		BoolOut_8

The \_GlobalIOPVariables will be automatically update with the array digital output definition.

- BoolOut:[1..6] OF \_MBoolOut;

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

IF DOut[1].

```

- **DOut[1].Q:** Digital output.
- **DOut[1].Present:** Presence of the I/O point.
- **DOut[1].Error:** Missing 24 volts to the output module.
- **DOut[1].Config:** Module configuration.

### 5.1.5.3 Analog inputs

When an analog input module is inserted the name of analog input is assigned inside the rack editor page:

Module name M6200A001_4		
IO	Type	Name
1	GenIn	GenIn
2		GenIn_1
3		GenIn_2
4		GenIn_3

for reading the inputs is necessary the "name" + the variables defined in the structure contained in the library **M\_Type**. In case analog inputs the structure is **\_MGenIn**. Inside this structure there are another substructures called **\_MGenInError** and **\_MGenInConfig**.

The screenshot shows the structure of the **\_MGenIn** type in the **m\_type** library. The structure contains the following fields:

Name	Type	Inherited from	Address	Initial	Comment
EngVal	REAL			0	Engineering value e.g. m, sec, bar, degree ...
PhysVal	REAL			0	Physical value in mA, V
RawVal	DWORD			0	Raw bit value
RawValExt	DWORD			0	Raw bit extension for 64 bits values
Present	BOOL			FALSE	Generic input is present
Error	BOOL			FALSE	Error on generic input
ErrorCode	_MGenInError			0	Error code on generic input
Config	_MGenInConfig				Configuration parameters

About the analog inputs are already defined the default configuration adding all the analog input points defined as **\_MGenIn** with a pre-configured scaling value:

- GenIn\_1 : \_MGenIn := ( Config:=(\_MGenInType.V10,  
ScalingLevel:=\_MGenScaling.FullScaling,  
P1:=-10,  
P2:=10,  
E1:=0,  
E2:=1));

In our program we can write:

The screenshot shows a SIMATIC Manager program window with the following code:

```

PROGRAM Main
VAR
END_VAR

IF GenIn.

```

A dropdown menu is open over the **GenIn.** part of the code, listing the following options:

- Config
- EngVal
- Error
- ErrorCode
- PhysVal
- Present
- RawVal
- RawValExt

- GenIn.EngVal: Engineering value (depends on the calibration).
- GenIn.PhysVal: Physical value (in Volt).

- GenIn.RawVal: Bit value.
- GenIn.RawValExt: Bit value extended at 64 bit.
- GenIn.Present: Presence of the I/O point.
- GenIn.Error: Error on the I/O.
- GenIn.ErrorCode: Error code of the I/O.
- GenIn.Config: I/O configuration.

If the name fits the keyword **\_array\_xx** the variable defined in the **\_GlobalIOVariables** will be an array:

Module name M6200A001_4		
IO	Type	Name
1		AI_array_01
2		AI_array_02
3		AI_array_03
4		AI_array_04

The **\_GlobalIOVariables** will be automatically update with the array analog input definition.

- GenIn[1..4] OF \_MGenIn;

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

IF AI[1].

```

- AI[1].EngVal: Engineering value (depends on the calibration).
- AI[1].PhysVal: Physical value (in Volt).
- AI[1].RawVal: Bit value.
- AI[1].RawValExt: Bit value extended at 64 bit.
- AI[1].Present: Presence of the I/O point.
- AI[1].Error: Error on the I/O.
- AI[1].ErrorCode: Error code of the I/O.
- AI[1].Config: I/O configuration.

### 5.1.5.4 Analog outputs

When an analog output module is inserted the name of analog output is assigned inside the rack editor page:

Module name M6250A001_4		
IO	Type	Name
1	GenOut	GenOut
2	GenOut	GenOut_1
3	GenOut	GenOut_2
4	GenOut	GenOut_3

For writing the outputs is necessary the "name" + the variables defined in the structure contained in the library **M\_Type**. In case analog outputs the structure is **\_MGenOut**. Inside this structure there are another substructures called **\_MGenOutError** and **\_MGenOutConfig**.

STRUCT _MGenOut					
Name	Type	Inherited from	Address	Initial	Comment
EngVal	REAL			0	Engineering value e.g. m, sec, bar, degree ...
PhysVal	REAL			0	Physical value in mA, V
RawVal	DWORD			0	Raw bit value to digital interface or communication
Present	BOOL			0	Generic output is present
Error	BOOL			0	Error on generic output
ErrorCode	_MGenOutError			0	Error code on generic output
Config	_MGenOutConfig				Configuration parameters

About the analog outputs are already defined the default configuration adding all the analog output points defined as **\_MGenOut** type with default scaling values:

- GenOut : \_MGenOut := ( Config:= ( OutType := \_MGenOutType.V10,  
ScalingLevel:= \_MGenScaling.FullScaling,  
P1:=-10,  
P2:=10,  
E1:=-1,  
E2:=1 ));

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

1 IF GenOut.

```

- GenOut.EngVal: Engineering value (depends on the calibration).
- GenOut.PhysVal: Physical value (in Volt).

- GenOut.RawVal: Bit value.
- GenOut.Present: Presence of the I/O point.
- GenOut.Error: Error on the I/O.
- GenOut.ErrorCode: Error code of the I/O.
- GenOut.Config: I/O configuration.

If the name fits the keyword **\_array\_xx** the variable defined in the **\_GlobalIOPVariables** will be an array:

Module name	M6250A001_4	
I/O	Type	Name
1		AO_array_01
2		AO_array_02
3		AO_array_03
4		AO_array_04

The **\_GlobalIOPVariables** will be automatically update with the array analog output definition.

- GenIn[1..4] OF \_MGenOut;

In our program we can write:

```

PROGRAM Main
VAR
END_VAR

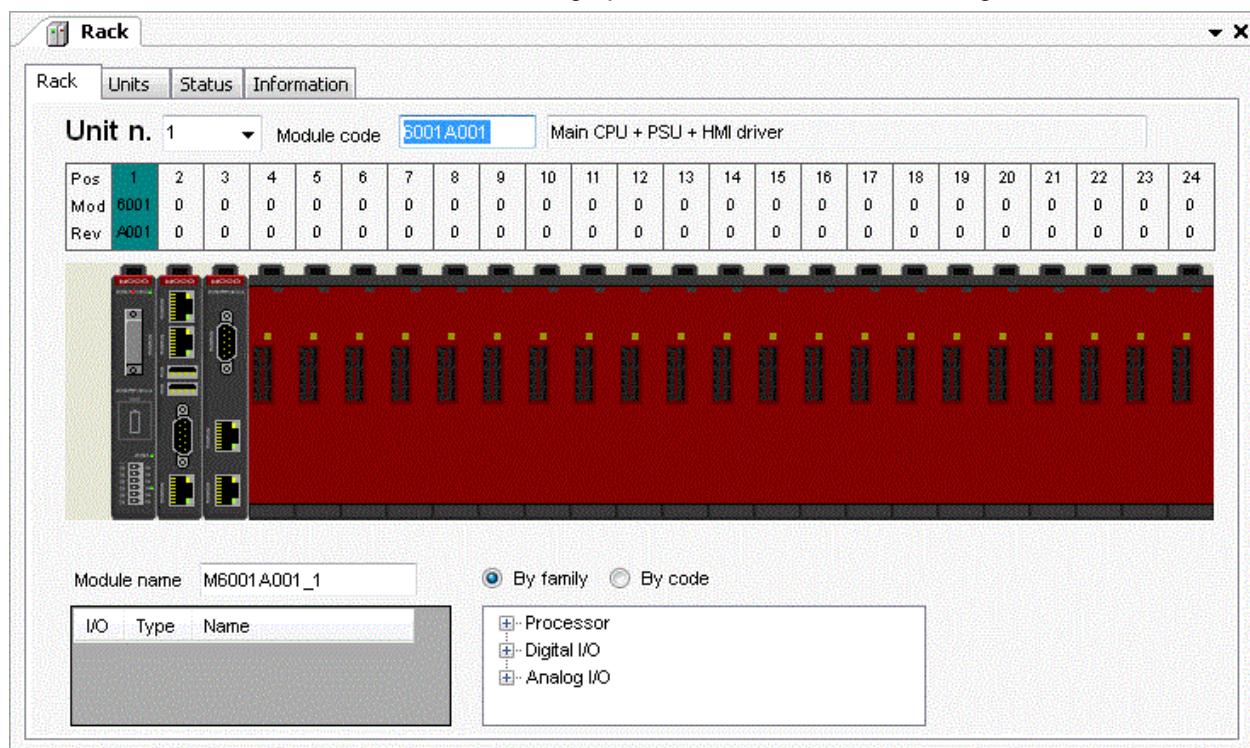
IF AO[1].

```

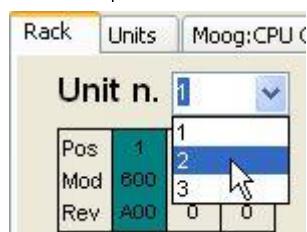
- AO[1].EngVal: Engineering value (depends on the calibration).
- AO[1].PhysVal: Physical value (in Volt).
- AO[1].RawVal: Bit value.
- AO[1].Present: Presence of the I/O point.
- AO[1].Error: Error on the I/O.
- AO[1].ErrorCode: Error code of the I/O.
- AO[1].Config: I/O configuration.

## 5.1.6 Sheet Rack

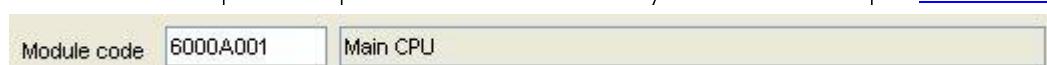
The first sheet **Rack** is a window that visualize in graphical mode the hardware configuration.



The **Unit** parameter show the current unit. These depends to the settings under sheet [Units](#).



The **Module code** parameter permit to insert the module by a code. See the chapter [Module Insertion](#).



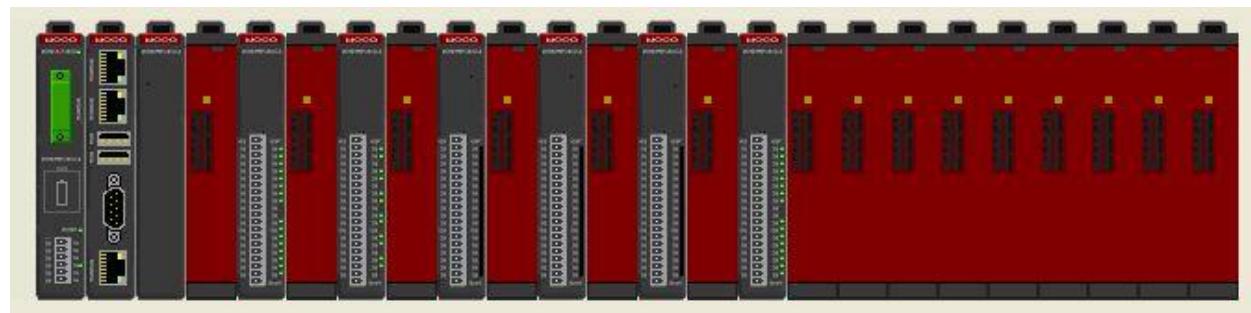
Above the rack there is a window that show:

Pos	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mod	600	0	0	0	610	0	618	0	620	0	622	0	625	0	615	0	0	0	0	0	0	0	0	0
Rev	A00	0	0	0	A00	0	A00	0	A00	0	A00	0	A00	0	A00	0	0	0	0	0	0	0	0	0

- Pos: Position number
- Mod: Module code
- Rev: Module revision

The number position is relative to the current unit and correspond at the physical place on the socket. Highlighted in green is the currently selected position.

The visualization use a graphical mode. By the module images is clear what is the place free and what is the place occupied.



## 5.1.7 Sheet Units

The second sheet **Units** is a window that visualize the units configuration.

	<input type="checkbox"/> Unit deployment as defined
Modules in unit 1	0
Modules in unit 2	0
Modules in unit 3	0
Modules in unit 4	0
Modules in unit 5	0
Modules in unit 6	0
Modules in unit 7	0
Modules in unit 8	0
Modules in unit 9	0
Modules in unit 10	0
Modules in unit 11	0
Modules in unit 12	0
Modules in unit 13	0
Modules in unit 14	0
Modules in unit 15	0
Modules in unit 16	0
Modules in unit 17	0
Modules in unit 18	0
Modules in unit 19	0
Modules in unit 20	0
Modules in unit 21	0
Modules in unit 22	0
Modules in unit 23	0
Modules in unit 24	0
Modules in unit 25	0
Modules in unit 26	0
Modules in unit 27	0
Modules in unit 28	0
Modules in unit 29	0
Modules in unit 30	0
Modules in unit 31	0
Modules in unit 32	0
Modules in unit 33	0
Modules in unit 34	0
Modules in unit 35	0
Modules in unit 36	0
Modules in unit 37	0
Modules in unit 38	0
Modules in unit 39	0
Modules in unit 40	0
Modules in unit 41	0
Modules in unit 42	0
Modules in unit 43	0
Modules in unit 44	0
Modules in unit 45	0
Modules in unit 46	0
Modules in unit 47	0
Modules in unit 48	0
Modules in unit 49	0
Modules in unit 50	0

- Unit deployment as defined:** If checked, when the modules in the socket are [optional](#), permit at the user to not install physically the socket/s. This means also the socket is optional.
- Modules in Unit 1..50:** The user can be defined the modules number for any units. Each unit must be a minimum of 3 or a multiple of thereof for a maximum of 24. The first unit starts with place number 1.

If the number inserted in the unit is wrong, appear a symbol that explain the error:

	<input checked="" type="checkbox"/> Unit deployment as defined
Modules in unit 1	1
Modules in unit 2	24
Modules in unit 3	0
Modules in unit 4	0
Modules in unit 5	0
Modules in unit 21	0
Modules in unit 22	0
Modules in unit 23	0
Modules in unit 24	0
Modules in unit 25	0

	<input checked="" type="checkbox"/> Unit deployment as defined
Modules in unit 1	3
Modules in unit 2	24
Modules in unit 3	4
Modules in unit 4	0
Modules in unit 5	0
Modules in unit 21	0
Modules in unit 22	0
Modules in unit 23	0
Modules in unit 24	M
Modules in unit 25	M

Rack	<input checked="" type="checkbox"/> Unit deployment as defined	
Units	Modules in unit 1	3
	Modules in unit 2	26
Status	Modules in unit 3	0
Information	Modules in unit 4	0
	Modules in unit 5	0
	Modules in unit 21	0
	Modules in unit 22	0
	Modules in unit 23	0
	Upper maximum limit	
	Modules in unit 24	0
	Modules in unit 25	0

### 5.1.8 Sheet Status

The third sheet **Status** is a window that visualize the plc status. If the plc is Offline the status is **n/a**.

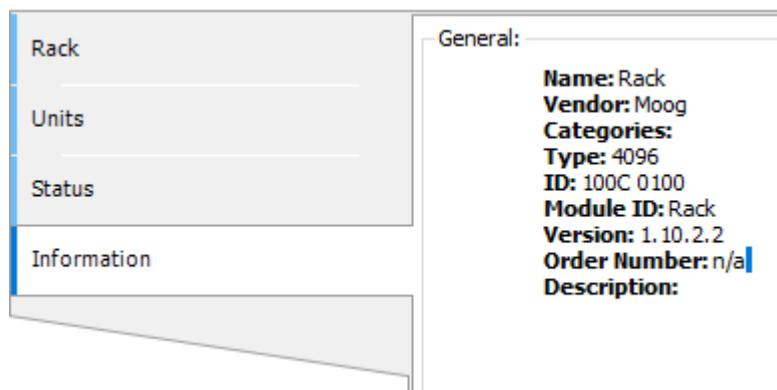
Rack	Moog:Place600	:	n/a
Units	Moog:empty	:	n/a
Status	Moog:CPU	:	n/a
Information	Moog:Bus600	:	n/a

If the plc is Online the status is **Running**.

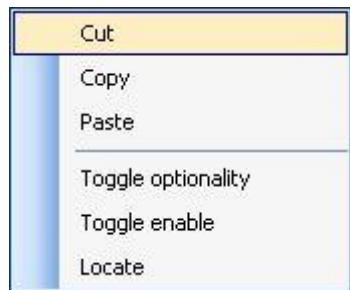
Rack			
Rack	Units	Status	Information
Moog:Bus600		:	Running
Moog:CPU		:	Running
Moog:empty		:	Running
Moog:Place600		:	Running

### 5.1.9 Information Sheet

The fourth sheet **Information** is a window that visualize the general information of the device used.



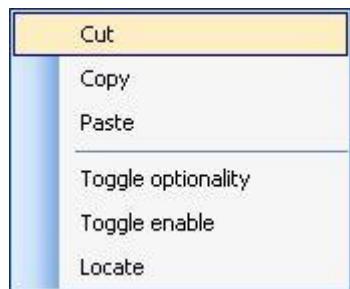
## 5.1.10 Operation on module



- [Cutting a Module](#)
- [Copying a Module](#)
- [Pasting a Module](#)
- [Adding a Module](#)
- [Moving a Module](#)
- [Toggle Optionality](#)
- [Toggle Enable](#)
- [Locate a Module](#)

### 5.1.11 Cutting a Module

To delete a Module from the Device Manager(the deletion includes all of its parameters) should be positionedon the module, click the right mouse button and select Cut from the context menu. This operation put in the clipboard all the informations.



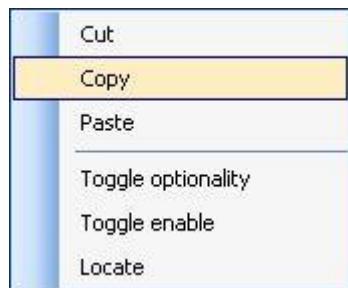
Otherwise is possible remove definitely the module with the key **DEL/CANC** in this way will not be copied to the clipboard.

How to **delete** a module:

- select it with the cursor
- click the right mouse button and select **Cut** or press **DEL** key.

### 5.1.12 Copying a Module

It is possible to copy a module from the Device Manager should be positioned on the module, click the right mouse button and select **Copy** from the context menu. The copied module will be on the clipboard ready to be pasted into another position or into another file: the clipboard will always contain the last object copied or cutted.



How to **copy** a module:

- select it with the cursor
- click the right mouse button and select **Copy**.

### 5.1.13 Pasting a Module

To paste a Module in the Device Manager should move to the place where you want the Module previously copied or cut (now present in the clipboard), click the right mouse button and select Paste from the context menu.



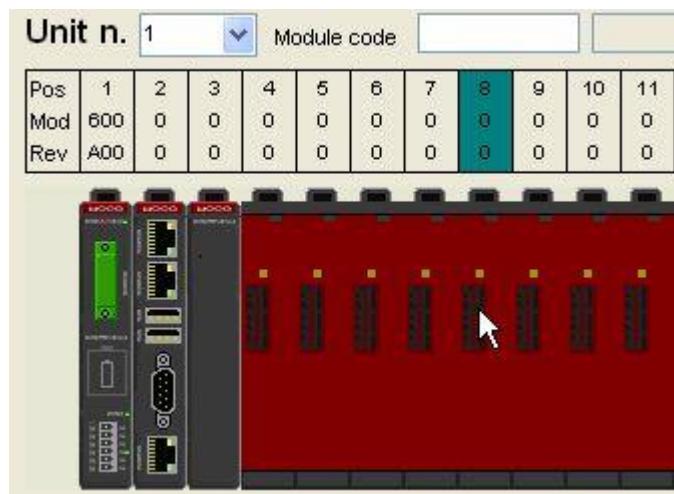
Another operation to copy a Module in the Device Manager, positioned on the Module you want to copy, click the left mouse button and simultaneously press the Ctrl key, then pressing and holding both buttons, drag the Module in the new position.

Through these command, the Module is pasted into the desired position. The original variables are deleted and new ones will be created of the names increased over the past used the same type but can still be changed later.

### 5.1.14 Adding a Module

To add a new module proceed as follows:

- Place the cursor in a **free** place



Select the desired one in the window "**Available Modules**". It is possible view the available modules choosing the option "**By family**" or "**By code**".

By family:

- By family  By code

- Processor
  - 6000 Main CPU + PSU
  - 6001 Main CPU + PSU + HMI driver
  - 6010 AUX CPU + PSU
- Digital I/O
  - 6100 16 digital inputs, 24 Vdc
  - 6150 16 digital outputs 24Vdc 0.5A
  - 6161 8 digital outputs rele
  - 6180 12 digital outputs 24Vdc 2A
- Analog I/O



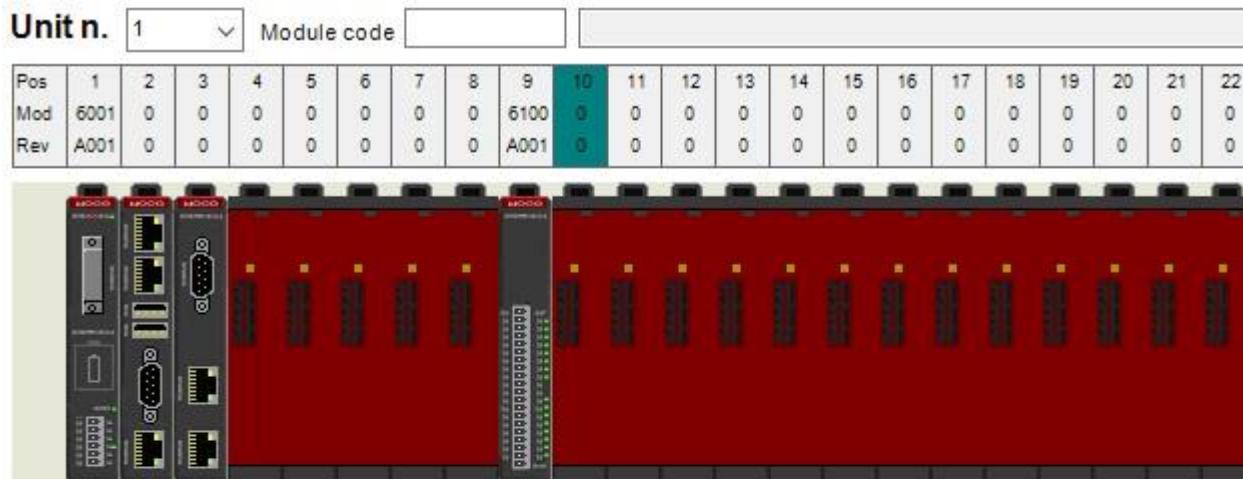
By code:

- By family  By code

- 6000 Main CPU + PSU
- 6001 Main CPU + PSU + HMI driver
- 6010 AUX CPU + PSU
- 6100 16 digital inputs, 24 Vdc
- 6150 16 digital outputs 24Vdc 0.5A
- 6161 8 digital outputs rele
- 6180 12 digital outputs 24Vdc 2A
- 6200 4 analog inputs 16 bits
- 6201 8 analog inputs 16 bits
- 6204 3 LVDT inputs



To insert the selected module, double-click.

Module name  By family  By code

- + Processor
- Digital I/O
  - 6100 16 digital inputs, 24 Vdc
    - ... 6100A001
  - + 6150 16 digital outputs 24Vdc 0.5A
  - + 6161 8 digital outputs relé
  - + 6180 12 digital outputs 24Vdc 2A
- + Analog I/O



In the box **ModuleCode** will appear the name of the added module with a description to the right.

Module code 

Main CPU

This name and this description will be visible every time the module will be selected. Another way to add a new module in the Device Manager is to move to the place where you want to insert the module, type the name in Module Code box and press enter key.

Module code 

16 digital input 24V CC

### 5.1.15 Moving a Module

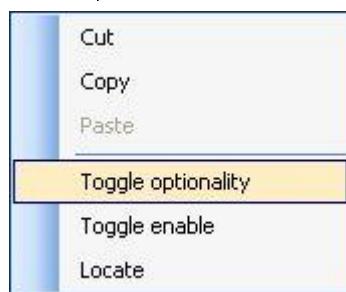
There are two methods to effect the moving a module in the rack:

- select the module with the mouse: holding down the left mouse key, drag the module to the desired position; release the mouse key;
- select the module with the cursor, "cut" it with the **Cut** command, move the cursor to the desired position, and activate the **Paste** command.

The module will be moved maintaining unaltered all its configuration parameters.

### 5.1.16 Toggle optionality

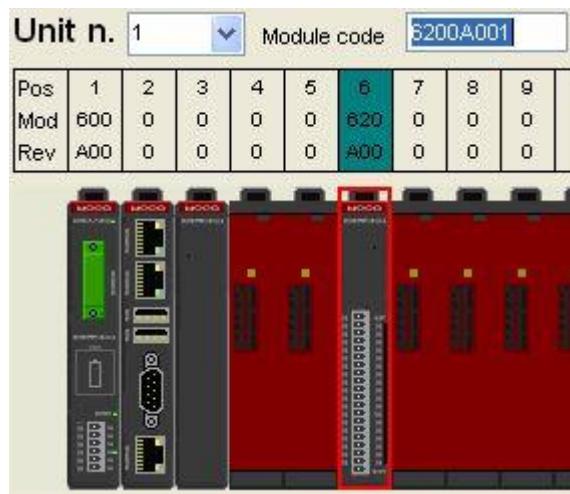
To set optional a module select the module, click right button and select **ToggleOptionality**.



An optional module declared may or may not be physically present in the predetermined position on the socket: the PLC will still be run. This mode is normally used when one needs to start the PLC in the absence of some Modules or when the application is prepared with multiple Modules, but for some types of equipment does not require the presence of all modules. If after that you will require the addition of these cards will not need to reprogram the PLC, but just make them active.

The variables on the module may used in the application program.

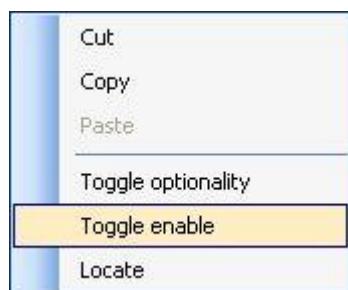
To specify that the card has become optional, it will be visually surrounded by a red frame.



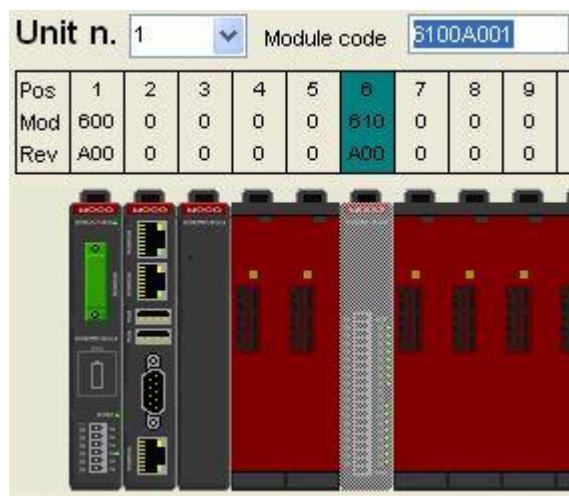
To remove the optional parameter must reposition itself on the desired module click the right mouse button and select **Toggle optionality** again from the context menu. The card will no longer be framed in red.

### 5.1.17 Toggle enable

To set a module disabled, select the module, click right button and select **Toggle Enable**.



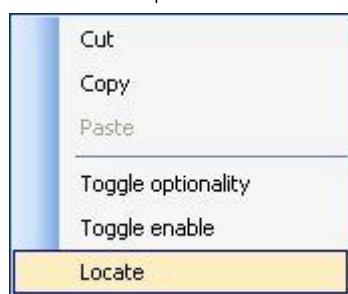
This mode is used when the module selected should **not** be physically present on the socket. The variables on the module **can not be used** in the application program. To specify that the card has become disabled, it will be covered by a graphic gray dither.



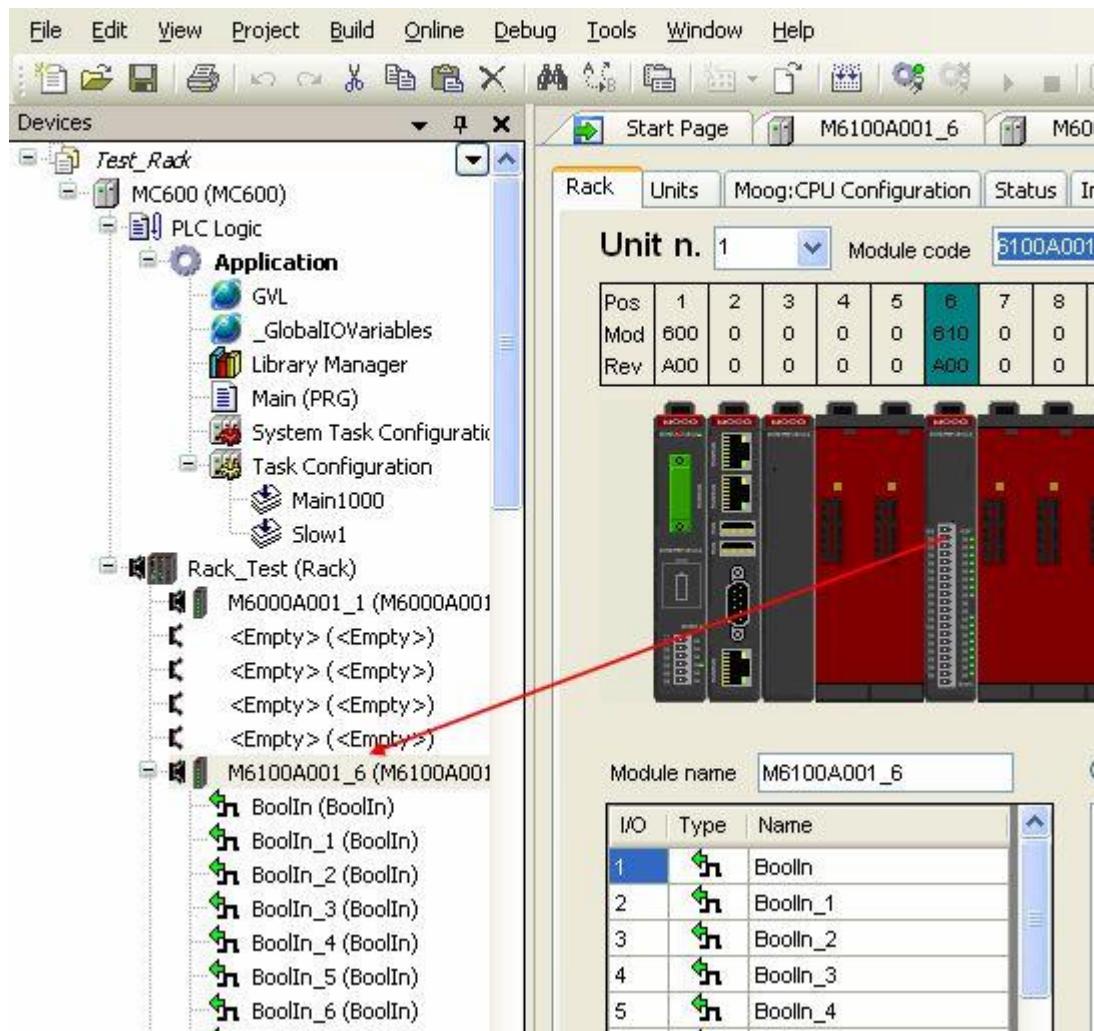
To activate a card previously must reposition itself on the desired module to click with the right mouse button a second time and select Toggle Enable from the context menu. The card will not be covered by a gray dither.

## 5.1.18 Locate a Module

To locate the position of a module in the tree, select the module, click right button and select **Locate**.

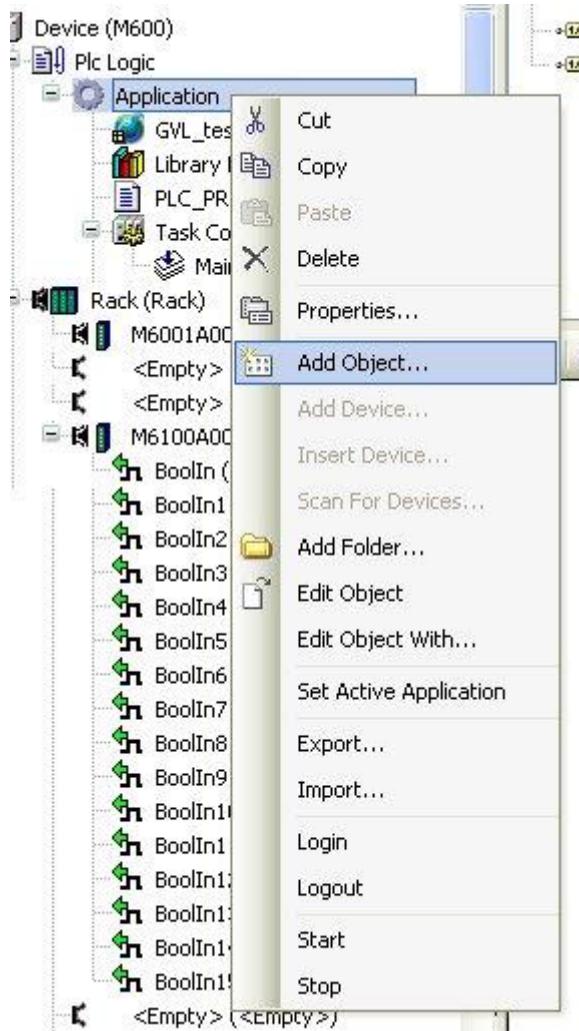


Performing this operation will be highlighted on the rack tree the position of the selected Module.



## 5.2 Moog MMI Manager

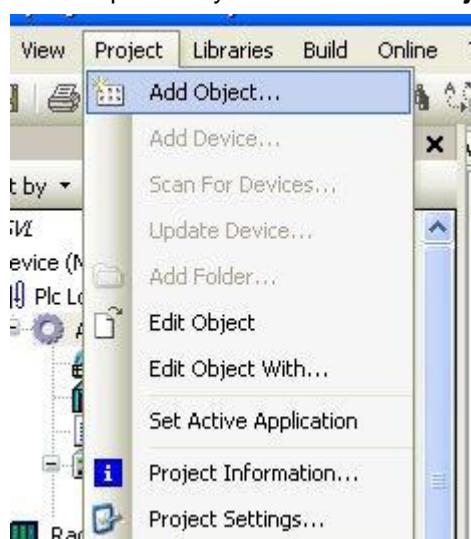
The object "MMImanager" contains all the settings of the HMI Panel. It's possible entry only one instance of the MMI Manager object. From application node press right button and select Add Object:



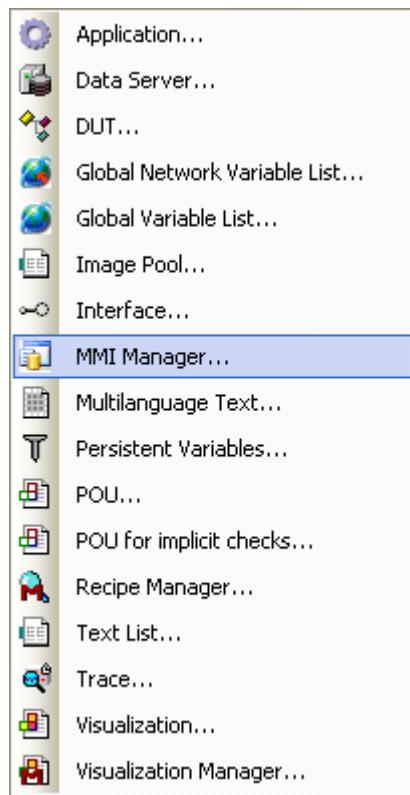
It's also possible Add Object from the **Tool Bar** by button :



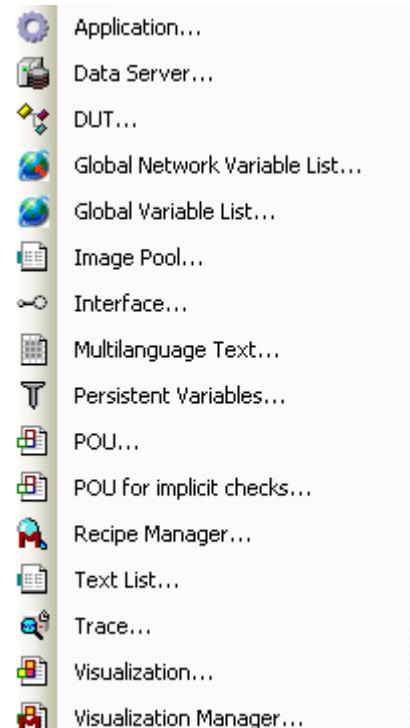
Another possibility is to select **Add Object** in the **Project** menu:



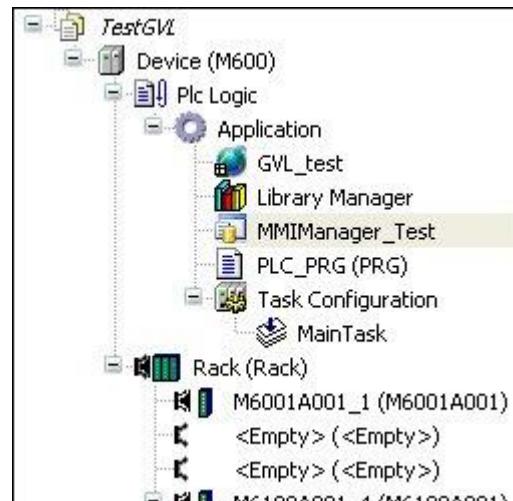
After that will appear the available objects:



In case you already have an MMI Manager, since there can be only one object of this type, it will not appear the possibility to select it as one can see in the following window.

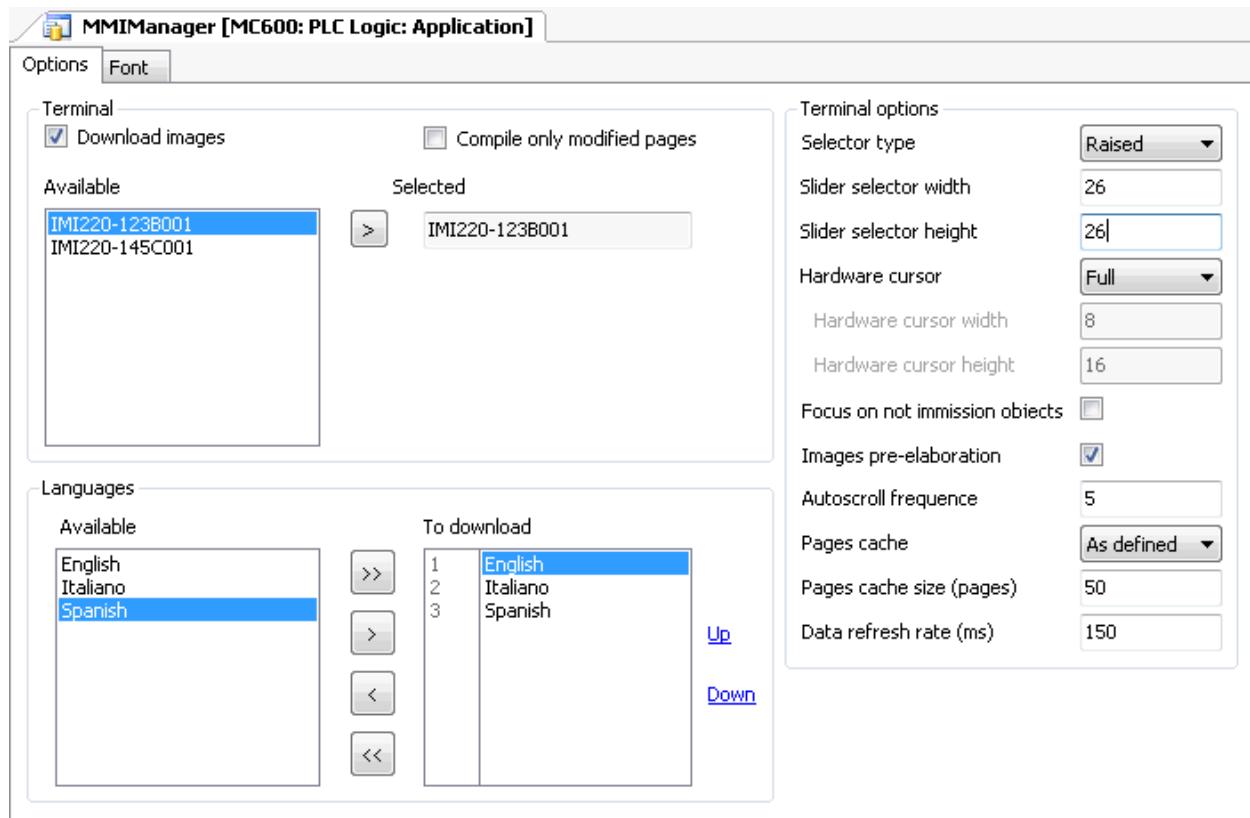


After inserting, the object MMI Manager, will appear in the Application root with the specific icon 



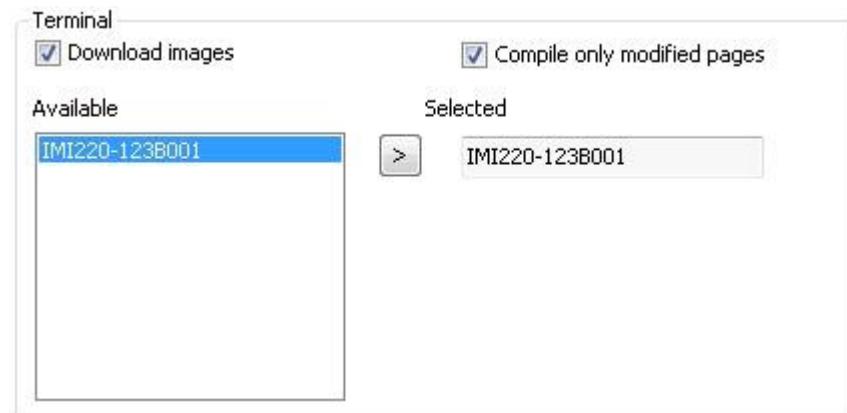
By double click on the MMI Manager object will appear the specific settings:

- [Options](#)
- [Font](#)



## 5.2.1 Options

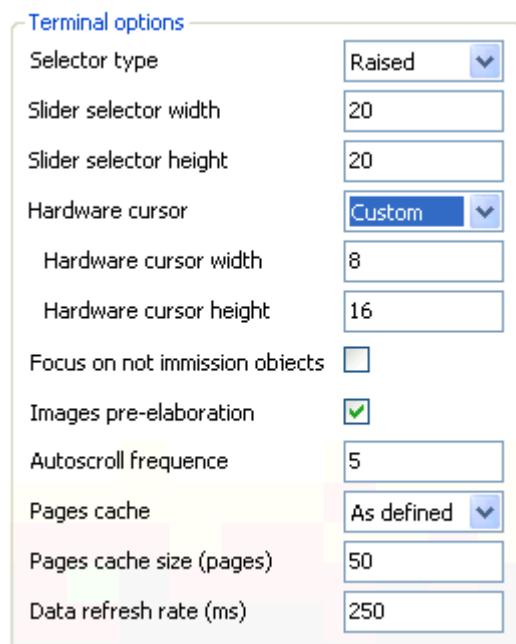
In the sheet **Options** it's possible select the terminal type that determinate the page aspect. This choice involves the selection of the objects and the attributes used in the pages.



- Download images:** This check permit to download the images during the CPU downloading.
- Compile only modified pages:** This check permit to compile only the modified pages.
- Available:** List of the available terminal installed on the MASS.
- Selected:** Terminal selected from the available list by the button

Regarding the terminal selected, any pages added under the MMI Manager, will be a specific dimensions. For example in case of using the terminal IMI220-123B001 the pages resolution will be 800x600.

Inside the Terminal options box it's possible:



- Selector type:** It's possible define the selector type between two type: Flat or Raised.
- Slider selector width:** Define the width dimension of the selector object expressed in pixels. If leave to 0 the width will be 14 pixels.
- Slider selector height:** Define the height dimension of the selector object expressed in pixels. If leave to 0 the height will be 14 pixels.
- Hardware cursor:** Permit to disable the hardware cursor by the choice No, in this case the cursor not appear in the fields on the pages. It's possible also define the cursor as a Full, in this case the cursor fill all the fields on the pages. If the hardware cursor is Custom it's possible to define the dimensions by the follow parameters:
  - Hardware cursor width:** Define the width dimension of the hardware cursor. If leave 0 the width respect the field dimension.
  - Hardware cursor height:** Define the height dimension of the hardware cursor. If leave 0 the width respect the field dimension.
- Focus on not immission objects:** Permit to insert the cursor on the fields where the immission is disabled.
- Images pre-elaboration:** If checked permit to enable the optimise the images used in the project (any format) during the PLC start-up. The pre-elaboration optimise the space and the velocity at run time.
- Autoscroll frequency:** Permit to scroll automatically any field that contains the string (Static Text, Variable Value) when the dimension of the field not permit to see the entire string. If 0 the Autoscroll is disabled. If different to 0 the Autoscroll scroll the string from right to left.

- **Pages cache:** Permit to disable the pages preload system by the choice No. In this case when, at run time, it's called a page, this take some time before to display and this depends to the complexity of the page.
- **As defined:** If pages cache is selected As defined, will be enabled the preload system at PLC startup. This system put all the pages defined in the Pages cache size in the RAM.
- - **Pages cache size (pages):** Number of the pages to put in the RAM
- **Most used:** If pages cache is selected Most used, will be enable the preload system at PLC startup and a special algorithm that put in RAM the most used pages.
- Data refresh rate (ms): Refresh rate expressed in ms that define the data update on the pages.

Inside the Languages box it's possible:



- **Available:** List of the available languages from the project. These names are made by the [Multilanguage text object](#). This list is updated every compiling.
- >: This button permit to put in the "To download" column the previous selected languages from the "Available" column.
- >>: This button permit to put in the "To download" column all the "Available" languages.
- <: This button permit to delete from the "To download" column the previous selected languages from "To download" column.
- <<: This button permit to delete from the "To download" column all the "To download" languages.
- **To download:** List of the languages to download on the CPU. In this column appear two column, one that display the real position of the language on the PLC and one that display the name of the languages.
  - **Up:** By this button is possible move the selected language in up respect to the others.
  - **Down:** By this button is possible move the selected language in down respect to the others.



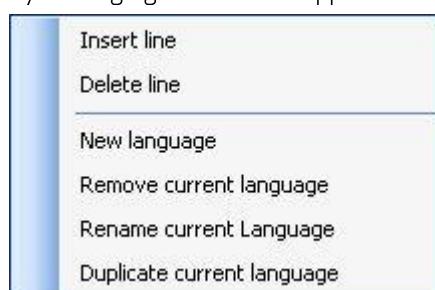
## 5.2.2 Font

In the sheet **Font** it's possible replace a specific font depending to the language used:

MMIManager [MC600: PLC Logic: Application]			
	Font to replace	English	Russian
*	arial	verdana	courier new
*			

- **Font to replace:** Define the font name that can be replaced with others font style. At run time when the language is changed also the font follow this table and change the font style used for others language. Is particular indicate when the language is Cyrillic, Chinese, Japanese.

By clicking right button will appear the follow context menu:



- **Insert line:** Permit to insert a new line.
- **Delete line:** Permit to delete the selected line.
- **New language:** Permit to create a new language column.



- Language name: Put the new language name. This name must be the same at the language name used in the Multilanguage text.
- OK: Confirm the operation. - Cancel: Abort the operation.

- **Remove current language:** Permit to delete the selected language column.



- OK: Confirm the operation.
- Cancel: Abort the operation.

- **Rename current language:** Permit to rename the selected language column.



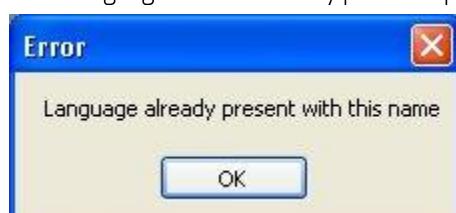
- Old name: Put the old name.  
 - New name: Put the new name.  
 - OK: Confirm the operation.  
 - Cancel: Abort the operation.

- Duplicate current language:** Permit to duplicate the selected language column.



- Language from: Put the language name.  
 - Language to: Put the new language name.  
 - OK: Confirm the operation.  
 - Cancel: Abort the operation.

If the language name is already present appear the follow message box:



- **OK:** Close the box.

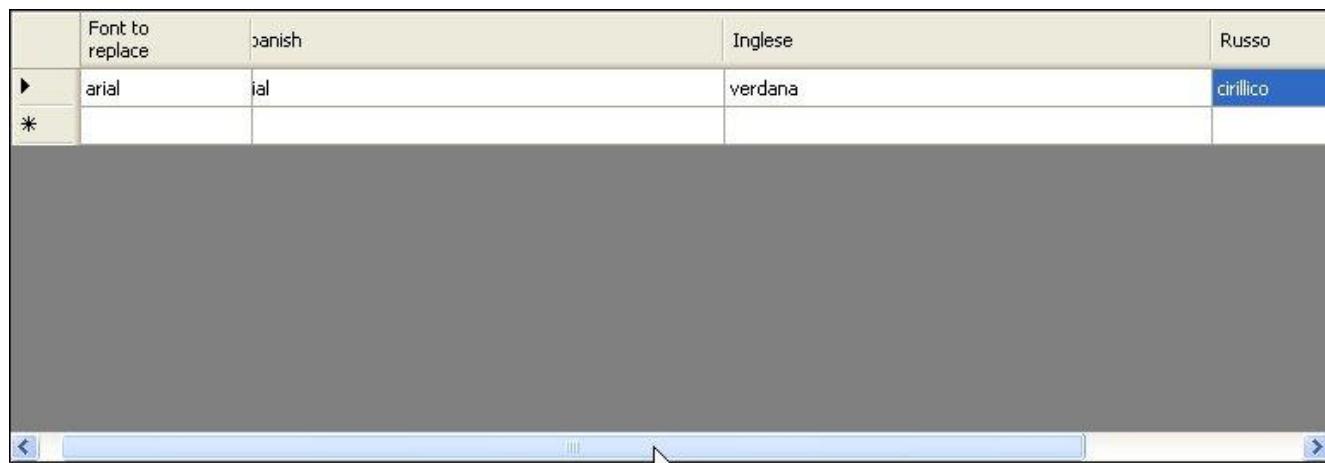
This editor permit to change the column order by drag & drop. The position of the column "Font to replace" is fixed:

	Font to replace	Spanish	Inglese	Russo
▶	arial	arial	verdana	cirillico
*				

	Font to replace	Inglese	Spanish	Russo
▶	arial	verdana	arial	cirillico
*				

If the column width exceed the window dimension will be possible to horizontal scroll the columns. The column "Font to replace" is always visible.

	Font to replace	Spagnolo	Inglese	Russo
▶	arial	rial	verdana	cirilico
*				



### 5.2.3 Variables

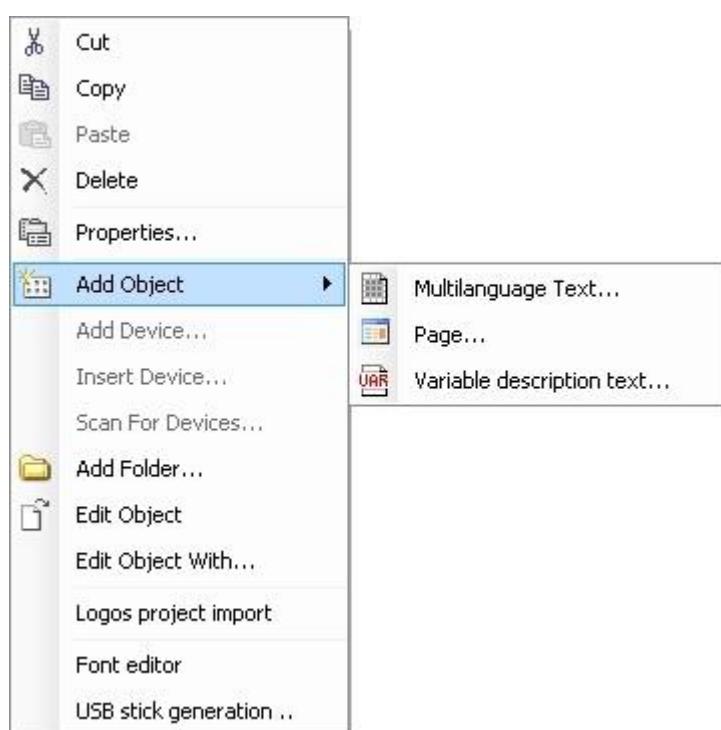
In the sheet **Variables** it's possible define a specific ID to the variable and connect a specific description and help.

	Variable name	Variable identifier	Description multilanguage text	Description	Help multilanguage text	Help
▶	Vis_Pre	1	MT1,0	<i>pressione</i>	MT1HELP,0	<i>Help Pressione</i>
	Vis_Vel	2	MT1,1	<i>velocità</i>	MT1HELP,1	<i>Help Velocità</i>
*	Vis_Tem	3	MT1,2	<i>tempo</i>	MT1HELP,2	<i>Help Tempo</i>

- **Variable name:** Put the variable name from the project.
- Variable identifier: After insertion of the variable name, automatically is assigned a progressive univocal ID. It's possible read this ID by the functions contained on the library M\_MC600HMI. This column is read only.
- Description multilanguage text: By the multilanguage text inserted in the project it's possible define the specific description using Multilanguage text NAME (eg: MT1) comma Multilanguage text ID (eg: 0).
- Description: After insertion of the Description multilanguage text, here appear the description. This column is read only.
- Help multilanguage text: By the multilanguage text inserted in the project it's possible define the specific help using Multilanguage text NAME (eg: MT1HELP) comma Multilanguage text ID (eg: 0).
- Help: After insertion of the Help multilanguage text, here appear the help. This column is read only.

## 5.2.4 Multilanguage Text Object

Under the MMI Manager object is possible to add one or more than one of the object called **Multilanguage Text**. Any multilanguage text is identify by a name and an incremental number called ID. In the multilanguage text is possible to manage one or more than languages. For add the object Multilanguage Text is necessary put the cursor on the MMI Manager level and click right button or press the specific button: Add Object  . Another possibility to add the multilanguage text is by the Menu project > Add Object > Multilanguage Text.



Appear the follow box:



- **Name:** Put the name of the multilanguage text.
- **Open:** Add a new multilanguage text.
- **Cancel:** Abort the operation

The new language created contain one column and this column bring the language from the Windows OS:

	ID	Italiano
▶	0	
*		

### 5.2.4.1 Export all texts

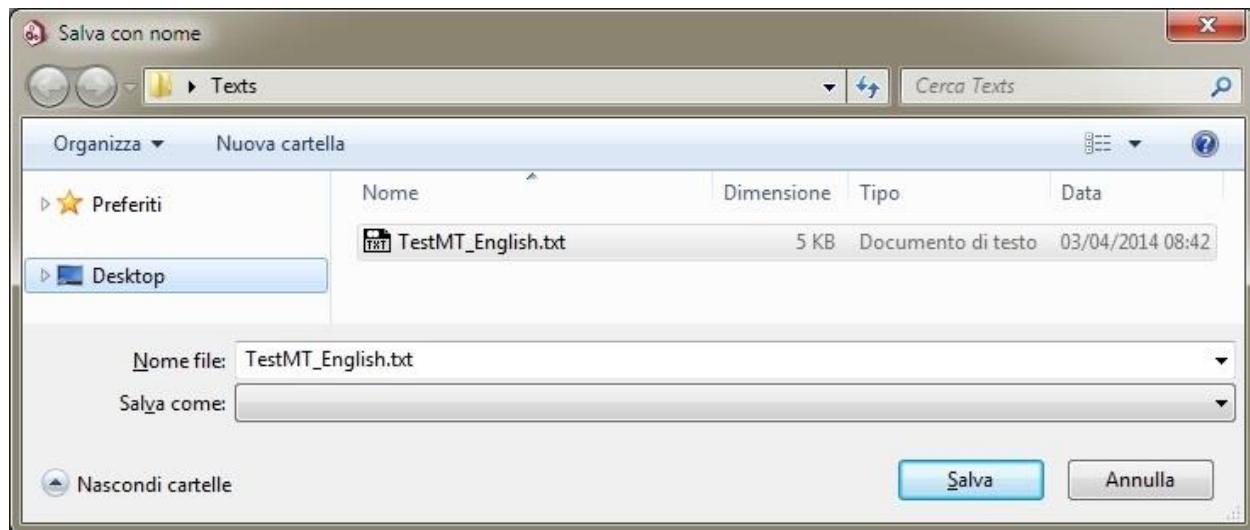
By selecting on MASS the command "Export all texts commands" available on "Project" toolbar is possible Export all the multilanguage texts present in the project in a text file:

Clicking Export appear the follow box:



- **Language to export:** Select the language to export from a language list.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

After the confirmation will appear the Windows® box where is possible define the location where put the exported file (\*.TXT):



The exported file is composed by "Project name" + "Language column":

**TestMT\_English**

The saved file can be opened and modified with anycommenttext editor or imported in excel program. The exported texts are composed by **MultilanguageName + Pipe + ID number + Pipe + Text**:

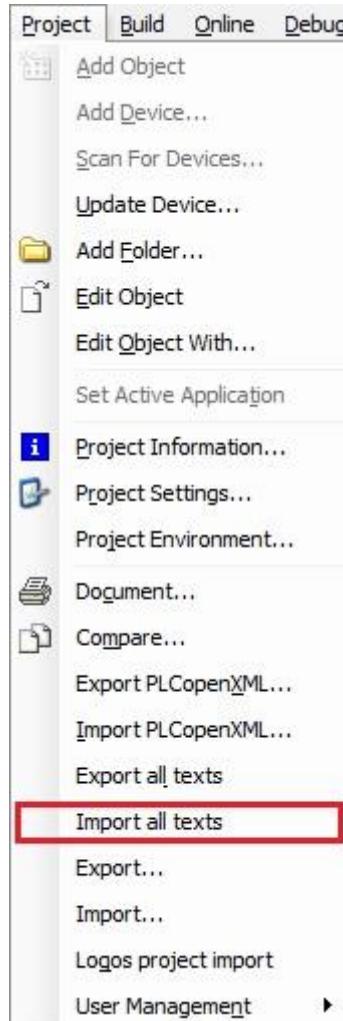
The screenshot shows a Windows Notepad window with the title "TestMT\_English.txt - Blocco note". The menu bar includes "File", "Modifica", "Formato", "Visualizza", and "?". The main content area contains the following text:

```
TOUCH_TEXT | 203 | d
TOUCH_TEXT | 204 | e
TOUCH_TEXT | 205 | f
TOUCH_TEXT | 206 | g
TOUCH_TEXT | 207 | h
TOUCH_TEXT | 208 | i
TOUCH_TEXT | 209 | j
TOUCH_TEXT | 210 | k
TOUCH_TEXT | 211 | l
TOUCH_TEXT | 212 | m
TOUCH_TEXT | 213 | n
TOUCH_TEXT | 214 | o
TOUCH_TEXT | 215 | p
TOUCH_TEXT | 216 | q
TOUCH_TEXT | 217 | r
TOUCH_TEXT | 218 | s
TOUCH_TEXT | 219 | t
TOUCH_TEXT | 220 | u
TOUCH_TEXT | 221 | v
TOUCH_TEXT | 222 | w
TOUCH_TEXT | 223 | x
TOUCH_TEXT | 224 | y
TOUCH_TEXT | 225 | z
Testi | 0 | Test counter
Testi | 1 | Program
Testi | 200 | Text with ID 200
Testi | 207 | free
```

### 5.2.4.2 Import all texts



By selecting on MASS the command "Import all texts" available on "Project" toolbar is possible Import all texts the languages from a text file and apply or create at all present multilanguage texts:



Clicking Import will appear the follow box:



- **Language to update:** Select the language column where apply the imported TXT or write the New language name. In this case will create a new language column.
- **OK:** Confirm the operation.

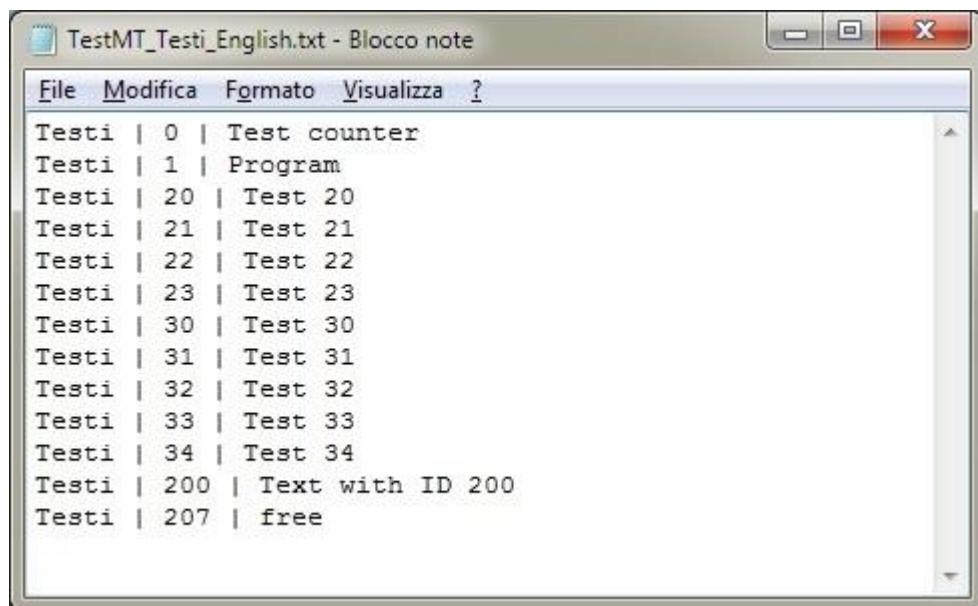
- **Cancel:** Abort the operation.

## ATTENTION

If, during the import, there are the same ID already wrote these will be overwritten.

Example:

If the TXT file contains the new ID:



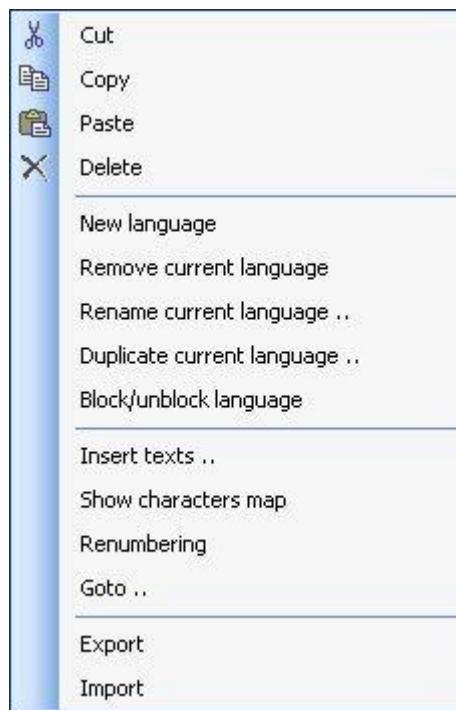
```
File Modifica Formato Visualizza ?  
Testi | 0 | Test counter  
Testi | 1 | Program  
Testi | 20 | Test 20  
Testi | 21 | Test 21  
Testi | 22 | Test 22  
Testi | 23 | Test 23  
Testi | 30 | Test 30  
Testi | 31 | Test 31  
Testi | 32 | Test 32  
Testi | 33 | Test 33  
Testi | 34 | Test 34  
Testi | 200 | Text with ID 200  
Testi | 207 | free
```

The new ID will be added:

21	TEST 21
22	Test 22
23	Test 23
▶	30 Test 30
31	Test 31
32	Test 32
33	Test 33
34	Test 34
*	

### 5.2.4.3 Multilanguage Text Context Menu

Clicking by right button appear the follow context menu:



- [Cut](#)
- [Copy](#)
- [Paste](#)
- [Delete](#)
- [New language](#)
- [Remove current language](#)
- [Rename current language](#)
- [Duplicate current language](#)
- [Block/unblock language](#)
- [Insert texts](#)
- [Show characters map](#)
- [Renumbering](#)
- [Goto](#)
- [Export](#)
- [Import](#)

#### 5.2.4.4 Cut



**WARNING!**  
Undo and Redo doesn't work in this editor.

Clicking on cut command on Multilanguage component context menu, the text is removed and copied into the clipboard and is possible [paste](#) in an other position.

### 5.2.4.5 Copy



WARNING!

Undo and Redo doesn't work in this editor.

Clicking on copy command on Multilanguage component context menu, the text is copied into the clipboard and is possible [paste](#) in an other position.

### 5.2.4.6 Paste



**WARNING!**  
Undo and Redo doesn't work in this editor.

Clicking on paste command on Multilanguage component context menu, is possible paste the text from a [cut](#) or a [copy](#) operations.

### 5.2.4.7 Delete



**WARNING!**  
Undo and Redo doesn't work in this editor.

Clicking on delete command on Multilanguage component context menu, is possible delete the selected text.

### 5.2.4.8 New Language



By this command is possible add a new language column.

Clicking New language on Multilanguage component context menu, appear the follow box:



- **Language name:** Put the name of the new language.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

After the confirmation will appear the new language column in the right position:

	ID	Italiano	English
▶	0	Pressione	
*	1	Velocità	
	2	Tempo	

### 5.2.4.9 Remove Current Language

 !	WARNING! Undo and Redo doesn't work in this editor.
--	--

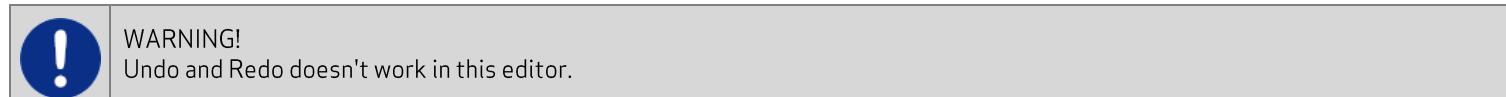
By this command is possible remove the selected language column.

Clicking Remove current language on Multilanguage component context menu, appear the follow box:



- **OK:** Confirm the operation. The selected language will be removed.
- **Cancel:** Abort the operation.

### 5.2.4.10 Rename Current Language



By this command is possible add a new language column.

Clicking Rename current language on Multilanguage component context menu, appear the follow box:



- **Old name:** Take the current selected name language.
- **New name:** Write the new language name.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

### 5.2.4.11 Duplicate Current Language

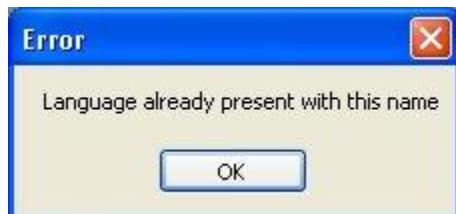


By this command is possible duplicate the selected language column.

Clicking Duplicate current language on Multilanguage component context menu, appear the follow box:



- Language from:** Take the current selected name language.
- Language to:** Write the new language name. If the name is already used appear the follow box:



- OK: Close the box and abort the operation.

- OK:** Confirm the operation.
- Cancel:** Abort the operation.

After the confirmation will appear the duplicate language column in the right position:

	ID	Italiano	English	EnglishAmerican
	0	Pressione	Pressure	Pressure
	1	Velocità	Speed	Speed
▶	2	Tempo	Time	Time
*				

### 5.2.4.12 Block/Unblock Language

Clicking Block/Unblock Language on Multilanguage component context menu, is possible block the column (in red) at the right of the ID column:  
By the horizontal scroll the first column is fixed and the others columns can be moved:

ID	Italiano	English	American
0	Pressione	ssure	Pressure
1	Velocità	eed	Speed
2	Tempo	e	Time

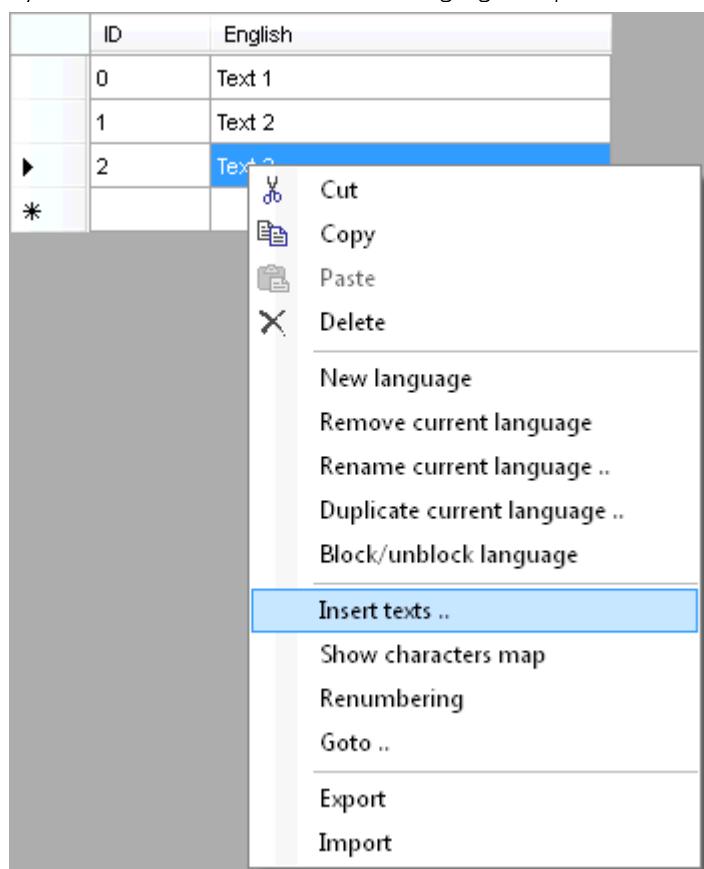
### 5.2.4.13 Insert Texts

 !	WARNING! Undo and Redo doesn't work in this editor.
--	--

Normally the new text is inserted by starting to write

	ID	English
	0	Text 1
	1	Text 2
	2	Text 3
*		

By the command Insert texts on Multilanguage component context menu, is possible add a new empty rows:



Clicking Insert texts appear the follow box:



- First text:** Indicate the start ID where start to insert a new rows.
- Number:** Indicate the number range.

- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

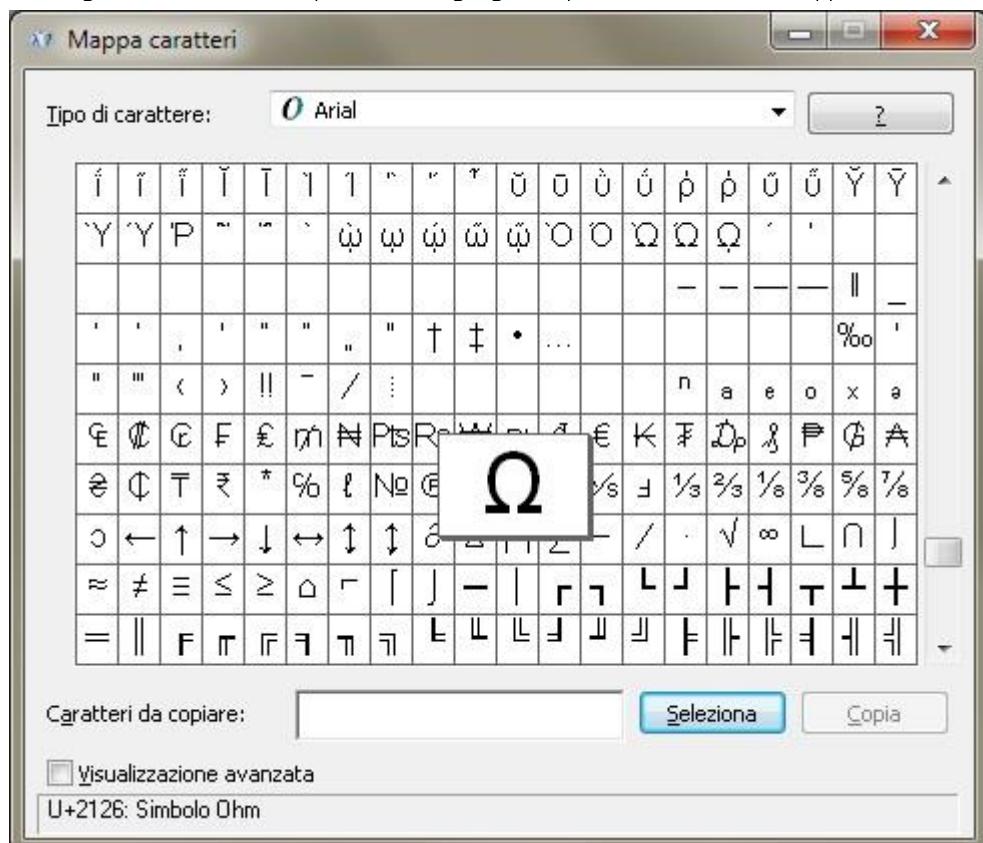
After the confirmation will appear the new rows that start from 200 per 10 texts:

ID	English
0	Text 1
1	Text 2
2	Text 3
200	Text 200
201	
202	
203	
204	
205	
206	
207	
208	
209	Text 209
*	

### 5.2.4.14 Show Characters Map

By this command is possible recall the characters map from Windows®:

Clicking Show characters map on Multilanguage component context menu, appear the follow box:



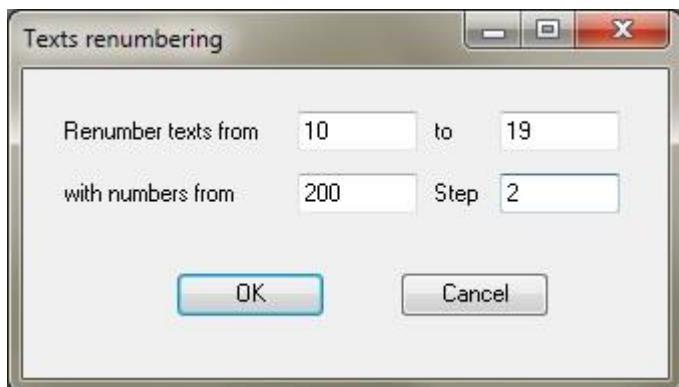
Select the character and copy into the multilanguage text.

### 5.2.4.15 Renumbering



By this command is possible renumbering the existing texts.

Clicking Renumbering on Multilanguage component context menu, appear the follow box:



- Renumber texts from:** Indicate the start ID where start to renumbering the existing rows.
- To:** Indicate the last ID where stop to renumbering the existing rows.
- With numbers from:** Indicate the new ID where to renumbering the existing rows.
- Step:** Indicate the step for any rows renumbered.
- OK:** Confirm the operation.
- Cancel:** Abort the operation.

After the confirmation will appear the new rows that start from 200 per 10 texts with step 2:

ID	English
0	Text 1
1	Text 2
2	Text 3
200	A
202	B
204	C
206	D
208	E
210	F
212	G
214	H
216	J
▶ 218	K
*	

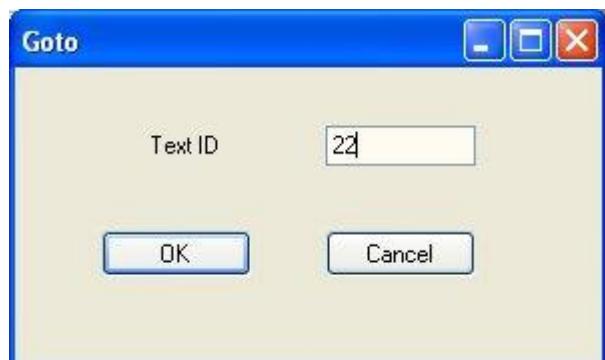
If the ID is already present appear the follow box:



### 5.2.4.16 Goto

By this command is possible Go to at the indicates ID.

Clicking Goto on Multilanguage component context menu, appear the follow box:



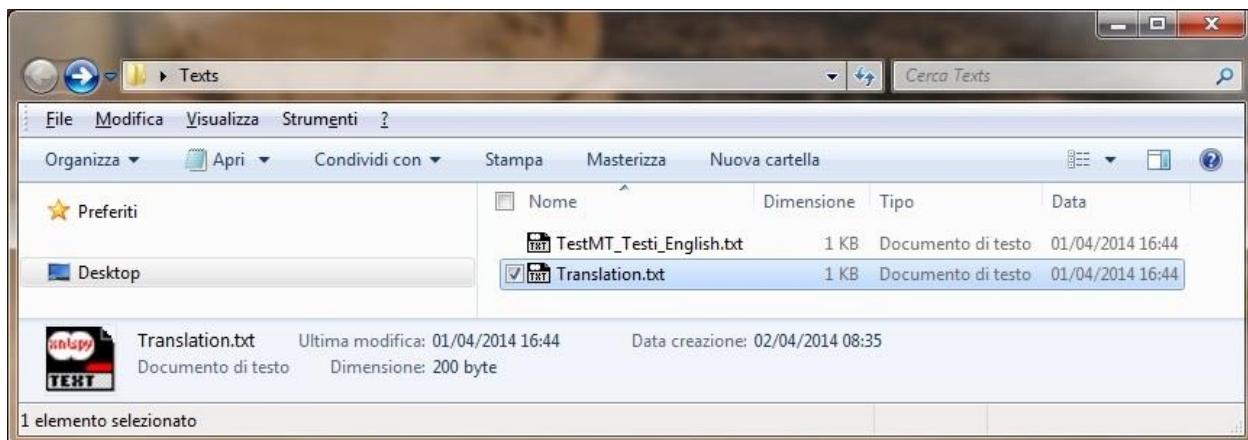
- **Text ID:** Indicate the text ID where put the cursor. If the ID doesn't exist the cursor will go to the first useful next.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

### 5.2.4.17 Import



By this command is possible Import the languages from a text file.

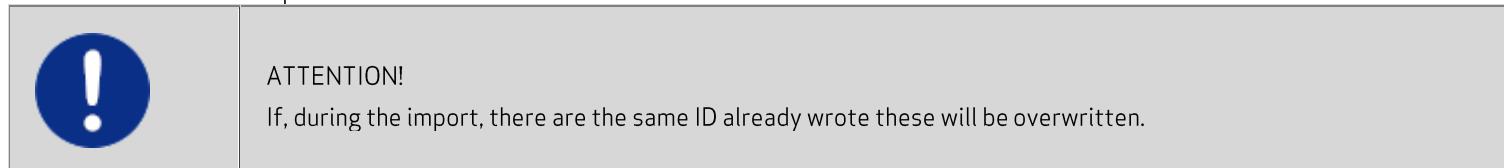
Clicking Import on Multilanguage component context menu, will appear the Windows® box where is possible select the import file (\*.TXT):



Clicking Open appear the follow box:

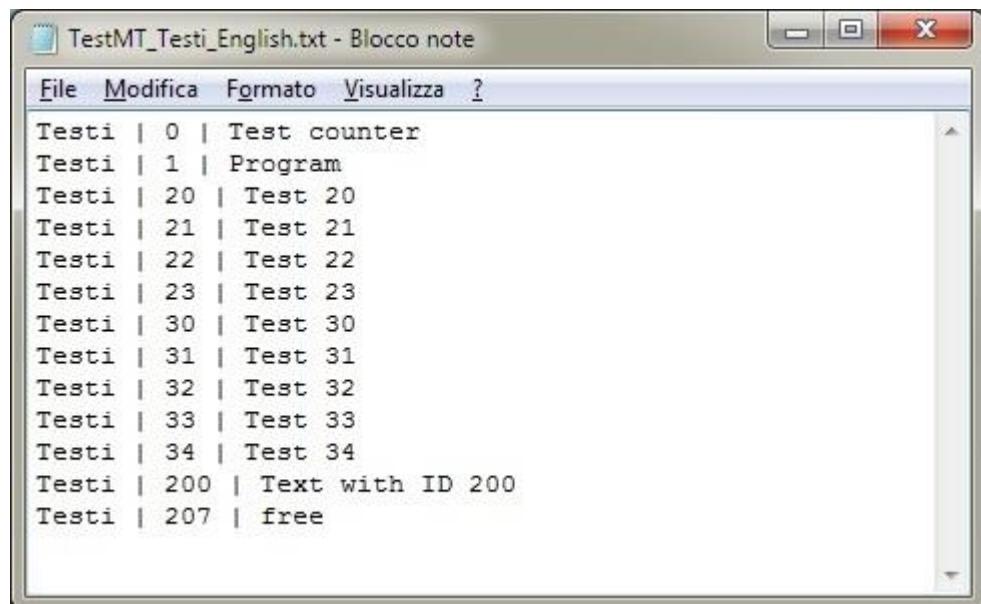


- Language to update:** Select the language column where apply the imported TXT or write the New language name. In this case will create a new language column.
- OK:** Confirm the operation.
- Cancel:** Abort the operation.



Example:

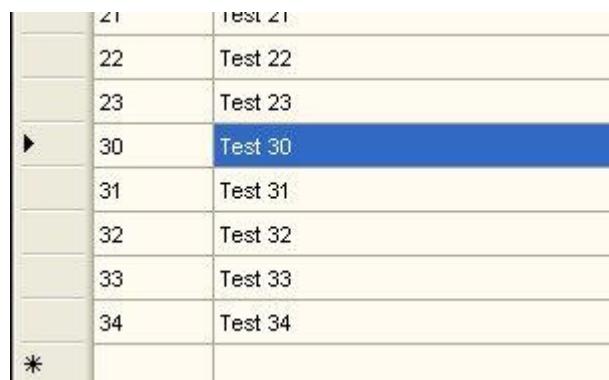
If the TXT file contains the new ID:



The screenshot shows a Windows Notepad window with the title "TestMT\_Testi\_English.txt - Blocco note". The menu bar includes "File", "Modifica", "Formato", "Visualizza", and "?". The main content area contains the following text:

```
Testi | 0 | Test counter
Testi | 1 | Program
Testi | 20 | Test 20
Testi | 21 | Test 21
Testi | 22 | Test 22
Testi | 23 | Test 23
Testi | 30 | Test 30
Testi | 31 | Test 31
Testi | 32 | Test 32
Testi | 33 | Test 33
Testi | 34 | Test 34
Testi | 200 | Text with ID 200
Testi | 207 | free
```

The new ID will be added:



21	Test 21
22	Test 22
23	Test 23
30	Test 30
31	Test 31
32	Test 32
33	Test 33
34	Test 34
*	

### 5.2.4.18 Export

By this command is possible Export the languages in a text file.

Clicking Export on Multilanguage component context menu, appear the follow box:

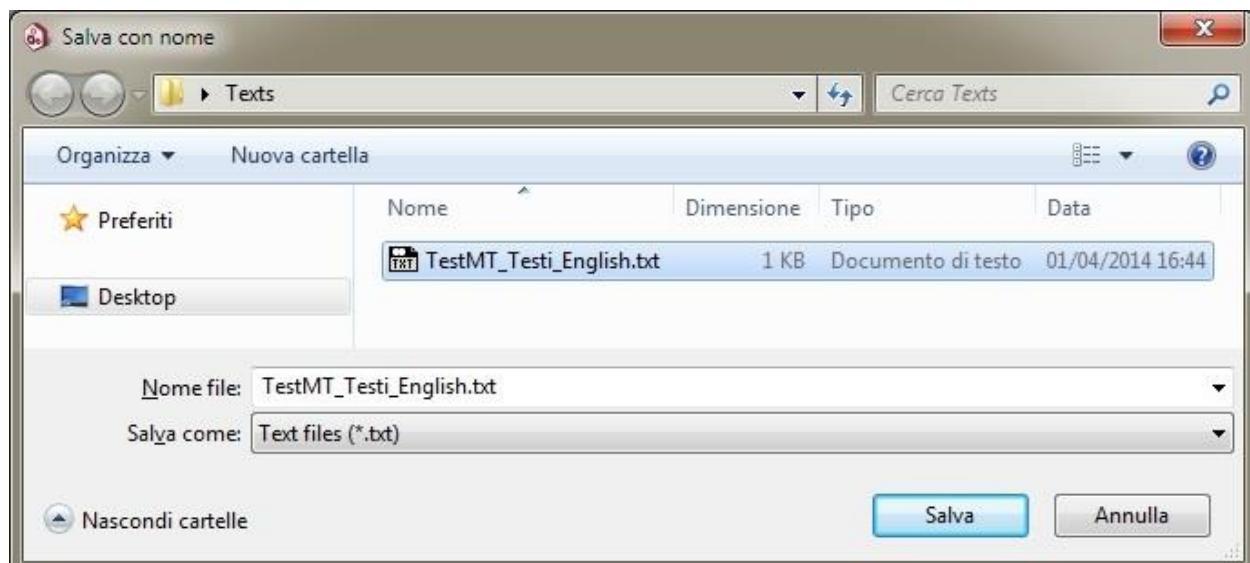


- **Language to export:** Select the language to export from a language list.
- **From ID:** Indicate the start ID. Default 0.
- **To ID:** Indicate the stop ID. Default 30000.

If in these fields leave empty numbers the export command export only the present ID.

- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

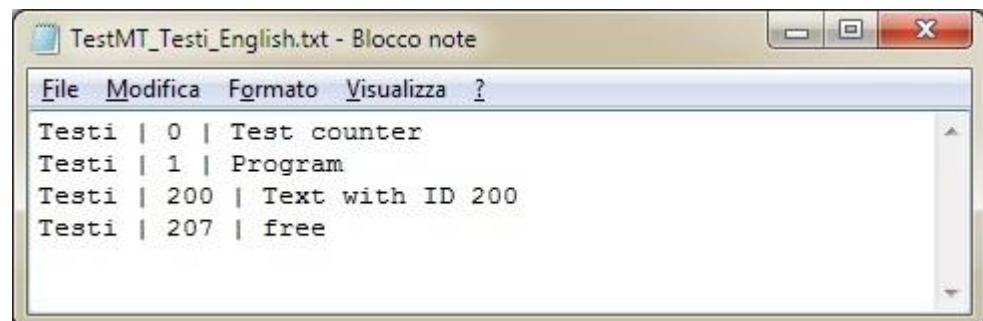
After the confirmation will appear the Windows® box where is possible define the location where put the exported file (\*.TXT):



The exported file is composed by "Project name" + "Multilanguage text name" + "Language column":

**TestMT\_Testi\_English**

The saved file can be opened and modified with anycommenttext editor or imported in excel program. The exported texts are composed by **MultilanguageName + Pipe + ID number + Pipe + Text**:

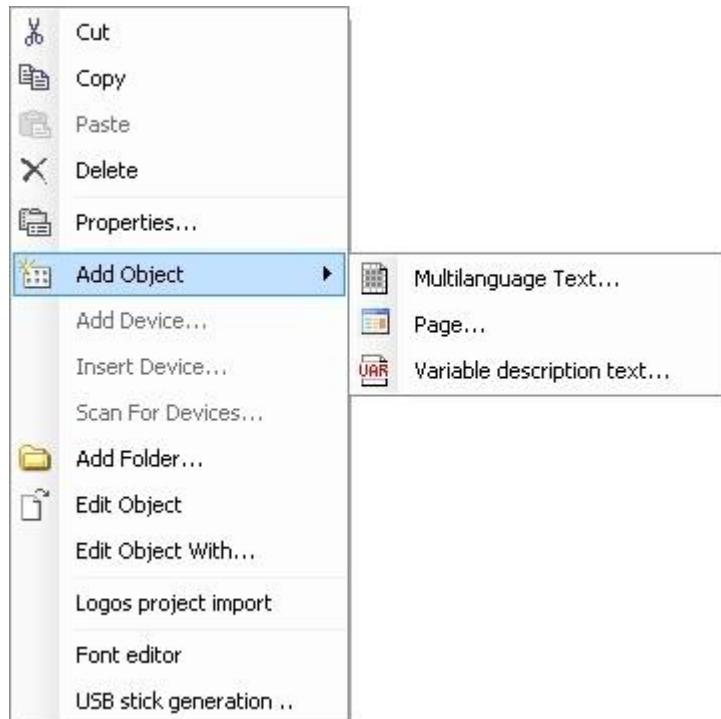


The screenshot shows a Windows Notepad window with the title bar 'TestMT\_Testi\_English.txt - Blocco note'. The menu bar includes 'File', 'Modifica', 'Formato', 'Visualizza', and '?'. The main text area contains the following entries:

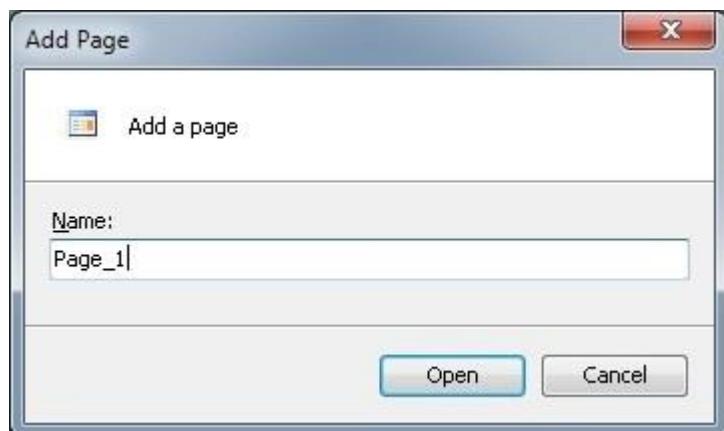
```
Testi | 0 | Test counter
Testi | 1 | Program
Testi | 200 | Text with ID 200
Testi | 207 | free
```

## 5.2.5 Page Object

Under the MMI Manager object is possible to add one or more than one of the object called **Page**. Any pages added have the dimensions and aspect referred to the selected terminal defined in the [Options](#) sheet. For add the object Page is necessary put the cursor on the MMI Manager level and click right button or press the specific button: Add Object  . Another possibility to add the Page is by the Menu project > Add Object > Page.

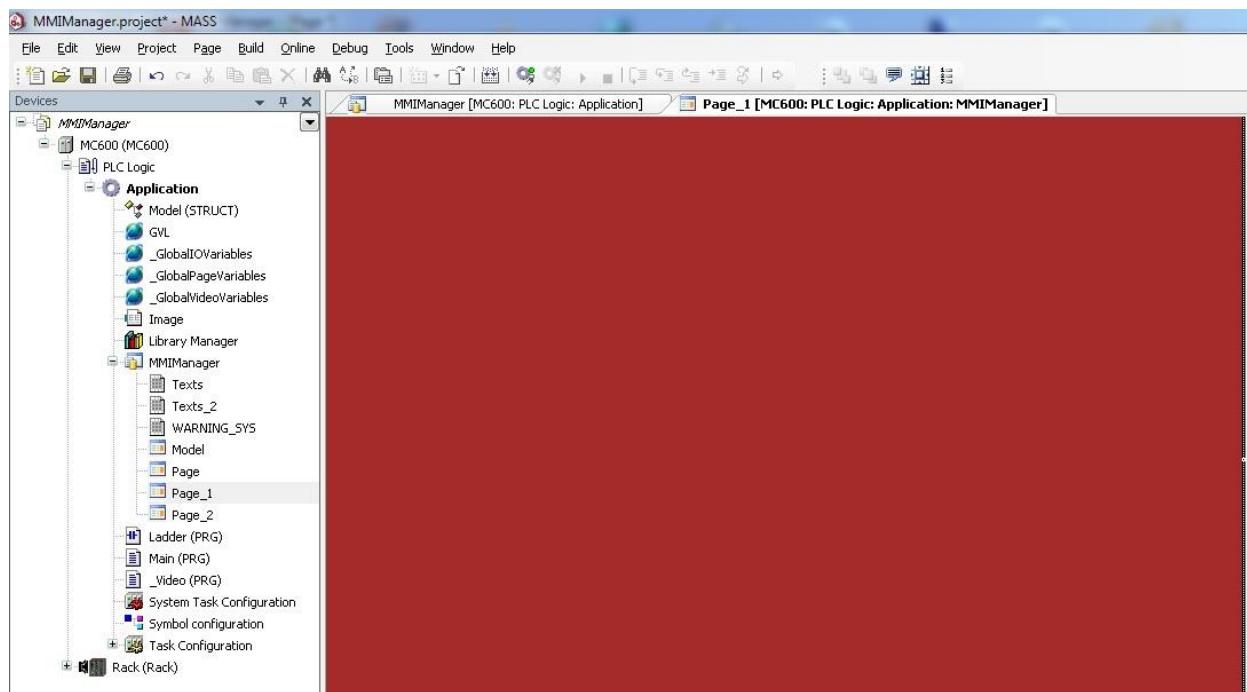


Appear the follow box:



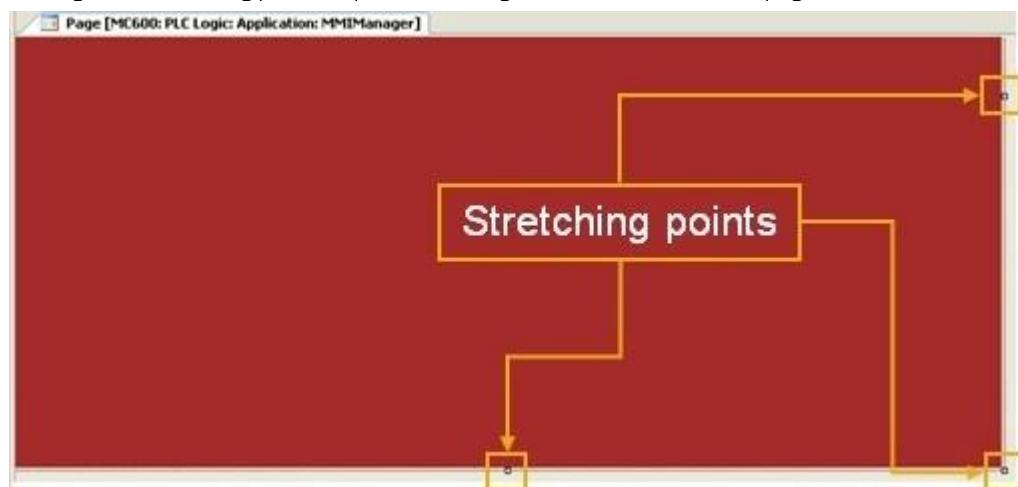
- **Name:** Put the name of the new page.
- **Open:** Add a new page.
- **Cancel:** Abort the operation

The inserted object Page creates an empty page with the size of the selected terminal in the MMI Manager > [Options](#):



### 5.2.5.1 Operation on the page

Through the stretching points is possible change the dimensions of the page:



By the cursor on the stretching points appear a double arrow:



dragging these points is possible modify the dimensions of the page.

### 5.2.5.2 Page Properties

To see the operations of the page insertion see the chapter [Page Object](#).

Page Object Properties:

Properties	
Property	Value
ObjectType	Page
SizeX	800
SizeY	600
PageType	Normal
Description	
Page	3
+ ExternalName	,0
+ BackgroundColor	,10824234
Border	<input type="checkbox"/>
Frame	Flat
Level	Level10
+ FKeys	1,50,4,60,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,...

#### 5.2.5.2.1 Common Properties

- [ObjectType](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)

#### 5.2.5.2.2 Object Page Properties

##### PageType

The object page could be of two different type:

PageType	Normal
Description	Normal
Page	Model

- Normal: If page is normal, the object page is a normally page used for show the data in the HMI.
- Model: If page is [model](#), the property change and is possible re-utilize this model in a different pages.

##### Description

Description	Setting Page
-------------	--------------

- Description: Page description.

##### Page

Page	3
------	---

- Page: Number page. This number define the pages numbering used for navigate into the pages. See FKeys property or use the variable ShowPage in the structure M\_Termln under M\_MC600Hmi library.

##### ExternalName

Bring the description of the page from the [Multilanguage text](#).

ExternalName	MT_1,20
MTName	MT_1
MTNumber	20

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

**Level**

Level	Level10
⊕ FKeys	Level1 Level2 Level3 Level4 Level5 Level6 Level7 Level8 Level9 Level10 Free

- Level: Can be set from Level 1 (High) to Level 10 (Low) or Free access. The level is manage by the variable AccessLevel in the structure M\_Termln under M\_MC600Hmi library.

**Kkeys**

Function Keys used for navigate.

⊕ FKeys	1,50,4,60,...
FK1	1
FK2	50
FK3	4
FK4	60
FK5	0
FK6	0

- FK1..FK32: Function Key (from 1 to 32 on the HMI) recall the follow page number. See also Page property.

### 5.2.5.3 Insert Object

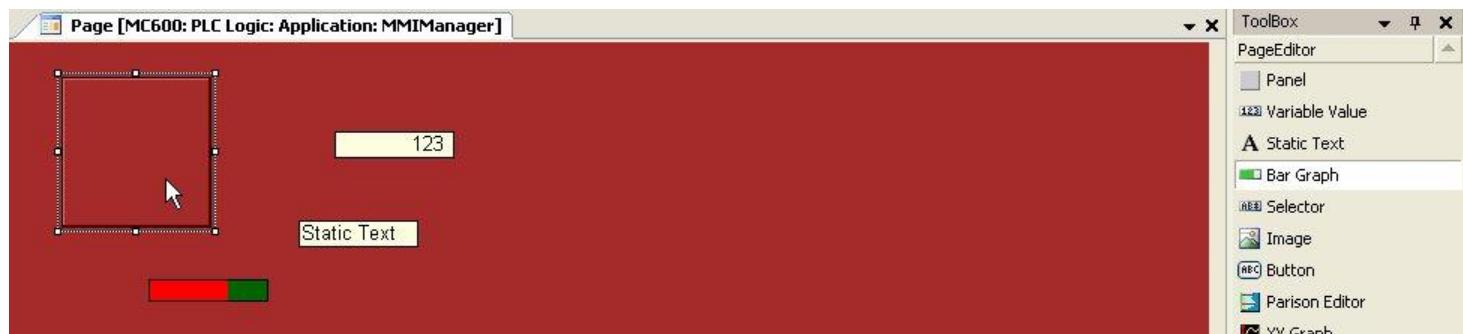
By the [Tool Box](#) is possible select and insert the object in the page:



The inserted object will have the top/left coordinates respect to the mouse position. However is possible [move](#) the object created.

### 5.2.5.4 Select Object

To select an object is sufficient one click on it:



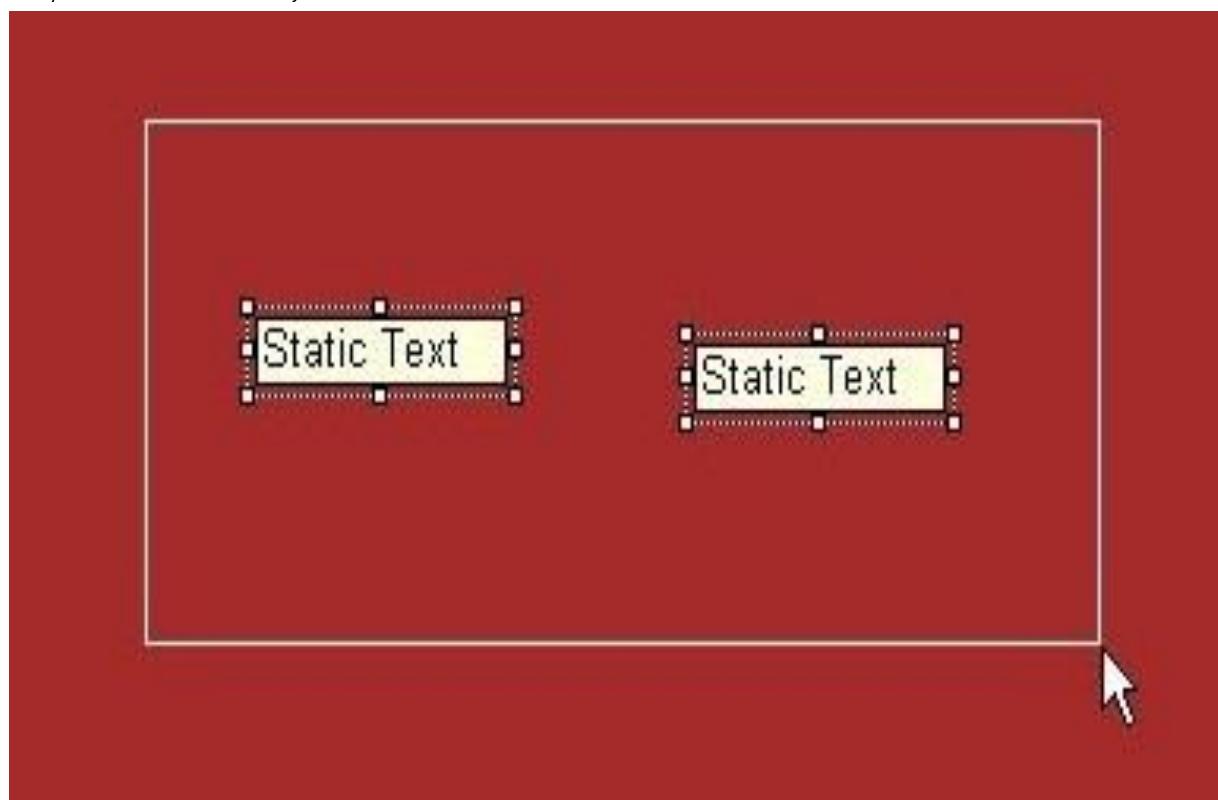
After that will appear a dashed border and the stretching points around the object.

To select a multiple object there are two way:

1. Holding down the SHIFT key clicking to select objects:



2. By the lace select the objects:

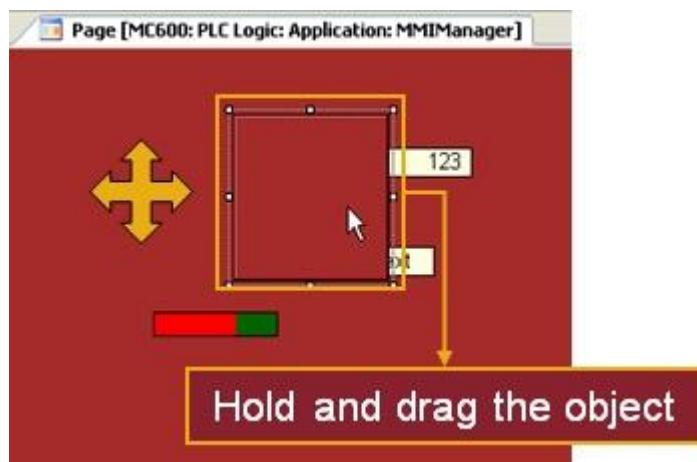


Is possible select the object/s also by a [Select Objects](#) in the context menu. For deselect the object/s click on the page or press key **ESC**.

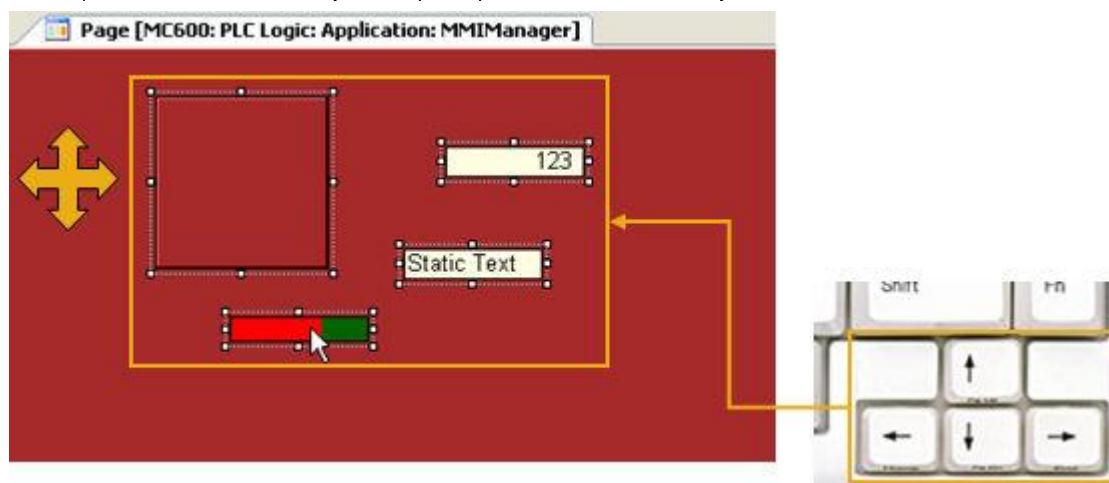


### 5.2.5.5 Move Object

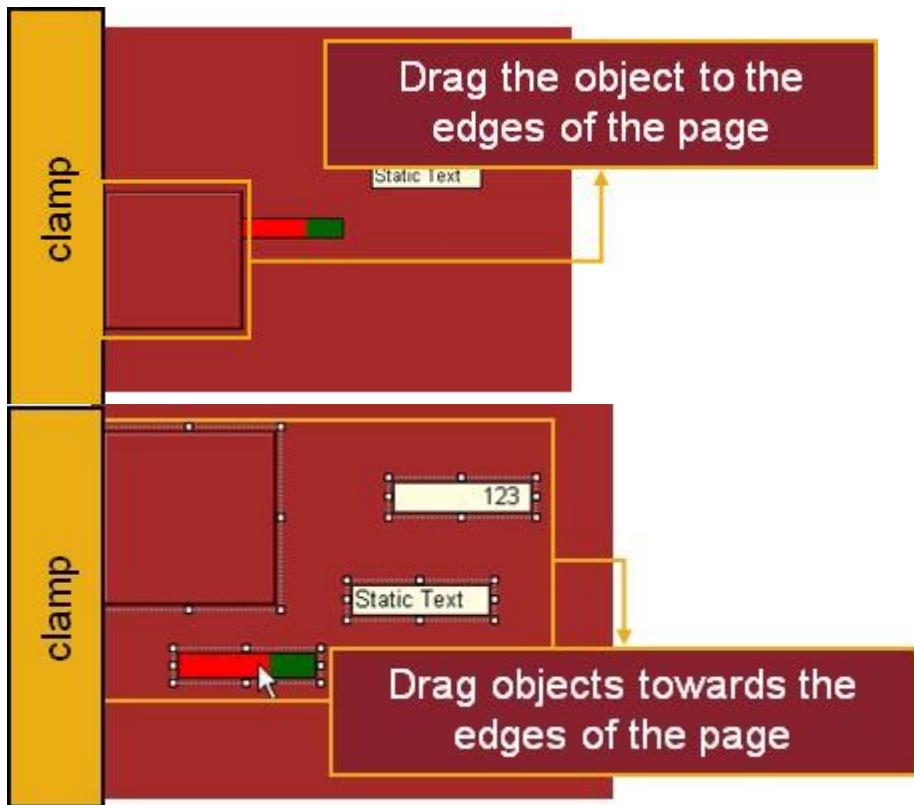
To move an object is necessary before [select it](#), after that by the left mouse button is possible move the object/s around the page:



Is also possible to move the object/s by a keyboard cursors (fine adjustment):



When the object/s is/are moved against to the page edge a clamp stop the movement:

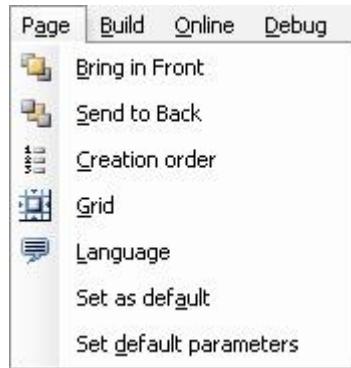


### 5.2.5.6 Menu Pages

When page editor is open appear the specific menu called "Pages":



This menu pages contain the follow commands:



- [Bring in front](#)
- [Send to back](#)
- [Creation order](#)
- [Grid](#)
- [Language](#)
- [Set as default](#)
- [View default parameters](#)

### 5.2.5.7 Tool Bar

When page editor is open appear the specific tool bar:

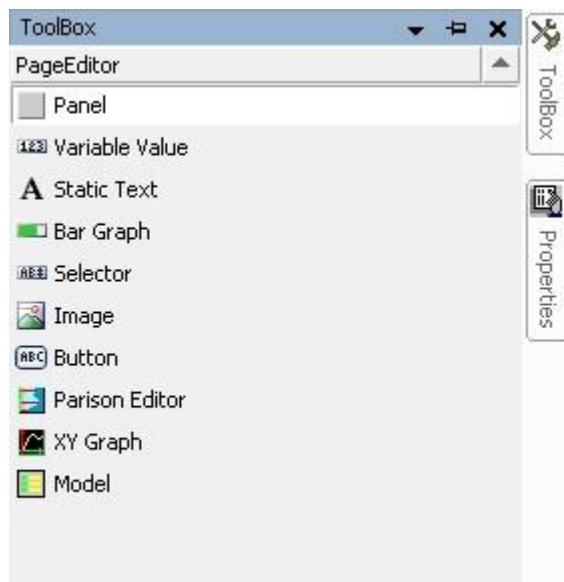


Tool bar contain the follow commands:

-  [Send to back](#)
-  [Bring in front](#)
-  [Creation order](#)
-  [Language](#)
-  [Grid](#)

### 5.2.5.8 Tool Box

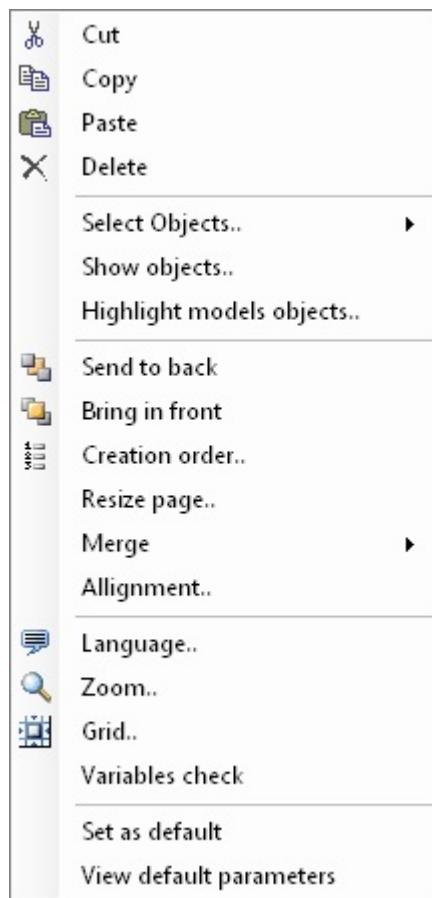
When page editor is open appear the specific Tool box called "Page Editor":



- **Panel:** Object that permit to realize graphical frame.
- **Variable Value:** Object that permit to show the common elementary data defined in the IEC1131 standard.
- **Static Text:** Object that permit to show the text from the [multilanguage text](#).
- **Bar Graph:** Object that permit to show the numeric value by an histogram or a deviation.
- **Selector:** Object that permit to write a numeric variable by select the different text from the [multilanguage text](#).
- **Image:** Object that permit to show the images from the Image Pool object.
- **Button:** Object that permit to set, enable or launch the commands.
- **Parison Editor:** Object that permit to [drawing a profile](#) for blow moulding machines.
- **XY Graph:** Object that permit to show or draw a charts.
- **Model:** Object that permit to insert in a page a "model page".

### 5.2.5.9 Page Context Menu

Clicking by right button appear the follow context menu:



- [Cut](#)
- [Copy](#)
- [Paste](#)
- [Delete](#)
- [Select objects](#)
- [Show objects](#)
- [Highlight models objects](#)
- [Send to back](#)
- [Bring in front](#)
- [Creation order](#)
- [Resize page](#)
- [Merge](#)
- [Alignment](#)
- [Language](#)
- [Grid](#)
- [Set as default](#)
- [View default parameters](#)

### 5.2.5.9.1 Cut

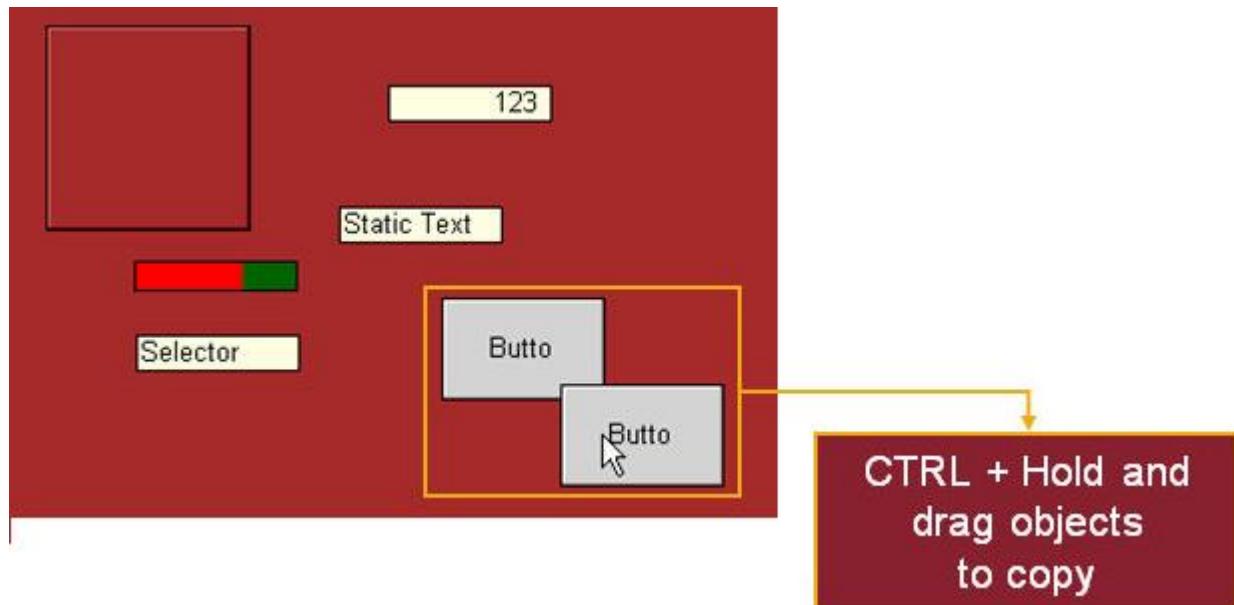
By this command is possible cut the **selected** object/s:

Clicking on CUT command the object is copied into the clipboard and is possible **paste** in an other position. The clipboard always contains the latest cut object. This command **can also be activated by the fast key**  **or by the combined keys** **CTRL + X**.

### 5.2.5.9.2 Copy

By this command is possible copy the **selected** object/s:

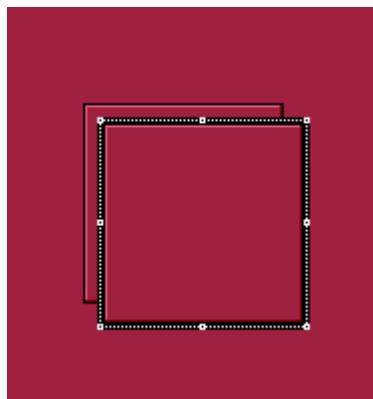
Clicking on copy button the object is copied into the clipboard and is possible **paste** in an other position. The clipboard always contains the latest copied object. This command can also be activated by the fast key  or by the combined keys **CTRL + C**. It's possible copy the object/s by a Shift + drag the object/s:



### 5.2.5.9.3 Paste

By this command is possible paste the object/s from a [copy](#) or a [cut](#) commands (clipboard):

Clicking on paste button you paste the object/s from the clipboard. If the paste command is executed in another page the object/s is/are pasted in the same position. If the paste command is executed in the same page where is performed a copy command the pasted position have an offset respect to the source of 10 pixels right and 10 pixels down:



The object/s pasted remain selected. This command can also be activated by the fast key or by the combined keys **CTRL + V**.

#### 5.2.5.9.4 Delete

By this command is possible delete the [selected](#) object/s:

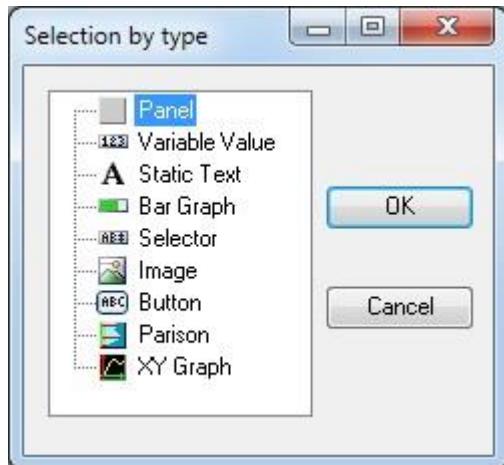
This command can also be activated by the fast key  or by the key **DEL**. The command **Undo** and **Redo** permit to recover the deleted object/s.

### 5.2.5.9.5 Select Objects

By this command is possible select the object/s in a page per typology:

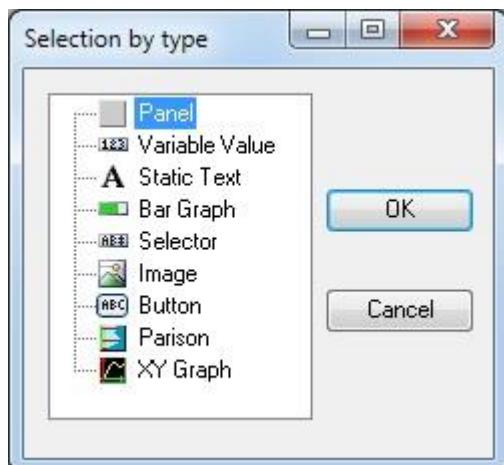
Clicking on **select object** you can choose from:

- **All:** Selects all objects on the page without any distinction.
- **By type:** By this command appear the follow box:



- **Panel:** Selects all the "Panel" objects contained on the page.
- **Variable Value:** Selects all the "Variable Value" objects contained on the page.
- **Static Text:** Selects all the "Static Text" objects contained on the page.
- **Bar Graph:** Selects all the "Bar Graph" objects contained on the page.
- **Selector:** Selects all the "Selector" objects contained on the page.
- **Image:** Selects all the "Image" objects contained on the page.
- **Button:** Selects all the "Button" objects contained on the page.
- **Parison:** Selects all the "Parison" objects contained on the page.
- **XY Graph:** Selects all the "XY Graph" objects contained on the page.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

- By type in panel: By this command appear the follow box:



- **Panel:** Selects all the "Panel" objects contained on the panel/s.
- **Variable Value:** Selects all the "Variable Value" objects contained on the panel/s.
- **Static Text:** Selects all the "Static Text" objects contained on the panel/s.
- **Bar Graph:** Selects all the "Bar Graph" objects contained on the panel/s.
- **Selector:** Selects all the "Selector" objects contained on the panel/s.
- **Image:** Selects all the "Image" objects contained on the panel/s.
- **Button:** Selects all the "Button" objects contained on the panel/s.
- **Parison:** Selects all the "Parison" objects contained on the panel/s.
- **XY Graph:** Selects all the "XY Graph" objects contained on the panel/s.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

### 5.2.5.9.6 Show Objects

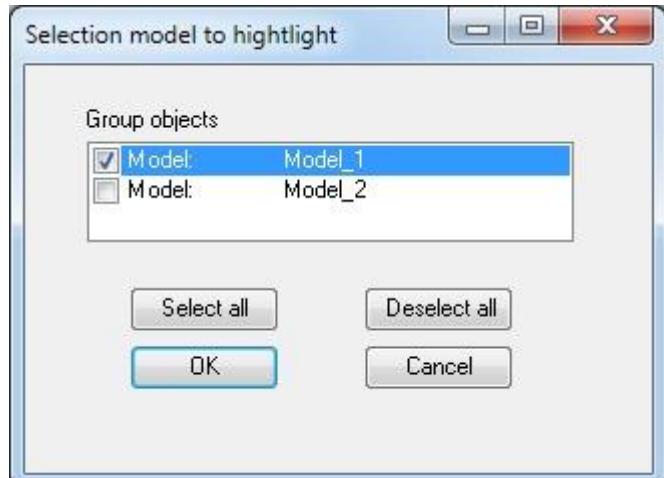
By this command is possible Show or Hide the panel and model object/s contained in the page:

- **Group objects:** List of the Panel/s and Model/s contained in the Page. By the check is possible define what is the object to hide or show.
- **Show all:** Check all object in the list.
- **Hide all:** Uncheck all object in the list.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

This operation have effect only in editing and not at run time. These settings are not persistent.

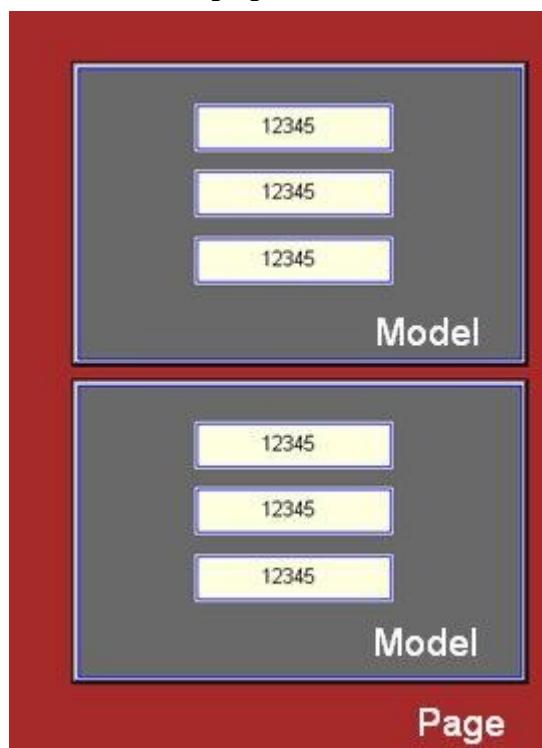
### 5.2.5.9.7      Highlight Models Objects

By this command is possible highlight the Model/s contained in the page:



- **Group objects:** List of the Model/s contained in the Page. By the check is possible define what is the object to highlight.
- **Select all:** Select all Model/s in the list.
- **Deselect all:** Deselect all Model/s in the list.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

The result of the highlight command is a blue border around to the Model/s:

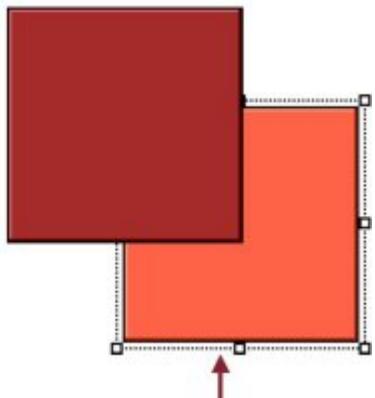


**This operation have effect only in editing and not at run time. These settings are not persistent.**

### 5.2.5.9.8 Send To Back

By this command is possible send to back the **selected** object/s respect to another object/s.

The **selected** object/s will be brought in background respect to the other/s object/s:

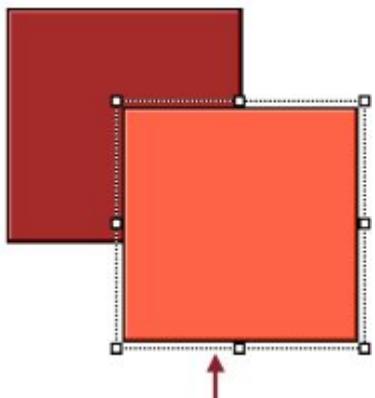


The [creation order](#) will be updated with a new order.

### 5.2.5.9.9 Bring In Front

By this command is possible bring in front the selected object/s respect to another object/s.

The selected object/s will be brought in front respect to the other/s object/s:

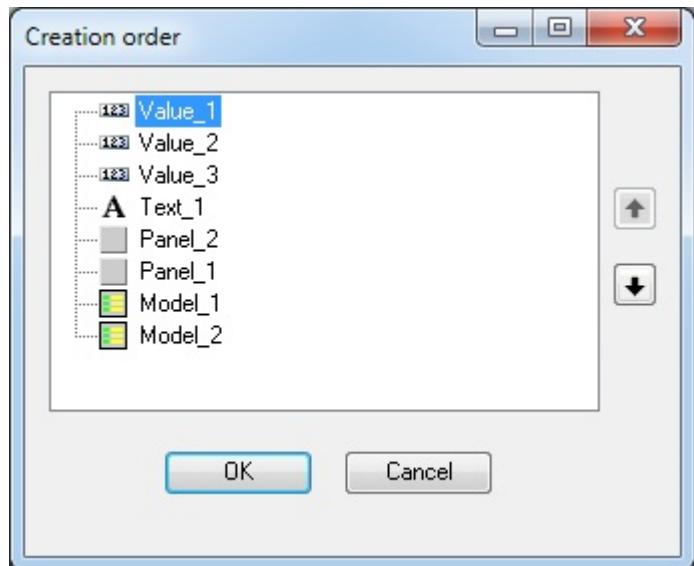


The creation order will be updated with a new order.

### 5.2.5.9.10 Creation Order

By this command is possible modify the creation order objects.

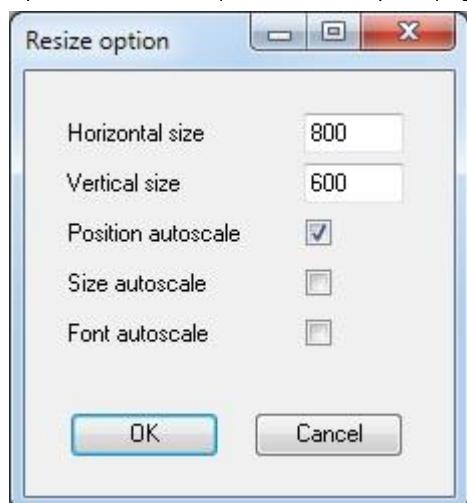
Appear this



- **Creation order:** List that contain the order of objects creation when it is inserted a new object. The last object (eg: Model\_2) is in front respect to the others. The first object (eg: Value\_1) is in background respect to the others.
- : After select the object is possible move in up and change the creation order.
- : After select the object is possible move in down and change the creation order.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

### 5.2.5.9.11 Resize Page

By this command is possible modify the page dimensions.

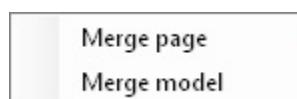


- **Horizontal size:** Set the horizontal size of the page expressed in pixels.
- **Vertical size:** Set the vertical size of the page expressed in pixels.
- **Position autoscale: (default selected)** If selected, the objects contained in the page, are reallocated in a new position. The dimensions of the objects are not modified.
- **Size autoscale:** If selected, the objects dimensions is scaled respect to the new page size. The position of the objects are not modified.
- **Font autoscale:** If selected, the font used in the objects is scaled respect to the vertical size.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

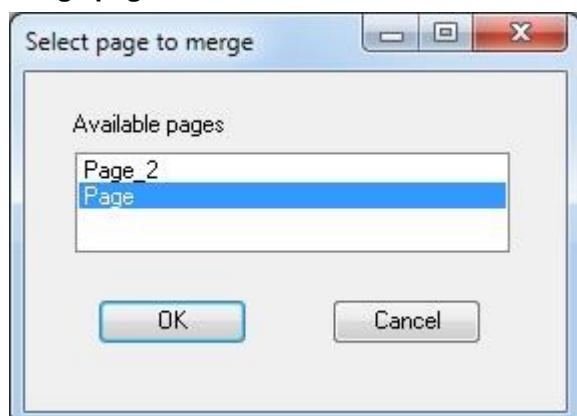
### 5.2.5.9.12 Merge

By this command is possible merge the object from another page or from a model.

You can choose between:

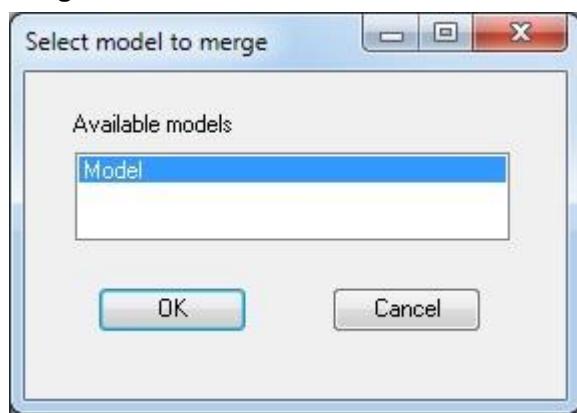


#### Merge page:



- **Available pages:** List of the available pages from the project.
- **OK:** Confirm the operation. All the objects contained in the selected page will be copied in the actual page. The new objects are already selected.
- **Cancel:** Abort the operation.

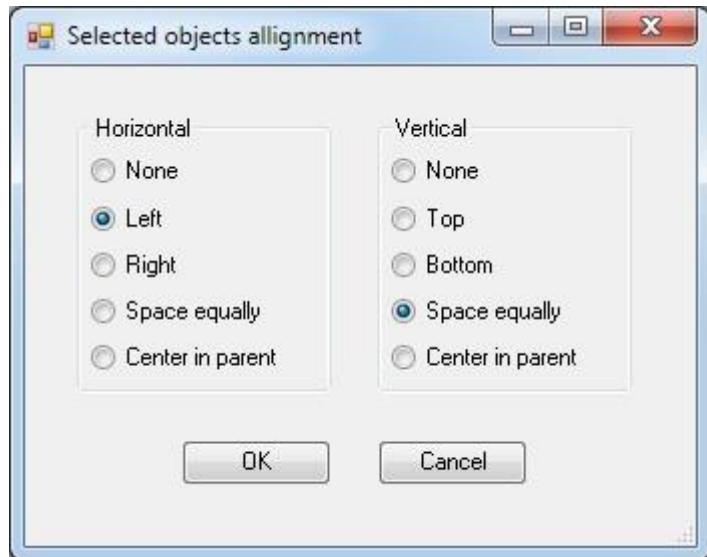
#### Merge model:



- **Available models:** List of the available models from the project.
- **OK:** Confirm the operation. All the objects contained in the selected model will be copied in the actual page. The new objects are already selected.
- **Cancel:** Abort the operation.

### 5.2.5.9.13 Alignment

By this command is possible align the **selected** object/s.



#### Horizontal:

- **None:** No horizontal alignment.
- **Left:** Alignment of all selected objects to the left respect to the leftmost object.
- **Right:** Alignment of all selected objects to the right respect to the rightmost object.
- **Space equally:** The objects at the ends are left in their position, while the intermediate objects are moved with a equidistant space.
- **Center in parent:** The selected objects maintain unchanged the distances between them, but they are all centered respect to the parent object.

#### Vertical:

- **None:** No vertical alignment.
- **Top:** Alignment of all selected objects to the top respect to the topmost object.
- **Bottom:** Alignment of all selected objects to the bottom respect to the bottommost object.
- **Space equally:** The objects at the ends are left in their position, while the intermediate objects are moved with a equidistant space.
- **Center in parent:** The selected objects maintain unchanged the distances between them, but they are all centered respect to the parent object.

#### Common:

- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

### 5.2.5.9.14 Language

By this command is possible choice the GUI language.

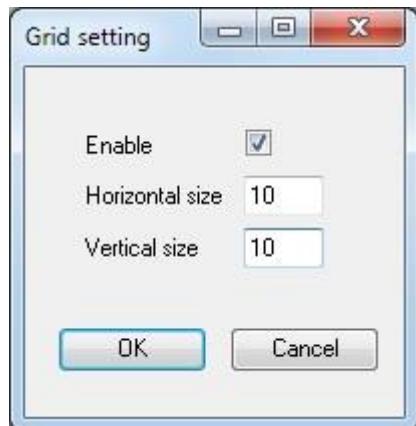


- **Available languages:** List of the installed languages in the project. See the [Multilanguage Text](#) chapter.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

**This operation have effect only in editing and not at run time. These settings are not persistent.**

### 5.2.5.9.15 Grid

By this command is possible activate the grid in the page.

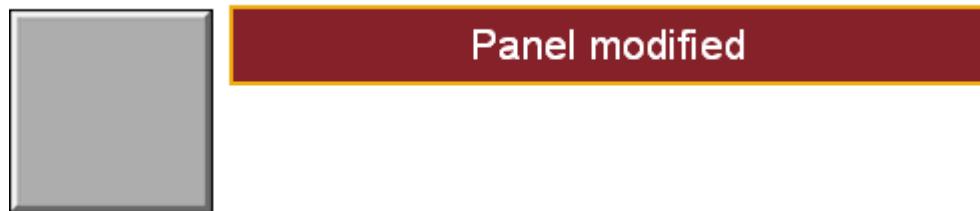


- **Enable:** If checked the grid is active. The grid is transparent. When an object is moved or insert in the page is hooked to the grid.
- **Horizontal size:** Horizontal grid dimension expressed in pixels.
- **Vertical size:** Vertical grid dimension expressed in pixels.

By ALT key pressed, the grid have no effect.

### 5.2.5.9.16 Set As Default

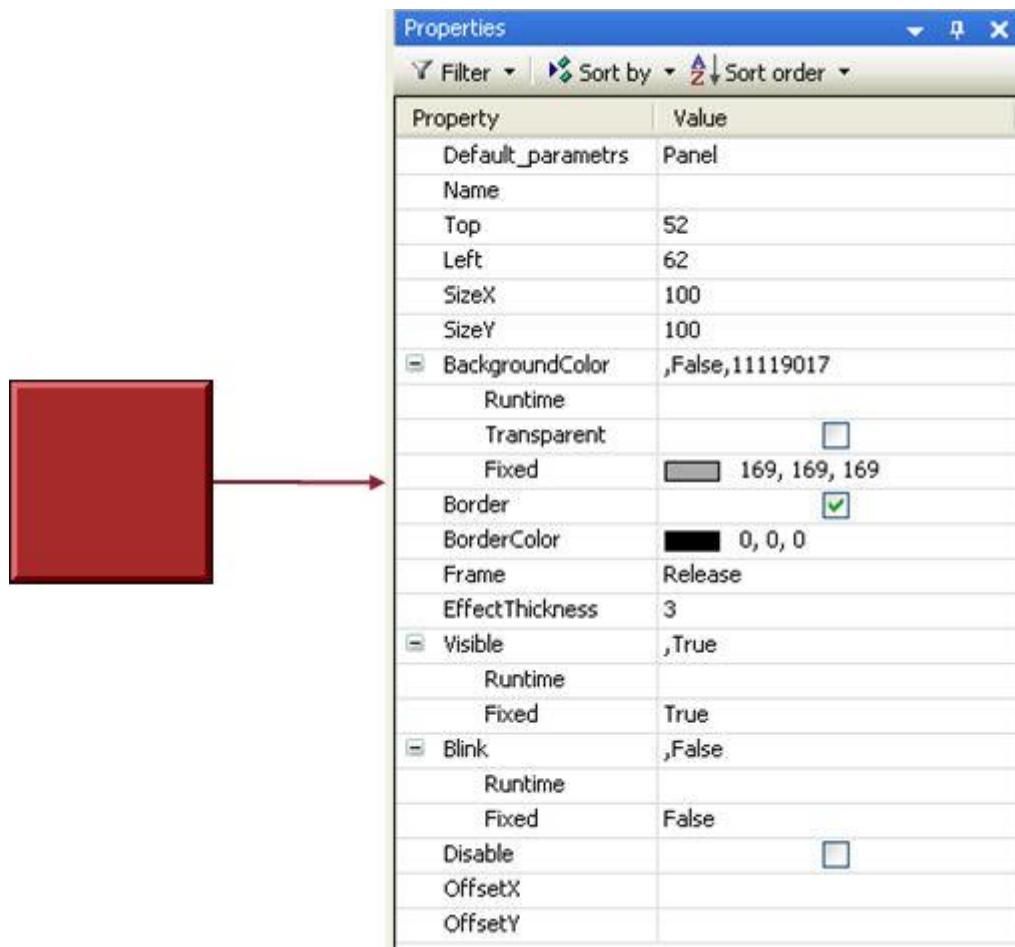
By this command is possible change the properties of the objects and set as default.



When the object is modified and set as default automatically is updated inside to the [Tool Box](#).

### 5.2.5.9.17 View Default Parameters

By this command is possible view the default properties of the selected object.



### 5.2.5.10 Common Objects Properties

Some properties are common in all objects:

The screenshot shows a 'Properties' window with two columns: 'Property' and 'Value'. A red box highlights the 'Property' column header, and another red box highlights the 'Value' column header. A third red box highlights the 'ObjectType' row, which is labeled 'Panel'. Below this, there are several other properties listed, such as 'Name', 'Top', 'Left', 'SizeX', 'SizeY', and various color and border settings. A fourth red box highlights the 'ExternalName' row, which contains 'MTName' and 'MTNumber' under a collapsed section. A fifth red box highlights the 'Visible' row, which has 'Runtime' and 'Fixed' sub-sections. A sixth red box highlights the 'Blink' row, which has 'Runtime' and 'Fixed' sub-sections. A seventh red box highlights the 'Type of object' section at the bottom.

Property	Value
ObjectType	Panel
Name	Panel_2
Top	200
Left	94
SizeX	100
SizeY	159
BackgroundColor	,False,12632256
Runtime	
Transparent	<input type="checkbox"/>
Fixed	<input type="color"/> 192; 192; 192
Border	<input checked="" type="checkbox"/>
BorderColor	<input type="color"/> 0; 0; 0
Frame	Release
EffectThickness	1
Visible	,True
Runtime	
Fixed	True
Blink	,False
Runtime	
Fixed	False
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	

Type of object

#### ObjectType

ObjectType Panel

Show the name of the current selected object.

## Number of Objects

In case of the [multiple selection](#) the property Object Type change in Number of Objects:

**Number of Obj...** 2

Show the number of the selected objects.

## Name

The PageEditor assign automatically a name and a incremental number of the objects inserted in the page. Is possible change this name but if the name is already define appear the follow property error:



This property is for future implementation.

## Top

**Top** 200

Numbers of pixel from the top of the object referred at the top of the page.

## Left

**Left** 94

Numbers of pixel from the left of the object referred at the left of the page.

## SizeX

**SizeX** 100

Indicate the horizontal dimension of the object expressed in pixels.

## SizeY

**SizeY** 159

Indicate the vertical dimension of the object expressed in pixels.

## BackgroundColor

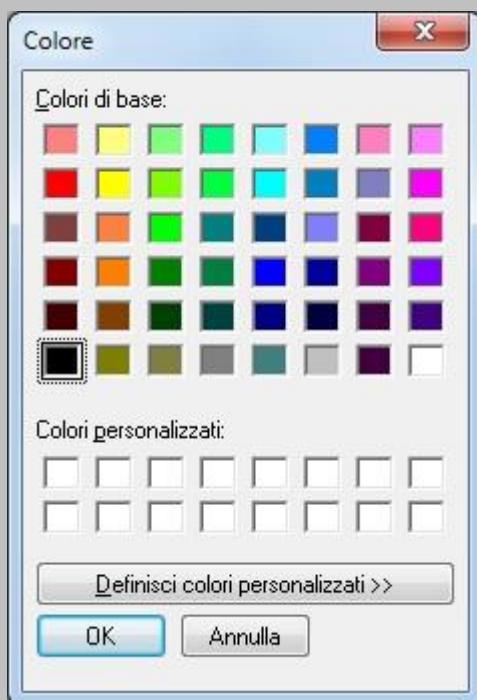
**BackgroundColor** ,False,12632256

Indicate the background color of the object.

<b>BackgroundColor</b>	,False,-5658199
Runtime	
Transparent	<input type="checkbox"/>
Fixed	<input type="color"/> 169; 169; 169

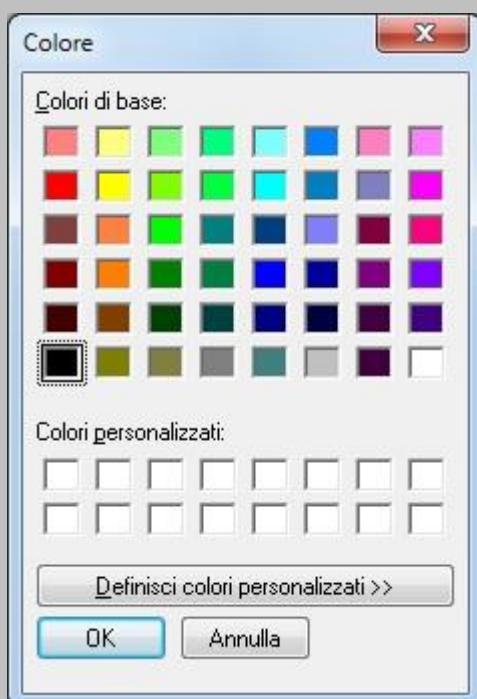
- RunTime: By a DINT variable is possible change on fly the background color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Transparent: If checked the background color is transparent.

- Fixed: By a palette color is possible define the fixed back ground color:



## Border

- Border**  If selected, adds a 1px border around the object with the color defined here:  
**Border**   
**BorderColor**  0; 0; 0
- By a palette color is possible define the Border color:

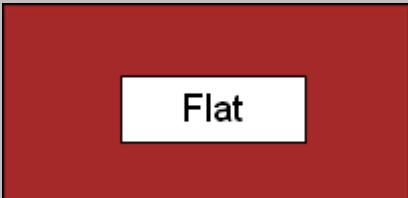


## Frame

Frame	Flat	
	Flat	
	Push	
	Release	
	CustomColor	

Frame style:

- Flat: The frame style appear flat.



- Push: The frame style appear pushed. In this case appear the property Effect Thickness.

Frame	Push
EffectThickness	1



- Release: The frame style appear released. In this case appear the property Effect Thickness.

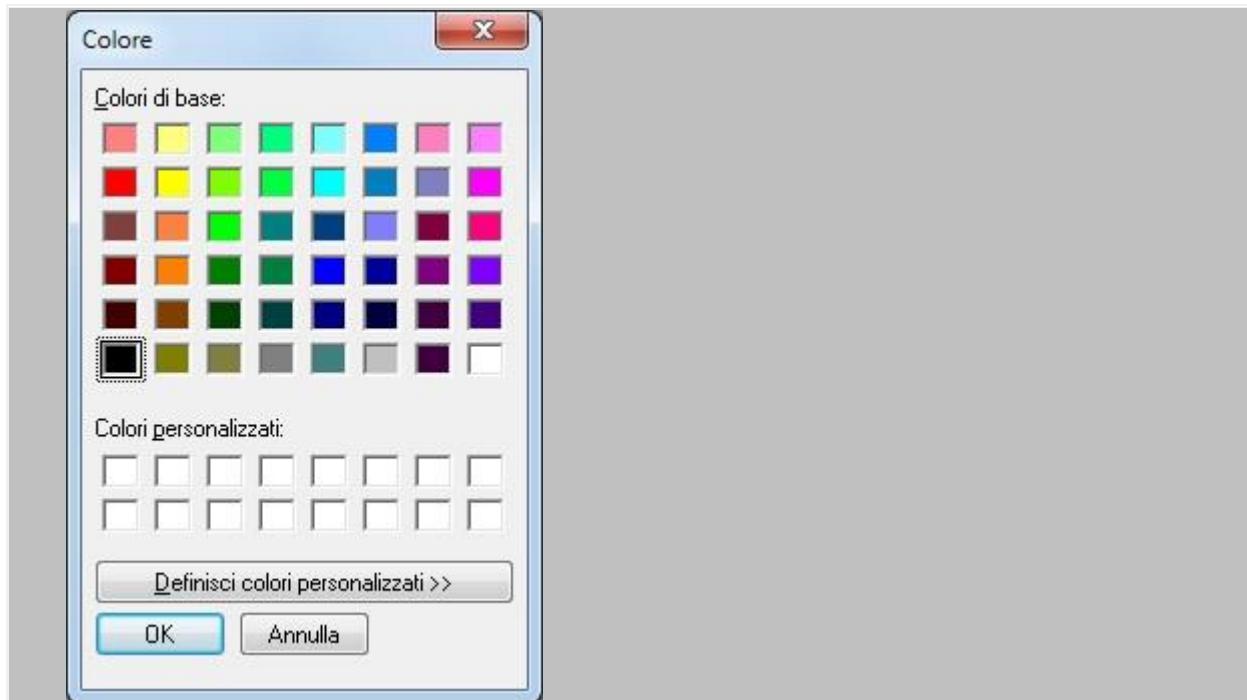
Frame	Release
EffectThickness	1



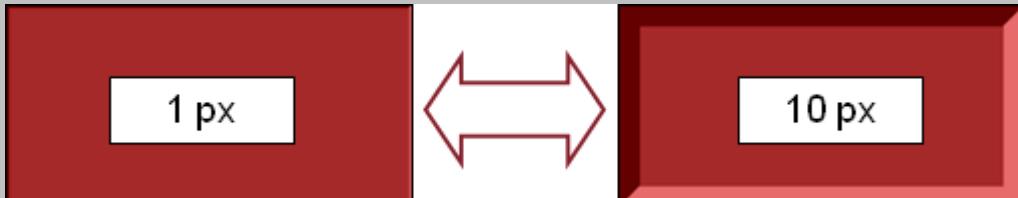
- CustomColor: The frame style take the color from the TopLeftColor and BottomRightColor. In this case appear the property Effect Thickness.

Frame	CustomColor
EffectThickness	5
TopLeftColor	255, 215, 0
BottomRightColor	0, 255, 0

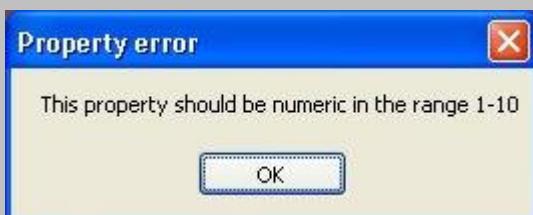
By a palette color is possible define the CustomColor frame:



- EffectThickness: The EffectThickness allows to set the border thickness from 1 to 10 pixels:



If the Effect thickness is greater than 10 pixels appear the follow box:



### Visible

<input checked="" type="checkbox"/>	Visible	,True
-------------------------------------	---------	-------

Permit to set visible or not the object on the map:

<input checked="" type="checkbox"/>	Visible	,True
Runtime		
Fixed		True

- Runtime: Insert a boolean variable when is TRUE the object is visible and vice-versa.
- Fixed: This property can be: True = visible, False = not visible or under Level:

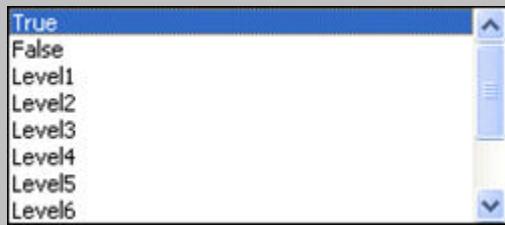


Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_Termln under M\_MC600Hmi library.

## Blink

<input type="checkbox"/>	Blink	,False
Permit to set blinking or not the object on the map:		
<input type="checkbox"/>	Blink	,False
	Runtime	
	Fixed	False

- Runtime: Insert a boolean variable when is TRUE the object blinking and vice-versa.
- Fixed: This property can be: True = blink, False = not blink or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_Termln under M\_MC600Hmi library.

## Disable

<input checked="" type="checkbox"/>	Disable	<input type="checkbox"/>
If checked permit to maintain the object in the map but not compile this.		

## Child

<input checked="" type="checkbox"/>	Child	<input checked="" type="checkbox"/>
This parameter is checked to default. Checked means that when this object is positioned above to the Panel object, this becomes a child of the panel. If not checked the object not becomes a child.		

## OffsetX

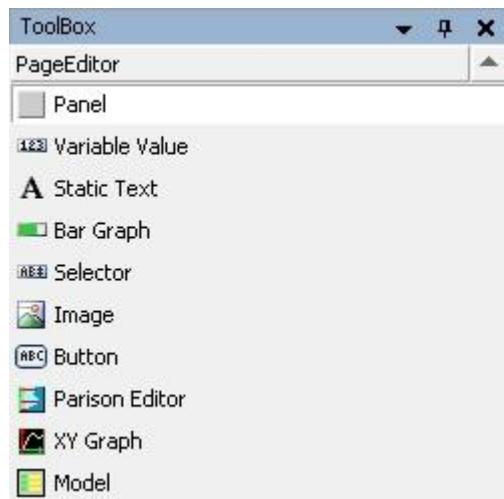
OffsetX	offsetx100
This parameter permit to move in horizontal way the object. The OffsetX accept Integer variable. The offset is expressed in pixels.	

## OffsetY

OffsetY	offsety100
This parameter permit to move in vertical way the object. The OffsetY accept Integer variable. The offset is expressed in pixels.	

### 5.2.5.11 Object Panel

By [ToolBox](#) is possible insert an object called Panel:



The Panel object is a piece of frame. To see the operations of object insertion see the chapter [Insert Object](#).

Panel Object Properties:

Properties	
Property	Value
ObjectType	Panel
Name	Panel_1
Top	193
Left	476
SizeX	100
SizeY	101
+ BackgroundColor	,False,16744448
Border	<input checked="" type="checkbox"/>
BorderColor	<span style="background-color: black; color: black;">█</span> 0, 0, 0
Frame	Release
EffectThickness	1
+ Visible	,True
+ Blink	,False
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	

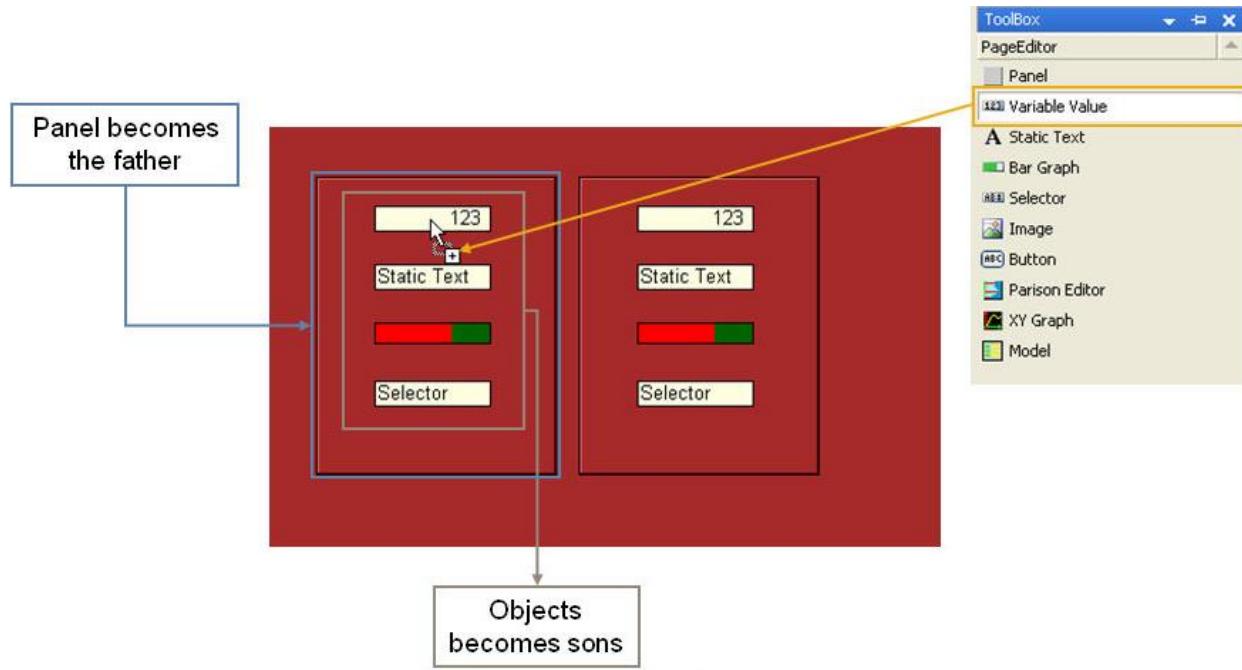
#### 5.2.5.11.1 Common properties

- [5.2.5.11.2 ObjectType](#)

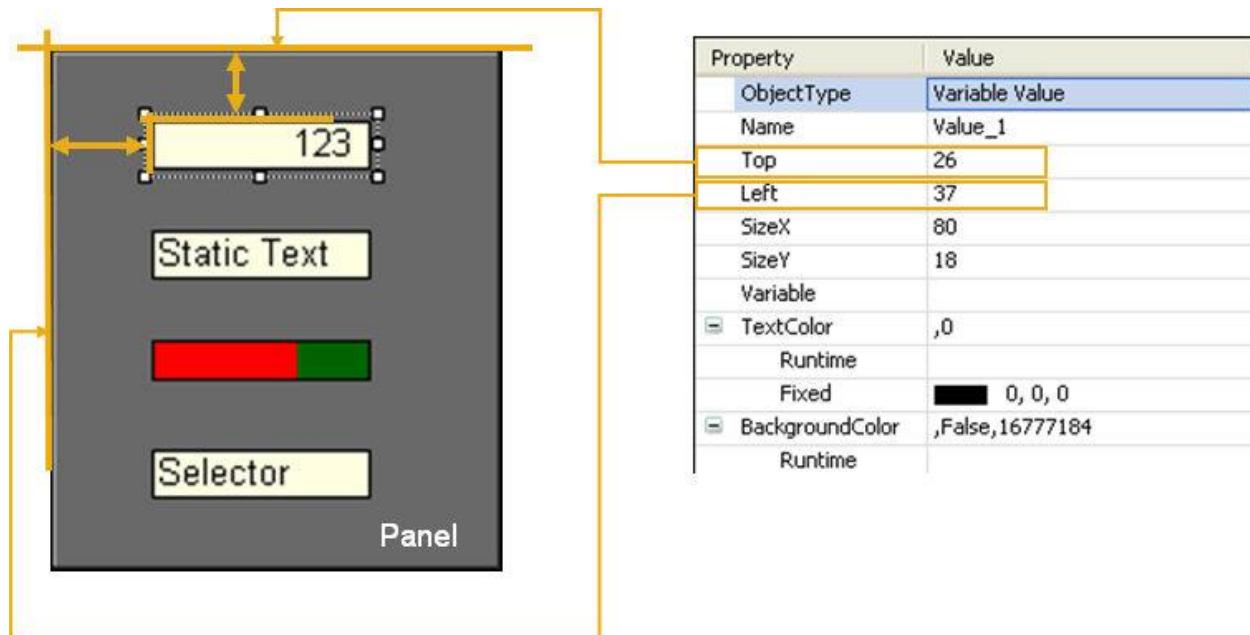
- [Name](#)
- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)

- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

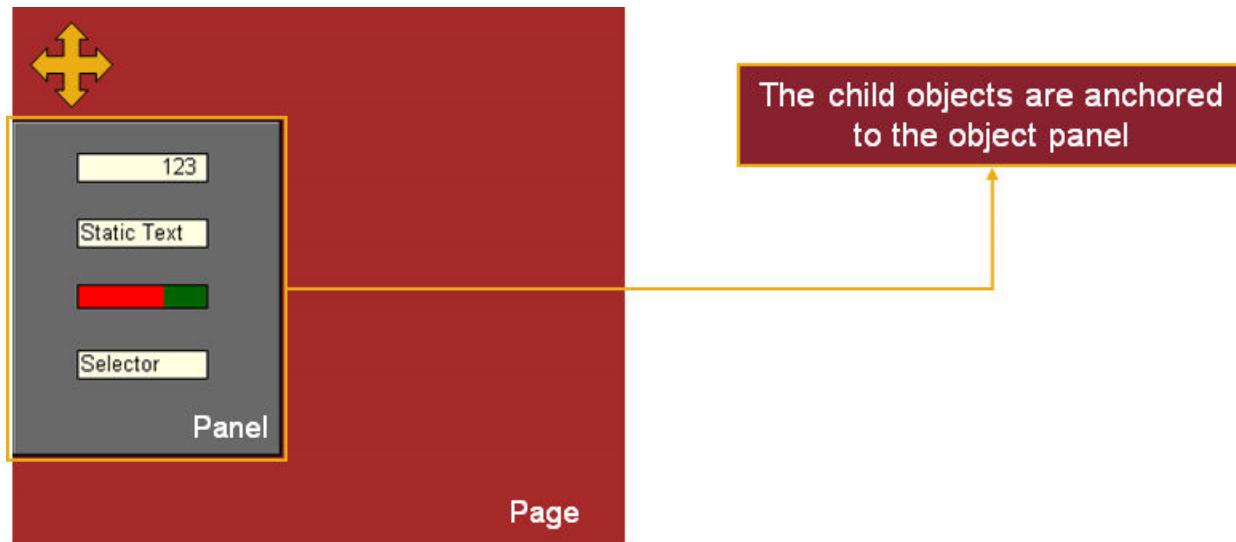
When another object from the tool box is inserted in the page and is inserted above the Panel, these objects become children of the Panel:



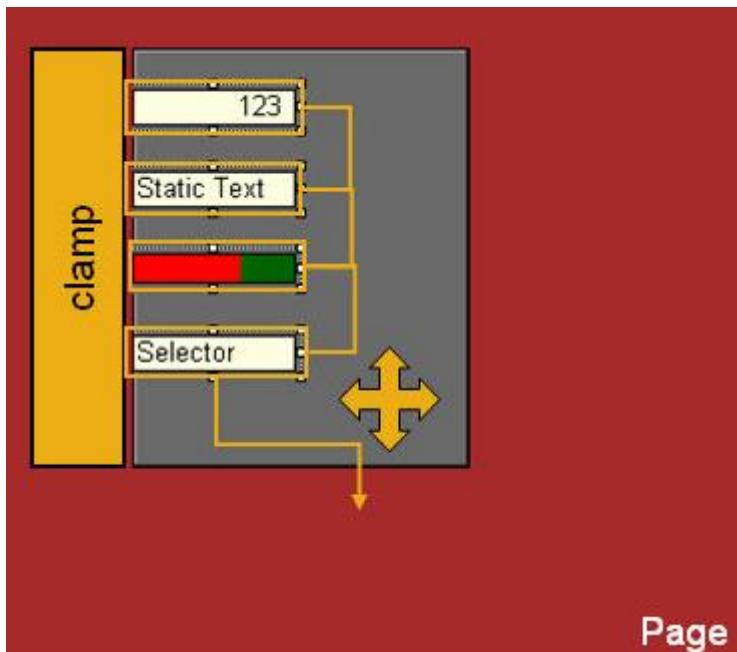
All the properties from the Panel: Visible, Blink, OffsetX, OffestY are reflected in the children objects. At this point all the objects are included into the Panel and they have the Top and Left position referred to the Panel.



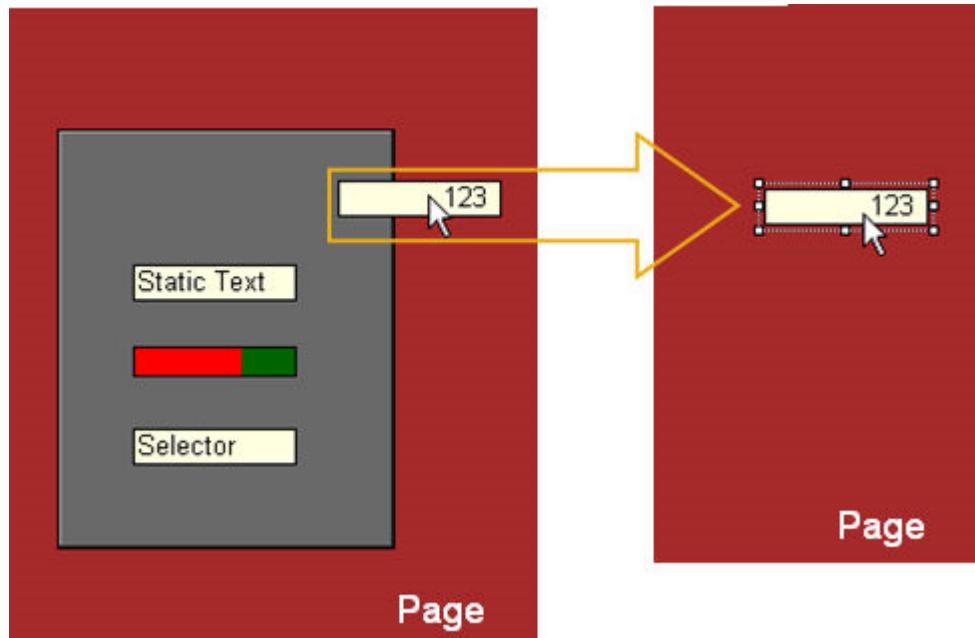
When the Panel is moved also the objects inside are moved:



All the objects inside the Panel are clamped respect the Panel dimensions:



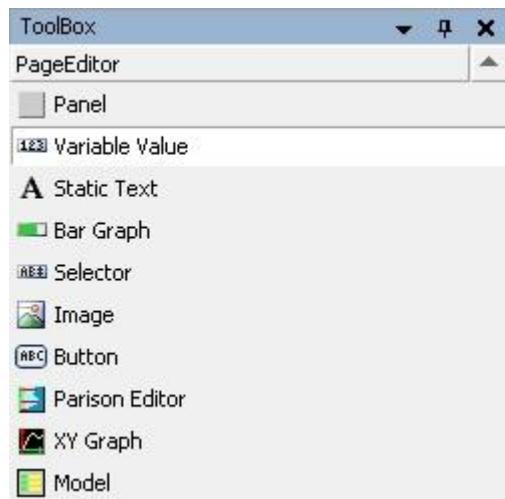
When an object inside the Panel is moved out this object lose the children property.



Another way to remove the children property is: select the object inside the Panel and un-check the [Child](#) property.

### 5.2.5.12 Object Variable Value

By [Tool Box](#) is possible insert an object called Variable Value:



The Variable Value object allow to edit or show different data type defined in the Standard IEC61131-3. To see the operations of object insertion see the chapter [Insert Object](#).

Variable Values Object Properties:

Properties	
Filter	<input type="checkbox"/>
Sort by	<input type="checkbox"/> Sort order
Property	Value
ObjectType	Variable Value
Name	Value_1
Top	79
Left	328
SizeX	80
SizeY	18
Variable	
+ TextColor	,0
+ BackgroundColor	,False,16777184
Border	<input checked="" type="checkbox"/>
BorderColor	<input type="color"/> 0, 0, 0
Frame	Flat
Font	Arial
FontSize	10
FontStyle	Normal
AlignX	Right
AlignY	Center
Length	3
+ Decimal	,0
+ Visible	,True
+ Blink	,False
+ Reverse	,False
+ Input	,True
+ Minimum	,0
+ Maximum	,0
+ ShowCoefficient	,1
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	
ObjectId	0
Group	0
ObjectIdUp	0
ObjectIdDown	0
ObjectIdLeft	0
ObjectIdRight	0

## 5.2.5.12.1 Common properties

- [ObjectType](#)
- [Name](#)
- [Top](#)
- [Left](#)

- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.12.2 Object Variable Value general properties

#### Variable

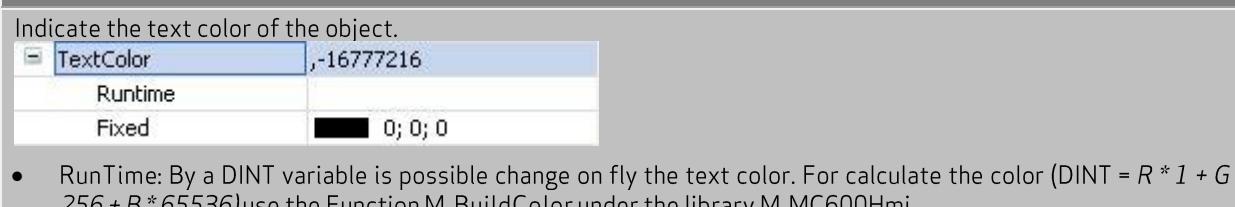


- Ok: Accept the wrong or not defined variable. Remember in this case adjust the Variable or insert a new one in the GVL.
- Cancel: Abort the operation and cancel the Variable Name.

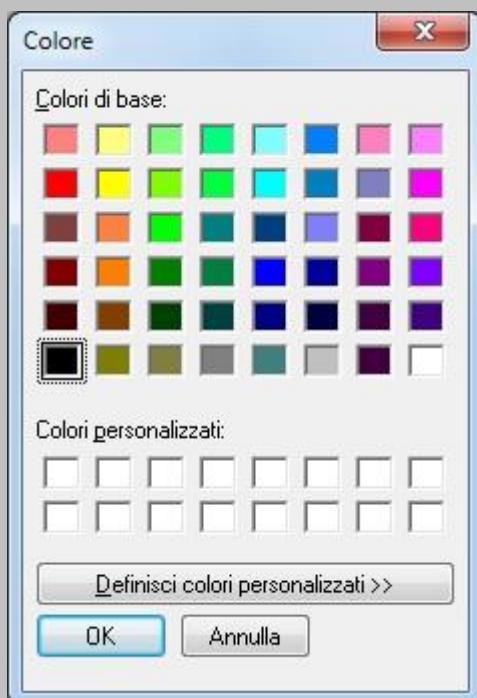
Variable Value object can accept different data type defined in the IEC1131 Standard:

- Numeric (Default INT)
- Boolean
- String
- Time
- Date
- Date & Time
- ...

#### TextColor



- Fixed: By a palette color is possible define the fixed text color



## Font

Select the font.

Font	Arial
FontSize	Arial
FontStyle	Arial Black
	Arial Monospace
AlignX	Arial Narrow
AlignY	Arial Unicode MS
+ Text	Arnprior
+ Visible	AvantGarde Bk BT
+ Blink	AvantGarde Md BT
+ Reverse	Baskerville Old Face
Disable	Batang
Child	BatangChe
OffsetX	Bauhaus 93
OffsetY	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Berylium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boopée
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size.

FontSize 10

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontStyle

Select the font style.

FontStyle	Normal
AlignX	Normal
AlignY	Bold
+ Text	Italic BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## AlignX / AlignY

The Variable Value can be aligned:

AlignX	Right
AlignY	Right
Length	Center
Alphanumeric	Left

AlignY	Center
Length	Top
Alphanumeric	Center
Visible	Bottom

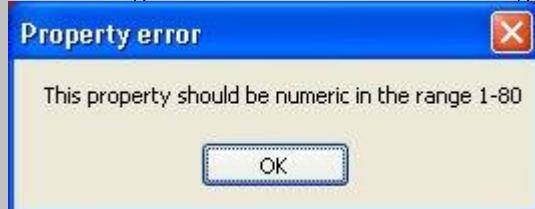
## Length

Select how many characters to use to display the Variable Value in the page:

Length 16

It is possible enter a number from a minimum of 1 to a maximum of 80 including decimal point. Default = 3.

If a number greater than 80 will see the following box:



- OK: the number previously entered will be restored.

## Decimal

This parameter indicates how many decimal digits should be displayed.

Decimal	Var_TestDec,0
Runtime	Var_TestDec
Fixed	0

- Runtime: With an INT variable you can change the number of decimal digits displayed dynamically.

- Fixed: Indicate the number of decimal digits to display fixed.

It is possible enter a number from a low of 1 to a maximum of 10. Default = 0.

By entering a number greater than 10 will see the following window:

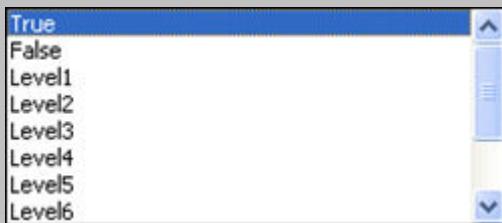


## Reverse

Permit to reverse or not the TextColor with the [BackgroundColor](#):

<input checked="" type="checkbox"/> Reverse	Var_TestRev, True
<input type="checkbox"/> Runtime	Var_TestRev
<input type="checkbox"/> Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in reverse and vice-versa.
- Fixed: This property can be: True = reverse, False = not reverse or under Level:



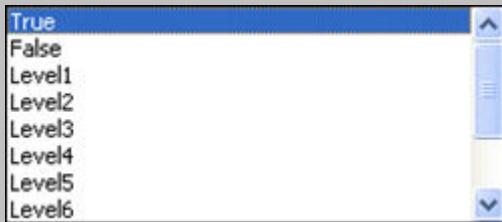
Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## Input

Allows to set the option to change the data by the operator.

<input checked="" type="checkbox"/> Input	Var_TestIn, True
<input type="checkbox"/> Runtime	Var_TestIn
<input type="checkbox"/> Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.
- Fixed: This property can be: True = input enable, False = input disable or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## ObjectId

This parameter is used to identify the object on the page.

ObjectId 201

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure **\_MVariableChange** this numerical parameter only when activated by the FB, and it is also verifiable in FB **M\_EventFocus** structure **\_MFocus.ObjectId**.

## Group

Parameter that allows to manage the cursor by group.

4

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to these selected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another. When we want jump directly from one field to other related all' ObjectId, is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing up arrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing downarrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing leftarrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing rightarrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

### Variable Value with a SINT variable:

### Variable Value with a INT variable:

### Variable Value with a DINT variable:

### Variable Value with a LINT variable:

### Variable Value with a USINT variable:

### Variable Value with a UINT variable:

### Variable Value with a UDINT variable:

### Variable Value with a ULINT variable:

### Variable Value with a REAL variable:

### Variable Value with a LREAL variable:

### Variable Value with a BYTE variable:

### Variable Value with a WORD variable:

### Variable Value with a DWORD variable:

### Variable Value with a LWORD variable:

## Password

Parameter that determines the masking by displaying asterisks typed characters (\*). This allows enter characters which must not be revealed.

Password

## Minimum

This parameter determines the minimum value in the object can be inserted by the operator.

Minimum	Var_TestMin,10
Runtime	Var_TestMin
Fixed	10

- Runtime: With a numeric variable (LREAL or the same type of variable), you can dynamically change the minimum value.
- Fixed: Enter the minimum value fixed.

If the entered value is smaller than the minimum value a warning message appear: 002: "Value is below the lower limit". This data is also verifiable in FB M\_EventFocus structure \_MFocus.Minimum.

## Maximum

This parameter determines the maximum value in the object can be inserted by the operator.

Maximum	Var_TestMax,30
Runtime	Var_TestMax
Fixed	30

- Runtime: With a numeric variable (LREAL or the same type of variable), you can dynamically change the maximum value.
- Fixed: Enter the maximum value fixed.

If the entered value is greater than the maximum value a warning message appear: 001: "Value is above the upper limit". This data is also verifiable in FB M\_EventFocus structure \_MFocus.Maximum.

## ShowCoefficient

This parameter displays the actual value of the variable multiplied / divided by the coefficient.

ShowCoefficient	Var_TestCoefficient,1
Runtime	Var_TestCoefficient
Fixed	1

- Runtime: With a numeric variable (LREAL), it is possible change the coefficient dynamically.
- Fixed: Enter the coefficientfixed.

## WARNING

During the viewing a numeric value, insignificant zeros are never made visibles

## Variable Value with a BOOLEAN variable:

### TextTrue

Parameter that combine a specific text when the variable is TRUE. If these properties are empty the default text is ON.

TextTrue	MT_TestBool,1
MTName	MT_TestBool
MTNumber	1

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

### TextFalse

Parameter that combine a specific text when the variable is FALSE. If these properties are empty the default text is OFF.

<input checked="" type="checkbox"/> TextFalse	MT_TestBool,2
MTName	MT_TestBool
MTNumber	2

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

### Variable Value with a DATE variable:

#### Variable Value with a DATE & TIME variable:

**Date**

This parameter determines the display style to be assigned to a date or date& Time.

Date	DD_MM_YY	<input type="button" value="▼"/>
<input checked="" type="checkbox"/> Visible	,Tr	<input type="button" value="▼"/>
Runtime	DD_MM	<input type="button" value="▼"/>
Fixed	MM_YY	<input type="button" value="▼"/>
<input checked="" type="checkbox"/> Blink	DD	<input type="button" value="▼"/>
Runtime	MM	<input type="button" value="▼"/>
	YY	<input type="button" value="▼"/>

- **Date:** Can be selected from:**DD/MM/YY, DD/MM, MM/YY, DD, MM, YY** (where DD stands for day, MM is the month, YY for year). To display the year with four digits refer to the variable FullYearFormat in the structure M\_Termln contained in the library **M\_MC600Hmi**. To display the date in English mode see the variable EnglishDateFormat in the structure M\_Termln contained in the library **M\_MC600Hmi**.

### Variable Value with a TIME variable:

#### Variable Value with a DT variable:

#### Variable Value with a TOD variable:

**Time**

This parameter determines the display style to assign to time.

Time	HH_MM_SS	<input type="button" value="▼"/>
<input checked="" type="checkbox"/> Visible	CentSec	<input type="button" value="▼"/>
Runtime	DecimSec	<input type="button" value="▼"/>
Fixed	Sec	<input type="button" value="▼"/>
<input checked="" type="checkbox"/> Blink	Min	<input type="button" value="▼"/>
Runtime	Hour	<input type="button" value="▼"/>
Fixed	HH_MM_SS	<input type="button" value="▼"/>
	HH_MM	<input type="button" value="▼"/>
	MM_SS	<input type="button" value="▼"/>

- **Time:**Can be selected from: **MilliSec, CentSec, DeciSec, Sec, Min, Hour, HH:MM:SS, HH:MM, MM:SS**(where millisec going to thousandths of a second,CentSec to hundredths of a second,DeciSec tenths of a second,Secforseconds,Min for minutes, Hour forhour,HH:MM:SS for hours:minutes:seconds, HH:MM for hours:minutes and MM:SSforminutes:seconds).

### Variable Value with a STRING or WSTRING variable:

**Alphanumeric**

Parameter that determines the limitation of the introduction of data only alphanumeric characters. This allows you to enter in the selected field names without including special characters.

Alphanumeric	<input checked="" type="checkbox"/>
--------------	-------------------------------------

**Password**

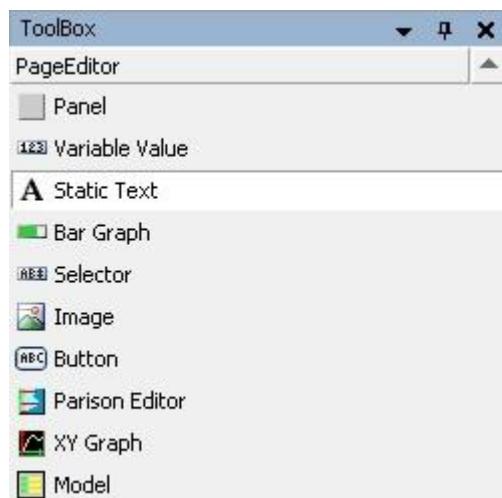
Parameter that determines the masking by displaying asterisks of typed characters (\*). This allows to insert in the selected field names not be displayed.

Password	<input checked="" type="checkbox"/>
----------	-------------------------------------



### 5.2.5.13 Object Static Text

By [ToolBox](#) is possible insert an object called Static Text:



Static text object allow to show a text from the [multilanguage text](#). To see the operations of object insertion see the chapter [Insert Object](#).

Static Text Object Properties:

Properties	
Property	Value
ObjectType	Static Text
Name	Text_1
Top	61
Left	368
SizeX	80
SizeY	18
TextColor	,0
BackgroundColor	,False,16777184
Border	<input checked="" type="checkbox"/>
BorderColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0
Frame	Flat
Font	Arial
FontSize	10
FontStyle	Normal
AlignX	Left
AlignY	Center
Text	,0
Visible	,True
Blink	,False
Reverse	,False
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	

#### 5.2.5.13.1 Common properties

- [ObjectType](#)
- [Name](#)

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

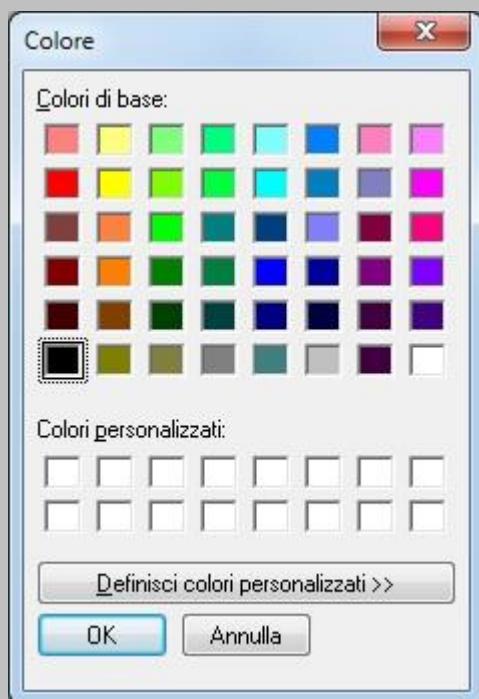
### 5.2.5.13.2 Object Static Text properties

#### TextColor

Indicate the text color of the object.

<input type="button" value="TextColor"/>	, -16777216
Runtime	
Fixed	<input type="color" value="0; 0; 0"/>

- RunTime: By a DINT variable is possible change on fly the text color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed text color:



#### Font

Select the font used.

Font	Arial
FontSize	Arial
FontStyle	Arial Black
AlignX	Arial Monospace
AlignY	Arial Narrow
Text	Arial Unicode MS
Visible	Arnprior
Blink	AvantGarde Bk BT
Reverse	AvantGarde Md BT
Disable	Baskerville Old Face
Child	Batang
OffsetX	BatangChe
OffsetY	Bauhaus 93
	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Berylium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boophee
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size.

FontSize 10

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontStyle

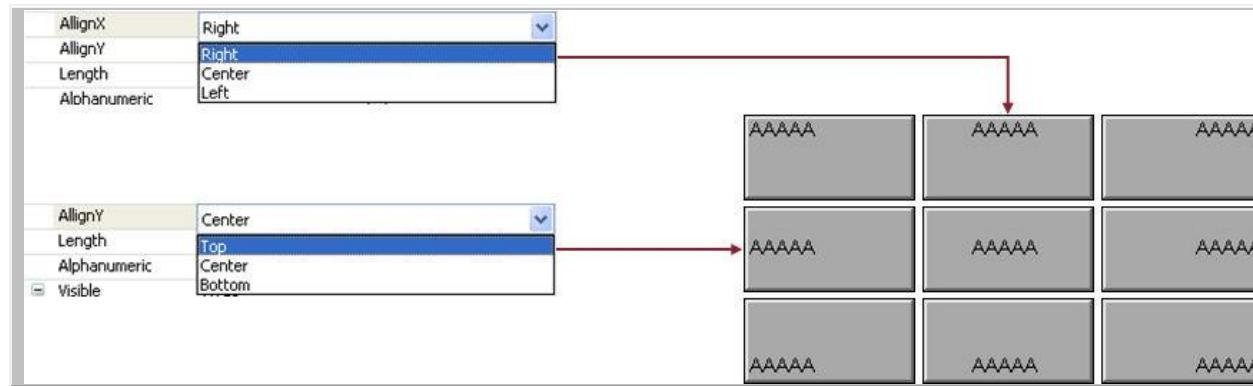
Select the font style.

FontStyle	Normal
AlignX	Normal
AlignY	Normal
Text	Normal
	Bold
	Italic
	BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## AlignX / AlignY

The text in thefield can bealigned:



## Text

Indicate the name and the number of the text.

<input checked="" type="checkbox"/> Text	MT_StaticText,1
MTName	MT_StaticText
MTNumber	1

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

**Texts [MC600: PLC Logic: Application: MMIManager]**

ID	English	Italiano
0	Test counter	Test counter
1	Program	Program
200	Text with ID. 200	Testo con ID. 200
201		
...		

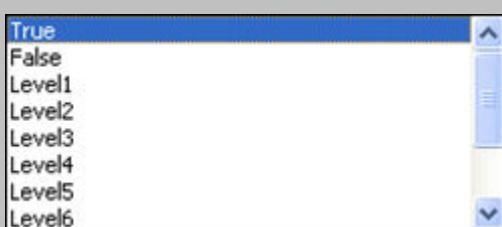
A yellow box highlights the 'Testo con ID. 200' entry. A yellow arrow points from this entry to a red rectangular area labeled 'Page' containing the text 'Testo con ID. 200'.

## Reverse

Permit to reverse or not the [TextColor](#) with the [BackgroundColor](#):

<input checked="" type="checkbox"/> Reverse	Var_TestRev,True
Runtime	Var_TestRev
Fixed	True

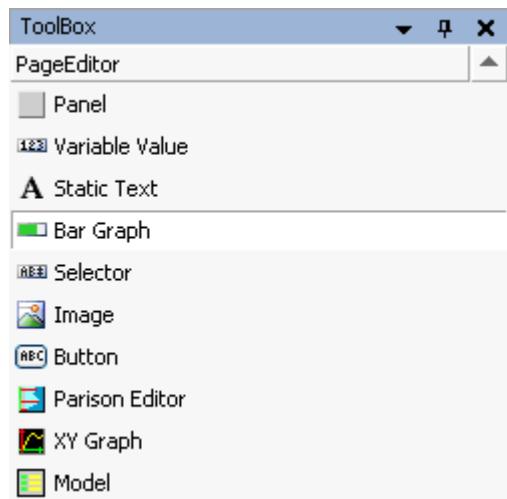
- Runtime: Insert a boolean variable when is TRUE the object is in reverse and vice-versa.
- Fixed: This property can be: True = reverse, False = not reverse or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is managed by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

### 5.2.5.14 Object Bar Graph

By [ToolBox](#) is possible insert an object called Bar Graph:



The Bar Graph object allow to show a numeric value in the graphically form. To see the operations of object insertion see the chapter [Insert Object](#).

Object Bar Graph properties:

Properties	
Filter	<input checked="" type="checkbox"/>
Sort by	<input type="button"/> Sort order <input type="button"/>
Property	Value
ObjectType	Bar Graph
Name	BarGraph_1
Top	113
Left	571
SizeX	80
SizeY	15
Variable1	
BarOperator	Absolute
BarStyle	Flat
Direction	Right
+ BackgroundColor	,False,25600
Border	<input checked="" type="checkbox"/>
BorderColor	<input type="color"/> 0, 0, 0
Frame	Flat
ShowValue	<input type="checkbox"/>
+ BarColor1	,16711680
+ Threshold1	,0
+ BarColor2	,16776960
+ Threshold2	,0
+ BarColor3	,32768
+ Threshold3	,0
+ BarColor4	,16776960
+ Threshold4	,0
+ BarColor5	,16711680
+ Visible	,True
+ Blink	,False
+ Input	,True
+ Increment	,1
+ Minimum	,0
+ Maximum	,0
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	
ObjectId	0
Group	0
ObjectIdUp	0
ObjectIdDown	0
ObjectIdLeft	0
ObjectIdRight	0

#### 5.2.5.14.1 Common properties

- 

#### 5.2.5.14.2 [ObjectType](#)

- [Name](#)

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

#### 5.2.5.14.3 Object Bar Graph properties

##### Variable1

Parameter of type numeric or TIME is displayed in the histogram.

Variable1	Var_TestBarGraph1
-----------	-------------------

##### Variable2

Type parameter numeric or TIME that represents the reference value for the Variable1.

Variable2 appears only if the parameter "BarOperator" is selected as Sum, Difference Start or Stop.

Variable2 must be the same type of Variable1.

Variable2	Var_TestBarGraph2
-----------	-------------------

##### BarOperator

Parameter that determines the display to be assigned to the histogram based on the value of Variable1 and possibly variable2.

BarOperator	Difference	
Variable2	Absolute	
BarStyle	Sum	
Direction	Difference	
	StartStop	

- Absolute: Show only Variable1.
- Sum: Show Variable1 + Variable2.
- Difference: Show Variable1 - Variable2.
- StartStop: Show the trait value between Variable1 and Variable2.

##### BarStyle

This parameter determines the display style to assign the histogram.

BarStyle	Led	
Direction	Flat	
BackgroundColor	Arrow	
Runtime	Raised	
Transparent	Recessed	
	Led	

- Flat: Histogram of the classical type.
- Arrow: Histogram of type vector.
- Raised: Histogram type of raised.
- Recessed: Histogram type in recessed.
- Led: Histogram bar type of LED.

##### Direction

This parameter determines the viewing direction to be assigned to the histogram when the value is positive.

Direction	Right
BackgroundColor	Up
Runtime	Down
Transparent	Right
	Left

- Up: From the bottom to the top.
- Down: From top to bottom.
- Right: From left to right.
- Left: From right to left.

## ShowValue

This parameter determines whether to display the value of the histogram within the same.

 ShowValue


## Font

Select the font.

Font	Arial
FontSize	Arial
FontStyle	Arial Black
AlignX	Arial Monospace
AlignY	Arial Narrow
Text	Arial Unicode MS
Visible	Arnprior
Blink	AvantGarde Bk BT
Reverse	AvantGarde Md BT
Disable	Baskerville Old Face
Child	Batang
OffsetX	BatangChe
OffsetY	Bauhaus 93
	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Beryllium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boopée
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size.

 FontSize 10

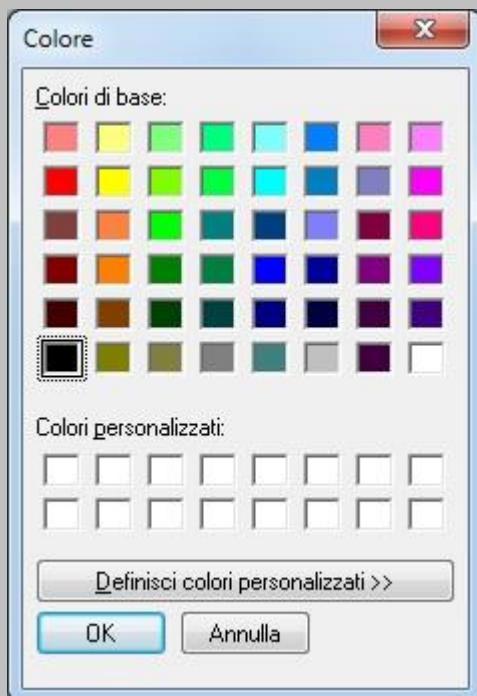
The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## TextColor

Indicate the text color of the object.

TextColor	, -16777216
Runtime	
Fixed	<span style="background-color: black; color: black;">#000000</span> 0; 0; 0

- RunTime: By a DINT variable is possible change on fly the text color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed text color:

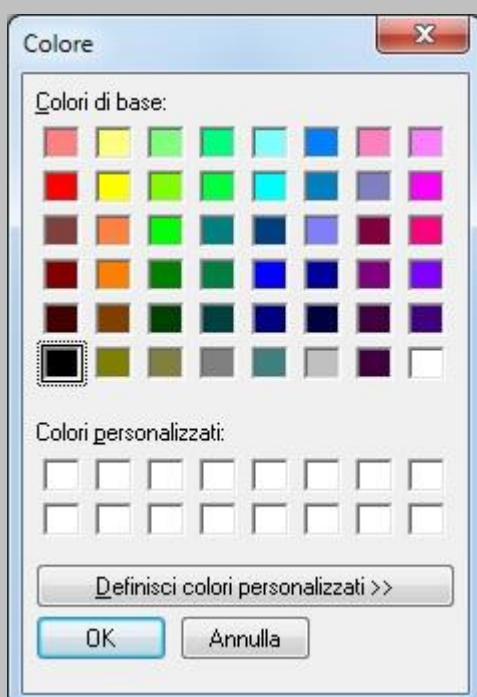


## BarColor1

This parameter contains the color code of the histogram, which is valid if the value is less than or equal to the one set in Thresold1.

<input checked="" type="checkbox"/> BarColor1	Var_TestBarColor1,16711680
Runtime	Var_TestBarColor1
Fixed	<span style="color: red;">255; 0; 0</span>

- RunTime: By a DINT variable is possible change on fly the histogram color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed histogram color:



## Thresold1

This parameter contains the Threshold1 value for the histogram display with color set in BarColor2.

Thresold1	Var_TestThresold1,0
Runtime	Var_TestThresold1
Fixed	0

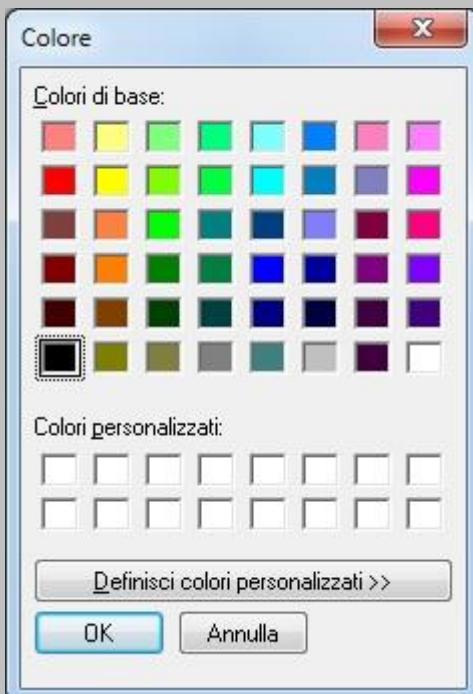
- RunTime: With a numeric variable, you can change the threshold dynamically.
- Fixed: Indicate the threshold to define the color histogram fixed.

## BarColor2

This parameter contains the color code of the histogram, which is valid if the value is higher than that set in Thresold1 and less than or equal to the one set in Thresold2.

BarColor2	Var_TestBarColor2,16776960
Runtime	Var_TestBarColor2
Fixed	255; 255; 0

- RunTime: By a DINT variable is possible change on fly the histogram color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed histogram color:



## Thresold2

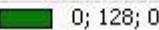
This parameter contains the Threshold2 value for the histogram display with color set in BarColor3.

Thresold2	Var_TestThresold2,0
Runtime	Var_TestThresold2
Fixed	0

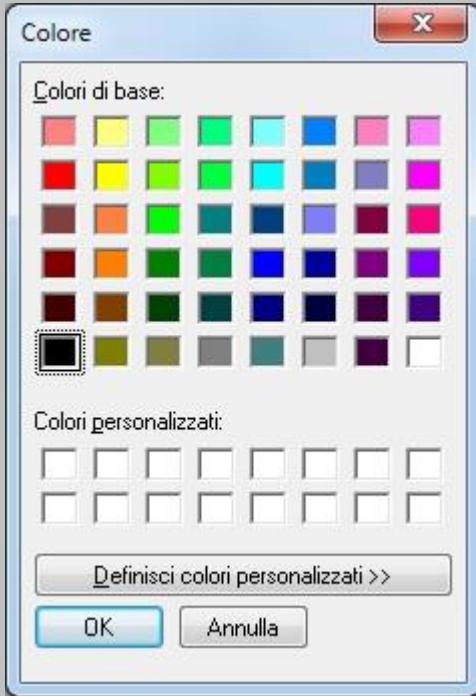
- RunTime: With a numeric variable, you can change the threshold dynamically.
- Fixed: Indicate the threshold to define the color histogram fixed.

## BarColor3

This parameter contains the color code of the histogram, which is valid if the value is higher than that set in Thresold2 and less than or equal to the one set in Thresold3.

BarColor3	Var_TestBarColor3,32768
Runtime	Var_TestBarColor3
Fixed	 0; 128; 0

- RunTime: By a DINT variable is possible change on fly the histogram color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed histogram color:



### Thresold3

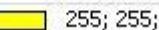
This parameter contains the Threshold3 value for the histogram display with color set in BarColor4.

Thresold3	Var_TestThresold3,0
Runtime	Var_TestThresold3
Fixed	0

- RunTime: With a numeric variable, you can change the threshold dynamically.
- Fixed: Indicate the threshold to define the color histogram fixed.

### BarColor4

This parameter contains the color code of the histogram, which is valid if the value is higher than that set in Thresold3 and less than or equal to the one set in Thresold4.

BarColor4	Var_TestBarColor4,16776960
Runtime	Var_TestBarColor4
Fixed	 255; 255; 0

- RunTime: By a DINT variable is possible change on fly the histogram color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.

- Fixed: By a palette color is possible define the fixed histogram color:



## Thresold4

This parameter contains the Threshold4 value for the histogram display with color set in BarColor5.

Thresold4	Var_TestThreshold4,0
Runtime	Var_TestThreshold4
Fixed	0

- RunTime: With a numeric variable, you can change the threshold dynamically.
- Fixed: Indicate the threshold to define the color histogram fixed.

## BarColor5

This parameter contains the color code of the histogram, which is valid if the value is higher than that set in Thresold4.

BarColor5	Var_TestBarColor5,16711680
Runtime	Var_TestBarColor5
Fixed	255; 0; 0

- RunTime: By a DINT variable is possible change on fly the histogram color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.

- Fixed: By a palette color is possible define the fixed histogram color:

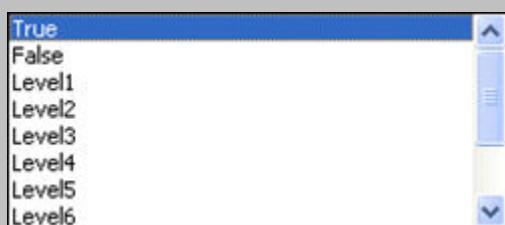


## Input

Allows to set the option to change the data by the operator. Visible and usable only in cases where the parameter BarOperator is selected Absolute or StartStop.

<input checked="" type="checkbox"/> Input	Var_TestIn,True
Runtime	Var_TestIn
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.
- Fixed: This property can be: True = input enable, False = input disable or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## Increment

Parameter indicating the value of increase or decrease in the histogram by the operator using the buttons increments or decrements or through the knob.

It is visible and usable only in the case that the parameter BarOperator is selected Absolute or StartStop and the Input parameter is equal to True.

<input checked="" type="checkbox"/> Increment	Var_TestIncrement,5
Runtime	Var_TestIncrement
Fixed	5

- RunTime: With a numeric variable, you can change the value to increment/decrement dynamically.
- Fixed: Insert the fixed value of increase/decrease.

## Minimum

This parameter determines the minimum value in the object can be inserted by the operator.

Minimum	Var_TestMin,10
Runtime	Var_TestMin
Fixed	10

- Runtime: With a numeric variable (LREAL or the same type of variable), you can dynamically change the minimum value.
- Fixed: Enter the minimum value fixed.

This data is also verifiable in FB M\_EventFocus structure \_MFocus.Minimum.

## Maximum

This parameter determines the maximum value in the object can be inserted by the operator.

Maximum	Var_TestMax,30
Runtime	Var_TestMax
Fixed	30

- Runtime: With a numeric variable (LREAL or the same type of variable), you can dynamically change the maximum value.
- Fixed: Enter the maximum value fixed.

This data is also verifiable in FB M\_EventFocus structure \_MFocus.Maximum.

## ObjectId

This parameter is used to identify the object on the page.

ObjectId 201

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure **\_MVariableChange** this numerical parameter only when activated by the FB, and it is also verifiable in FB **M\_EventFocus** structure **\_MFocus.ObjectId**.

## Group

Parameter that allows to manage the cursor by group.

Group 4

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to the selected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another. When we want jump directly from one field to other related all 'ObjectId', is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing up arrow.

ObjectIdUp 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing down arrow.

ObjectIdDown 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing left arrow.

ObjectIdLeft 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing right arrow.

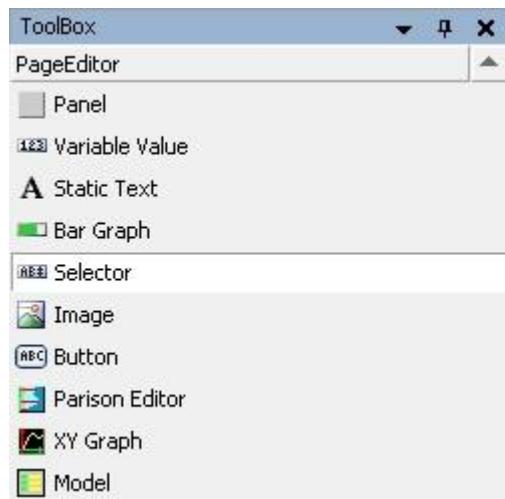
ObjectIdRight 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

### 5.2.5.15 Object Selector

By [ToolBox](#) is possible insert an object called Selector:



The Selector object allow to manage a multitext selection with a drop-down box and write a numeric or boolean variable. To see the operations of object insertion see the chapter [Insert Object](#).

Selector Object Properties:

Properties

Filter | Sort by | Sort order ▾

Property	Value
ObjectType	Selector
Name	Selector_1
Top	195
Left	618
SizeX	80
SizeY	18
Variable	
+ TextColor	,0
+ DownTextColor	,0
+ BackgroundColor	,False,16777184
+ DownBackgroundColor	,16711680
ListTextColor	<span style="background-color: black; color: black;">█</span> 0, 0, 0
ListBackgroundColor	<span style="background-color: white; border: 1px solid black;">█</span> 255, 255, 255
Border	<input checked="" type="checkbox"/>
BorderColor	<span style="background-color: black; color: black;">█</span> 0, 0, 0
Frame	Flat
Font	Arial
FontSize	10
FontStyle	Normal
AlignX	Left
AlignY	Center
+ Text	,0
Range	2
FirstValue	0
TextNum	1
+ Visible	,True
+ Blink	,False
+ Reverse	,False
+ Input	,True
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	
ObjectId	0
Group	0
ObjectIdUp	0
ObjectIdDown	0
ObjectIdLeft	0
ObjectIdRight	0

### 5.2.5.15.1 Common properties

- 

#### 5.2.5.15.2 [ObjectType](#)

- [Name](#)

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.15.3 Object Selector properties

#### Variable

Parameter of type numeric or boolean that contains the variable whose value determines the display text. In the case of boolean values can be clearly only 2 (false/true).

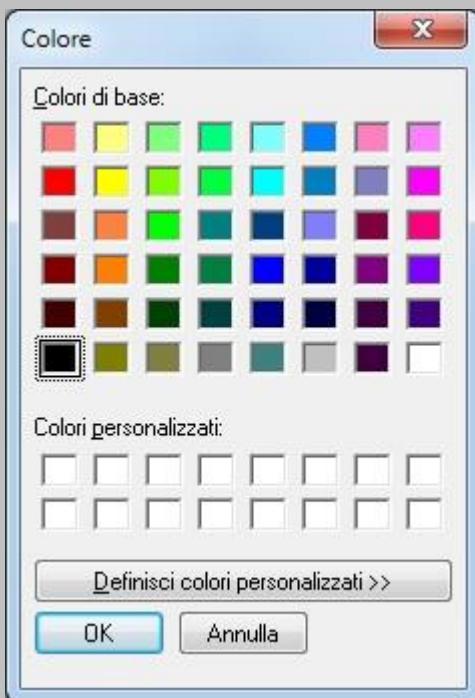
Variable	Var_TestSelector
----------	------------------

#### TextColor

Indicate the text color of the object.

TextColor	, -16777216
Runtime	<input type="color"/>
Fixed	<input type="color"/> 0; 0; 0

- RunTime: By a DINT variable is possible change on fly the text color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed text color:



#### DownTextColor

Indicate the down text color of the object.

<input checked="" type="checkbox"/> DownTextColor	Var_TestDownTextColor,65280
Runtime	Var_TestDownTextColor
Fixed	0; 255; 0

- RunTime: By a DINT variable is possible change on fly the down text color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed down text color:

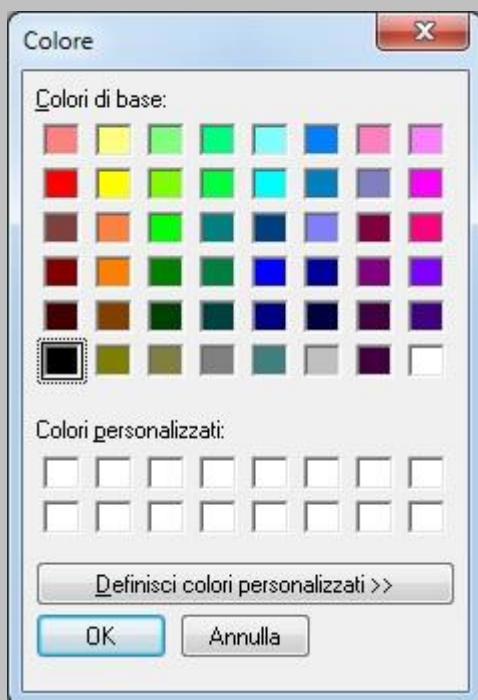
## DownBackgroundColor

Indicate the down background color of the object.

<input checked="" type="checkbox"/> DownBackgroundColor	Var_TestDownBackgroundColor,16711680
Runtime	Var_TestDownBackgroundColor
Fixed	255; 0; 0

- RunTime: By a DINT variable is possible change on fly the down background color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.

- Fixed: By a palette color is possible define the fixed down background color:



### ListTextColor

Indicate the list text color of the object.

ListTextColor  0; 0; 0

### ListBackgroundColor

Indicate the list background text color of the object.

ListBackgroundColor  255; 255; 255

### Font

Select the font used to show the text on the page.

Font	Arial
FontSize	FontSize
FontStyle	Normal
AlignX	Normal
AlignY	Normal
+ Text	Arial Black
+ Visible	Arial Monospace
+ Blink	Arial Narrow
+ Reverse	Arial Unicode MS
Disable	Arnprior
Child	AvantGarde Bk BT
OffsetX	AvantGarde Md BT
OffsetY	Baskerville Old Face
	Batang
	BatangChe
	Bauhaus 93
	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Berylium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boophee
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size.

FontSize 10

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontStyle

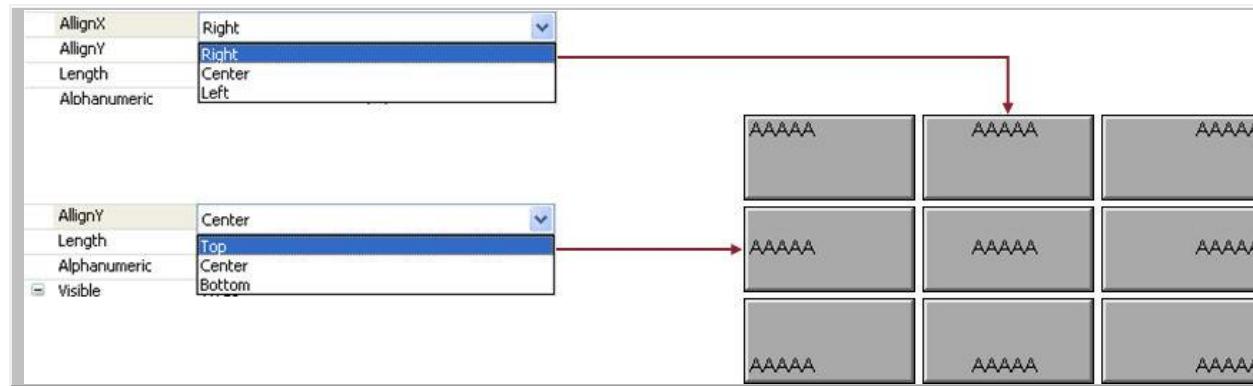
Select the font style.

FontStyle	Normal
AlignX	Normal
AlignY	Normal
+ Text	Normal
	Bold
	Italic
	BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## AlignX / AlignY

The text in thefield can bealigned:

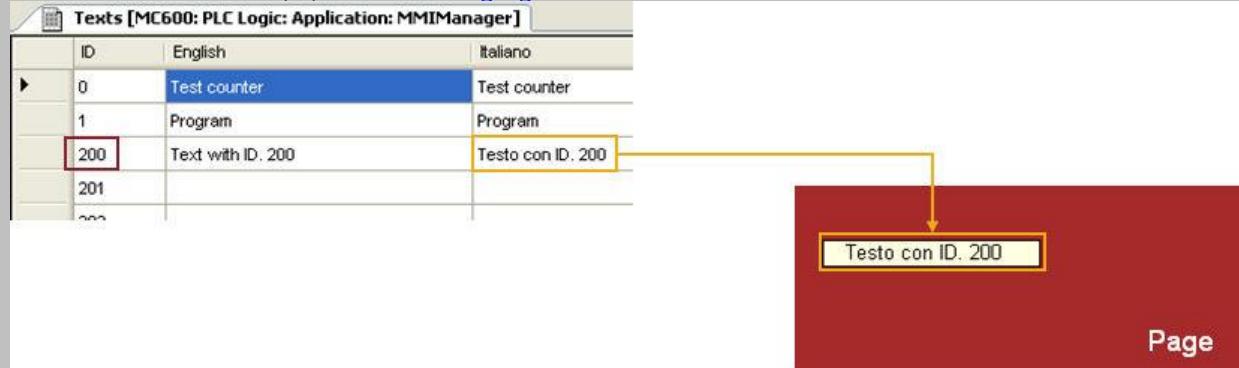


## Text

Indicate the name and the number of the text.

<input type="checkbox"/> Text	MT_StaticText,1
MTName	MT_StaticText
MTNumber	1

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).



## Range

This parameter determines how many values will have the selector object, that is what are the possible selections. This parameter indicates how many consecutive multilingual texts that make the text list, starting with the number specified in the parameter MTNumber.

<input type="checkbox"/> Range	2
--------------------------------	---

## FirstValue

Parameter that determines the value of the variable that corresponds to the first display text. For example, if the value is equal to 1, the beginning of the list with the value of the variable will be equal to 1, if the value is equal to 4, the beginning of the list with the value of the variable will be equal to 4.

<input type="checkbox"/> FirstValue	1
-------------------------------------	---

For boolean variable insert 0 = false.

## TextNum

This parameter determines the number of texts to be displayed on multiple lines consecutively in the drop down menu.

<input type="checkbox"/> TextNum	1
----------------------------------	---

## Reverse

Permit to reverse or not the [TextColor](#) with the [BackgroundColor](#):

<input checked="" type="checkbox"/> Reverse	Var_TestRev,True
Runtime	Var_TestRev
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in reverse and vice-versa.
- Fixed: This property can be: True = reverse, False = not reverse or under Level:



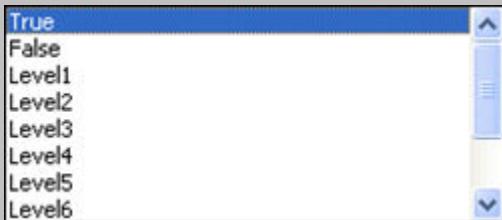
Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## Input

Allows to set the option to change the data by the operator.

<input checked="" type="checkbox"/> Input	Var_TestIn,True
Runtime	Var_TestIn
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.
- Fixed: This property can be: True = input enable, False = input disable or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is manage by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## ObjectId

This parameter is used to identify the object on the page.

ObjectId 201

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure \_MVariableChange this numerical parameter only when activated by the FB, and it is also verifiable in FB M\_EventFocus structure \_MFocus.ObjectId.

## Group

Parameter that allows to manage the cursor by group.

Group 4

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to theselected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another. When we want jump directly from one field to other related all'ObjectId, is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter setin ObjectId) selectable by pressing up arrow.

ObjectIdUp 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing downarrow.

 ObjectIdDown 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing leftarrow.

 ObjectIdLeft 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing rightarrow.

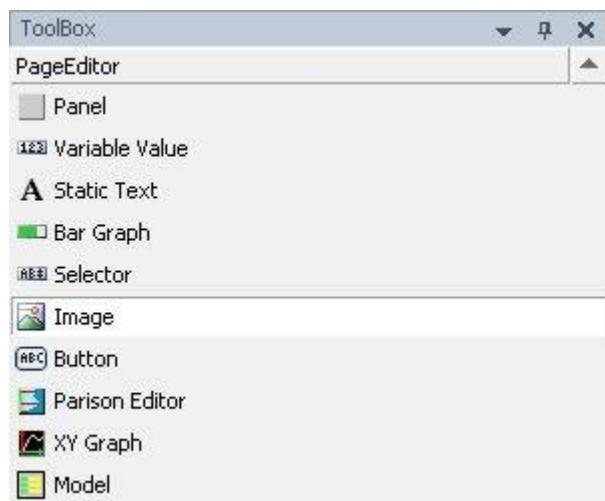
 ObjectIdRight 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

### 5.2.5.16 Object Image

By [ToolBox](#) is possible insert an object called Image:



The Image object allow to show an image from the **Image Pool** object (see ImagePool CoDeSys object).

ID	File name	Image
0	Led_OFF.bmp	
1	Led_ON.bmp	

To see the operations of object insertion see the chapter [Insert Object](#).

Image Object Properties:

Properties

Filter | Sort by | Sort order ▾

Property	Value
ObjectType	Image
Name	Image_1
Top	143
Left	198
SizeX	80
SizeY	80
BackgroundColor	,False,16777215
Runtime	
Transparent	<input type="checkbox"/>
Fixed	<input type="color"/> 255, 255, 255
Border	<input checked="" type="checkbox"/>
BorderColor	<input type="color"/> 0, 0, 0
Frame	Flat
EffectThickness	1
TopLeftColor	<input type="color"/> 211, 211, 211
BottomRightColor	<input type="color"/> 169, 169, 169
Image	,0,,No0,0
IPName	
IPNumber	0
IPNumberRuntime	
TransparentColor	No
FixedTransparentColor	<input type="color"/> 0, 0, 0
Rotation	0
Visible	,True
Runtime	
Fixed	True
Blink	,False
Runtime	
Fixed	False
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	

### 5.2.5.16.1 Common properties

#### 5.2.5.16.2 ObjectType

- [Name](#)
- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)

- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.16.3 Object Image properties

#### Image

Image	
IPName	ImagePool
IPNumber	2
IPNumberRuntime	RunTime

- IPName: Name of the Image Pool used in the project.
- IPNumber: Number of image to show (ID).
- IPNumberRuntime: By a INT variable it is possible to change the image (ID) dynamically. If this parameter is present the number write in IPNumber have not effect.
- TransparentColor: This parameter allows to make the image transparent (then take the background color).

TransparentColor	No
FixedTransparentColor	No
Rotation	TopLeft

- TopLeft: The color that determines the transparency has two options: the first in the top left TopLeft or a fixed color to the specified voice FixedTransparentColor.
- FixedTransparentColor: Is the parameter that, if you choose the Fixed option, allows to select the color from among the color palette

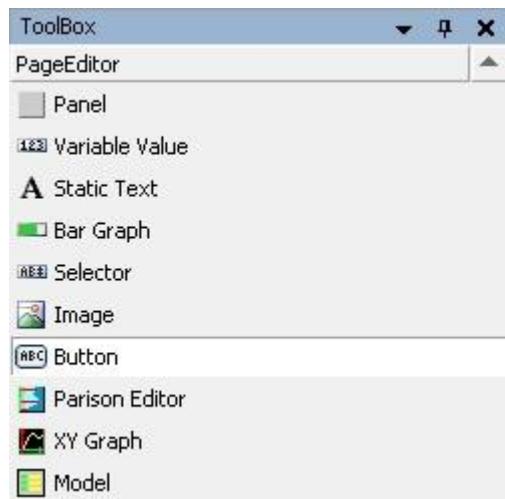
FixedTransparentColor  255, 255, 0

- Rotation: This parameter determines how many degrees in a clockwise direction, the selected image should be rotated before being displayed. The possible choice is between the values of 0° (no rotation), 90°, 180° and 270°.

Rotation	0
Visible	0
Runtime	90
Fixed	180
	270

### 5.2.5.17 Object Button

By [ToolBox](#) is possible insert an object called Button:



The Button object allow to: set, activate and make others specific commands. To see the operations of object insertion see the chapter [Insert Object](#).

Button Object Properties:

Properties

Filter | Sort by | Sort order ▾

Property	Value
ObjectType	Button
Name	Button_1
Top	282
Left	656
SizeX	80
SizeY	50
Action	Button
Variable	
+ TextUp	,0
+ TextDown	,0
TextBkColorTranspar...	<input type="color"/>
+ TextColor	,0
+ DownTextColor	,0
+ BackgroundColor	,False,13882323
+ DownBackgroundColor	,16711680
+ Image	,0,,No0,0
+ DownImage	,0,,No0,0
+ DisabledImage	,0,,No0,0
OppositeImage	<input type="color"/>
Border	<input checked="" type="checkbox"/>
BorderColor	<input type="color"/> 0, 0, 0
Frame	Release
EffectThickness	1
Font	Arial
FontSize	10
FontStyle	Normal
AlignX	Center
AlignY	Center
+ Visible	,True
+ Blink	,False
+ Input	,True
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	
ObjectId	0
Group	0
ObjectIdUp	0
ObjectIdDown	0
ObjectIdLeft	0
ObjectIdRight	0

### 5.2.5.17.1 Common properties

- 

#### 5.2.5.17.2 [ObjectType](#)

- [Name](#)

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.17.3 Object Button properties

#### Action

This parameter determines the action to do when the button is pressed.

Action	Set
Variable	Set
TextUp	Reset
MTName	Button
MTNumber	Switch
TextDown	SetReset
MTName	PageCall
MTNumber	ThrowKey
	Command

- **Set:** When the button is activated, the boolean variable set in the Variable field, takes the value TRUE (ON).
- **Reset:** When the button is activated, the boolean variable set in the Variable field, takes the value FALSE (OFF).
- **Button:** When the button is activated, the boolean variable set in the Variable field, takes the value TRUE (ON) for the time that the button is pressed; when released, the boolean variable set in the Variable field, assumes the value FALSE (OFF).
- **SetReset:** When the button is activated, the boolean variable set in the Variable field, takes the value TRUE (ON). At a subsequent activation assumes the value FALSE (OFF).
- **Switch:** When the button is activated, the boolean variable set in the Variable field takes the value opposite to the current one (eg if it is FALSE (OFF) will take the value TRUE (ON) and vice-versa).
- **PageCall:** When the button is activated is called the page set in CallPage.
- **ThrowKey:** When the button is activated is simulated pressing set the Key field.
- **Command:** When the button is activated is set to run the command in the Command field the command to be executed must be a Windows®.
- **PageClose:** When the button is activated the popup page is closed.
- **Increment:** When the button is activated the numeric variable defined in the Variable field is increments by the value set in the field Increment; if the value in the Increment field is negative, the variable is decremented.

#### Variable

Parameter of type boolean or (only for the Increment option) numerical affected the activation of the button when pressed.

Variable Var\_TestButtonSet

Appears if the button has the Action parameter set to the values: Set, Reset, Button, Switch, SetReset and Increment.

#### CallPage

This parameter contains the page number to call if the button has the Action parameter set PageCall.

CallPage 1

#### Key

Parameter that specifies which key or combination of keys are simulated when the button is activated if the Action parameter is set to the value ThrowKey or PageClose.

Key		ESC, False, False, False, False
Code	ESC	
Capital		<input type="checkbox"/>
Shift		<input type="checkbox"/>
Ctrl		<input type="checkbox"/>
Alt		<input type="checkbox"/>

You can select the key code in the field that you want to launch, and perhaps add the desired attributes: Capital (change the lowercase letters to uppercase), the Shift, Ctrl and Alt.

Key		
Code	DEL	<input type="button" value="▼"/>
Capital	CR	<input type="button" value="▲"/>
Shift	ESC	
Ctrl	DEL	
Alt	a	
<input checked="" type="checkbox"/> TextUp		c
<input type="checkbox"/> MTName		d
<input type="checkbox"/> MTNumber		e

If the Action parameter is set to PageClose, in addition to the simulation of the key or combination of keys pressed will also automatically close the popup page.

## Command

This parameter specifies which command (only under Windows® operating system) to run when the button is activated.

Command prova.exe

If the command can not be executed, it will appear at the bottom of the terminal a warning "006: Operation denied on this Operating System".

## TextUp

Indicate the name and the number of the text when the button is not pressed.

TextUp		MT_Page4,13
MTName	MT_Page4	
MTNumber	13	

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

## TextDown

Indicate the name and the number of the text when the button is pressed.

TextDown		MT_Page4,14
MTName	MT_Page4	
MTNumber	14	

- MTName: Name for the [Multilanguage text](#).
- MTNumber: Number (ID) of the [Multilanguage text](#).

If the MTName is not assigned the text displayed is taken from TextUp.

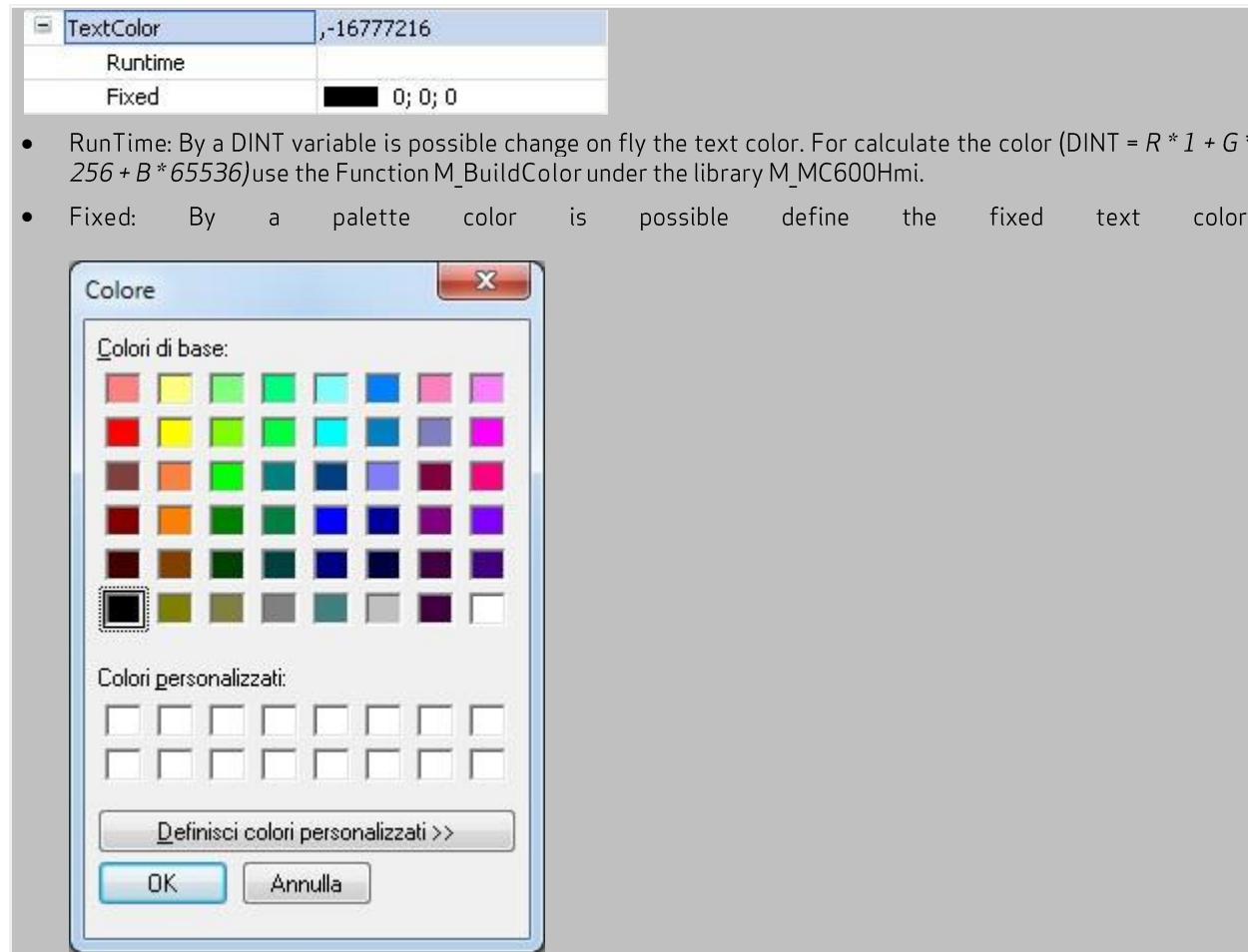
## TextBkColorTransparent

Parameter that indicates whether the background of the text should be transparent.

TextBkColorTransparent

## TextColor

Indicate the text color of the object.



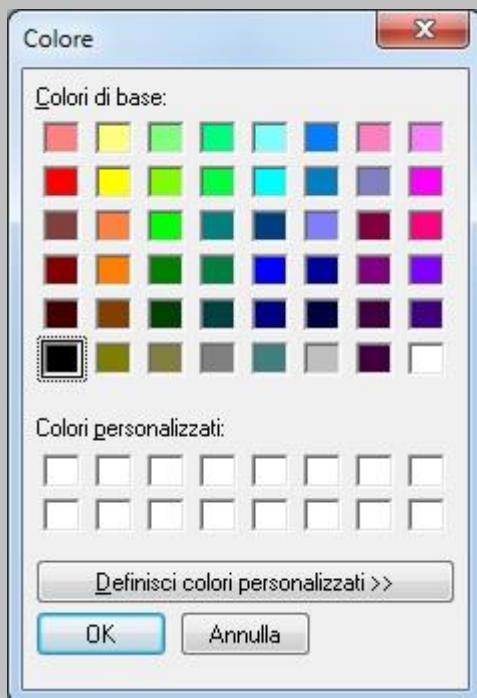
## DownTextColor

Indicate the down text color of the object.

DownTextColor	,16777215
Runtime	
Fixed	<input type="color"/> 255; 255; 255

- RunTime: By a DINT variable is possible change on fly the down text color. For calculate the color (DINT = R \* 1 + G \* 256 + B \* 65536) use the Function M\_BuildColor under the library M\_MC600Hmi.

- Fixed: By a palette color is possible define the fixed down text color:

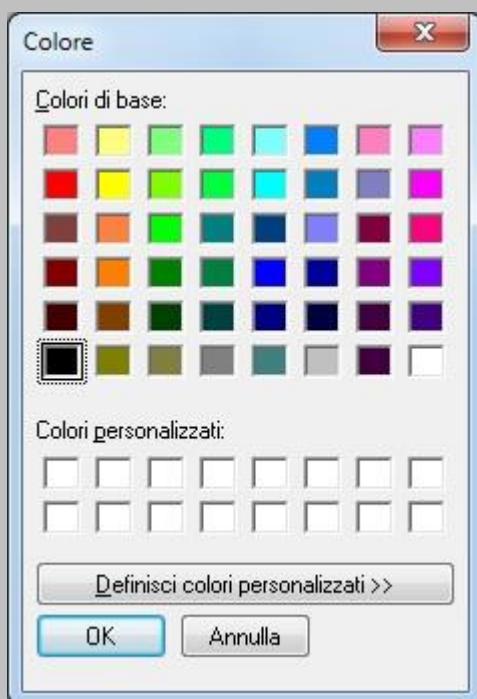


## DownBackgroundColor

Indicate the down background color of the object.

<input checked="" type="checkbox"/> DownBackgroundColor	Var_TestDownBackgroundColor,16711680
Runtime	Var_TestDownBackgroundColor
Fixed	<span style="background-color: red; color: black;">255; 0; 0</span>

- RunTime: By a DINT variable is possible change on fly the down background color. For calculate the color (DINT = R \* 1 + G \* 256 + B \* 65536) use the Function M\_BuildColor under the library M\_MC600Hmi.
- Fixed: By a palette color is possible define the fixed down background color:



## Image

Image parameters that contain the IPName, IPNumber and eventually the IPNumber Runtime when the button is not pressed. Vedere oggetto [Image](#).

<input type="checkbox"/> <b>Image</b>	Test_img,1,,No0,0
IPName	Test_img
IPNumber	1
IPNumberRuntime	
TransparentColor	No
Rotation	0

## DownImage

Image parameters that contain the IPName, IPNumber and eventually the IPNumber Runtime when the button is pressed. Vedere oggetto [Image](#).

<input type="checkbox"/> <b>DownImage</b>	1,0,,No0,0
IPName	1
IPNumber	0
IPNumberRuntime	
TransparentColor	No
Rotation	0

In case it is no assignment, the image displayed will be the one set in Image(if present).

## DisableImage

Image parameters that contain the IPName, IPNumber and eventually the IPNumber Runtime when the button is disabled. Vedere oggetto [Image](#).

<input type="checkbox"/> <b>DisabledImage</b>	Test_img,2,,No0,0
IPName	Test_img
IPNumber	2
IPNumberRuntime	
TransparentColor	No
Rotation	0

In case it is no assignment, the image displayed will be the one set in Image(if present).

## OppositeImage

This parameter determines whether the image should be placed on the key in the opposite position with respect to the location of the text (parameters AlignX and AlignY).

<input type="checkbox"/> OppositeImage	<input checked="" type="checkbox"/>
--	-------------------------------------

## Font

Select the font used to show the text on the page.

Font	Arial
FontSize	Arial
FontStyle	Arial Black
AlignX	Arial Monospace
AlignY	Arial Narrow
Text	Arial Unicode MS
Visible	Arnprior
Blink	AvantGarde Bk BT
Reverse	AvantGarde Md BT
Disable	Baskerville Old Face
Child	Batang
OffsetX	BatangChe
OffsetY	Bauhaus 93
	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Berylium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boophee
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size used to show the text on the page.

FontSize 10

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontStyle

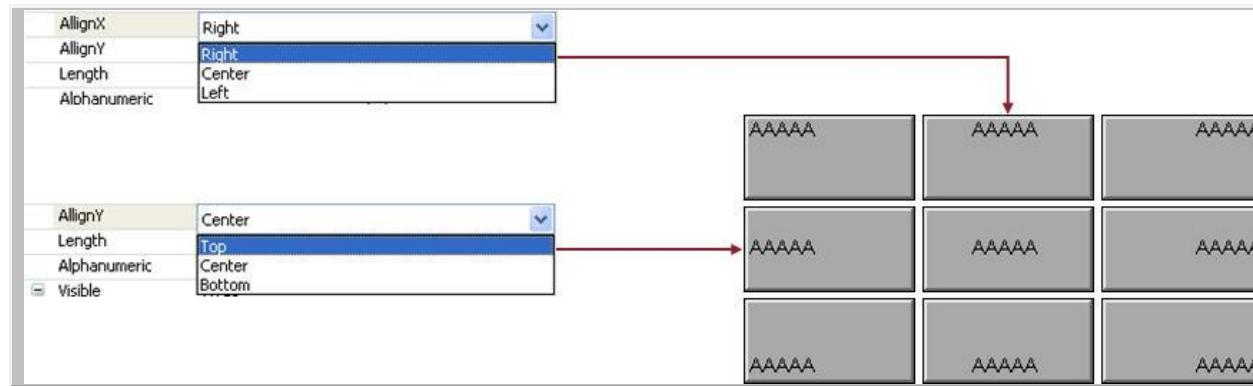
Select the font style used to show the text on the page.

FontStyle	Normal
AlignX	Normal
AlignY	Bold
Text	Italic
	BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## AlignX / AlignY

The text in thefield can bealigned:

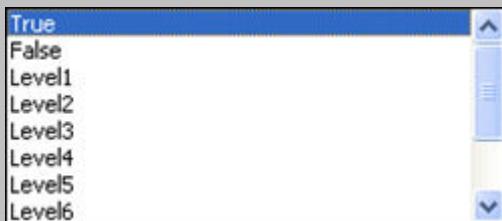


## Input

Allows to set the option to change the data by the operator.

<input checked="" type="checkbox"/> Input	Var_TestIn, True
Runtime	Var_TestIn
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.
- Fixed: This property can be: True = input enable, False = input disable or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is managed by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## ObjectId

This parameter is used to identify the object on the page.

ObjectId 201

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure \_MVariableChange this numerical parameter only when activated by the FB, and it is also verifiable in FB M\_EventFocus structure \_MFocus.ObjectId.

## Group

Parameter that allows to manage the cursor by group.

Group 4

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to these selected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another. When we want jump directly from one field to other related all'ObjectId, is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing up arrow.

ObjectIdUp 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing downarrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing leftarrow.

0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing rightarrow.

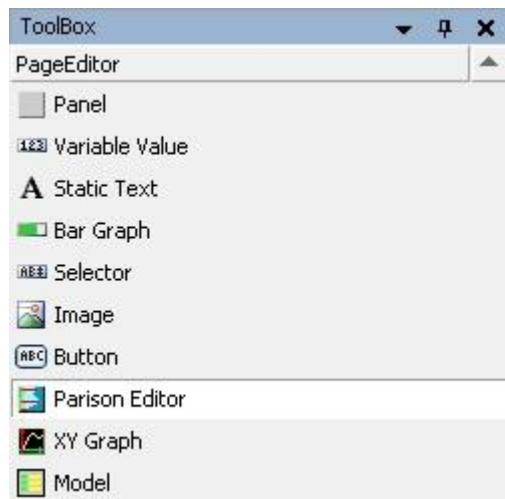
0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

### 5.2.5.18 Object Parison Editor

By [ToolBox](#) is possible insert an object called Parison:



The Parison object allow to edit a profile for Blow Moulding Machine. To see the operations of object insertion see the chapter [Insert Object](#).

Parison Object Properties:

Properties	
Property	Value
ObjectType	Parison Editor
Name	ParisonEditor_1
Top	324
Left	388
SizeX	100
SizeY	100
Variable	
FirstProfile	
NumProfile	1
FirstHeadFeedback	
NumHeadFeedback	1
TextColor	,0
BackgroundColor	,False,32768
Border	<input checked="" type="checkbox"/>
BorderColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0
Frame	Flat
Font	Arial
FontSize	10
FontStyle	Normal
SerialMarkerSizeX	10
SyncSizeX	3
ProfileBaseColor	<span style="background-color: #a1a1a1; color: #a1a1a1;">#a1a1a1</span> 169, 169, 169
ProfileRangeColor	<span style="background-color: #80c0ff; color: #80c0ff;">#80c0ff</span> 135, 206, 235
ProfileBorderColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0
ProfileOldColor	<span style="background-color: white; color: white;">#fff</span> 255, 255, 255
CursorColor	<span style="background-color: yellow; color: yellow;">#ffff00</span> 255, 255, 0
MasterColor	<span style="background-color: blue; color: blue;">#0000ff</span> 0, 0, 255
MarkerColor	<span style="background-color: blue; color: blue;">#0000ff</span> 0, 0, 255
SerialMarkerColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0, 0
FeedbackColor	<span style="background-color: red; color: red;">#ff0000</span> 255, 0, 0
SyncBackgroundColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0
SyncColor	<span style="background-color: red; color: red;">#ff0000</span> 255, 0, 0
SyncExtrusionColor	<span style="background-color: green; color: green;">#008000</span> 0, 128, 0
SyncFillingColor	<span style="background-color: black; color: black;">#000000</span> 0, 0, 0
WorkingPointColor	<span style="background-color: orange; color: orange;">#ffa500</span> 255, 165, 0
Visible	,True
Input	,True
Disable	<input type="checkbox"/>
Child	<input checked="" type="checkbox"/>
OffsetX	
OffsetY	
ObjectId	0

#### 5.2.5.18.1 Common properties

- 
- 5.2.5.18.2 [ObjectType](#)
- [Name](#)

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.18.3 Object Parison properties

#### Variable

Parameter \_MPEditortype determines the display.

See the information in the Help Moog Libraries under M\_MC600Hmi Library.

#### FirstProfile

Parameter MParProfiletype or simple array, which contains the profile or profiles.

FirstProfile Profili

See the information in the Help Moog Libraries under M\_MC600Hmi Library.

#### NumProfile

This parameter defines how many profiles are editable. The minimum number is 1.

NumProfile 10

#### FirstHeadFeedback

Parameter\_MParFeedbacktype or simple array, which contains the profile or profiles of feedback produced by the head.

FirstHeadFeedback Feedback

See the information in the Help Moog Libraries under M\_MC600Hmi Library.

#### NumHeadFeedback

This parameter defines the number of feedback displayed, produced by the head. The minimum number is 1

NumHeadFeedback 1

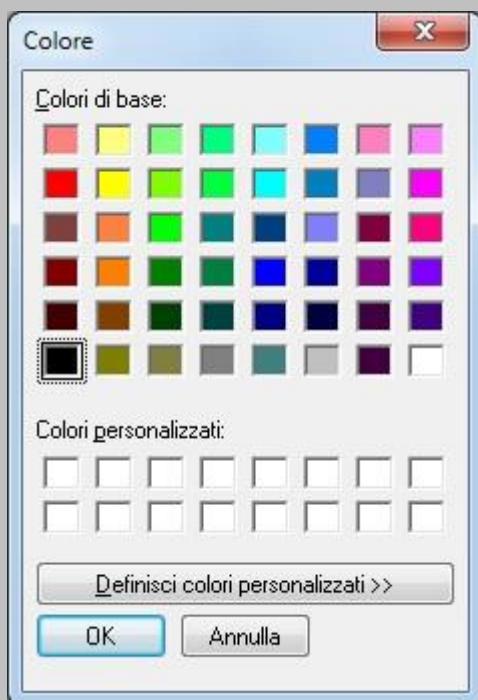
#### TextColor

Indicate the text color of the object.

<input checked="" type="checkbox"/> TextColor	, -16777216
Runtime	
Fixed	 0; 0; 0

- RunTime: By a DINT variable is possible change on fly the text color. For calculate the color ( $DINT = R * 1 + G * 256 + B * 65536$ ) use the Function M\_BuildColor under the library M\_MC600Hmi.

- Fixed: By a palette color is possible define the fixed text color:



## Font

Select the font used to show the text on the page.

Font	Arial
FontSize	Arial
FontStyle	Arial Black
AlignX	Arial Monospace
AlignY	Arial Narrow
+ Text	Arial Unicode MS
+ Visible	Arnprior
+ Blink	AvantGarde Bk BT
+ Reverse	AvantGarde Md BT
Disable	Baskerville Old Face
Child	Batang
OffsetX	BatangChe
OffsetY	Bauhaus 93
	Baveuse
	Bell MT
	Bella Donna
	Berlin Sans FB
	Berlin Sans FB Demi
	Bernard MT Condensed
	Berylium
	Biondi
	Blue Highway
	Blue Highway Condensed
	Blue Highway D Type
	Blue Highway Linocut
	Bodoni MT Poster Compressed
	Book Antiqua
	Bookman Old Style
	Bookshelf Symbol 7
	Boopée
	Bradley Hand ITC

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontSize

Select the font size used to show the text on the page.

FontSize	10
----------	----

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## FontStyle

Select the font style used to show the text on the page.

FontStyle	Normal
AlignX	Normal
AlignY	Bold
Text	Italic BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## SerialMarkerSizeX

This parameter determines the horizontal width, in pixels, of the area that displays the serial marker.

SerialMarkerSizeX 10

## SyncSizeX

This parameter determines the horizontal width, in pixels, histogram display a synchronization point.

SyncSizeX 3

## ProfileBaseColor

Parameter that determines the color used to display the base of the profile.

ProfileBaseColor 169, 169, 169

## ProfileRangeColor

Parameter that determines the color used to display the range of the profile.

ProfileRangeColor 135, 206, 235

## ProfileBorderColor

Parameter that determines the color used to display the right edge of the profile.

ProfileBorderColor 0, 0, 0

## ProfileOldColor

Parameter that determines the color used to display the right edge of the profile as soon as a change in the profile.

The edge of the old profile will be stored with the color set in ProfileOldColor until the new profile will not be saved.

ProfileOldColor 255, 255, 255

## CursorColor

Parameter that determines the color used to display the cursor horizontally through all four vertical areas.

CursorColor 255, 255, 0

## MasterColor

Parameter that determines the color used to display the master.

MasterColor 0, 0, 255

## MarkerColor

Parameter that determines the color used to display the marker.

MarkerColor 255, 255, 255

**SerialMarkerColor**

Parameter that determines the color used to display the serial marker.

<input type="color"/>	SerialMarkerColor	 255, 128, 0
-----------------------	-------------------	---

**FeedbackColor**

Parameter that determines the color used to display the feedback.

<input type="color"/>	FeedbackColor	 255, 0, 0
-----------------------	---------------	---

**SyncBackgroundColor**

Parameter that determines the color used to display the background synchronisms.

<input type="color"/>	SyncBackgroundColor	 0, 0, 0
-----------------------	---------------------	---

**SyncColor**

Parameter that determines the color used to display the synchronism in filling and in extrusion.

<input type="color"/>	SyncColor	 255, 0, 0
-----------------------	-----------	---

**SyncExtrusionColor**

Parameter that determines the color used to display the synchronism in extrusion.

<input type="color"/>	SyncExtrusionColor	 255, 255, 0
-----------------------	--------------------	---

**SyncFillColor**

Parameter that determines the color used to display the synchronism in filling.

<input type="color"/>	SyncFillColor	 0, 255, 0
-----------------------	---------------	---

**WorkingPointColor**

Parameter that determines the color used to display the working point.

<input type="color"/>	WorkingPointColor	 128, 128, 0
-----------------------	-------------------	---

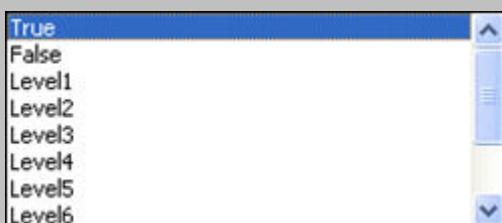
**Input**

Allows to set the option to change the data by the operator.

<input checked="" type="checkbox"/> Input	Var_TestInputParison1, True
Runtime	Var_TestInputParison1
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.

- Fixed: This property can be: True = input enable, False = input disable or under Level:



Level: can be set from Level 1 (High) to Level 10 (Low). The level is managed by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

**ObjectId**

This parameter is used to identify the object on the page.

<input type="text"/>	ObjectId	201
----------------------	----------	-----

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure **\_MVariableChange** this numerical parameter only when activated by the FB, and it is also verifiable in FB **M\_EventFocus** structure **\_MFocus.ObjectId**.

## Group

Parameter that allows to manage the cursor by group.

Group

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to theselected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another. When we want jump directly from one field to other related all'ObjectId, is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter setin ObjectId) selectable by pressing up arrow.

ObjectIdUp

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing downarrow.

ObjectIdDown

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing left arrow.

ObjectIdLeft

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

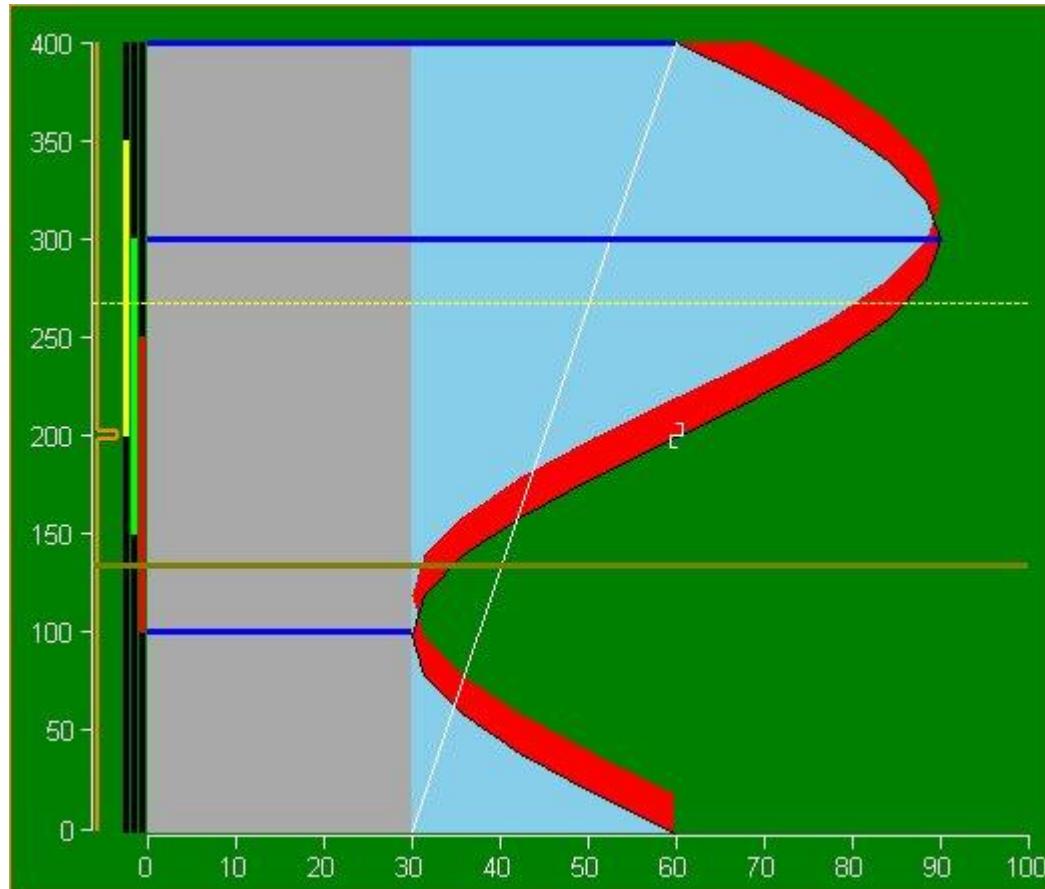
## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing right arrow.

ObjectIdRight

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.



The Parison Object is usually composed by the following 5 parts:

1. Vertical ruler: (**\_MPEditor.ShowVRuler**: it's the BOOL parameter which enable the ordinate axis visualization. Default value is: TRUE).



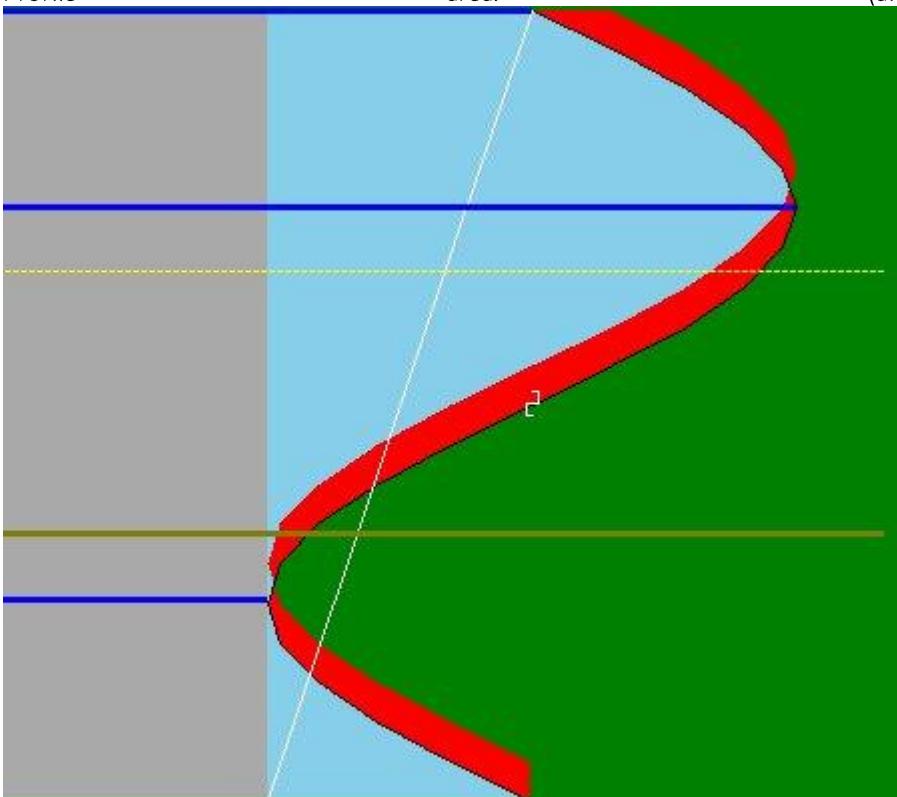
2. Serial marker area: (**\_MPEditor.ShowSM**: is the BOOL parameter which enable the visualization of serial markers bar. Default value is: TRUE).



3. Synchronism area: (**\_MPEditor.Sync** is the INT parameter which define the number of shown synchronism. Must be configured at least to 1 or higher value (up to 8). Default value is: 8.



4. Profile area: (always visible).



5. Horizontal ruler: (**\_MPEditor.ShowHRuler**: is the BOOL parameter which enable the abscissa axis visualization. Default value is TRUE.



The area visibility of the point 1,2,3,5 can be modified by runtime.

The space for the visualization is based on the profile area.

All the parts share the same background color.

Vertical areas share the same scaling factor.

L'istogramma verticale mostra il punto di lavorazione *attuale (per la testa selezionata)*.

L'area dei Serial markers contiene un diagramma dello stato logico del serial marker lungo il profilo.

Se posizionato a sinistra è OFF (spento), a destra è ON (acceso). (**SerialMarkerColor**: è il colore fisso usato per visualizzare i serial marker, **ShowSM**: è il parametro di tipo *BOOL* che abilita la visualizzazione della barra dei Serial Markers, **SerialMarkerSizeX**: è il parametro di tipo numerico fisso che determina l'ampiezza orizzontale in pixel dell'area che visualizza il serial marker).



L'area dei sincronismi contiene da 0 a 8 linee a seconda di quanti sincronismi sono programmati. (**Sync**: è il parametro di tipo *INT* che determina il numero di sincronismi visualizzati).

Ogni segnale di sincronismo è definito da punti di start e punti di stop (definiscono l'ampiezza dei sincronismi) e dalla modalità di lavoro con accumulatore abilitato.



Il colore di ogni linea di sincronismo è impostabile in base alla direzione nella quale funzionare. (**SyncColor**: è il colore fisso per visualizzare un sincronismo funzionante in entrambe le direzioni, **SyncExtrusionColor** è il colore fisso per visualizzare un sincronismo funzionante in estrusione e **SyncFillColor**: è il colore fisso per visualizzare un sincronismo funzionante in riempimento).

Nell'area della visualizzazione del profilo (massimo 400 punti) ogni punto definisce un valore di posizione da 0 a 100,00%; il profilo è disegnato e composto da un'interpolazione di punti base (masters), evidenziati da una linea orizzontale blu.

L'interpolazione può essere di vari tipi: curve **Bezier**, **lineare**, **piatta**, **parabolica 1** (parabola con tangente 0 sul punto finale) o **parabolica 2** (parabola con tangente 0 sul punto iniziale).

Un'interpolazione può essere selezionata in modo differente per ogni area disponibile tra un master e l'altro. In quest'area, oltre a mostrare il profilo corrente, si può visualizzare il feedback del profilo attuale presente sulla testa (abilitando **MPEditor.ShowHRuler.ShowFeedback**: parametro di tipo *BOOL*).

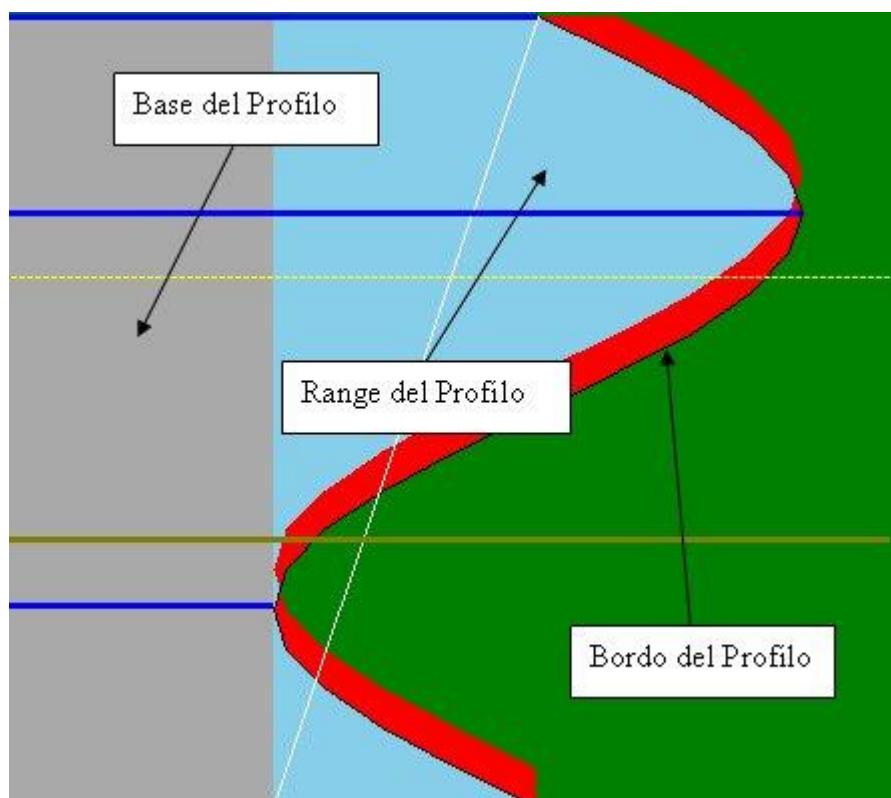
Su un profilo è possibile inserire dei marcatori (markers) tramite il parametro **ShowMK** che permettono di scoprire visivamente un punto del Parison.

L'oggetto Parison è dotato di cursore *orizzontale* che si può muovere verticalmente ed attraversa tutte e quattro le aree verticali. Esso è presente anche quando l'oggetto non ha il focus. La sua visualizzazione è:

1. Focus assente: linea tratteggiata dello spessore di 1 pixel.
2. Focus presente: linea continua dello spessore di 1 pixel.
3. Focus presente ed in edit : linea continua dello spessore di 3 pixel.



L'area del profilo è mostrata in tre colori differenti: base del profilo (valore del punto più basso - **ProfileBaseColor**), range del profilo (**ProfileRangeColor**) e bordo del profilo **ProfileBorderColor**). I colori sono selezionabili a *design time*.



I master sono visualizzati utilizzando una linea continua di 3 pixel di spessore di un colore selezionabile (**MasterColor**) a design time.

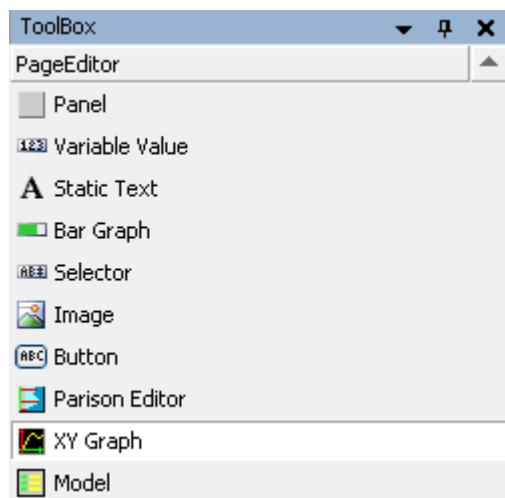
*La linea inizia dall'asse verticale e termina al valore del punto.*



Durante la modifica del profilo una linea di un colore selezionato (**ProfileOldColor**) permette di visualizzare il bordo destro del profilo originale fino a che il profilo nuovo non sarà memorizzato.

### 5.2.5.19 Object XY Graph

By [ToolBox](#) is possible insert an object called XY Graph:



The XY Graph object allow to show a numeric value in the graphically form. To see the operations of object insertion see the chapter [Insert Object](#).

XY Graph Object Properties:

Properties	
Property	Value
ObjectType	XY Graph
Name	XYGraph_1
Top	323
Left	551
SizeX	100
SizeY	100
Variable	
+ BackgroundColor	,False,32768
Border	<input checked="" type="checkbox"/>
BorderColor	<span style="background-color: black; color: black;">█</span> 0, 0, 0
Frame	Flat
Font	Arial
FontSize	10
FontStyle	Normal
AxisX	
AxisY1	
AxisY2	
AxisY3	
AxisY4	
AxisY5	
AxisY6	
AxisY7	
AxisY8	
AxisY9	
AxisY10	
Curve1	
Xdata1	
Ydata1	
Curve2	
Xdata2	
Ydata2	
Curve3	
Xdata3	
Ydata3	
Curve4	
Xdata4	
Ydata4	
Curve5	
Xdata5	
Ydata5	
Curve6	
Xdata6	

#### 5.2.5.19.1 Common properties

- 
- **5.2.5.19.2 [ObjectType](#)**
- **[Name](#)**

- [Top](#)
- [Left](#)
- [SizeX](#)
- [SizeY](#)
- [BackgroundColor](#)
- [Border](#)
- [Frame](#)
- [Visible](#)
- [Blink](#)
- [Disable](#)
- [Child](#)
- [OffsetX](#)
- [OffsetY](#)

### 5.2.5.19.3 Object XY Graph properties

#### Variable

Parameter type **\_MXYGraph** that contains the data will be used in the field.

Variable GVL.Page1\_XY

For each graph field, the must be instantiated a variable of type **\_MXYGraph**. For details, see the Help **Moog Libraries** under the **M\_MC600Hm** library.

#### Font

Select the font used to show the text on the page.

Font	Arial	▼
FontSize	Arial	▲
FontStyle	Arial Black	
AlignX	Arial Monospace	
AlignY	Arial Narrow	
Text	Arial Unicode MS	
Visible	Arnprior	
Blink	AvantGarde Bk BT	
Reverse	AvantGarde Md BT	
Disable	Baskerville Old Face	
Child	Batang	
OffsetX	BatangChe	
OffsetY	Bauhaus 93	
	Baveuse	
	Bell MT	
	Bella Donna	
	Berlin Sans FB	
	Berlin Sans FB Demi	
	Bernard MT Condensed	
	Berylium	
	Biondi	
	Blue Highway	
	Blue Highway Condensed	
	Blue Highway D Type	
	Blue Highway Linocut	
	Bodoni MT Poster Compressed	
	Book Antiqua	
	Bookman Old Style	
	Bookshelf Symbol 7	
	Boopée	
	Bradley Hand ITC	

The available fonts are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help **Moog Font Editor**.

#### FontSize

Select the font size used to show the text on the page.

FontSize 10

The available font size are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help **Moog Font Editor**.

## FontStyle

Select the font style used to show the text on the page.

FontStyle	Normal
AlignX	Normal
AlignY	Bold
Text	Italic
	BoldItalic

The available font style are taken from the Windows OS. For import the font from Windows and install it into the MC600 PLC see the Help Moog Font Editor.

## AxisX

Parameter type **\_MXYGraphAxis** that contains the command related to the X axis.

AxisX	GVL.Page1_XY_AxisX
-------	--------------------

For each graph field, the must be instantiated a variable of type **\_MXYGraphAxis**. For details, see the Help **Moog Libraries** under the **M\_MC600Hmi** library.

## AxisY1..AxisY10

Parameter type **\_MXYGraphAxis** that contains the command related to the Y axis (from 1 up to 10).

AxisY1	GVL.Page1_XY_AxisY1
--------	---------------------

For each graph field, the must be instantiated a variable of type **\_MXYGraphAxis**. For details, see the Help **Moog Libraries** under the **M\_MC600Hmi** library.

## Curve1..Curve10

Parameter type **\_MXYGraphCurve** that influence the display of the single curve.

Curve1	GVL.Page1_XY_Curve
--------	--------------------

...

Curve10
---------

For each graph field, the must be instantiated a variable of type **\_MXYGraphCurve**. For details, see the Help **Moog Libraries** under the **M\_MC600Hmi** library.

## XData1..XData10

Numeric variable to be plotted on the graph to the X axis (usually using an array).

## YData1..YData10

Numeric variable to be plotted on the graph to the Y axis (usually using an array).

## Input

Allows to set the option to change the data by the operator.

<input checked="" type="checkbox"/> Input	Var_TestIn,True
Runtime	Var_TestIn
Fixed	True

- Runtime: Insert a boolean variable when is TRUE the object is in input enable and vice-versa.
- Fixed: This property can be: True = input enable, False = input disable or under Level:

True
False
Level1
Level2
Level3
Level4
Level5
Level6

Level: can be set from Level 1 (High) to Level 10 (Low). The level is managed by the variable AccessLevel in the structure M\_TermIn under M\_MC600Hmi library.

## ObjectId

This parameter is used to identify the object on the page.

ObjectId 201

When the cursor is positioned on this field, the operating system writes to the variable ObjectId of the structure **\_MVariableChange** this numerical parameter only when activated by the FB, and it is also verifiable in FB **M\_EventFocus** structure **\_MFocus.ObjectId**.

## Group

Parameter that allows to manage the cursor by group.

Group 4

If the parameter is not set (value 0), the cursor will move standard, that will have it on the first page field to input allowed in the top, bottom, left and right in according to these selected arrows.

If it is set to a number in the Group parameter, using the arrows left and right, the cursor will move in all fields with the same number, while using the up and down arrows, the cursor will move between one group and another.

When we want jump directly from one field to other related all'ObjectId, is needed in the parameter on the desired arrow (ObjectIdUp, ObjectIdDown, ObjectIdLeft, ObjectIdRight) write this parameter.

## ObjectIdUp

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing up arrow.

ObjectIdUp 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdDown

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing downarrow.

ObjectIdDown 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdLeft

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing leftarrow.

ObjectIdLeft 0

If the parameter is not set (value 0), the cursor will move in standard way.

When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

## ObjectIdRight

This parameter is used to identify the object (with the same parameter set in ObjectId) selectable by pressing rightarrow.

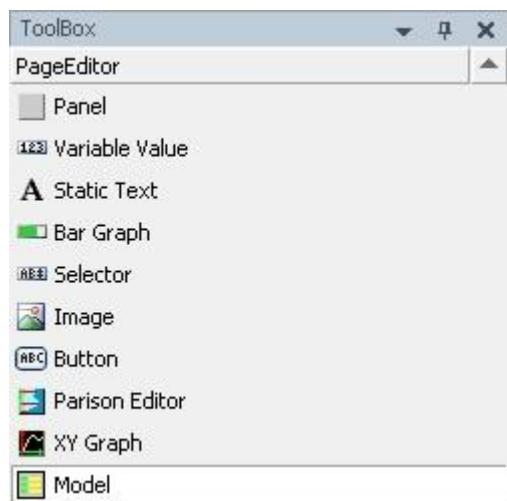
ObjectIdRight 0

If the parameter is not set (value 0), the cursor will move in standard way.

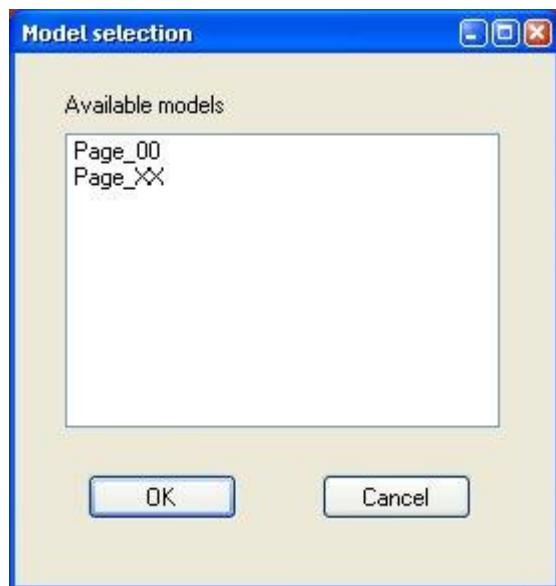
When want to jump directly to a desired field, you must write the ObjectId parameter set in the desired field.

### 5.2.5.20 Object Model

By [ToolBox](#) is possible insert an object called Model:



The Model object allow to insert in a page another page defined as a Model. When selecting in the ToolBox the Model object and drag it to the main page, a list of pages available model appear:



To see the operations of object insertion see the chapter [Insert Object](#).

Model Object properties:

Properties	
Property	Value
ObjectType	Model
Name	Model_1
Top	126
Left	33
PageFrom	Model
%A	Struct1
%B	
%C	
%D	
%E	
%F	
%G	
%H	
%I	
%J	

#### 5.2.5.20.1 Common properties

- 

#### 5.2.5.20.2 ObjectType

- Name
- Top
- Left
- Visible
- Child

#### 5.2.5.20.3 Object Model properties

##### PageFrom

Parameter that define the fixed name of the Model page.

PageFrom	Page_XX
----------	---------

##### %A..%J

When creating a model it is possible define the attributes in texts that begin with the "%" character. In the names of variables can be inserted such texts that function as place holder and indicates the parameters of the macro will be replaced by the page that uses it:

%A.Setpoint  
%A.ActualPosition

The merger of the model to the main page is performed during compilation. During this operation, the parameters are changed in each macro and inspection is carried out and the assignment of each variable:

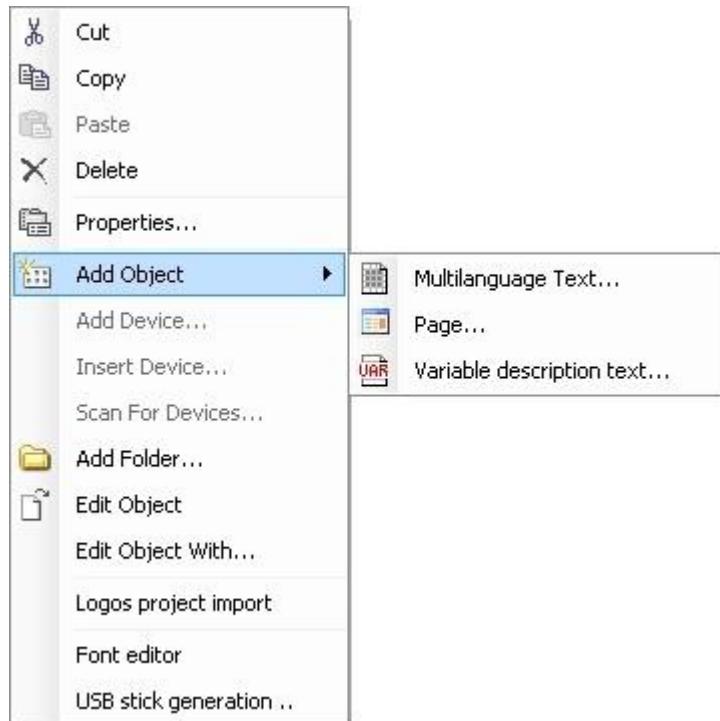
MyStructure.Setpoint  
MyStructure.ActualPosition

%A	MyStructure
%B	
%C	
%D	
%E	
%F	
%G	
%H	
%I	
%J	

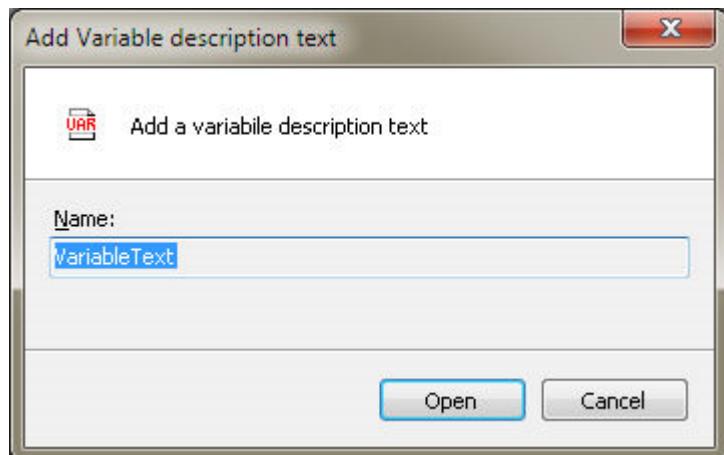
## 5.2.6 Variable Description Text Object

Under the MMI Manager object is possible to add one object called **Variable description text**. The Variable description text permit to describe all the variables contained in the currently application. The Variable description text is used for create the "variable history" (see function block M\_EventChanging). The Variable description text is identify by a name and an incremental number called ID. In the Variable description text is possible to manage one or more than languages. For add the object Variable description text is necessary put the cursor on

the MMI Manager level and click right button or press the specific button: Add Object . Another possibility to add the Variable description text is by the Menu project > Add Object > Variable description text.



Appear the follow box:



- Name:** Automatically.
- Open:** Add variable description text.
- Cancel:** Abort the operation

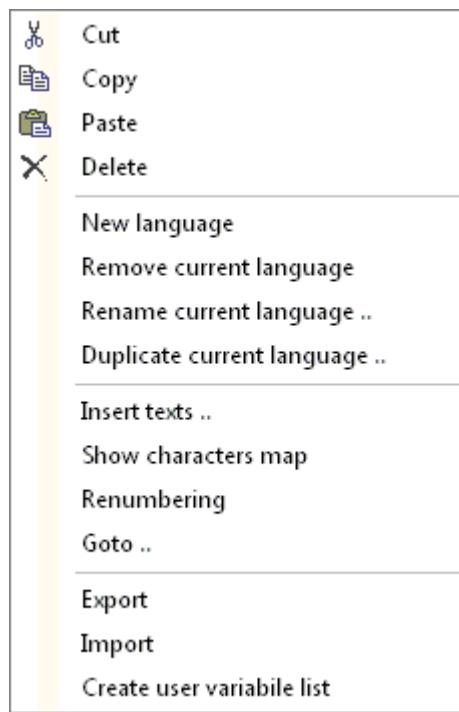
The variable description text created contain one column and this column bring the variable names from the application:

	ID	VarNames
▶	0	
*		



### 5.2.6.1 Variable description text Context Menu

Clicking by right button appear the follow context menu:



- [Cut](#)
- [Copy](#)
- [Paste](#)
- [Delete](#)
- New language
- Remove current language
- Rename current language
- Duplicate current language
- Insert texts
- Show characters map
- [Renumbering](#)
- [Goto](#)
- [Export](#)
- [Import](#)
- Create user variable list

## 5.2.6.1.1 Cut



**WARNING!**  
Undo and Redo doesn't work in this editor.

By this command is possible cut the selected text on the variable description text.

Now the text is copied into the clipboard and is possible [paste](#) in an other position.

## 5.2.6.1.2

[Copy](#)

WARNING!

Undo and Redo doesn't work in this editor.

By this command is possible cut the selected text on the variable description text.

Now the text is copied into the clipboard and is possible [paste](#) in an other position.

## 5.2.6.1.3 Paste



**WARNING!**  
Undo and Redo doesn't work in this editor.

By this command is possible paste the text from a [cut](#) or a [copy](#) operations on the variable description text.

5.2.6.1.4      [Delete](#)

**WARNING!**  
Undo and Redo doesn't work in this editor.

By this command is possible delete the selected text on the variable description text.

## 5.2.6.1.5 New Language



By this command is possible add a new language column on the variable description text component.

Clicking New language appear the follow box:



- **Language name:** Put the name of the new language.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

After the confirmation will appear the new language column in the right position:

ID	VarNames	English	Italiano	Spanish
0	a	Description		
1	Check	ATTENTION		
2	DateTime			
3	Main.VarEntries			
4	Main.VarExtension			
5	Main.VarFileNames[1]			

## 5.2.6.1.6 Remove Current Language



By this command is possible remove the selected language column from the variable description text component.

Clicking Remove current language appear the follow box:



- **OK:** Confirm the operation. The selected language will be removed.
- **Cancel:** Abort the operation.

## 5.2.6.1.7 Rename Current Language



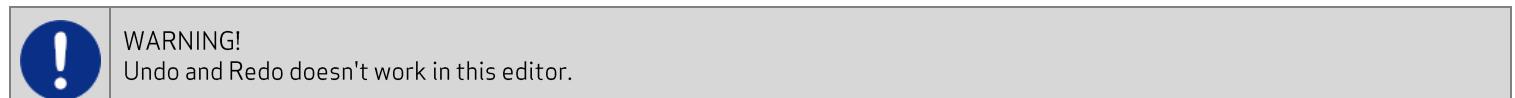
By this command is possible add a new language column on the variable description text component.

Clicking Rename current language appear the follow box:



- **Old name:** Take the current selected name language.
- **New name:** Write the new language name.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

## 5.2.6.1.8 Duplicate current language

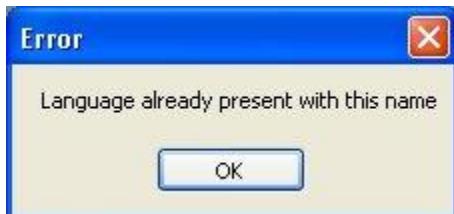


By this command is possible duplicate the selected language column on the variable description text component.

Clicking Duplicate current language appear the follow box:



- **Language from:** Take the current selected name language.
- **Language to:** Write the new language name. If the name is already used appear the follow box:



- **OK:** Close the box and abort the operation.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

## 5.2.6.1.9 Insert Texts

 !	WARNING! Undo and Redo doesn't work in this editor.
--	--

Normally the new text is inserted by starting to write

	ID	English
	0	Text 1
	1	Text 2
.	2	Text 3
*		

By the command Insert texts is possible add a new empty rows on the variable description text component.

Clicking Insert texts appear the follow box:



- **First text:** Indicate the start ID where start to insert a new rows.
- **Number:** Indicate the number range.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

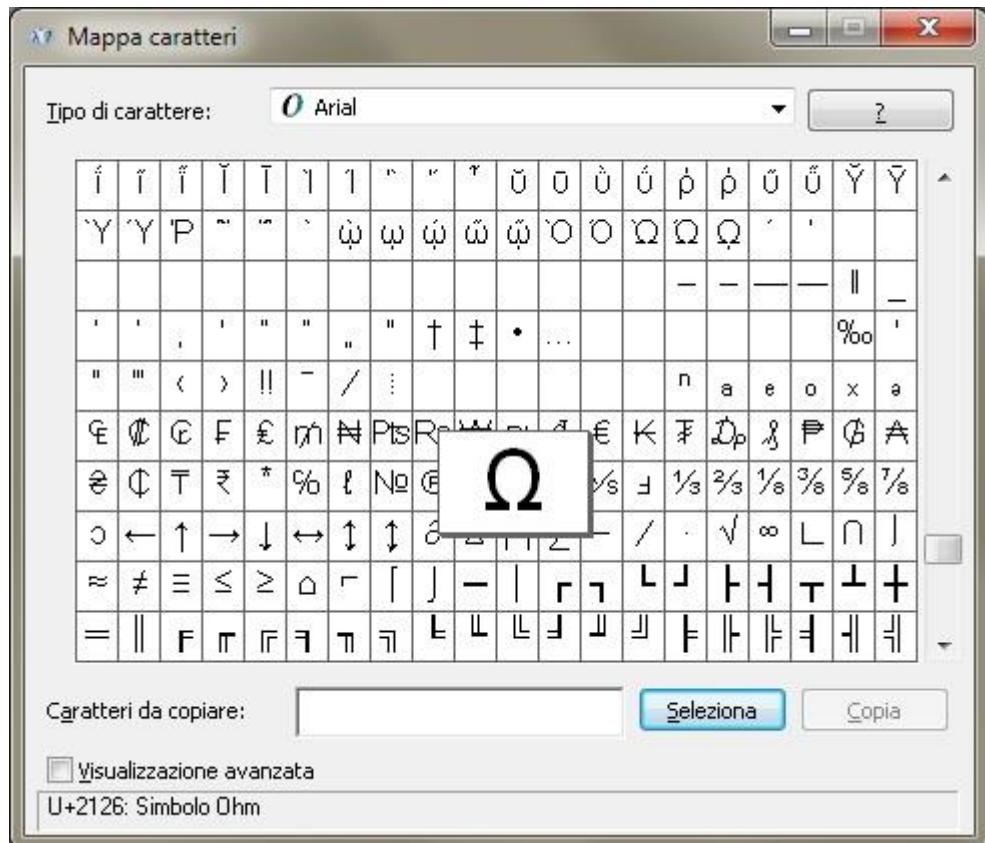
After the confirmation will appear the new rows that start from 200 per 10 texts:

	ID	English
	0	Text 1
	1	Text 2
	2	Text 3
	200	Text 200
▶	201	
	202	
	203	
	204	
	205	
	206	
	207	
	208	
	209	Text 209
*		

## 5.2.6.1.10 Show Characters Map

By this command is possible recall the characters map from Windows®.

Clicking Show characters map appear the follow box:



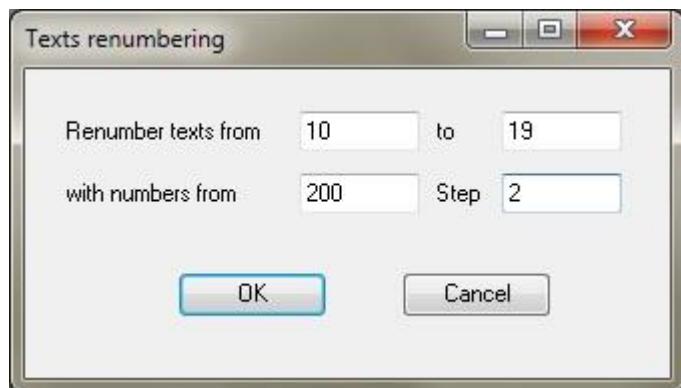
Select the character and copy into the multilanguage text.

## 5.2.6.1.11 Renumbering



By this command is possible renumbering the existing texts on the variable description text component.

Clicking Renumbering appear the follow box:



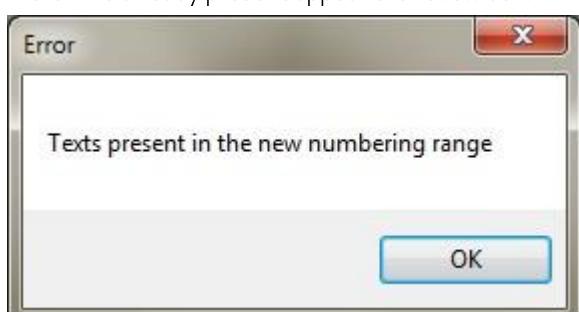
- **Renumber texts from:** Indicate the start ID where start to renumbering the existing rows.
- **To:** Indicate the last ID where stop to renumbering the existing rows.
- **With numbers from:** Indicate the new ID where to renumbering the existing rows.
- **Step:** Indicate the step for any rows renumbered.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

After the confirmation will appear the new rows that start from 200 per 10 texts with step 2:

**VariableText [MC600: PLC Logic: Application: MMIManager]**

ID	VarNames	English	Italiano
0			
1	a	Description	
2	Check	ATTENTION	
3	DateTime		
4	Main.VarEntries		
5	Main.VarExtension		
6	Main.VarFileNames[1]	Text1	
7	Main.VarFileNames[10]	Text2	
8	Main.VarFileNames[2]	Text3	
9	Main.VarFileNames[3]		
20	TestModel.tTime		
21	TestModel2.dDate		
22	TestModel2.iNumeric		
23	TestModel2.tTime		
24	Words		
25			
200	Main.VarFileNames[4]		
202	Main.VarFileNames[5]		
204	Main.VarFileNames[6]		
206	Main.VarFileNames[7]		
208	Main.VarFileNames[8]		
210	Main.VarFileNames[9]		
212	Message		
214	Number		
216	TestModel.dDate		
218	TestModel.iNumeric		
*			

If the ID is already present appear the follow box:



## 5.2.6.1.12 Goto

By this command is possible Go to at the indicates ID on the variable description text component.

Clicking Goto appear the follow box:



- **Text ID:** Indicate the text ID where put the cursor. If the ID doesn't exist the cursor will go to the first useful next.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

## 5.2.6.1.13 Export

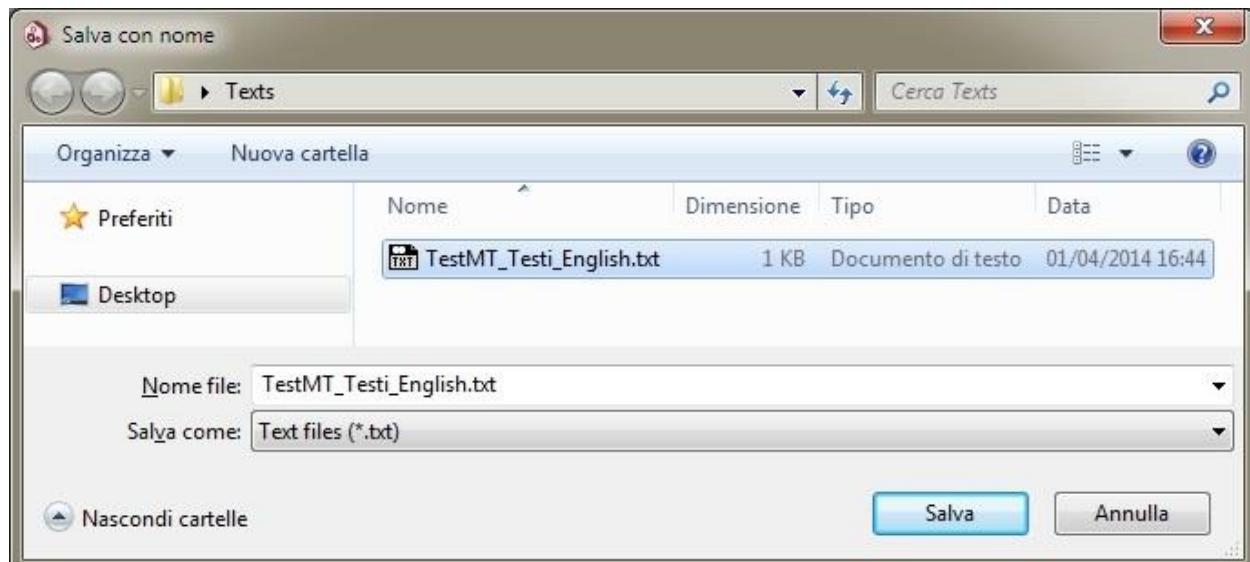
By this command is possible Export the languages in a text file from the variable description text component.

Clicking Export appear the follow box:

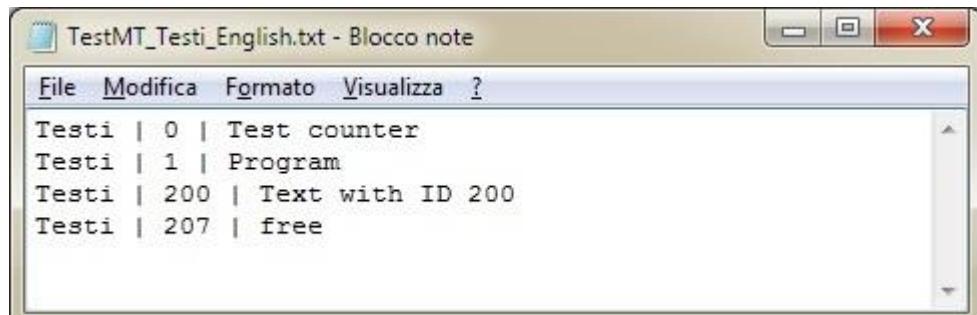


- **Language to export:** Select the language to export from a language list.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.

After the confirmation will appear the Windows® box where is possible define the location where put the exported file (\*.TXT):



The saved file can be opened and modified with any common text editor:

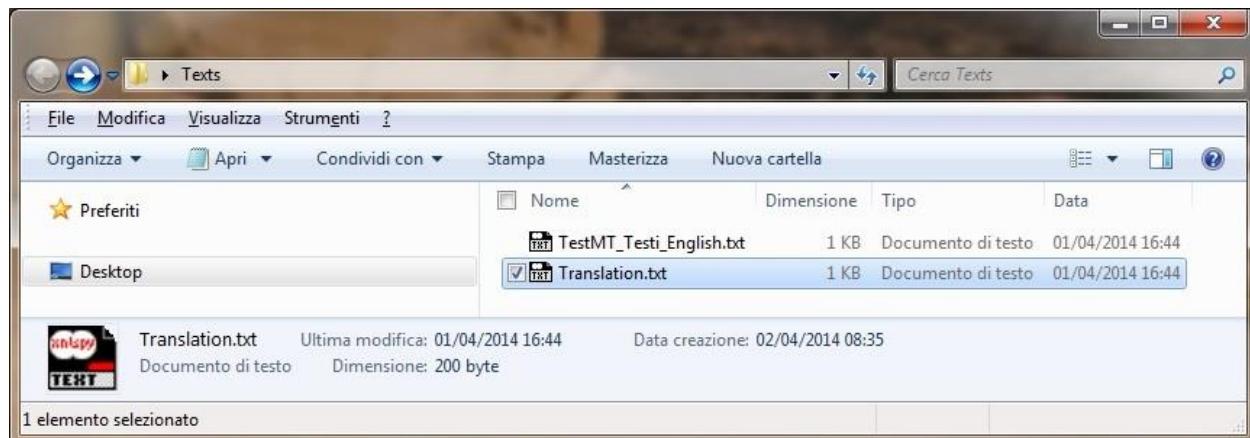


## 5.2.6.1.14 Import



By this command is possible Import the languages from a text file on the variable description text component.

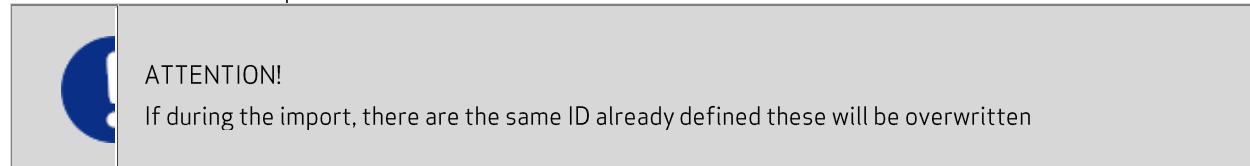
Clicking Import will appear the Windows® box where is possible select the import file (\*.TXT):



Clicking Open appear the follow box:

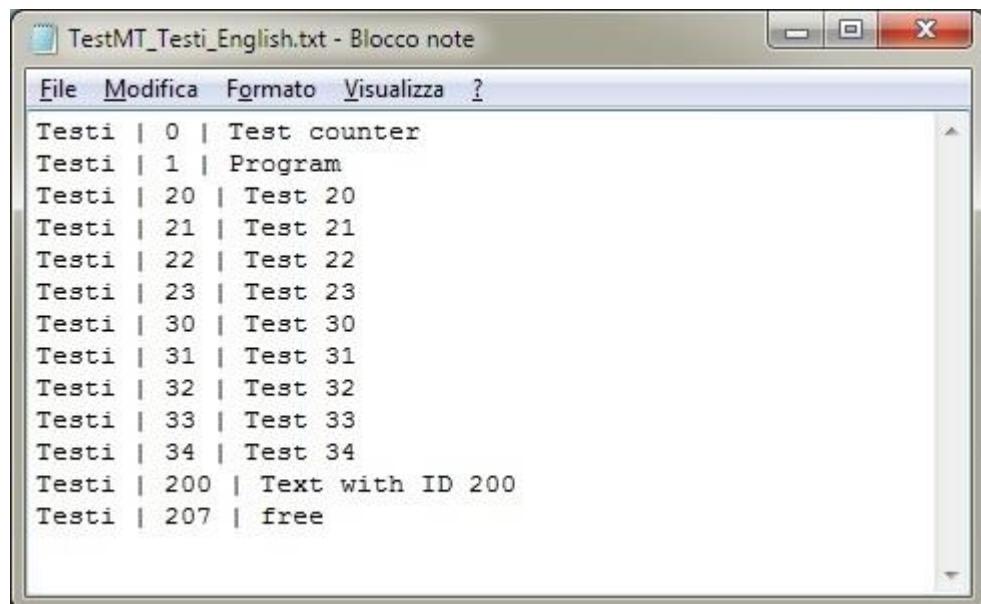


- **Language to update:** Select the language column where apply the imported TXT.
- **OK:** Confirm the operation.
- **Cancel:** Abort the operation.



Example:

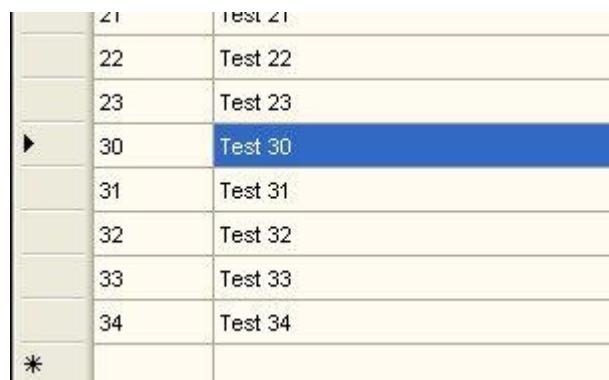
If the TXT file contains the new ID:



The screenshot shows a Windows Notepad window with the title "TestMT\_Testi\_English.txt - Blocco note". The menu bar includes "File", "Modifica", "Formato", "Visualizza", and "?". The main content area contains the following text:

```
Testi | 0 | Test counter
Testi | 1 | Program
Testi | 20 | Test 20
Testi | 21 | Test 21
Testi | 22 | Test 22
Testi | 23 | Test 23
Testi | 30 | Test 30
Testi | 31 | Test 31
Testi | 32 | Test 32
Testi | 33 | Test 33
Testi | 34 | Test 34
Testi | 200 | Text with ID 200
Testi | 207 | free
```

The new ID will be added:



21	Test 21
22	Test 22
23	Test 23
30	Test 30
31	Test 31
32	Test 32
33	Test 33
34	Test 34
*	

## 5.2.6.1.15 Create user variable list



**WARNING!**  
Undo and Redo doesn't work in this editor.



**WARNING!**  
This command create a list of the writable and used in the pages variables. The suggestion is to launch this command after finishing to create the application Pages.  
Only the principal variables used in the page objects: Variable value, Bargraph and Selector are caught.

By this command is possible create list of the variables on the variable description text component.

Clicking Create user variable list appear the follow result:

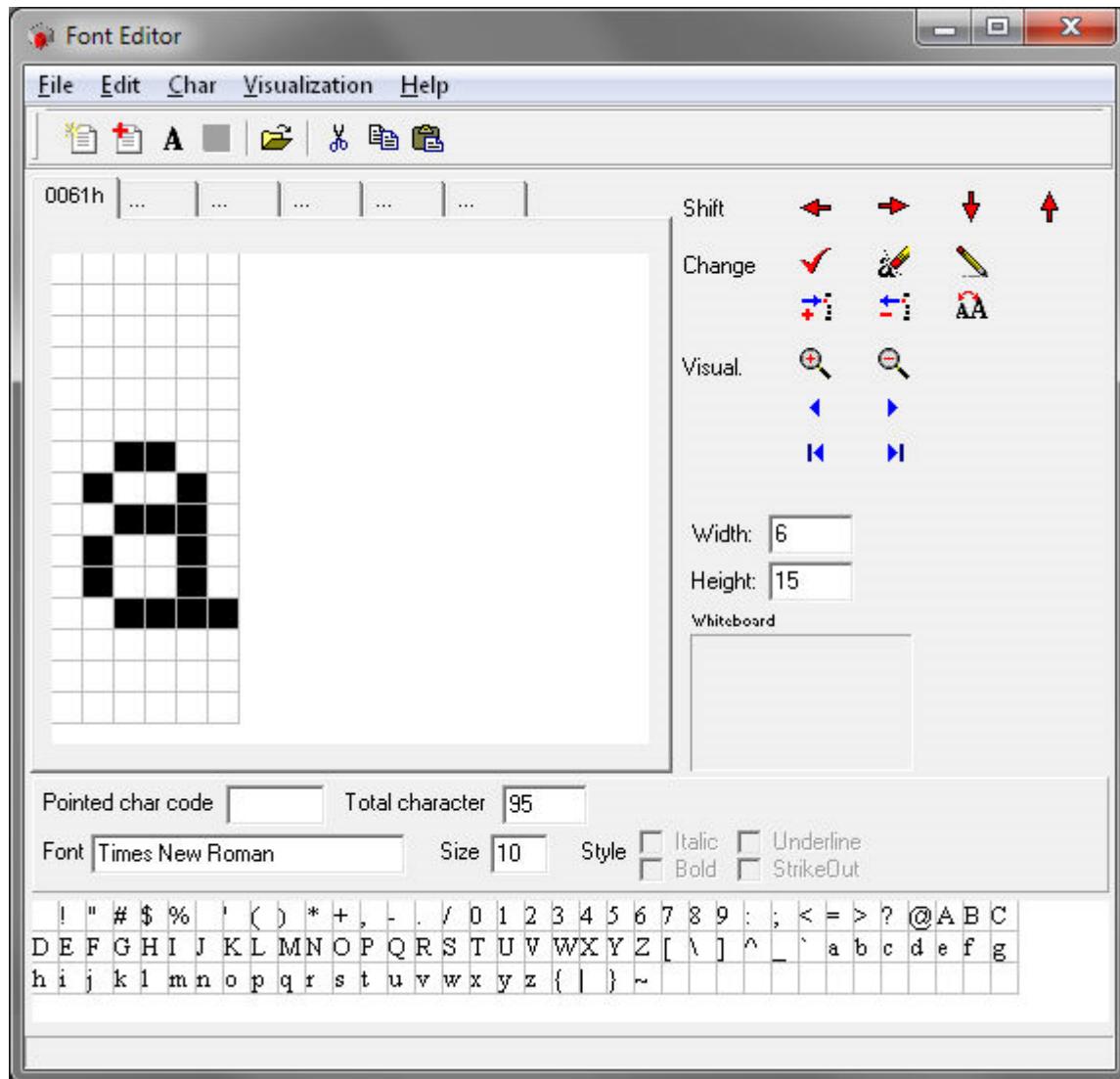
VAR	VariableText [MC600: PLC Logic: Application: MMIManager]	
ID	VarNames	English
0		
1	a	
2	Check	
3	DateTime	
4	Main.VarEntries	
5	Main.VarExtension	
6	Main.VarFileNames[1]	
7	Main.VarFileNames[10]	
8	Main.VarFileNames[2]	
9	Main.VarFileNames[3]	
10	Main.VarFileNames[4]	
11	Main.VarFileNames[5]	
12	Main.VarFileNames[6]	
13	Main.VarFileNames[7]	
14	Main.VarFileNames[8]	
15	Main.VarFileNames[9]	
16	Message	
17	Number	
18	TestModel.dDate	
19	TestModel.iNumeric	
20	TestModel.tTime	
21	TestModel2.dDate	
22	TestModel2.iNumeric	
23	TestModel2.tTime	
24	Words	
*		

If the new variables are inserted in the second time in our application, is necessary to launch again the command Create list of the variables. The new variables are inserted at the end of the list:

VAR	VariableText [MC600: PLC Logic: Application: MMIManager]	
ID	VarNames	English
0		
1	a	
2	Check	
3	DateTime	
4	Main.VarEntries	
5	Main.VarExtension	
6	Main.VarFileNames[1]	
7	Main.VarFileNames[10]	
8	Main.VarFileNames[2]	
9	Main.VarFileNames[3]	
10	Main.VarFileNames[4]	
11	Main.VarFileNames[5]	
12	Main.VarFileNames[6]	
13	Main.VarFileNames[7]	
14	Main.VarFileNames[8]	
15	Main.VarFileNames[9]	
16	Message	
17	Number	
18	TestModel.dDate	
19	TestModel.iNumeric	
20	TestModel.tTime	
21	TestModel2.dDate	
22	TestModel2.iNumeric	
23	TestModel2.tTime	
24	Words	
25	b	

## 5.3 Moog Font Editor

From Menu Tools is possible recall the "Font editor" tool that permit to import the Fonts (from Windows and from Logos) and create a specific fonts for MC600 system.



The Fonts used on MC600 system have the extension \*.FONT. Normally on the MC600 CPUs are already installed the System Fonts that include:

- **Arial.font:**

size	normal	italic	bold	underline	strike
8	X				
8		X			
8			X		
8		X	X		
10	X				
10		X			
10			X		
10		X	X		
12	X				
12		X			
12			X		
12		X	X		
18	X				
18		X			
18				X	

18

X

X

- **Verdana.font:**

size	normal	italic	bold	underline	strike
8	X				
8		X			
10	X				
10			X		
10		X	X		
12	X				
40	X				

- **Courier New.font:**

size	normal	italic	bold	underline	strike
8	X				
8		X			
8			X		
8		X	X		
10	X				
10		X			
10			X		
10		X	X		
12	X				
12		X			
12			X		
12		X	X		
18	X				
18		X			
18			X		
18		X	X		

- **Moogo.font:**

size	normal	italic	bold	underline	strike
8	X				
10	X				
20	X				
28	X				

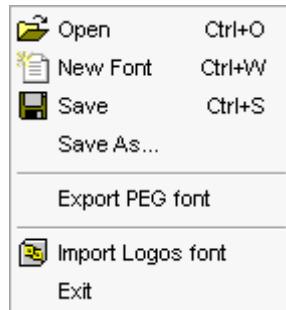
If some size or Fonts type are not in the table and your application use it, is necessary to create a new Font that contains the new size or new Fonts. E.g.:

Application use Arial 20pt Normal.

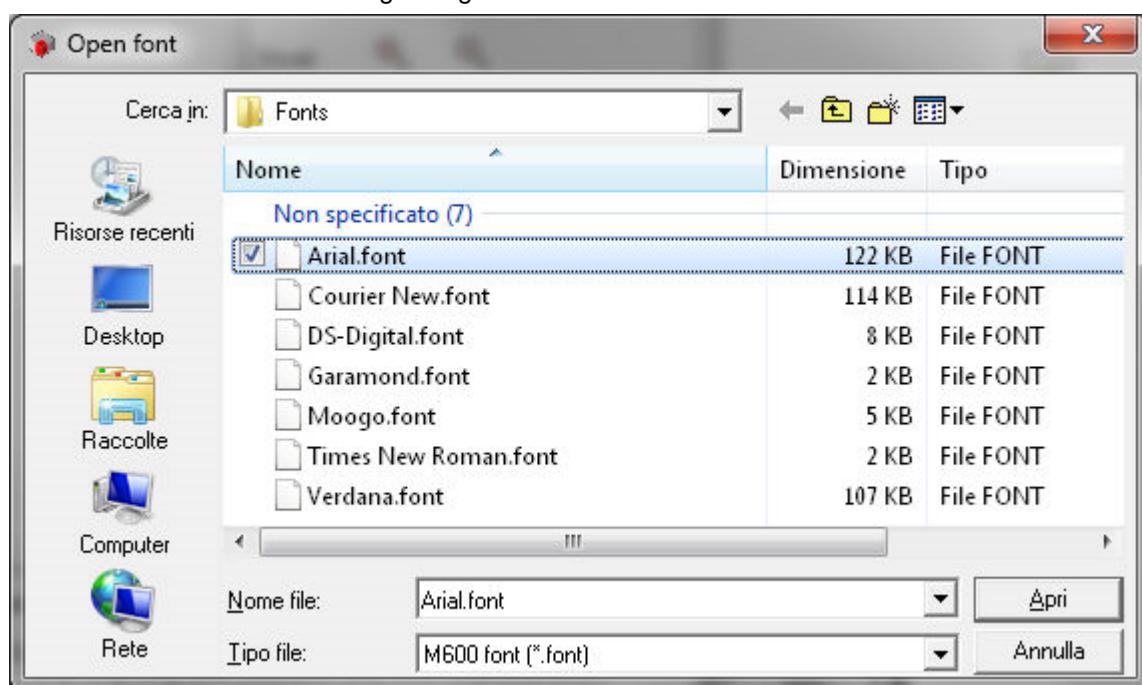
In Arial.font is not present is necessary to create a new font Arial with size 20.

### 5.3.1 File menu

**File menu** allows to open, create new font, save, save as, export PEG font, import Logos font and exit. Some menu commands can be activated either with mouse or keyboard and cursors.



**Open:** allows to open an existing MC600 Font (\*.font). This command can be also activated through fast key or by the keys CTRL + O. This command activates the following dialog box:



How to open a file:

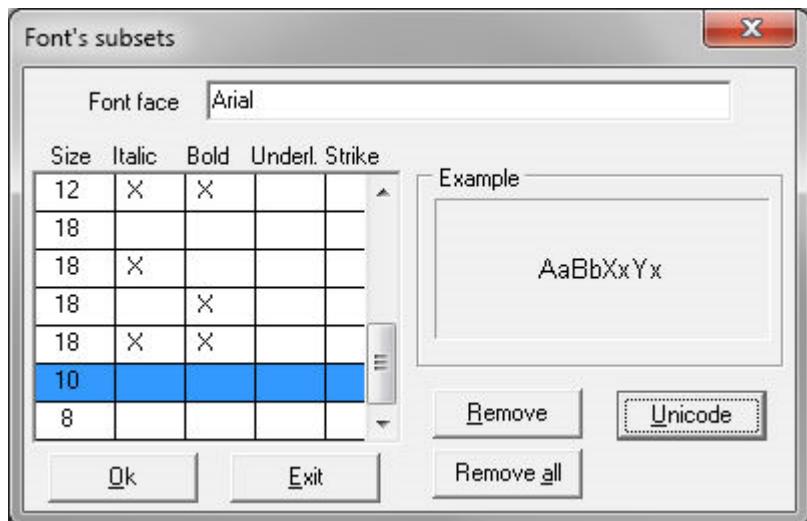
- select the directory containing desired \*.FONT file
- select one the listed files
- click on **Open** key

- Appear

the

Fonts

subset:



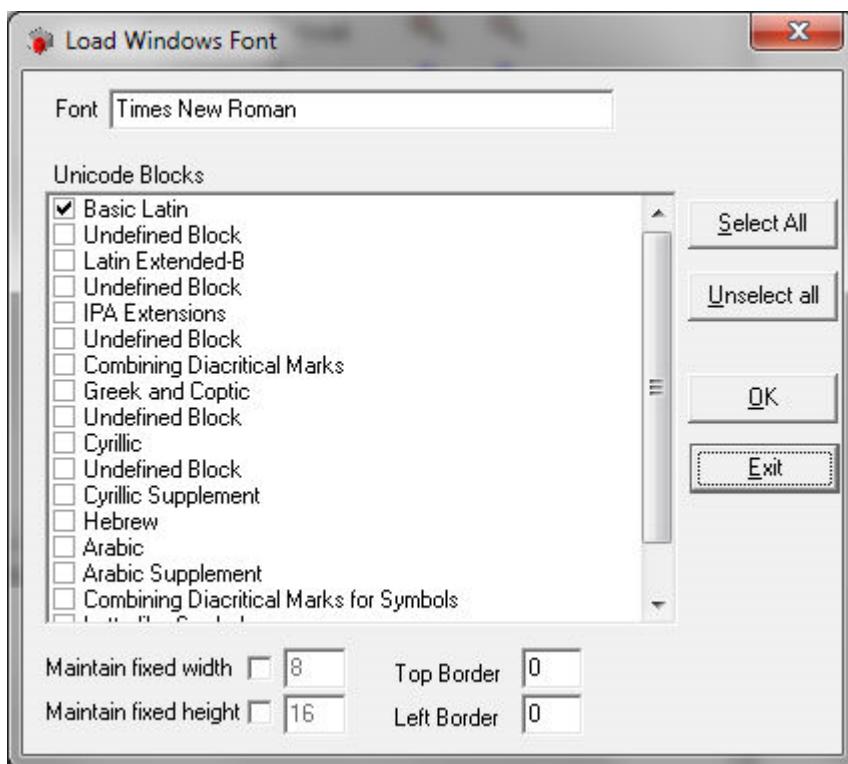
- Select a subset to open
- - Remove: remove the selected subset. This command activates the following dialog box:



- Yes: delete the selected subset - No: abort the operation
- Remove all: remove all subset. This command activates the following dialog box:

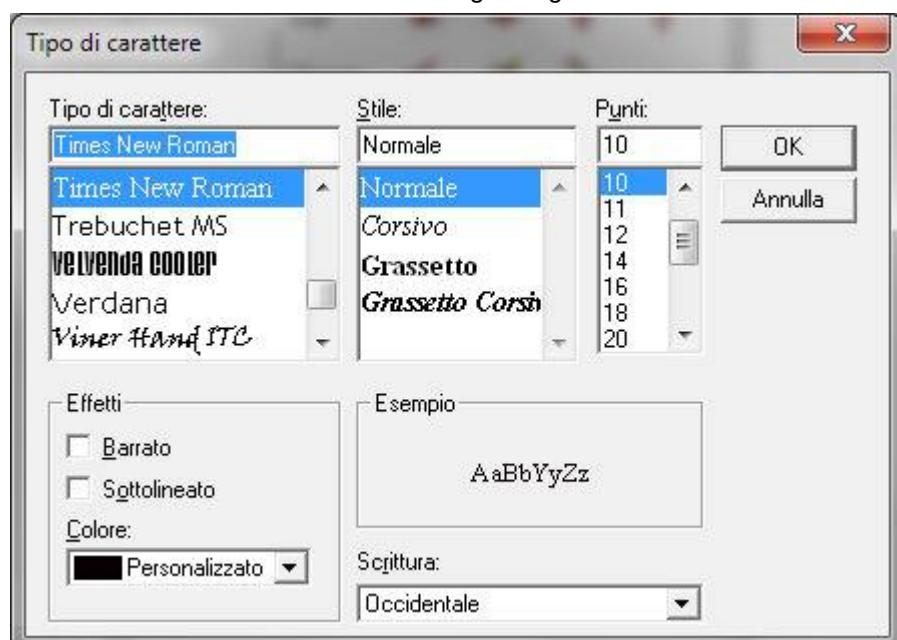


- Yes: delete all subset - No: abort the operation
- Unicode: show the Unicode blocks of the selected subset:



- Ok: Close the windows.
- o Ok: proceed to open the subset font into the Font Editor
- o Exit: abort the operation
- **Cancel** closes the dialog box.

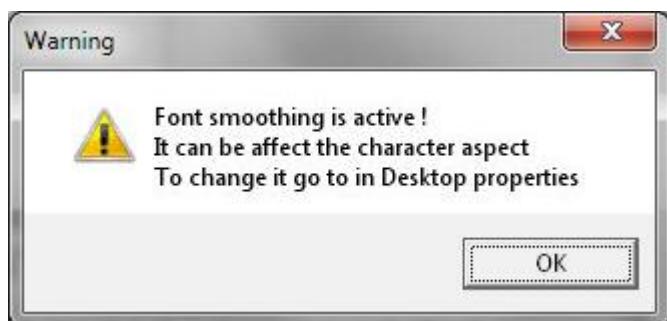
**New font:** allow to open the characters list from Windows. This command can be also activated through fast key or by the keys CTRL + W. This command activates the following dialog box:



How to select the new font:

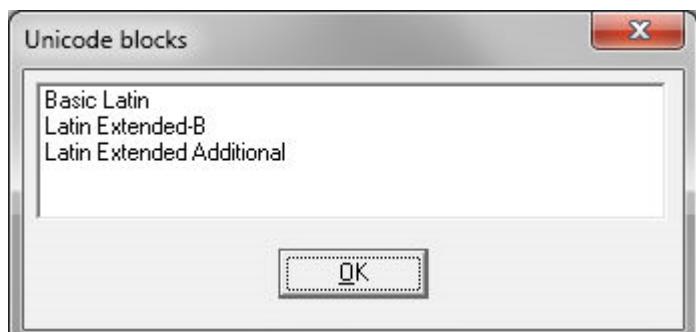
- select the Character type
- select the Style
- select the Size
- click OK to proceed

- If click OK and appear this dialog box:



Disable "Clear type" on your Windows System.

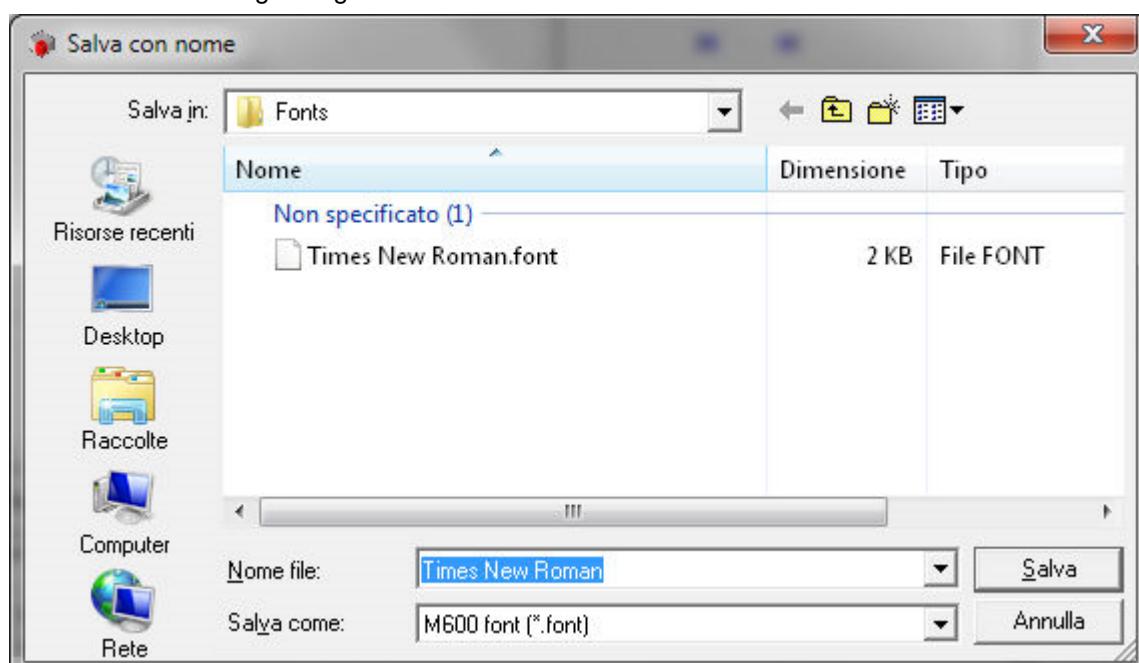
- Select the Unicode blocks that we want to include in the FONT:



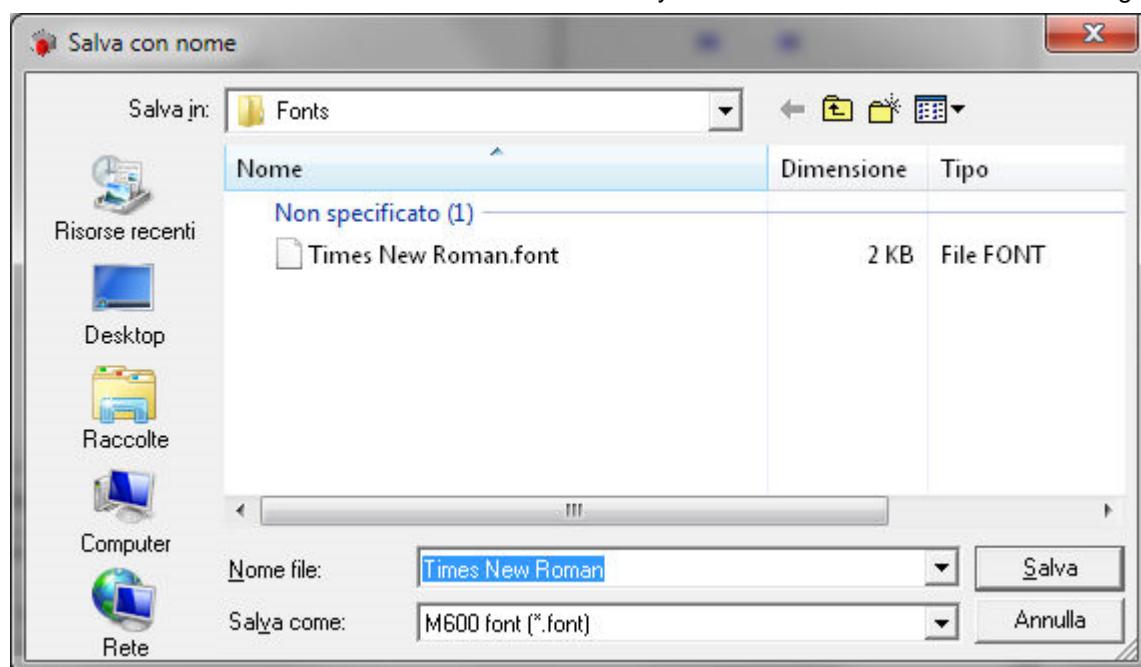
- Select All: select all Unicode blocks  
 - Unselect All: deselect all Unicode blocks  
 - Maintain fixed width: if selected permit to fix the width dimensions (expressed in pixels)  
 - Maintain fixed height: if selected permit to fix the height dimensions (expressed in pixels)  
 - Top Border: number of pixels that define, from the top, the position where put all characters imported  
 - Left Border: number of pixels that define, from the left, the position where put all characters imported  
 - OK: proceed to transform the TrueType font in MC600 font (\*.FONT)  
 - Exit: abort the operation

- Cancel closes this dialog box

**Save:** allows to save active file. This command is valid only when data contained in the window have been edited but not saved. Right after saving data, this command deactivates. This command can be also activated by fast key or by the keys CTRL + S. This command activates the following dialog box:

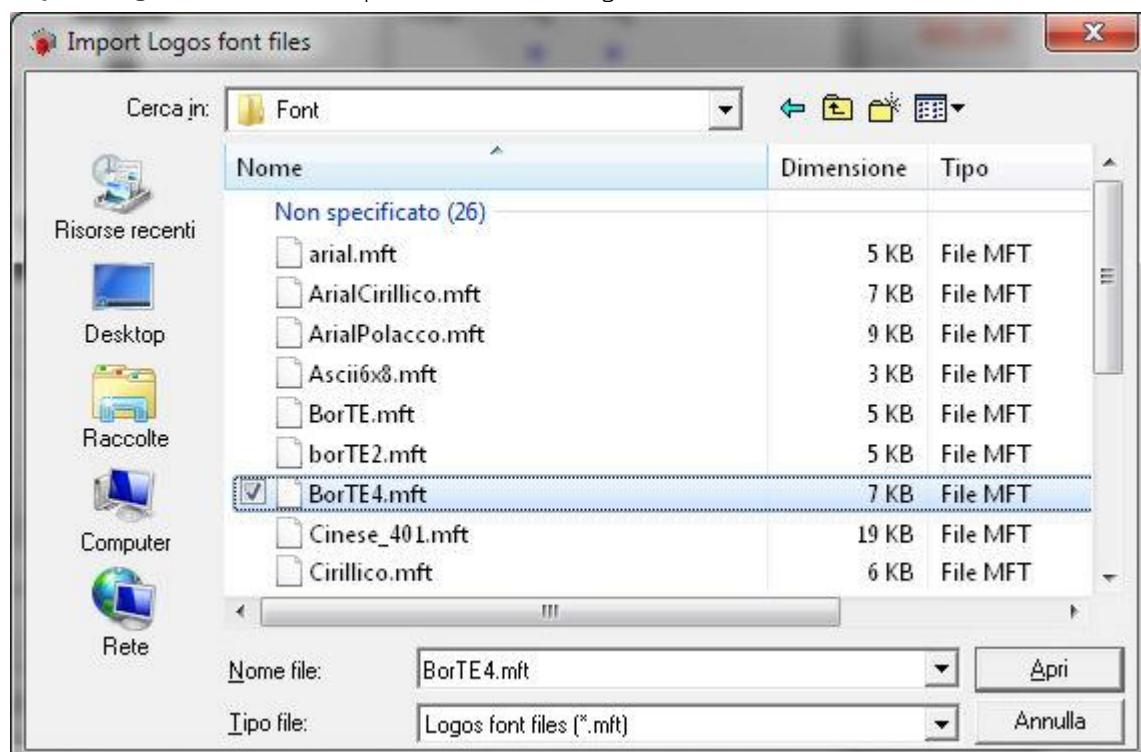


**Save As:** allows to save active file with a name/directory different for current ones. The following dialog box will pop up:



**Export PEG font:** for internal use only.

**Import Logos font:** allow to import the fonts from Logos fonts. This command activates the following dialog box:

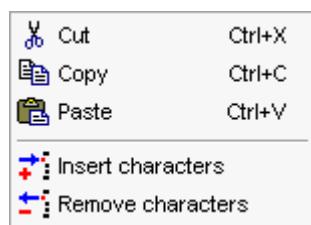


- select the Logos Font to import
- click OK to proceed
- Cancel closes this dialog box.

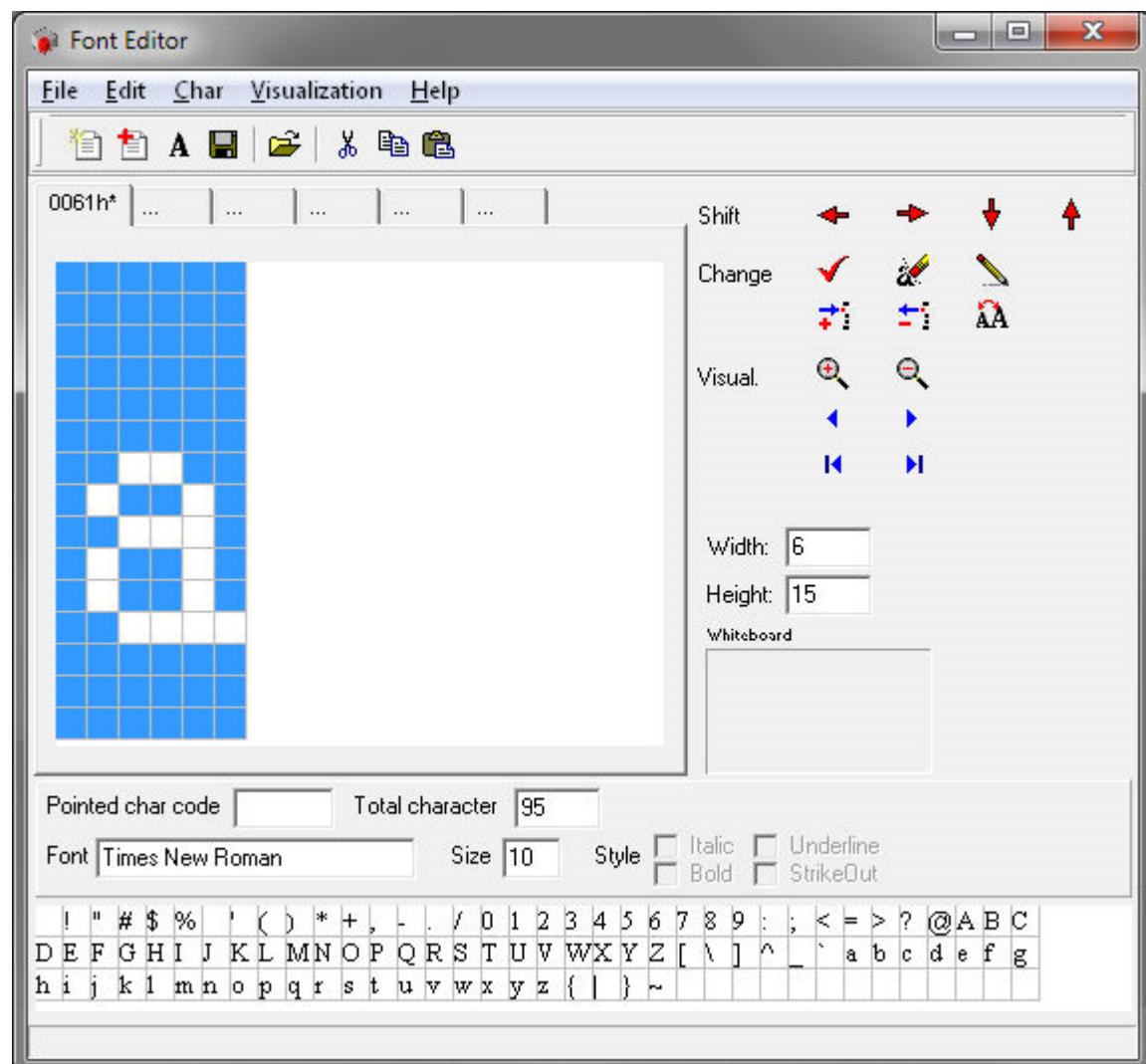
**Exit:** close the Font editor tool.

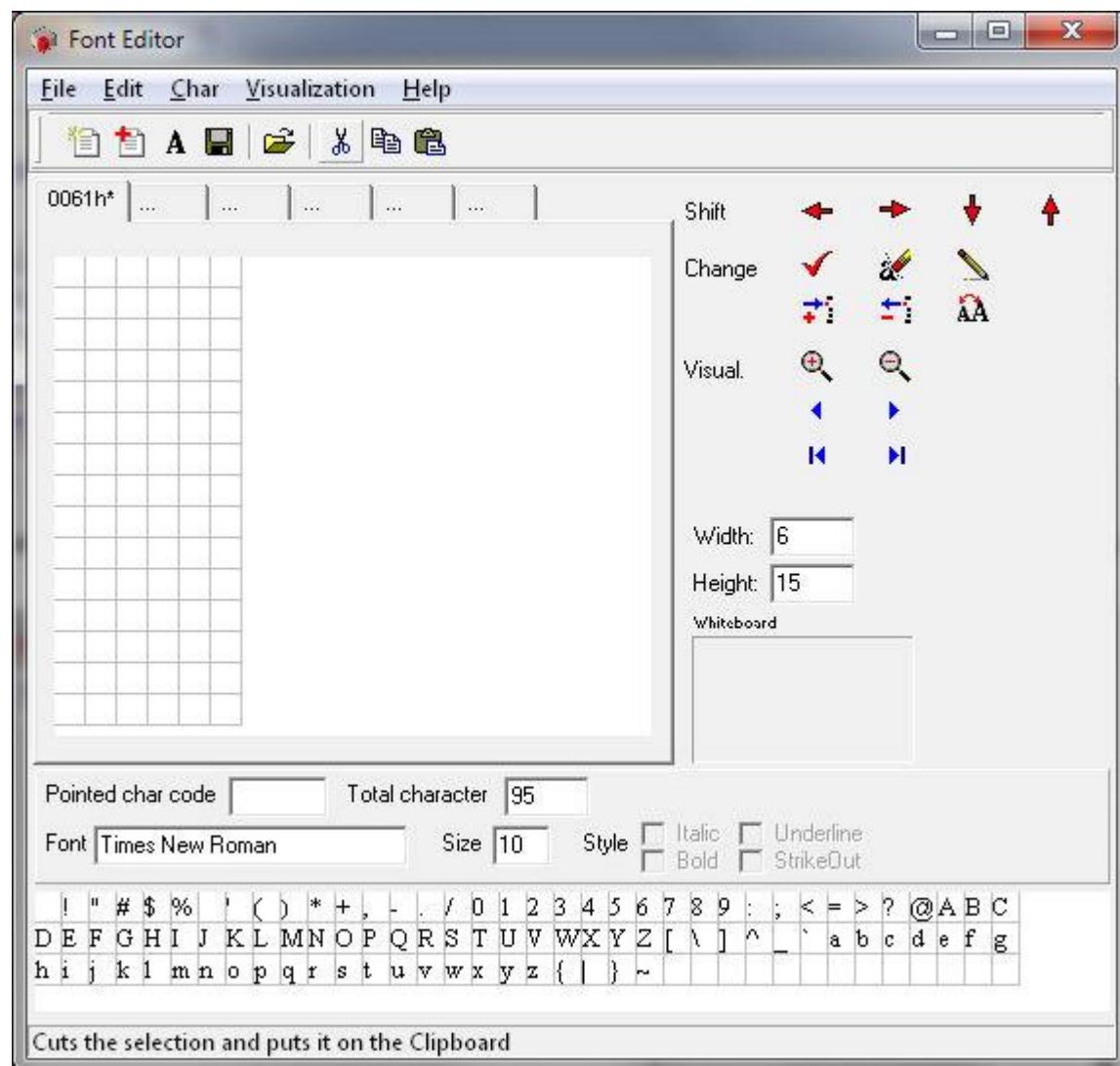
### 5.3.2 Edit menu

**Edit menu** allows to cut, copy, paste, insert characters and remove characters.



**Cut:** after selecting the character (see below) is possible to cut the character through fast key or by the keys CTRL + X:

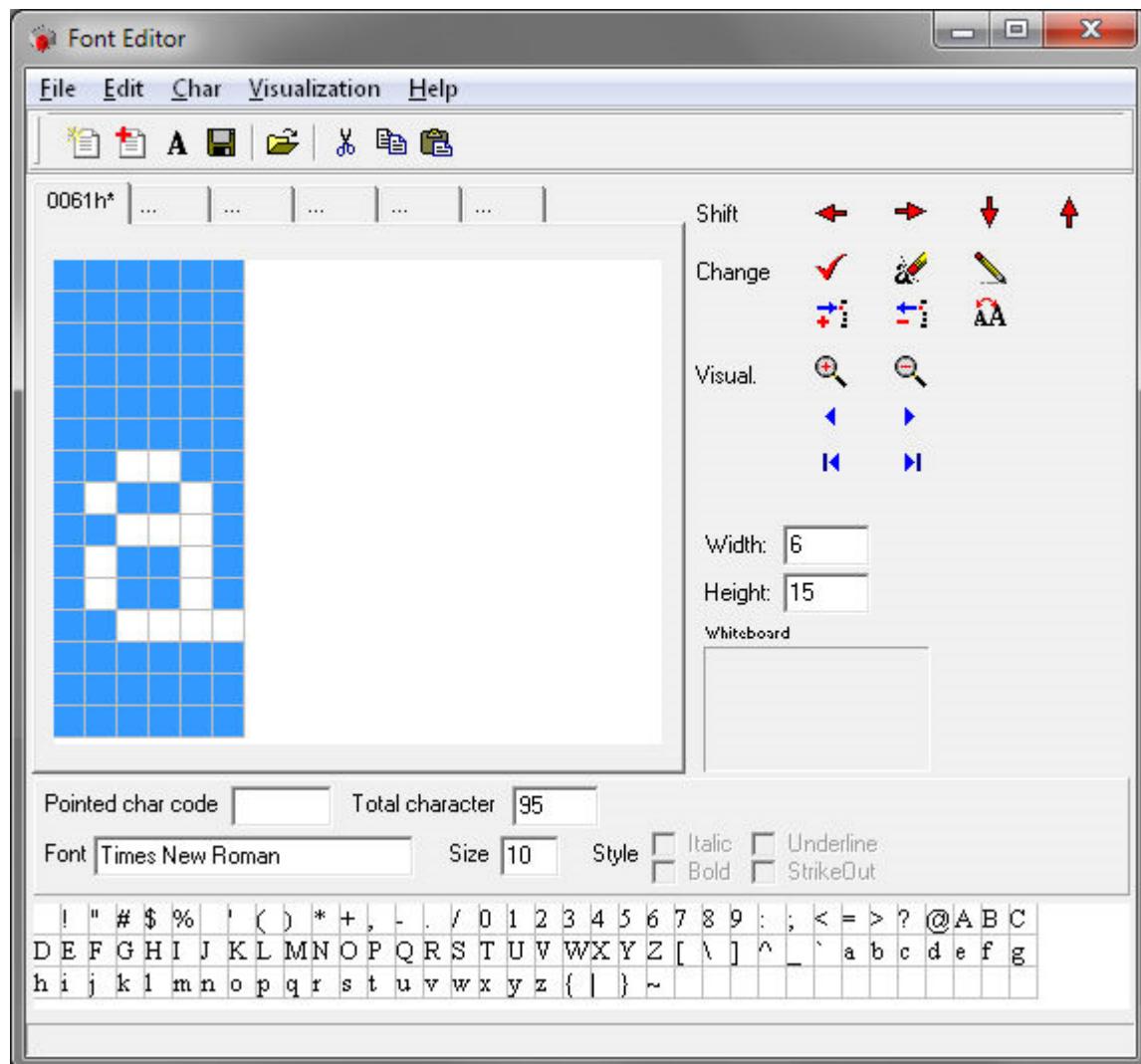




Cuts the selection and puts it on the Clipboard

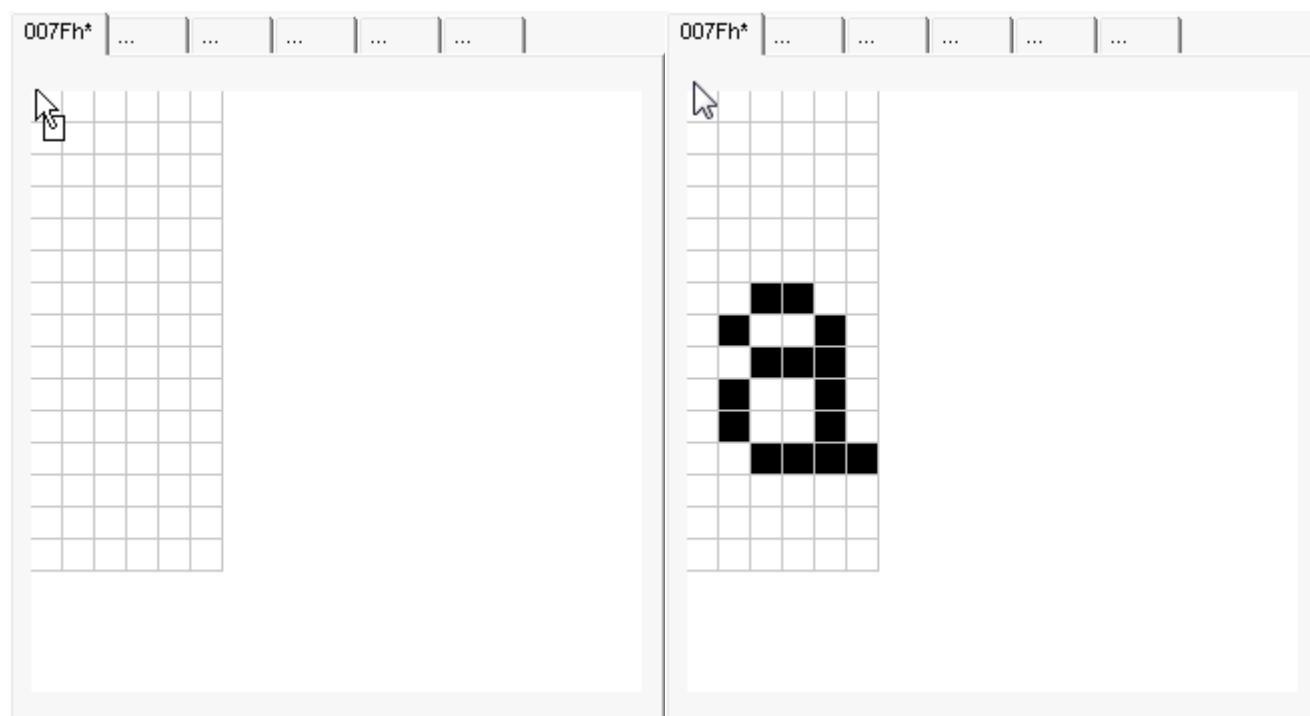
Confirm the operation with the button (Update) or in [Char menu](#). Now the character is on the clipboard.

**Copy:** after selecting the character (see below) is possible to copy the character through fast key or by the keys CTRL + C:

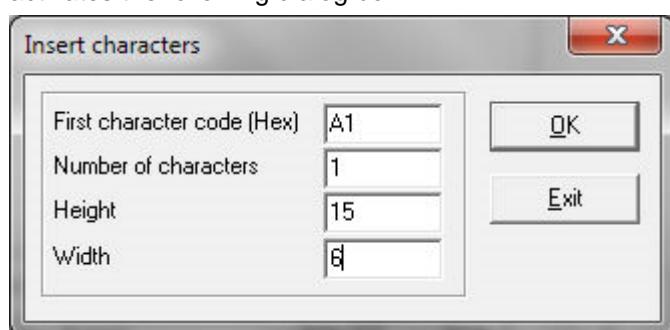


Now the character is on the clipboard.

**Paste:** allows to paste the clipboard contents, (derived from a **Cut or Copy** command). This command can be also activated through fast key or by the keys CTRL + V. The Paste operation is performed by select a destination or insert a new character and click right mouse button.



**Insert characters:** allow to insert a new character in the font. This command can be also activated through fast key . This command activates the following dialog box:

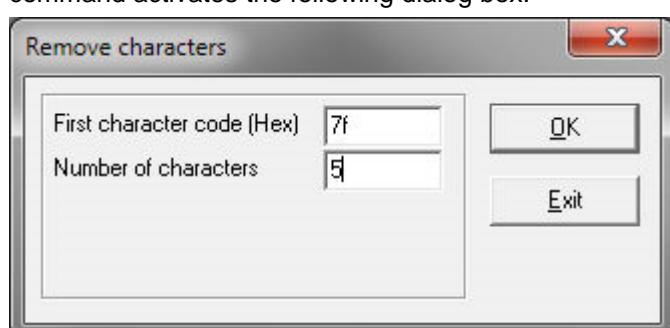


- First character code (Hex): insert a character code in hexadecimal referring to the Windows Characters Map:



- Number of character: number of characters to insert starting from a code insert in "First character code"
- Height: height dimension expressed in pixel
- Width: width dimension expressed in pixel.

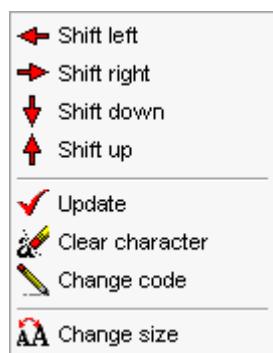
**Remove characters:** allow to remove a character in the font table. This command can be also activated through fast key This command activates the following dialog box:



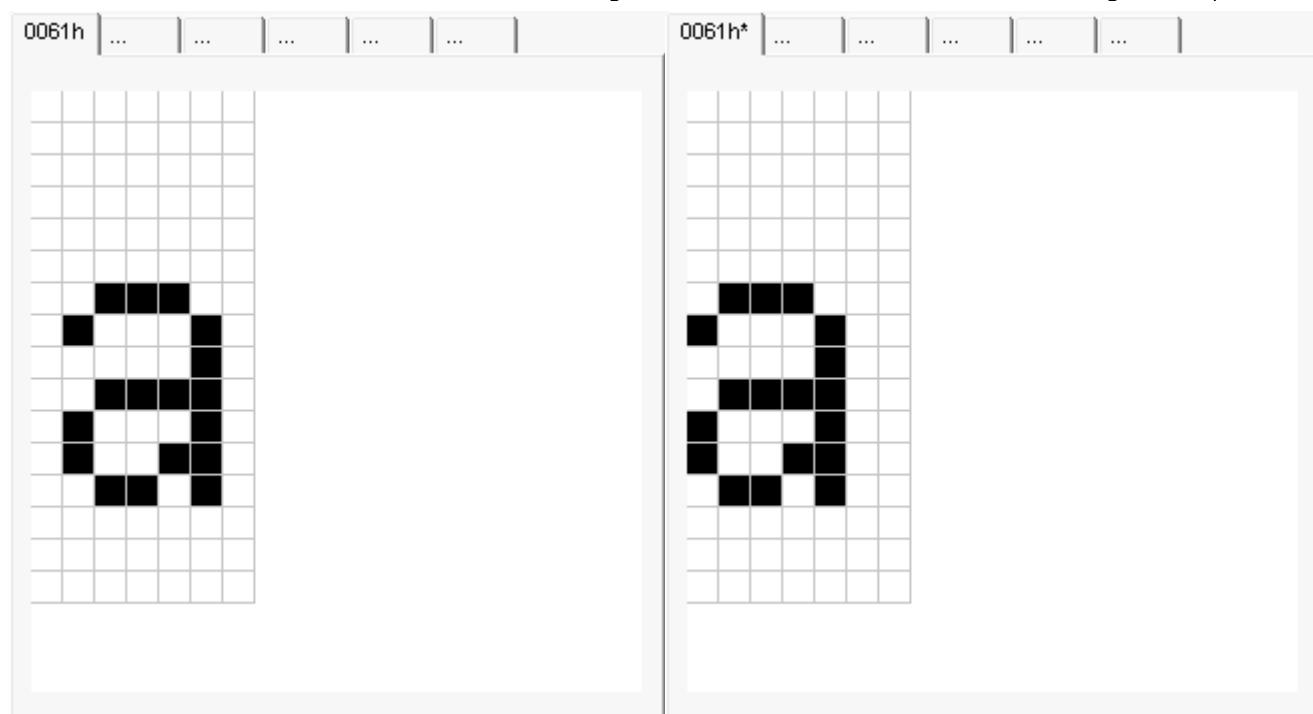
- First character code (Hex): insert a character code in hexadecimal:
- Number of characters: number of characters to remove starting from a code insert in "First character code".

### 5.3.3 Char menu

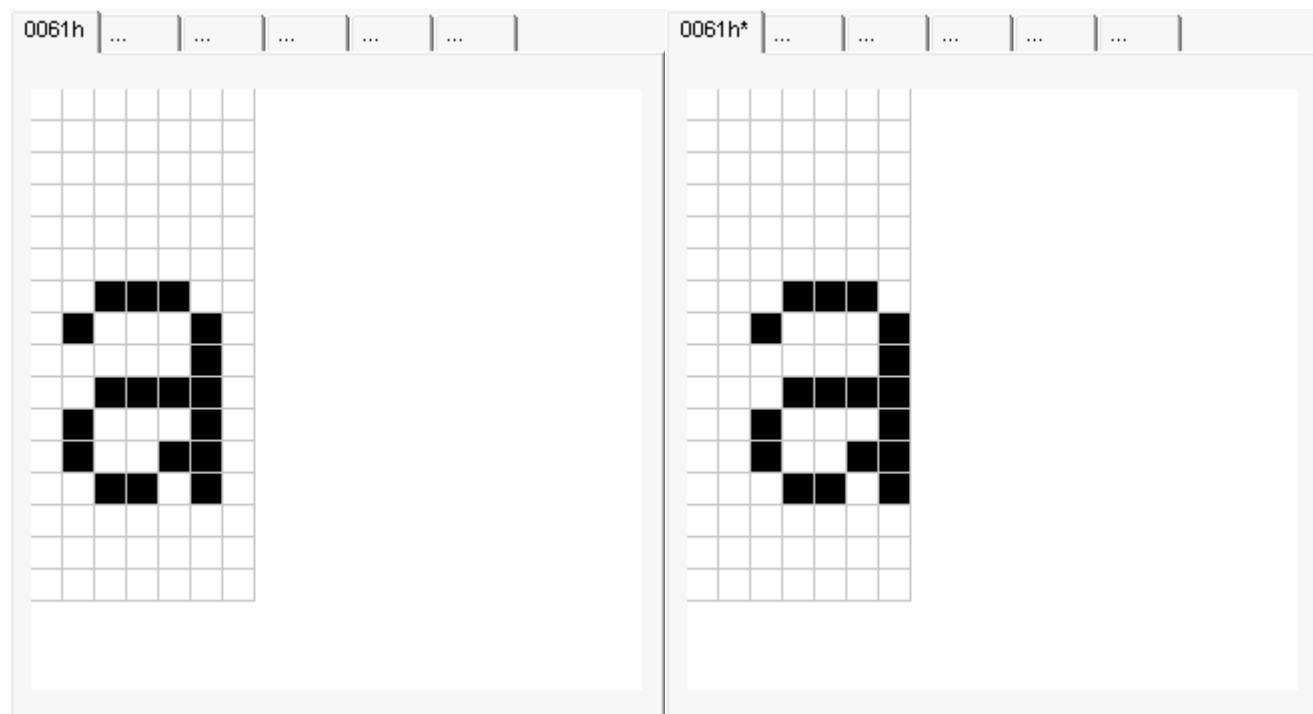
**Edit menu** allows to shift, update, clear, change code and change size of the selected character.



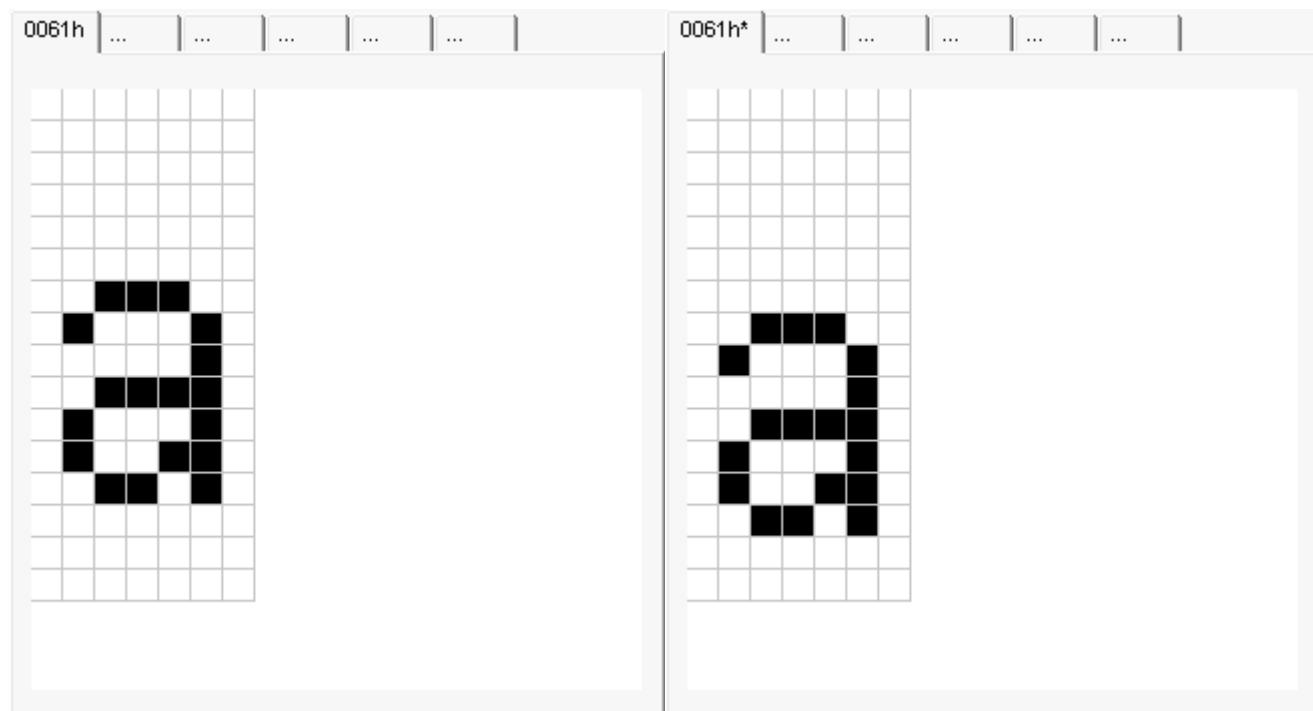
**Shift left:** allow to shift left a selected character on the grid. This command can be also activated through fast key



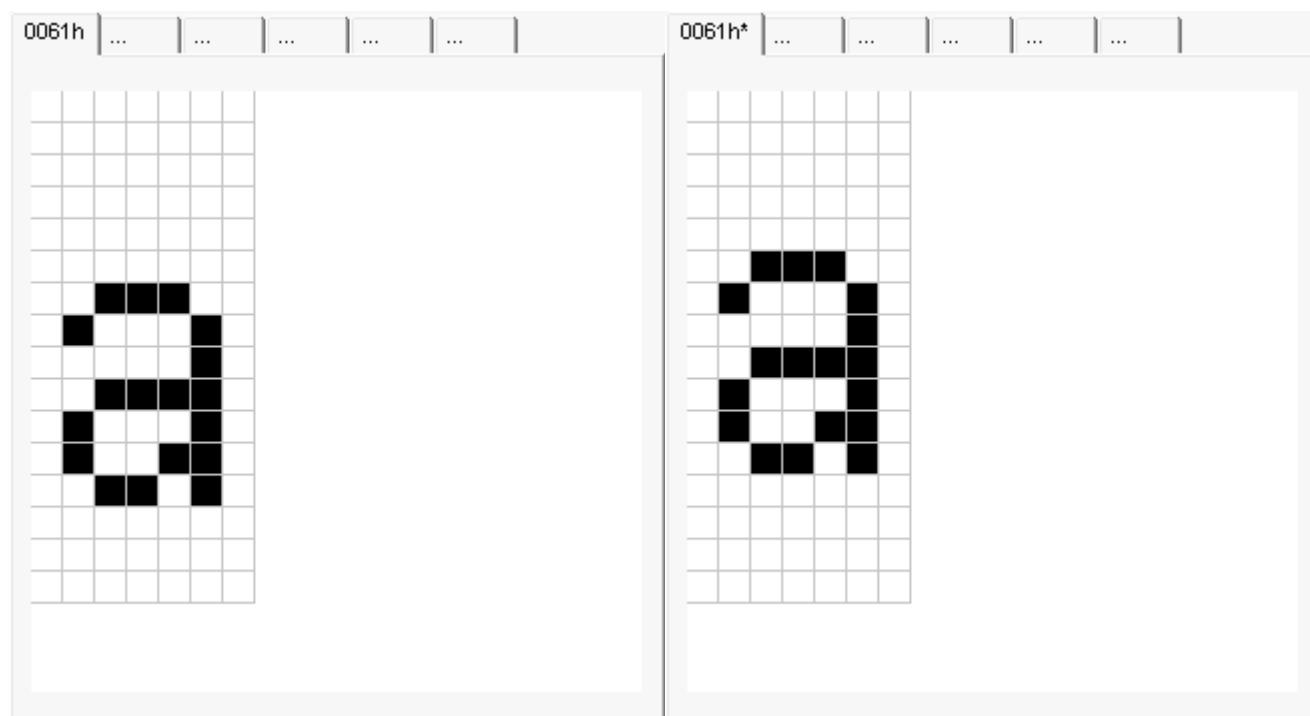
**Shift right:** allow to shift right a selected character on the grid. This command can be also activated through fast key



**Shift down:** allow to shift down a selected character on the grid. This command can be also activated through fast key .



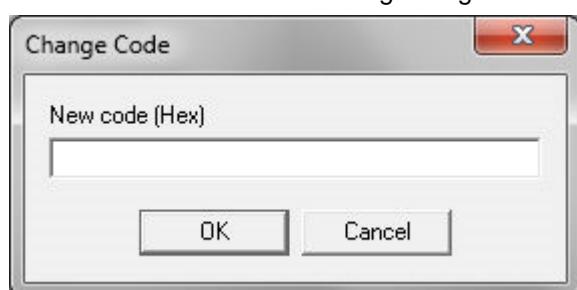
**Shift up:** allow to shift up a selected character on the grid. This command can be also activated through fast key .



**Update:** after any commands, to confirm, select update. This command can be also activated through fast key

**Clear character:** allow to delete the character. This command can be also activated through fast key

**Change code:** allow to change the code of the character selected. This command can be also activated through fast key . This command activates the following dialog box:

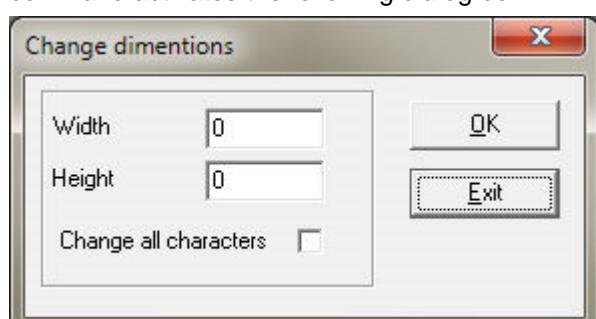


New code (Hex): insert a character code in hexadecimal

OK: confirm the operation

Cancel: abort the operation.

**Change size:** allow to change the size of the character selected. This command can be also activated through fast key . This command activates the following dialog box:



Width: change the width size

Height: change the height size

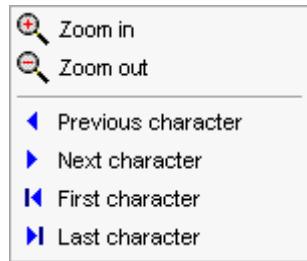
Change all characters: if checked all the characters assume the new dimension

OK: confirm the operation

Exit: abort the operation.

### 5.3.4 Visualization menu

**Visualization menu** allows to Zoom in, Zoom out, go to previous character, go to next character, go to first character and go to Last character.



**Zoom in:** allow to zoom in the selected character. This command can be also activated through fast key 

**Zoom out:** allow to zoom out the selected character. This command can be also activated through fast key 

**Previous character:** allow to navigate at the previous character. This command can be also activated through fast key 

**Next character:** allow to navigate at the next character. This command can be also activated through fast key 

**First character:** allow to navigate at the first character. This command can be also activated through fast key 

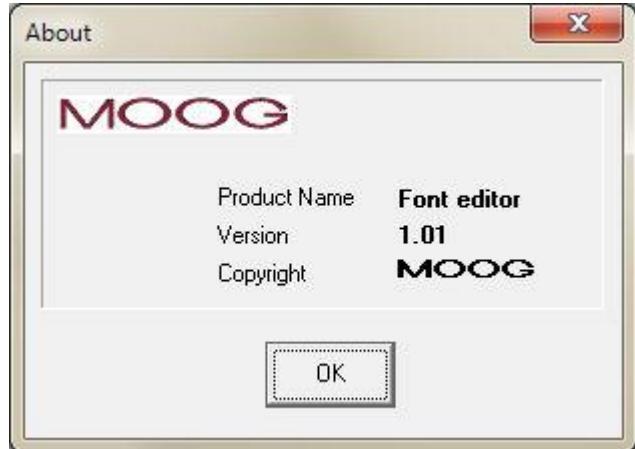
**Last character:** allow to navigate at the last character. This command can be also activated through fast key 

### 5.3.5 Help menu

Font editor information

About...

**About:** This command activates the following dialog box:



### 5.3.6 Tool bar

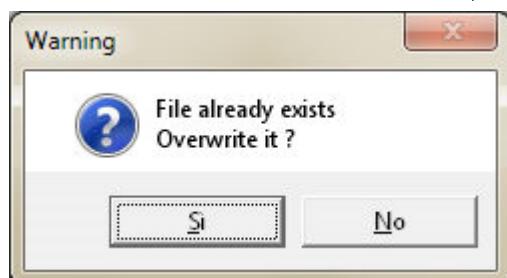
Below the menu bar there is the Tool bar with the command buttons which allow you to quickly execute some of the menu operations; each button is identified by a design which represents the action it effects. If the mouse cursor stays over a button for more than half a second, a text box appears giving a brief description of the command.



**New Font**: allow to import a new character from a Windows characters list.

**Add Font**: allow to add a new font into an existing font subset:

- Open an existing Font.
- Add Font following the same procedure as a insert a new Font.
- Save the new font in the same Font Name (overwrite).



- Yes: save the new font subset
- No: abort the operation.

**visualize Font Subset**: allow to visualize the opened font subset.

**Save**: allows to save active file.

**Open**: allows to open an existing MC600 Font (\*.font).

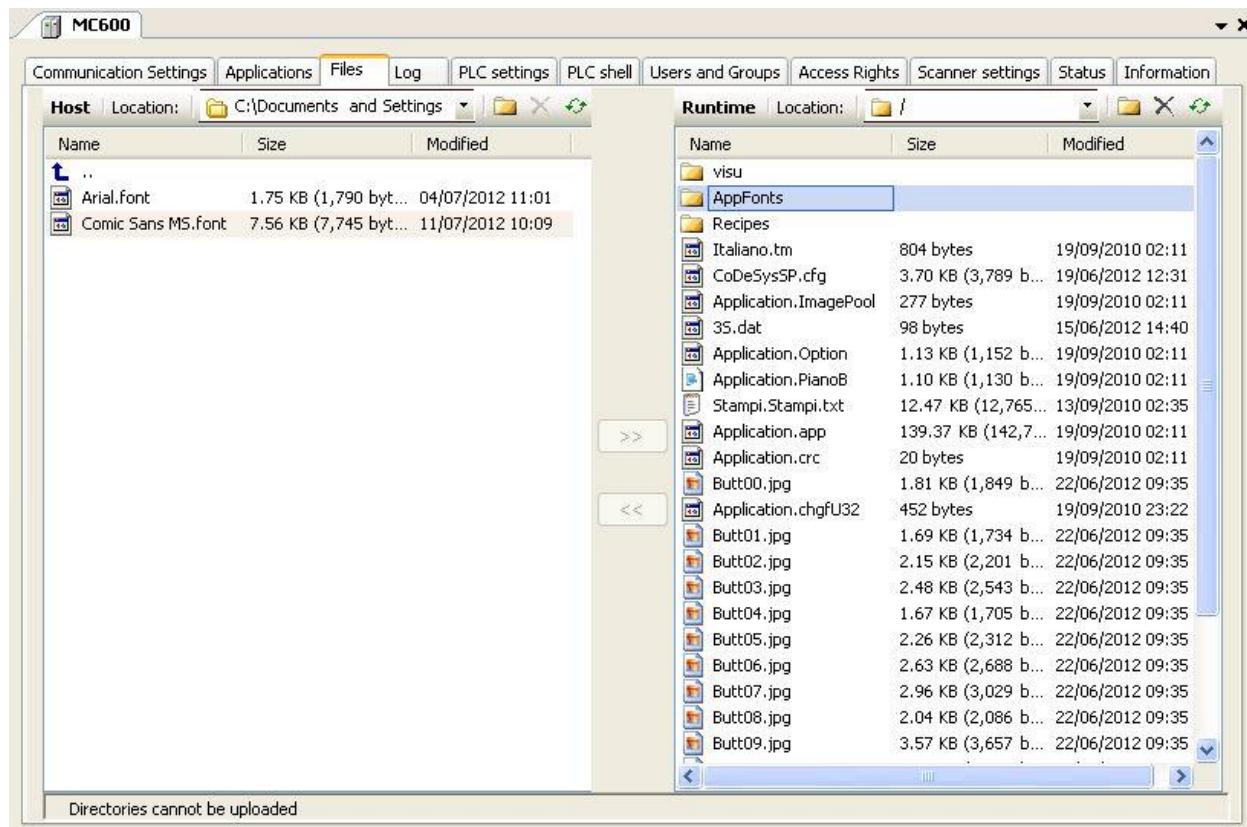
**Cut**: allow to cut the selected character.

**Copy**: allow to copy the selected character.

**Paste**: allows to paste the clipboard contents, (derived from a **Cut or Copy** command).

### 5.3.7 Font Installation procedure

When the new Font/s is/are imported on the MC600 format (\*.FONT) is possible to proceed at the installation on the MC600 CPUs. This sub-dialog of the device dialog serves to transfer files between the host and the controller. This means you can choose any file from a directory of the local network to get it copied to the files directory of the currently connected runtime system, or vice versa.



In the left part of the dialog the files on the **Host** (PC) are displayed, in the right part that on the **Runtime** (MC600) system.

With button the runtime file list can be updated.

With button a new folder can be created, into which the file(s) should be copied.

With button all files resp. folders currently selected in the list will be removed.

In the location field the folder of the respective file system must be specified, which should be used for the file transfer. This is to be done via the selection list at the entry field or via browsing in the file system tree.

The files to be copied have to be selected in the file system tree. Multiple selection is possible, also a folder can be selected in order to get copied all contained files.

For transferring the selected files to the defined host or runtime system directory, use button resp. . To "transfer" in this context means to "copy". So, if a file is not yet available in the "target" directory, it will be created also there. If however already a file with the given name is available and is not write-protected, this will be overwritten. In case of write-protection an appropriate message will be generated.

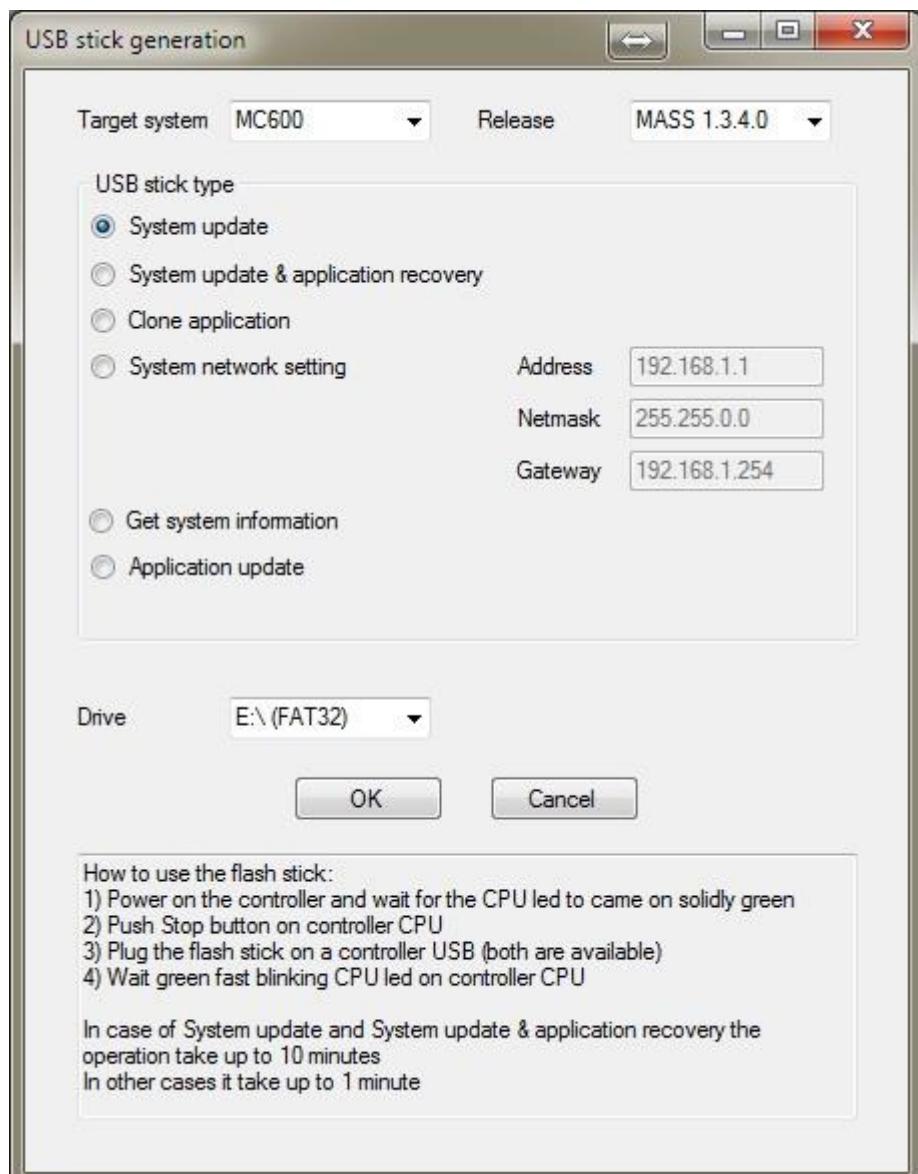
The new Fonts **must be copied into "AppFonts"**.

## 5.4 Moog USB stick generation



From **Menu Tools** is possible recall the "USB stick generation" tool that permit to:

- [System update](#)
- [Clone application](#)
- [System network setting](#)
- [Get system information](#)
- [Application update](#)
- [Full system backup](#)



## 5.4.1 System Update

	<p><b>WARNING!</b> Loading firmware on MC600 will delete all existing data, especially:</p> <ul style="list-style-type: none"><li>• the actually loaded firmware gets deleted from controller</li><li>• the stored boot application gets deleted from the controller</li><li>• the stored project archive gets deleted from the controller</li><li>• Retain and Persistent data gets deleted from controller</li></ul> <p>IP address will not be deleted</p>
--	--

The "System update" command load or update thefirmware (RunTime System ) inside the CPU MC600 using the firmware version installed on the MASS show on the top right section of the form.

Those are the steps for a "System update" command:

On your PC:

- First step prepare an USB stick formatted in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation and select "System update":
- Select the Target system (MC600 or MC600plus depending on model).
- Select the firmware Release (depending to the MASS version).
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to update the MC600 CPUs.

On MC600:

- Turn ON the PLC and wait run: CPU led green (with application) or CPU led orange (without application)
- Push STOP button on the CPU
- Insert the USB key into PLC USB port
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking.
- CPU automatically reboot (Manual CPU reboot for MC600 models).

Firmware update can be performed also using WebBrowser page, please see section "[WebServer](#)".

## 5.4.2 Clone Application

This command permit to clone one application from the MC600 CPU to another one (WHIT THE SAME HARDWARE CONFIGURATION).

Those are the steps for a "Clone application" command:

- First step prepare an USB stick formatted in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation
- Select the Target system (MC600 or MC600plus depending on model)
- Select "Clone application" command
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to clone the application from the MC600 CPUs.

### On MC600:

#### 1st Step:

- Turn ON the PLC and wait run: CPU led green (with application)
- Push STOP button on the CPU
- Insert the USB key into USB1 or USB2
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking (the application is copied into the USB key).

#### 2nd Step:

- In another CPU MC600 push STOP button on the CPU
- Insert the USB key into USB1 or USB2 or USB3 (MC600plus)
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking (the application is copied into the CPU).
- PLC automatically reboot

### 5.4.3 System Network Setting



WARNING!

At the end of Network setting procedure the PLC will automatically reboot!

This command permit to change the network setting (IP, Subnet Mask and Gateway) on the MC600 CPU. These parameters are written on the Licence Key.

Those are the steps for a "System network setting" command:

- First step prepare an USB stick formatted in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation and select "System network setting":
- Change the Address, Netmask and Gateway. If appear the red symbol this means that some data are not correct.
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to change the network settings on the MC600 CPUs.

#### On MC600:

- Turn ON the PLC and wait run: CPU led green (with application) or CPU led orange (without application)
- Push STOP button on the CPU
- Insert the USB key into USB1 or USB2
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking
- PLC automatically reboot

## 5.4.4 Get System information

This command gets the information from the MC600 CPU and generates in a folder "MoogDeviceData" a file TXT called "device\_configuration.txt" inside to the USB stick. In this TXT file can be found the information about production data, License key data and MC600 firmware version.

Those are the steps for a "Get system information" command:

- First step prepare an USB stick formated in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation and select "Get System information":
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to get the information from MC600 CPUs.

### On MC600:

- Turn ON the PLC and wait run: CPU led green (with application) or CPU led orange (without application)
- Push STOP button on the CPU
- Insert the USB key into USB1 or USB2
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking.

Under the path "PathUSB":\MoogDeviceData\device\_configuration.txt you will find your configuration file.

## 5.4.5 Application Update

This command permit to update the application with a USB flash drive.

	<p><b>WARNING!</b> Before to execute the "Application update" command, run the following commands:</p> <ul style="list-style-type: none"><li>• Build menu &gt; Generate code</li><li>• Online menu &gt; Create boot application</li></ul>
--	---

Those are the next steps for a "System update" command:

- Prepare an USB stick formatted in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation and select "Application update":
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to programs the application for the MC600 CPU.

On MC600:

- Turn ON the PLC and wait run: CPU led green (with application) or CPU led orange (without application)
- Push STOP button on the CPU
- Insert the USB key into USB1 or USB2 or USB3 (MC600plus9).
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking
- Wait to auto restart of the MC600

## 5.4.6 Full System Backup

	<p><b>WARNING!</b></p> <p>Full system backup command will load the firmware on MC600 and will delete all existing data, especially:</p> <ul style="list-style-type: none"> <li>• the actually loaded firmware gets deleted from controller</li> <li>• the stored boot application gets deleted from the controller</li> <li>• the stored project archive gets deleted from the controller</li> <li>• Retain and Persistent data gets deleted from controller</li> </ul>
--	---

(N.B. available only on MC600plus models)

This command permit to clone a complete system MC600plus system (firmware and application) to another one (WHIT THE SAME HARDWARE CONFIGURATION).

Those are the steps for a "Full system backup" command:

- First step prepare an USB stick formatted in FAT or FAT32.
- Insert the USB key in your PC
- Open USB stick generation
- Select the Target system (MC600plus)
- Select "Full system backup" command
- Click OK to proceed. Automatically the USB stick generation will be closed.
- Now the USB contains the correct files and folders that permit to execute a complete backup from the MC600plus CPUs.

### On MC600plus:

#### 1st Step (CPU to be copied):

- Turn ON the PLC and wait run: CPU led green (with application)
- Push STOP button on the CPU
- Insert the USB key into USB1 or USB2
- Wait the procedure: CPU led orange blinking (application will be stopped)
- Procedure complete when CPU led is green and fast blinking (the application is copied into the USB key).
- Application will restart

#### 2nd Step (CPU to update):

- In another CPU MC600 push STOP button on the CPU
- Insert the USB key into USB1 or USB2 or USB3 (MC600plus)
- Wait the procedure: CPU led orange blinking
- Procedure complete when CPU led is green and fast blinking (the application is copied into the CPU).
- PLC automatically reboot

## 5.5 System Task Configuration (Wizard)

There is an object called "**System Task Configuration**" that contains all the setting for the automatic construction of Task, Code (POU) and Variables for complex controls. It is possible insert only one object type System Task Wizard in the project. The object **System Task Configuration** allows you to set:

1) Wizard for Temperature Control (**Auto tuning temperature controls**) allows the management of one or more Temperature controls:

- Code \_TemperatureControl (PRG)
- Variables \_GlobalTemperatureVariables
- Task \_TemperatureControl

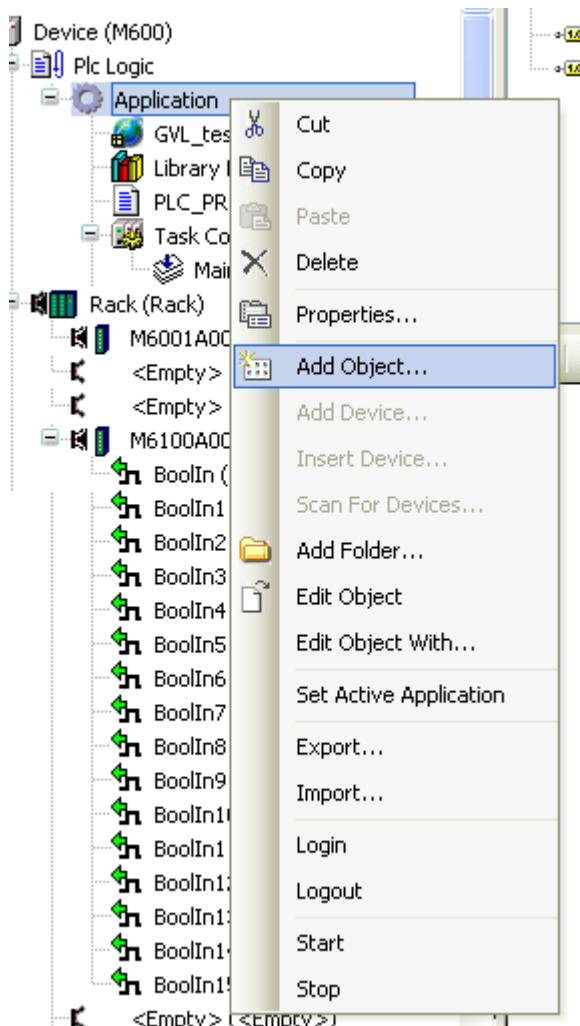
2) Wizard for Axis Control (**Auto tuning axis controls**) allows the management of one or more Axis controls

- Code \_UserAxisManagenet (PRG) and \_AxisControl (PRG)
- Variables \_GlobalAxisVariables
- Task \_AxisControl

3) Wizard for Video control (**Video**) allows the management of one or more Video controls:

- Code \_Video (PRG)
- Variables \_GlobalVideoVariables
- Task \_Video

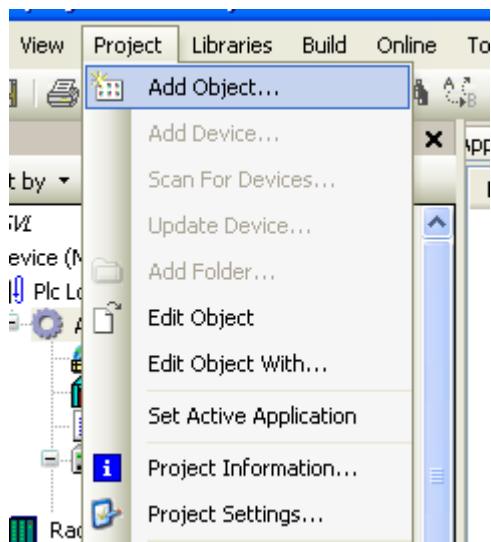
To insert the object System Task Configuration is necessary, after pressing the right mouse button on **Application**, choose **Add Object**:



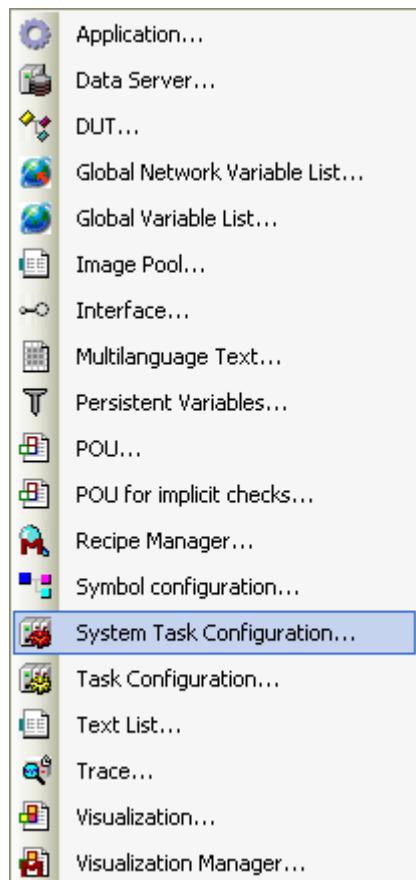
It's possible select on the **Tool Bar** the icon **Add Object**.



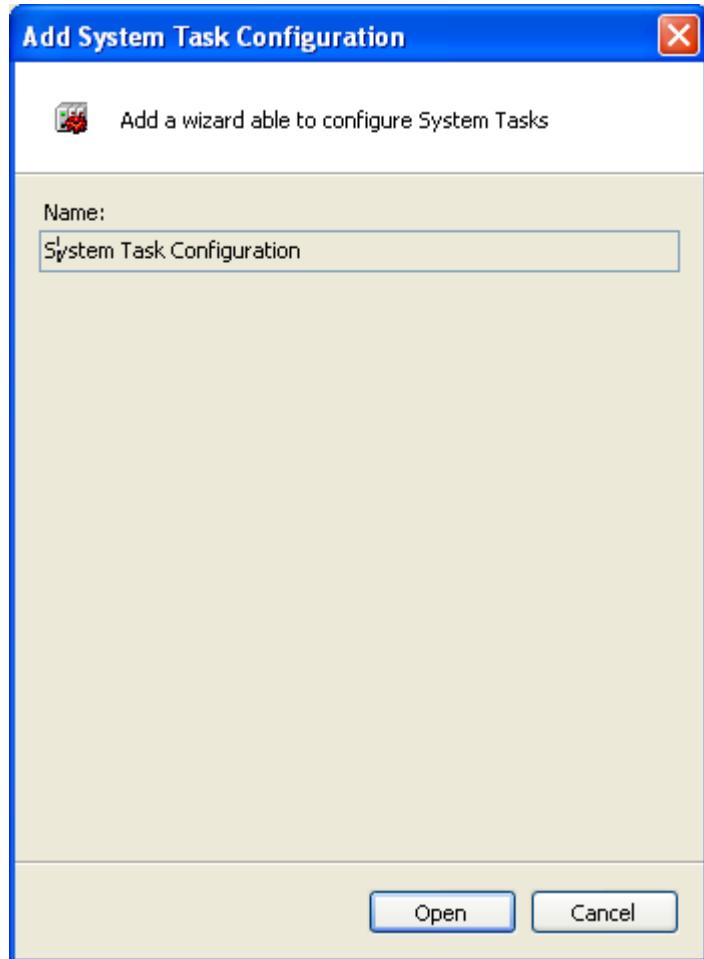
Another possibility is to choose **Add Object** from the menu **Project**.



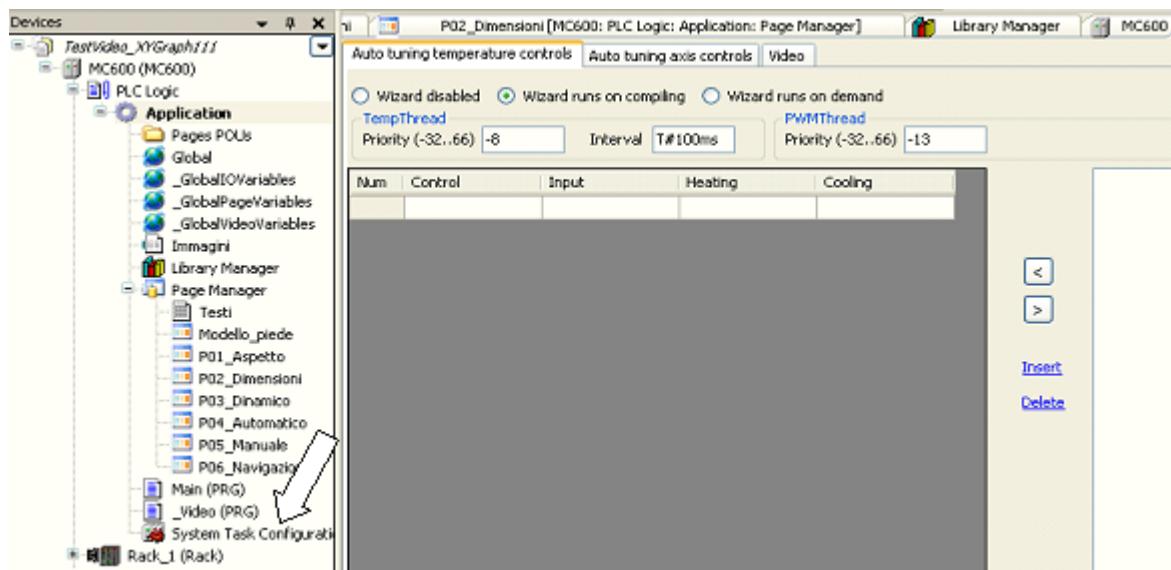
Select **System Task Configuration** on the next window.



On the next window **Add System Task Configuration:**



Select the button **Open** for the configuration menu.

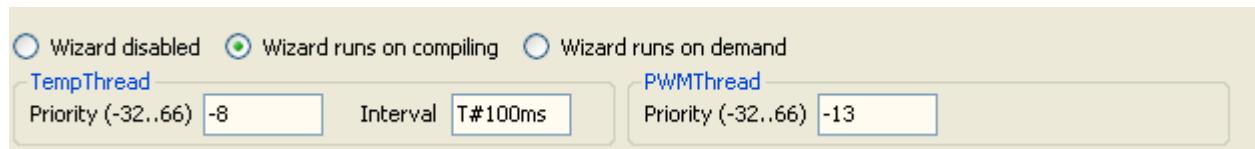


At this point in Device window there's the new object **System Task Configuration** as subfolder of **Application** with the icon . If System Task Configuration is already present (It's possible insert only one object of this type) isn't possible select another one. When you select the object **System Task Configuration** with a double click of the left mouse button appears a new windows with three sheet:

- [Auto Tuning Temperature Controls](#)
- [Auto Tuning Axis Controls](#)
- [Video Control](#)

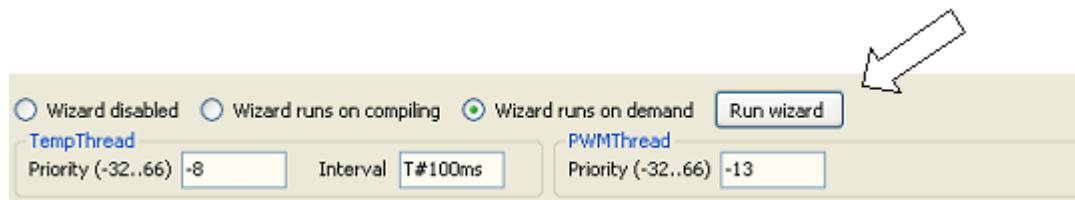
## 5.5.1 Auto Tuning Temperature Controls

Sheet **Auto Tuning Temperature Controls** setting and configure temperature controls. In the head there are three buttons: **Wizard disabled**, **Wizard runs on compiling** (default) and **Wizard runs on demand**.



- **Wizard Disabled:** Select this option to don't activate wizard. It's possible insert all data but Task, POU and GVL don't create or update.
- **Wizard runs on compiling:** Wizard process data and generate Task, POU and GVL for each compilation (default).
- **Wizard runs on demand:** Wizard process data and generate Task, POU and GVL if required by programmer.

The request can be executed to press a button **Run wizard** that appears only when this option is selected:



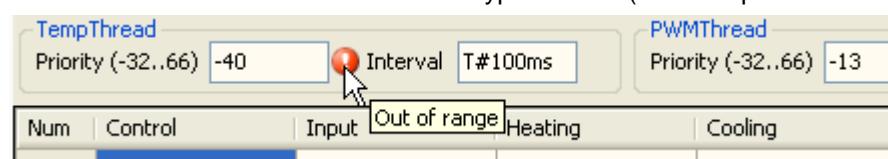
It's possible, as first activity, change the priority of Thread Temperature (default -8), its interval (default 100 msec) and the priority of the Thread of PWM (default -13).

Changes recommended for advance users only.

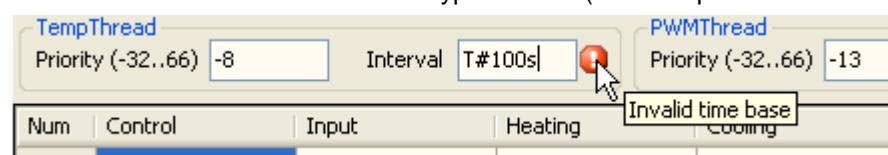
Priority is adjustable from -32 (real-time) to 66.

The interval (selectable from 100 to 10000ms) is set to 100 msec, which is the minimum time of the loop and is strongly recommended not to change it.

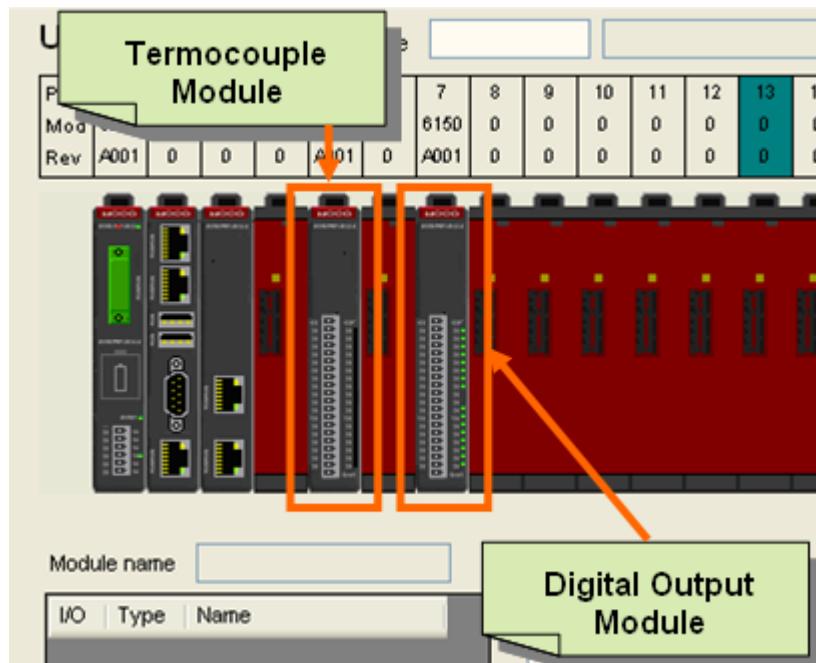
If you enter a value not included in the Priority field, a white box with a red exclamation mark appears. Moving the mouse over the exclamation mark will be visible the type of error (for example: Out of Range).



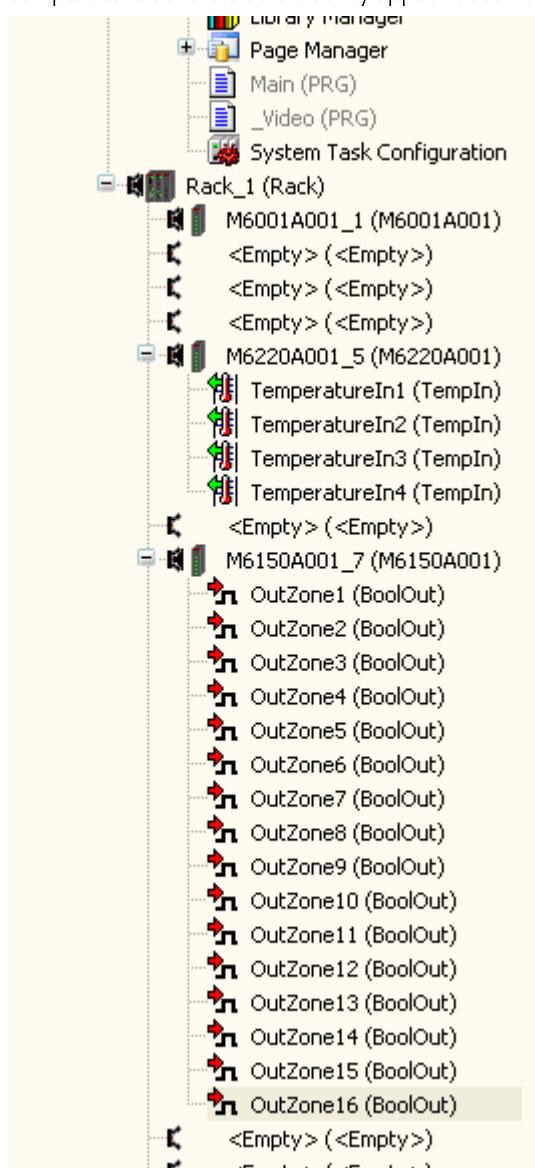
If you enter a value not included in the Interval field, a white box with a red exclamation mark appears. Moving the mouse over the exclamation mark will be visible the type of error (for example: Invalid Time Base).



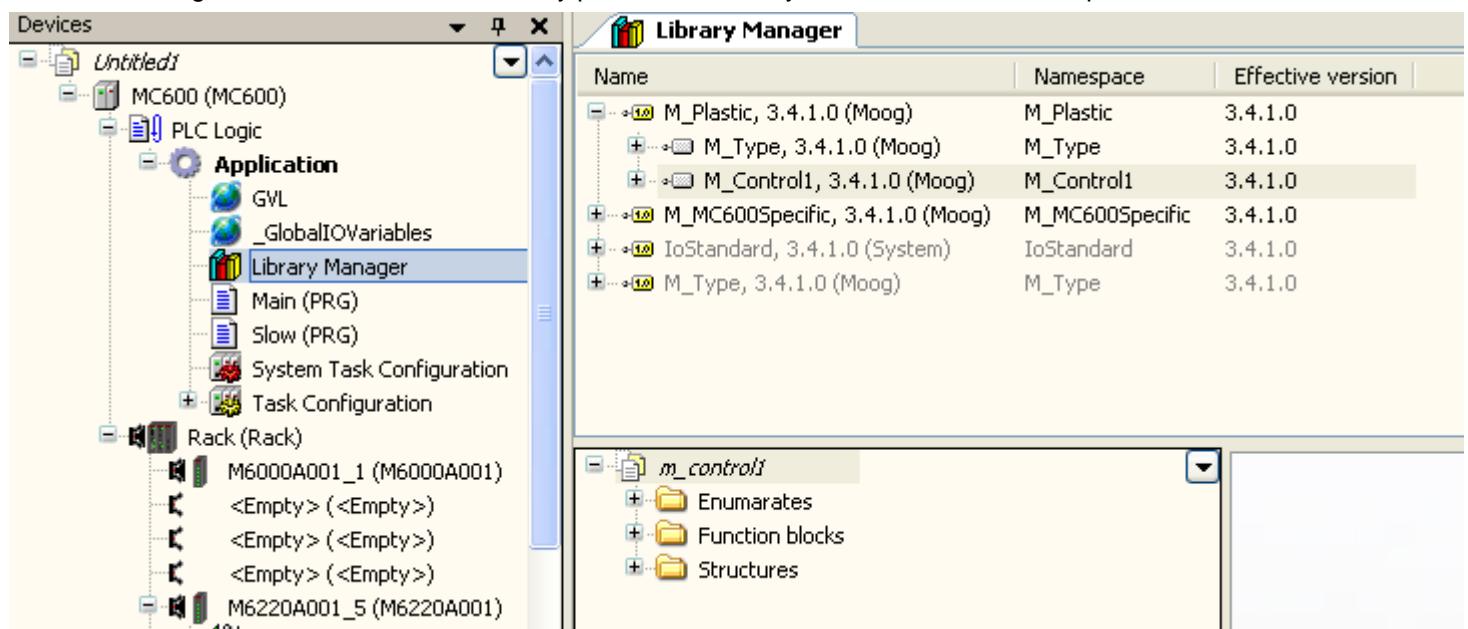
To manage a temperature control, first you must be installed on the **Device Editor** a **Temperatures module IMI220-6220A001** (4 zones temperature) or **IMI220-6221A001** (8 Zone Temperature) and a **Digital Output Module IMI220-6150A001** (16 digital outputs) or **IMI220-6180A001** (12 digital outputs).



Once inserted the modules, if you don't want to use the default variables, it's possible rename them before continuing the definition of temperature controls so that they appear automatically.



The second thing it's need to enter, if not already present, the library **M\_Control1** related temperature controls.



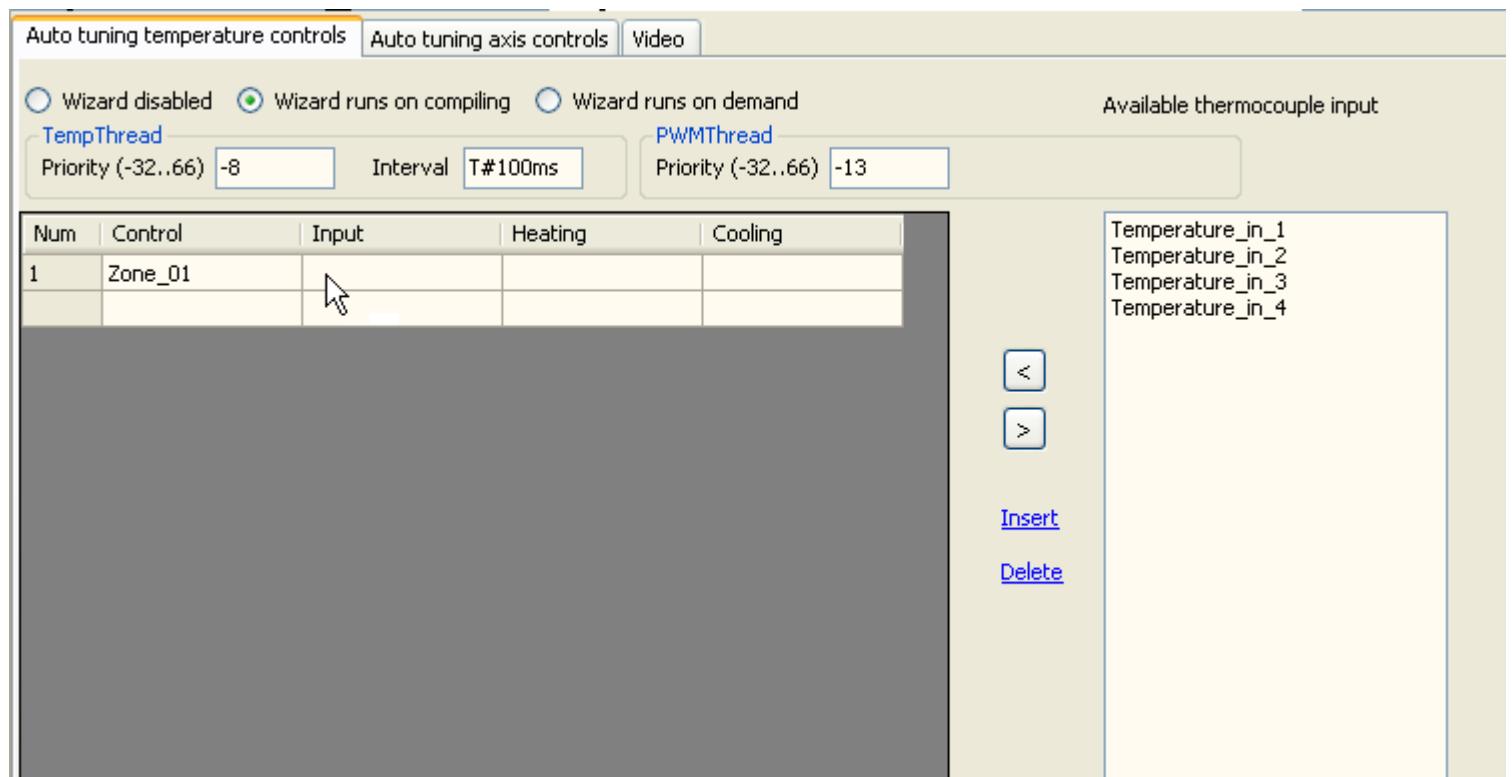
In the second column **Control** insert the variable that identify the structure **\_MATTEMP** related to the Zone.

Num	Control	Input	Heating	Cooling
1	Zone 01			

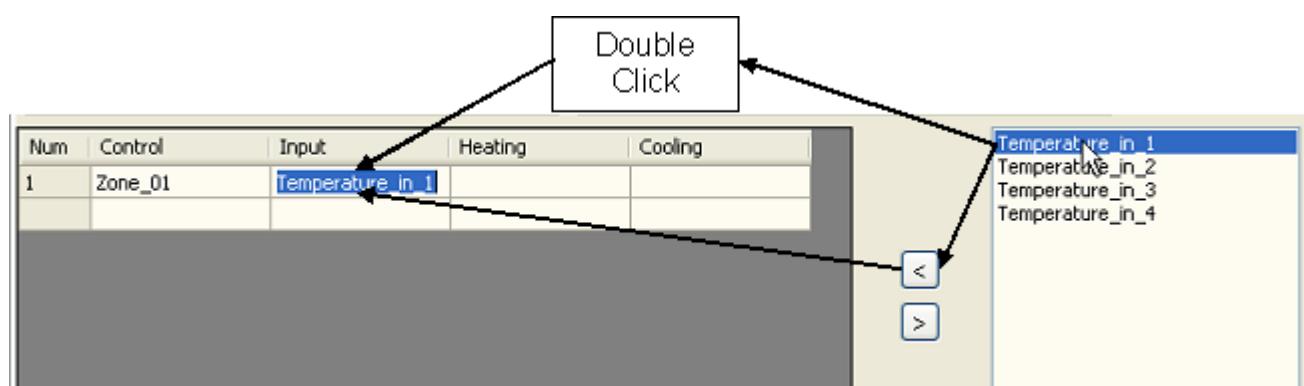
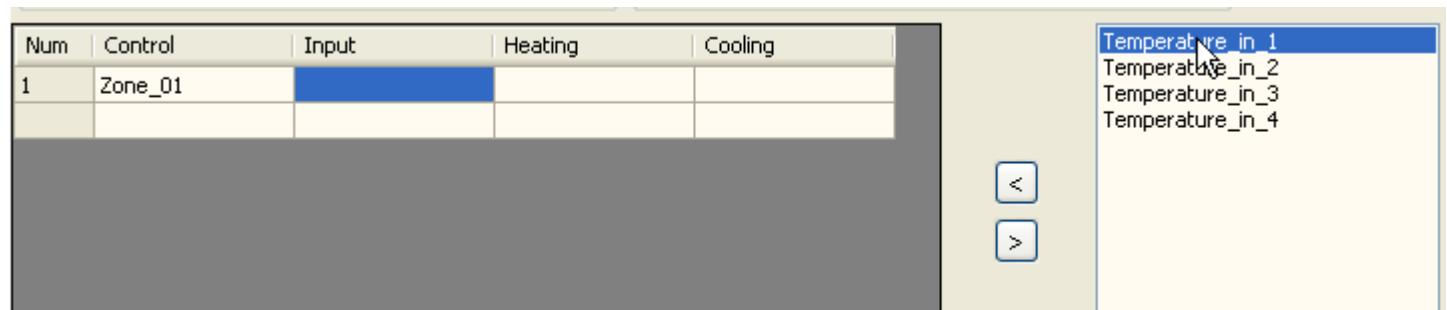
The sheet Auto Tuning Temperature Controls allows the user to enter all data on temperature controls. The grid has five columns: **NUM, CONTROL, INPUT, HEATING e COOLING**.

- **NUM**: The first column (only read) is the progressive number of the controls.
- **CONTROL**: The second column is the name of the variable of temperature control related **\_MATTEMP** structure of **M\_Control1** library.
- **INPUT**: The third column is the name of thermocouple input related to the zone where you want to know the current temperature (**\_MGenIn**).
- **HEATING**: The fourth column is the name of the digital output related to the zone that you want to adjust the heating (**\_MBoolOut**).
- **COOLING**: In the fifth column is possible (not required) to enter the name of the digital output related to the zone that you want to adjust the cooling (**\_MBoolOut**).

In the **Input** column insert the thermocouple input present in temperature module of the Device (RACK). It's possible insert the input just writing manually the variable or positioning in the input field appears in the right window the available thermocouple input.



Then simply select the desired thermocouple input in the column Available thermocouple input and using a double click of the mouse or the arrow to left < : the input will be automatically included in the table.



When the variable is added to the grid, this will no longer be present among the available variables. You can restore the previous situation by selecting the desired variable on the grid and use the arrow to the right >. At this point, the variable will still be available. In the fourth column **Heating** insert the digital output related at the Zone where you want to adjust the heating. It's possible insert the input just writing manually the variable or positioning in the Heating field appears in the right window the available boolean output.

Auto tuning temperature controls   Auto tuning axis controls   Video

Wizard disabled    Wizard runs on compiling    Wizard runs on demand

TempThread   PWMThread

Priority (-32..66) -8   Interval T#100ms   Priority (-32..66) -13

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1		

Available boolean output

<   >

[Insert](#)   [Delete](#)

- Out\_Zone\_01
- Out\_Zone\_02
- Out\_Zone\_03
- Out\_Zone\_04
- Out\_Zone\_05
- Out\_Zone\_06
- Out\_Zone\_07
- Out\_Zone\_08
- Out\_Zone\_09
- Out\_Zone\_10
- Out\_Zone\_11
- Out\_Zone\_12
- Out\_Zone\_13
- Out\_Zone\_14
- Out\_Zone\_15
- Out\_Zone\_16

Then simply select the desired digital output and using a double click of the mouse or the arrow to left  the output will be automatically included in the table.

Num   Control   Input   Heating   Cooling

1   Zone\_01   Temperature\_in\_1

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1		

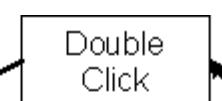
Out\_Zone\_01

<   >

[Insert](#)   [Delete](#)

- Out\_Zone\_01
- Out\_Zone\_02
- Out\_Zone\_03
- Out\_Zone\_04
- Out\_Zone\_05
- Out\_Zone\_06
- Out\_Zone\_07
- Out\_Zone\_08
- Out\_Zone\_09
- Out\_Zone\_10
- Out\_Zone\_11
- Out\_Zone\_12
- Out\_Zone\_13
- Out\_Zone\_14
- Out\_Zone\_15
- Out\_Zone\_16

Double Click



Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	

Out\_Zone\_01

<   >

[Insert](#)   [Delete](#)

- Out\_Zone\_01
- Out\_Zone\_02
- Out\_Zone\_03
- Out\_Zone\_04
- Out\_Zone\_05
- Out\_Zone\_06
- Out\_Zone\_07
- Out\_Zone\_08
- Out\_Zone\_09
- Out\_Zone\_10
- Out\_Zone\_11
- Out\_Zone\_12
- Out\_Zone\_13
- Out\_Zone\_14
- Out\_Zone\_15
- Out\_Zone\_16

Added the variable in the grid, this will no longer be present among the variables available. You can restore the previous situation by selecting the desired variable on the grid and use the arrow to the right  At this point, the variable will still be

available. In the fifth column **Cooling** inset the digital output related at the Zone where you want to adjust the cooling. It's possible insert the input just writing manually the variable or positioning in the Heating field appears in the right window the available boolean output.

The screenshot shows the 'Auto tuning temperature controls' interface. At the top, there are three radio buttons: 'Wizard disabled' (unchecked), 'Wizard runs on compiling' (checked), and 'Wizard runs on demand' (unchecked). Below these are two priority settings: 'TempThread' set to -8 and 'PWMThread' set to -13. A table lists a single zone control entry:

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	

To the right of the table is a list of available boolean outputs:

- Out\_Zone\_02
- Out\_Zone\_03
- Out\_Zone\_04
- Out\_Zone\_05
- Out\_Zone\_06
- Out\_Zone\_07
- Out\_Zone\_08
- Out\_Zone\_09
- Out\_Zone\_10
- Out\_Zone\_11
- Out\_Zone\_12
- Out\_Zone\_13
- Out\_Zone\_14
- Out\_Zone\_15
- Out\_Zone\_16

Below the table are buttons for navigating the list: '<' and '>'. To the right of the list are 'Insert' and 'Delete' buttons.

Then simply select the desired digital output and using a double click of the mouse or the arrow to left : the output will be automatically included in the table.

This screenshot shows the same interface after selecting 'Out\_Zone\_09' from the list on the right. The 'Cooling' column in the table now contains 'Out\_Zone\_09'.

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	Out_Zone_09

The list of available outputs remains the same, with 'Out\_Zone\_09' now highlighted. Navigation buttons ('<', '>') and 'Insert'/'Delete' buttons are also present.

In this screenshot, a 'Double Click' callout points to the 'Out\_Zone\_09' entry in the table. Arrows show the movement from the table cell to the list on the right and back again, illustrating the double-click action.

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	Out_Zone_09

The list of available outputs includes 'Out\_Zone\_09', which is now highlighted. Navigation buttons ('<', '>') and 'Insert'/'Delete' buttons are visible.

When the variable is added to the grid, this will no longer be present among the available variables. You can restore the previous situation by selecting the desired variable on the grid and use the arrow to the right . At this point, the variable will still be available. It's possible insert or delete line in the grid used commands **Insert** and **Delete** at the right side of it.



If for example we want to cancel the third Zone, you must move to the third row of the grid and click **Delete**.

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	Out_Zone_09
2	Zone_02	Temperature_in_2	Out_Zone_02	Out_Zone_10
3	Zone_03	Temperature_in_3	Out_Zone_03	Out_Zone_11
4	Zone_04	Temperature_in_4	Out_Zone_04	Out_Zone_12

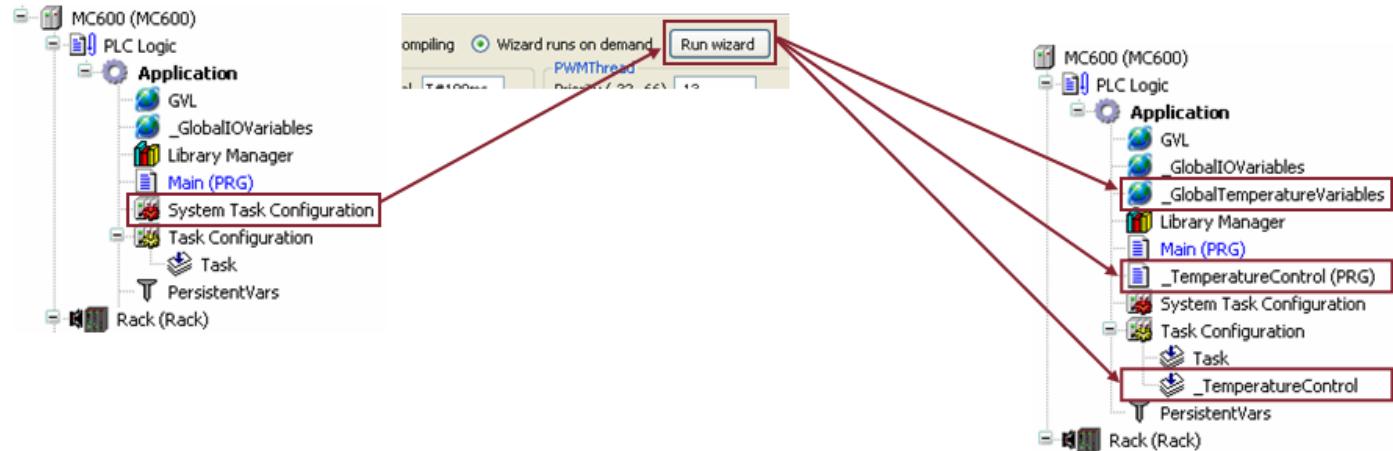
Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	Out_Zone_09
2	Zone_02	Temperature_in_2	Out_Zone_02	Out_Zone_10
3	Zone_04	Temperature_in_4	Out_Zone_04	Out_Zone_12

If contrary, starting from the example above, we wish to create a blank line in place number 3, you must move to the third row of the grid and click on **Insert**. This will insert a new blank line and the selected one will be moved to the next line (the fourth).

Num	Control	Input	Heating	Cooling
1	Zone_01	Temperature_in_1	Out_Zone_01	Out_Zone_09
2	Zone_02	Temperature_in_2	Out_Zone_02	Out_Zone_10
3				
4	Zone_04	Temperature_in_4	Out_Zone_04	Out_Zone_12

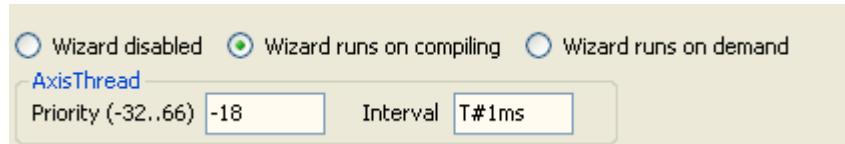
When you are done configuring all zones, it is possible to generate the temperature control. If you use the option **Wizard runs on compiling** this will happen every time you make a compilation of the program otherwise using the **Wizard runs on demand** data will be processed only if requested by the user. When generated the temperature control created:

- Code: **\_TemperatureControl (PRG)**
- Variables: **\_GlobalTemperatureVariables**
- Task: **\_TemperatureControl**



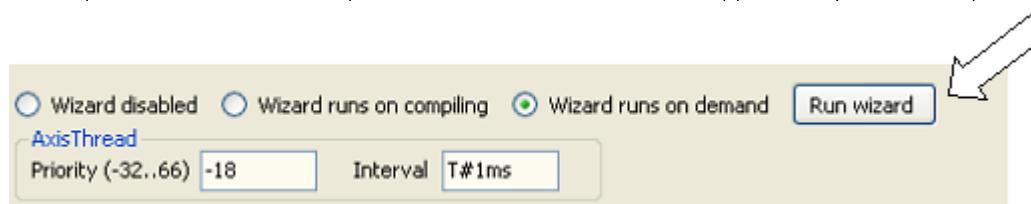
## 5.5.2 Auto Tuning Axis Controls

Sheet **Auto Tuning Axis Controls** setting and configure axis controls. In the head there are three buttons: **Wizard disabled**, **Wizard runs on compiling** (default) and **Wizard runs on demand**.



- **Wizard Disabled:** Select this option to don't activate wizard. It's possible insert all data but Task, POU and GVL don't create or update.
- **Wizard runs on compiling:** Wizard process data and generate Task, POU and GVL for each compilation (default).
- **Wizard runs on demand:** Wizard process data and generate Task, POU and GVL if required by programmer.

The request can be executed to press a button **Run wizard** that appears only when this option is selected.

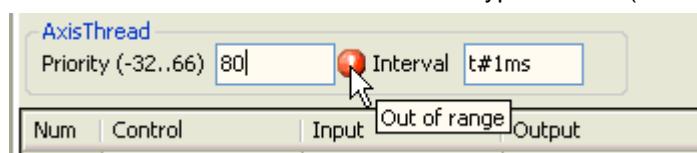


It's possible, as first activity, change the priority of Axis Thread (default -18), its interval (default 1 msec).

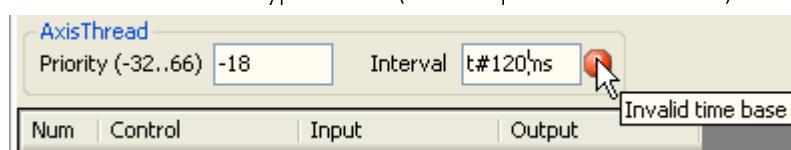
Changes recommended for advance users only.

Priority is adjustable from -32 (real-time) to 66.

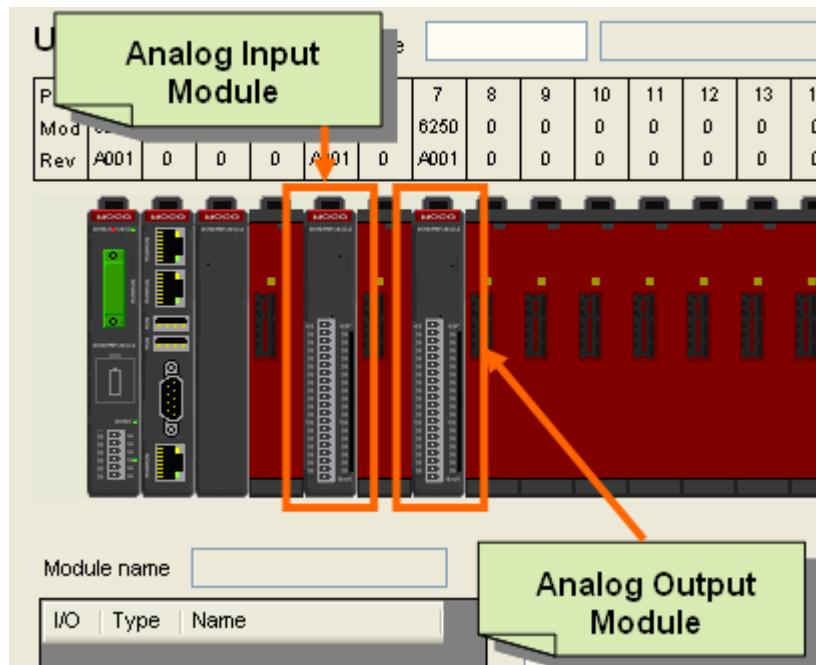
The interval (selectable from 1 to 100 msec) is set to 1 msec, which is the minimum time of the loop and is strongly recommended not to change it. If you enter a value not included in the priority field, a white box with a red exclamation mark appears. Moving the mouse over the exclamation mark will be visible the type of error (for example: Out of Range).



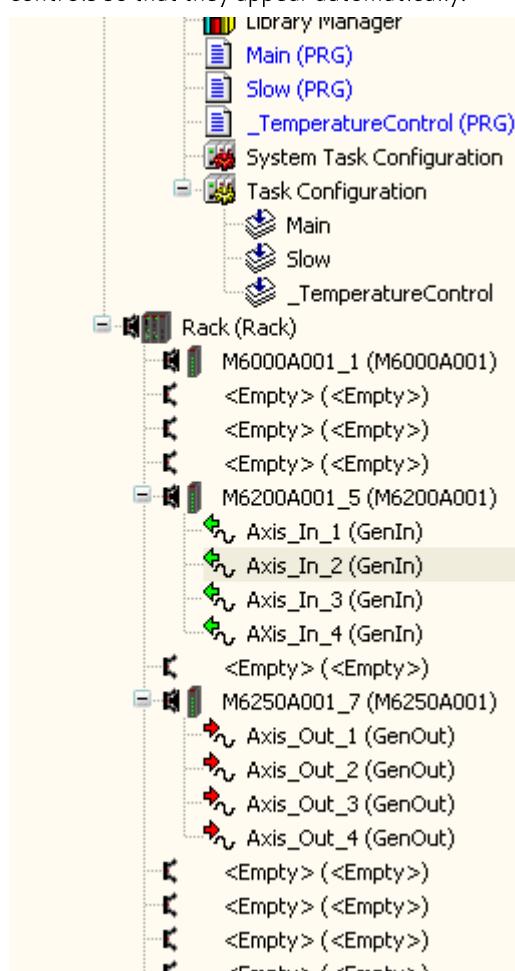
If you enter a value not included in the interval field, a white box with a red exclamation mark appears. Moving the mouse over the exclamation mark will be visible the type of error (for example: Invalid time base).



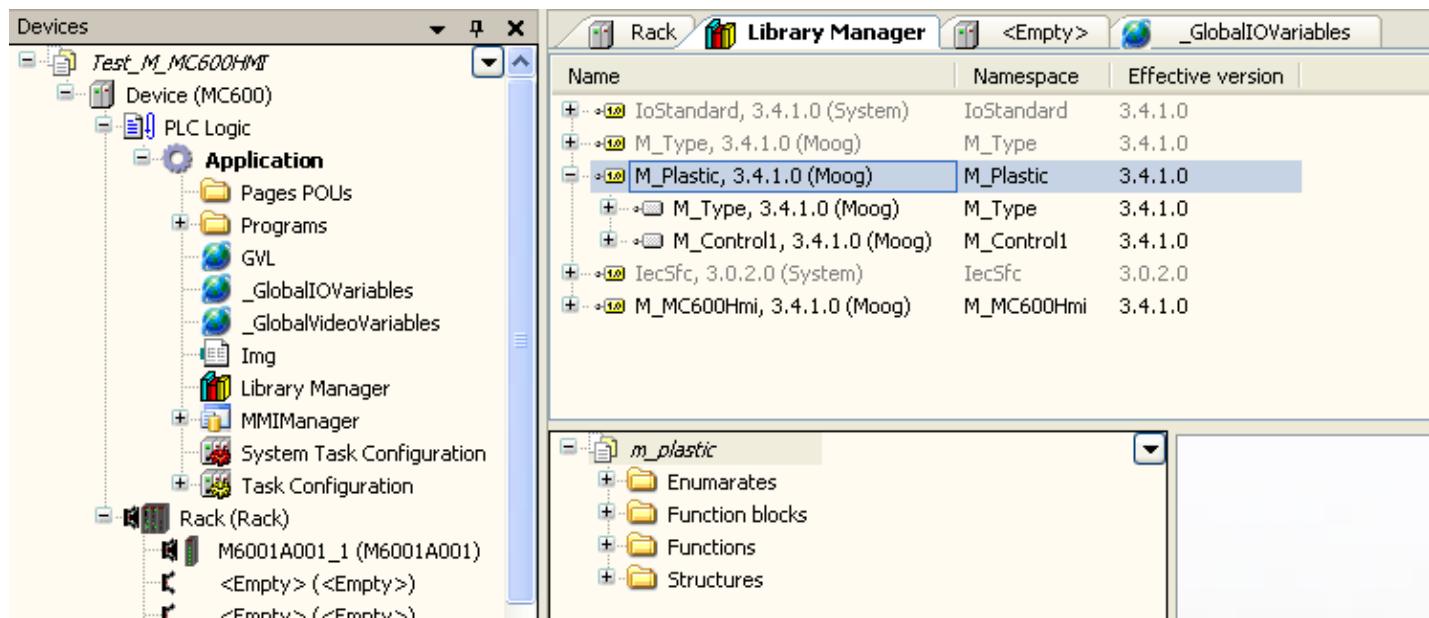
To manage an axis control, first you must be installed on the **Device Editor** a **Analog input module IMI220-6200A001** (4 analog inputs) or **IMI220-6201A001** (8 analog inputs) and a **AnalogOutputModule IMI220-6250A001** (4 analog outputs) or **IMI220-6251A001** (8 analog outputs).



Once inserted the modules, if you don't want to use the default variables, it's possible rename them before continuing the definition of Axis controls so that they appear automatically.



The second thing you need to enter, if not already present, the library **M\_Plastic** related axis controls.



In the second column **Control** insert the variable that identify the structure **\_MATAxis** related to the axis.

Num	Control	Input	Output
1	C_Axis_01		

The sheet Auto Tuning Axis Controls allows the user to enter all data on axis Controls. The grid contain four columns:

- **NUM**: The first column (only read) is the progressive number of the controls.
- **CONTROL**: The second column is the name of the variable of axis control related **\_MATAxis** structure of **M\_Plastic** library.
- **INPUT**: The third column is the name of the analog input related to the axis control (**\_MGenIn**).
- **OUTPUT**: The fourth column is the name other analog output related to the axis control (**\_MGenOut**).

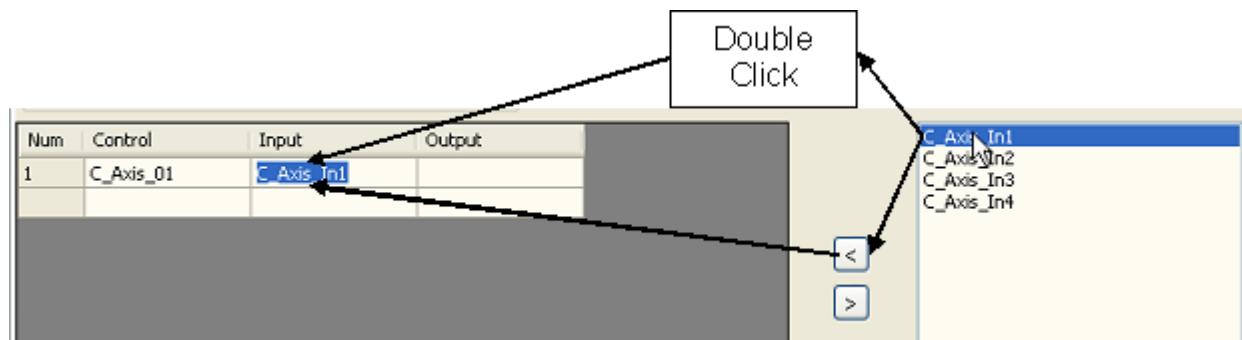
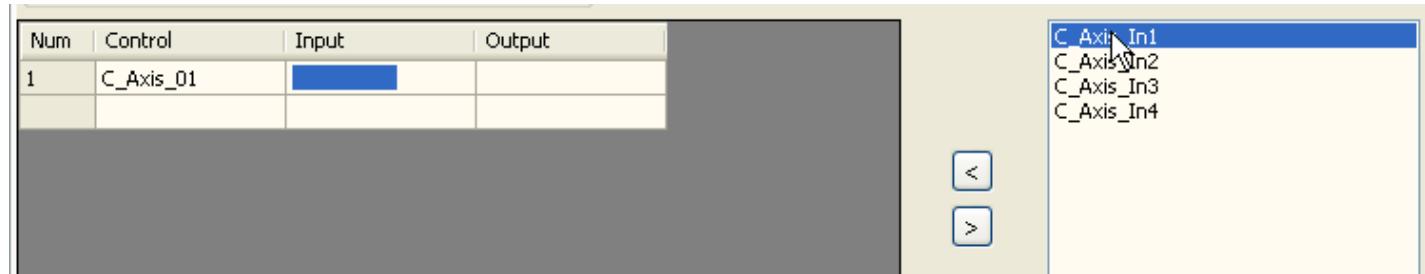
In the **Input** column insert the analog input present in a analog input module of the Device (RACK). It's possible insert the input just writing manually the variable or positioning in the input field appears in the right window the available general input.

Num	Control	Input	Output
1	C_Axis_01		

Available general input  
 C\_Axis\_In1  
 C\_Axis\_In2  
 C\_Axis\_In3  
 C\_Axis\_In4

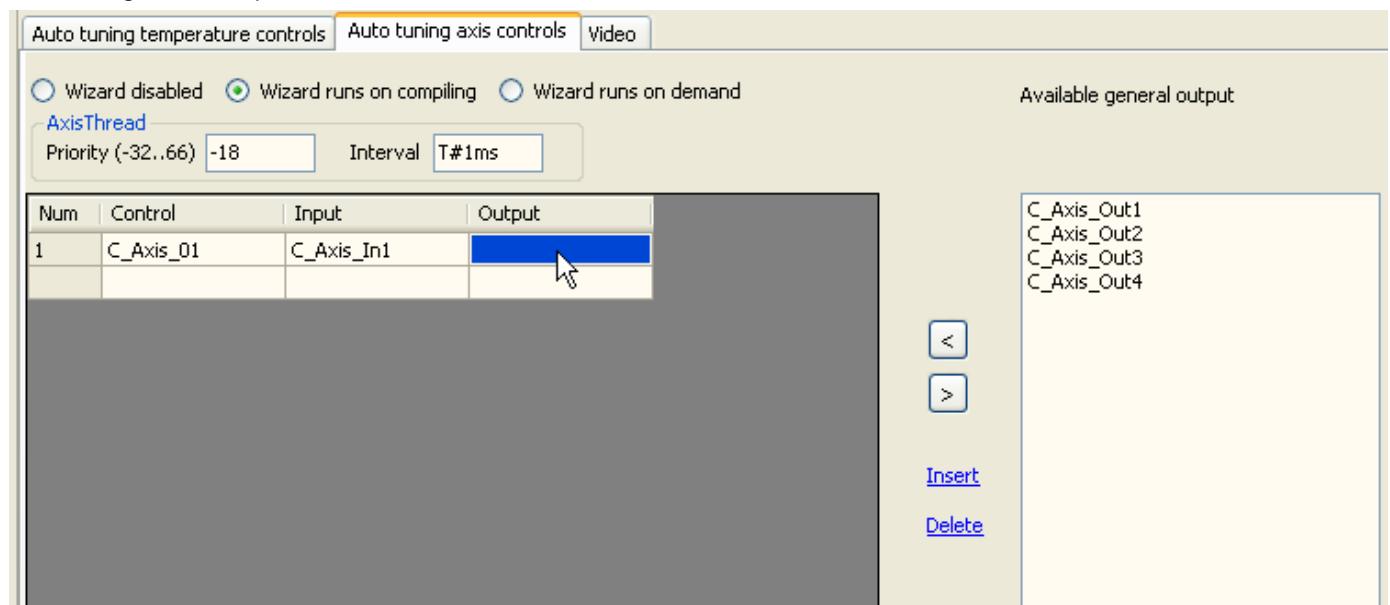
<  
 >  
[Insert](#)  
[Delete](#)

Then simply select the desired analog input in the column "Available general input" and using a double click of the mouse or the arrow to left the input will be automatically included in the table.

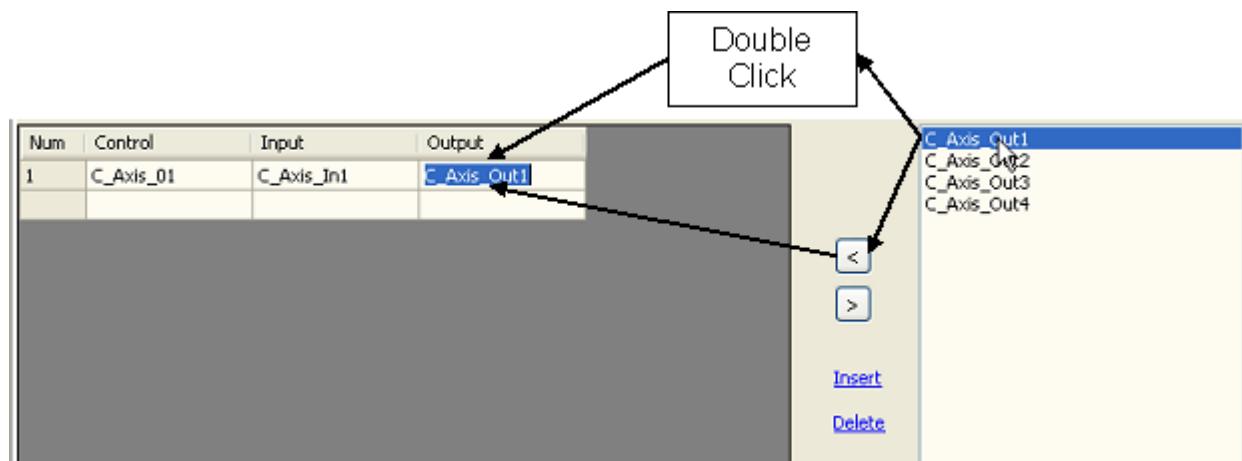
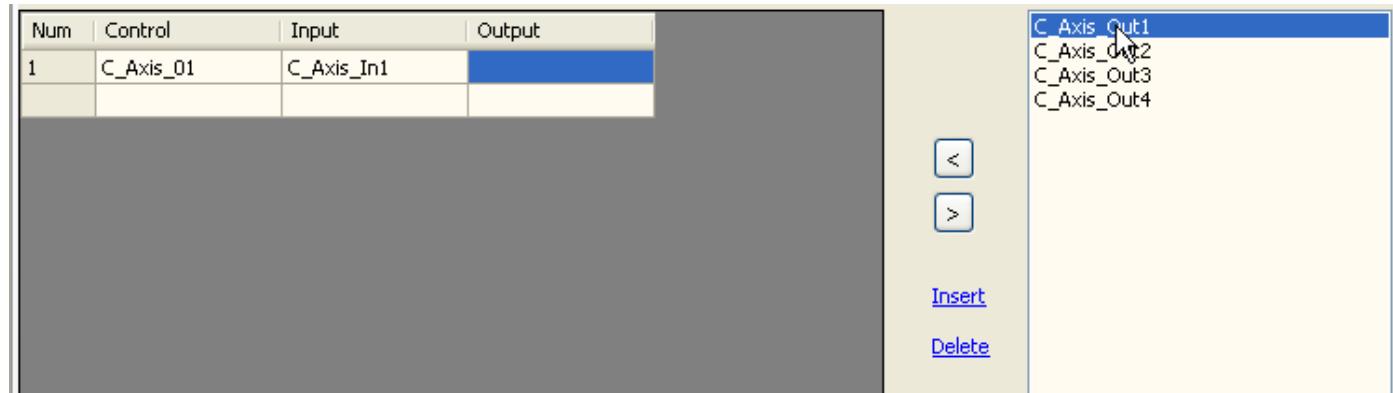


When the variable is added to the grid, this will no longer be present among the available variables. It's possible to restore the previous situation by selecting the desired variable on the grid and use the arrow to the right . At this point, the variable will still be available. In the fourth column **Output** insert the analog output related at the Axis where you want to adjust.

It's possible to insert the input just writing manually the variable or positioning in the Output field appears in the right window the available general output.



Then simply select the desired analog output and using a double click of the mouse or the arrow to left : the output will be automatically included in the table.

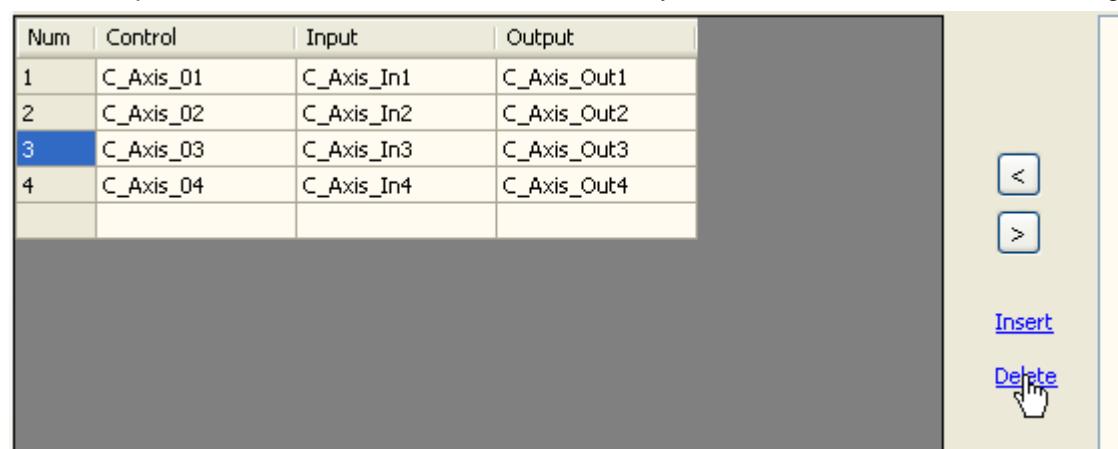


When the variable is added to the grid, this will no longer be present among the available variables. You can restore the previous situation by selecting the desired variable on the grid and use the arrow to the right . At this point, the variable will still be available.

It's possible insert or delete line in the grid used commands **Insert** and **Delete** at the right side of it.



If for example we want to cancel the third Axis Control, you must move to the third row of the grid and click **Delete**.



Num	Control	Input	Output
1	C_Axis_01	C_Axis_In1	C_Axis_Out1
2	C_Axis_02	C_Axis_In2	C_Axis_Out2
3	C_Axis_04	C_Axis_In4	C_Axis_Out4

<
>
  
[Insert](#)
  
[Delete](#)

If contrary, starting from the example above, we wish to create a blank line in place number 3, you must move to the third row of the grid and click on **Insert**. This will insert a new blank line and the selected one will be moved to the next line (the fourth).

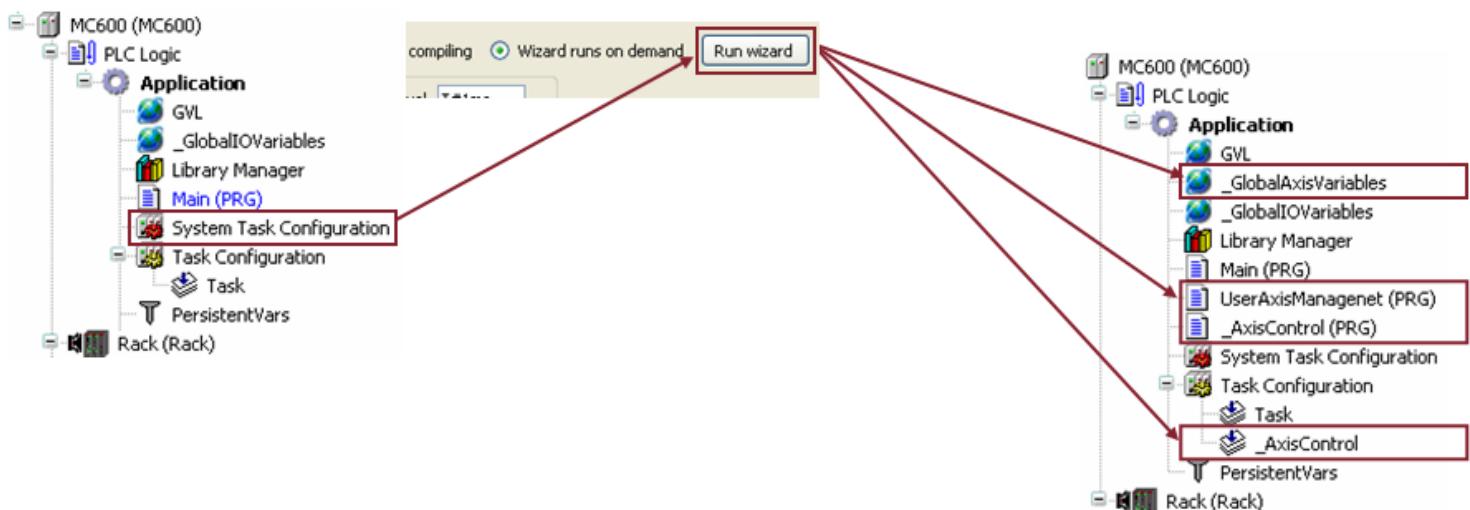
Num	Control	Input	Output
1	C_Axis_01	C_Axis_In1	C_Axis_Out1
2	C_Axis_02	C_Axis_In2	C_Axis_Out2
3			
4	C_Axis_04	C_Axis_In4	C_Axis_Out4

<
>
  
Insert
Delete

When you are done configuring allAxis Controls, it is possible to generate the general control. If you use the option **Wizard runs on compiling** this will happen every time you make a compilation of the program otherwise using the **Wizard runs on demand** data will be processed only if requested by the user.

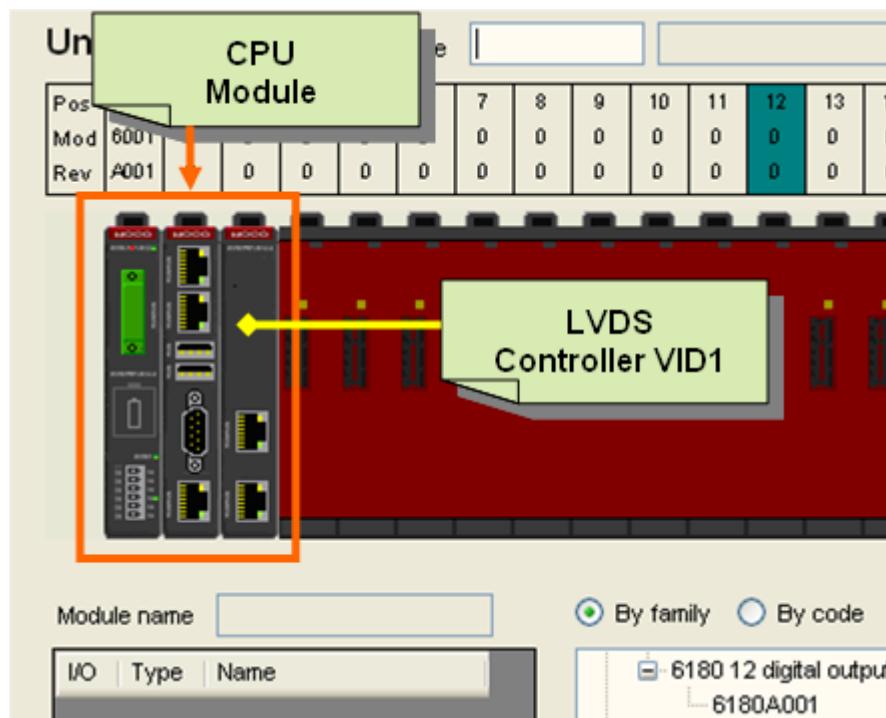
When generated the axis control created:

- Code: **UserAxisManagenet (PRG)** and **\_AxisControl (PRG)**
- Variables: **\_GlobalAxisVariables**
- Task: **\_AxisControl**



### 5.5.3 Video Control

For the video management is required in Device Editor to install a CPU module with LDVS controller (e.g.: **IMI220-6001A001**).



The sheet **Video**, contains the setting for the management of the video connected to the PLC. It's present a button called **Run wizard** that you select at the end of configuration of the object.



You can, before generating the video control, change the priority of the monitor thread, he priority of the keyboard thread and Interval. Expert users are required for this changes. The priority of the thread monitor is set from 0 (real time) to 67, while the thread of the keyboard is set from 0 (real time) to 66.

The interval (selectable from 10 to 100 msec) is set default to 25 msec.

If you insert a wrong value in priority field, will appear in the right side a white exclamation mark in a red field. Moving the mouse over the exclamation mark will be visible the type of error (for example: Out of Range).



If you insert a wrong value in Interval field, will appear in the right side a white exclamation mark in a red field. Moving the mouse over the exclamation mark will be visible the type of error (for example: Invalid time base).



The Videosheet allows the user to enter all data concerning the control of the LVDS Video connected aboard the CPU module.

The string **VID1** identifies the terminal's name adapter for local terminal (See the CPU configuration):

Parameter	Type	Value	Default Value	Unit	Description
Name of RS232/RS485 line	STRING	'SER1'	'SER1'		Serial line name in the application software
Name of local embedded terminal adap...	STRING	'VID1'	'VID1'		Terminal adapter name in the application software

The grid have five columns: **NUM**, **CONTROL**, **MONITOR**, **KEYBOARD** and **TOUCH SCREEN**.

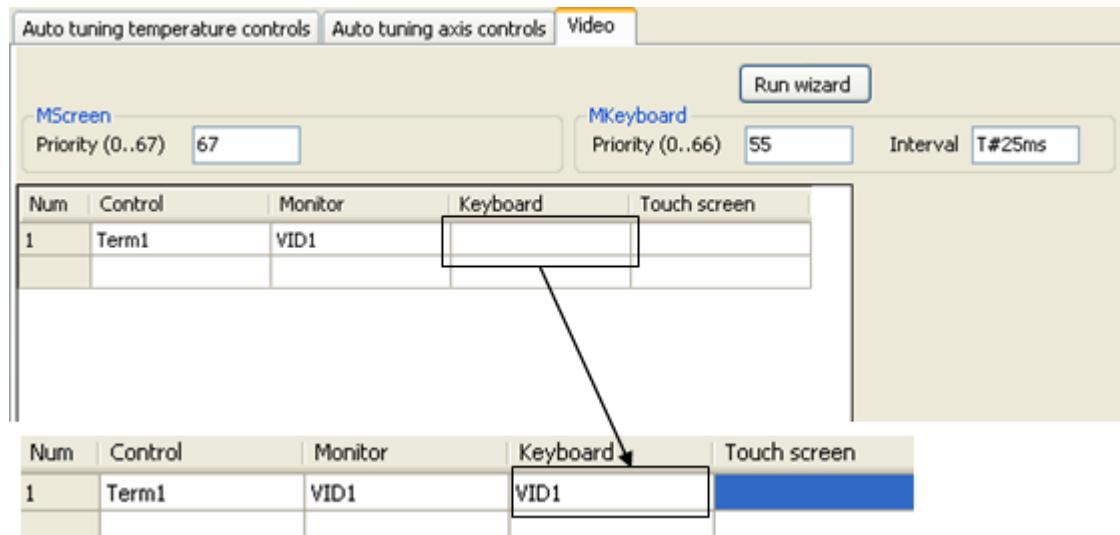
- **NUM:** The first column is the progressive numeration of the controls (only read).
- **CONTROL:** In the second column is mandatory to enter one name of variable-video's control on the structure **\_MTermin** of the library **M\_MC600Hmi**.

MScreen		MKeyboard		Run wizard	
Num	Control	Monitor	Keyboard	Touch screen	
1	Term1				
<b>Term1 : _MTermin</b>					

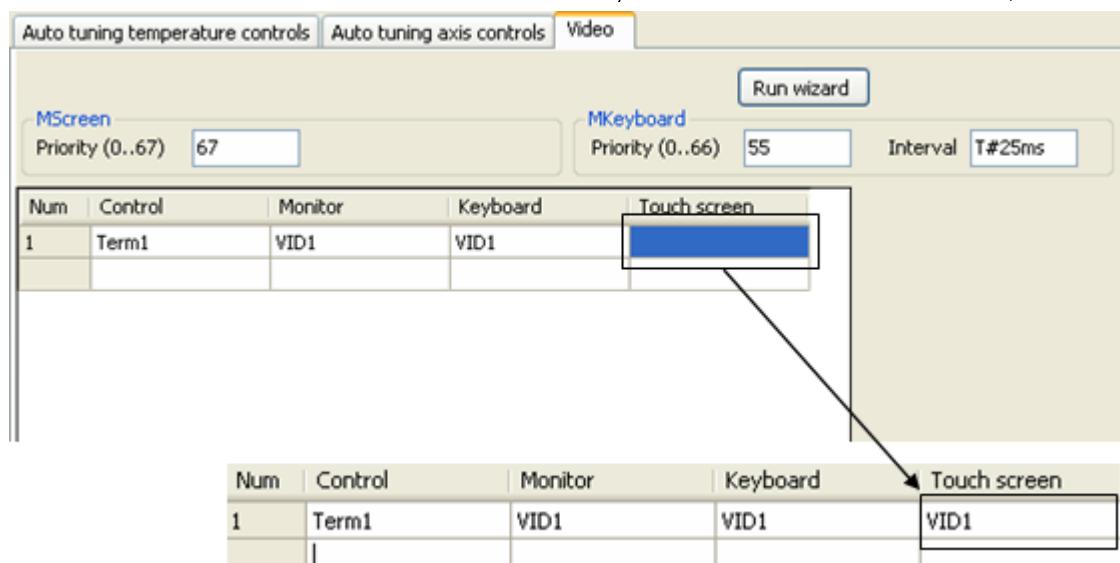
- **MONITOR:** In the third column is mandatory to enter the name of the controller (in our case **VID1**).

MScreen		MKeyboard		Run wizard	
Num	Control	Monitor	Keyboard	Touch screen	
1	Term1				
1	Term1	VID1			

- **KEYBOARD:** In the fourth column is mandatory to enter the name of the controller (in our case **VID1**).

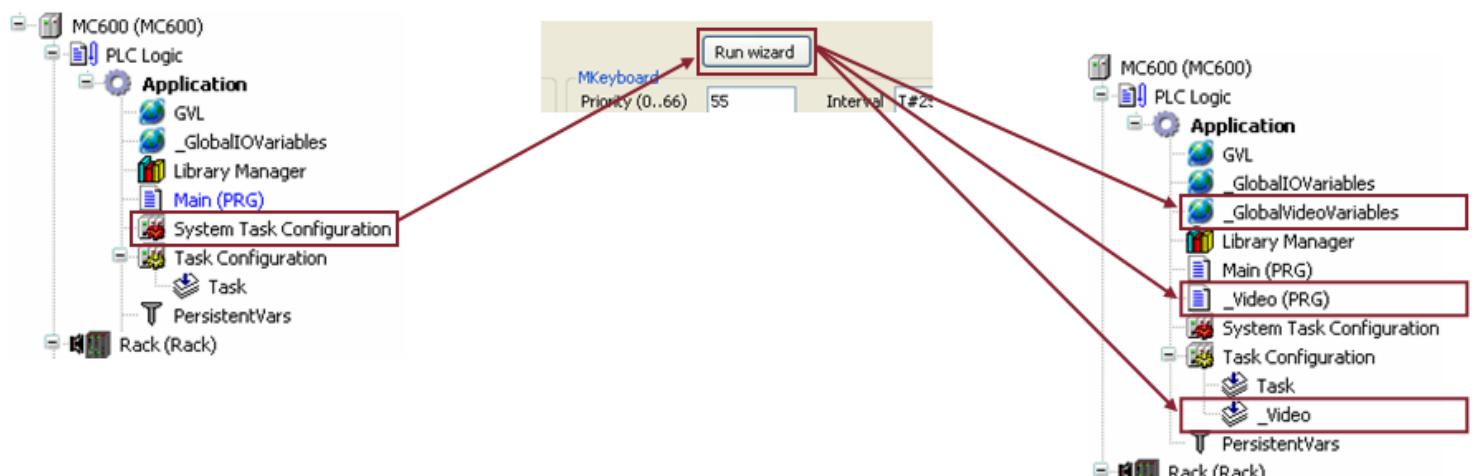


- TOUCH SCREEN:** In the fifth column is mandatory to enter the name of the controller (in our case **VID1**).



When all the columns are complete it's possible generate the video's controls, select the button **Run Wizard**. When you press the button created this:

- Code: **\_Video (PRG)**
- Variables: **\_GlobalVideoVariables**
- Task: **\_Video**





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