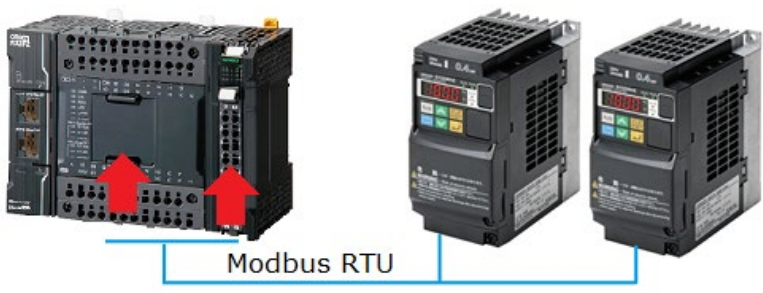
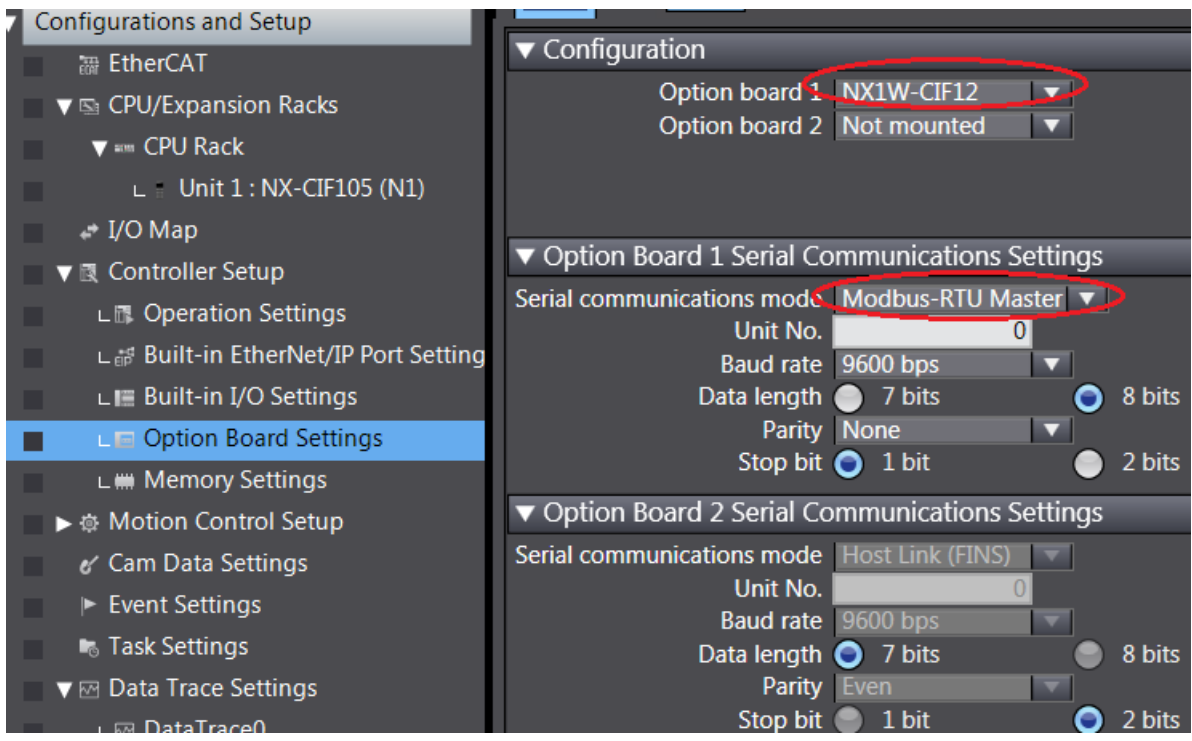



Reference	<b>MX2_Control_Serial</b>
Revision	<b>3.0</b>
Author	<b>JP Viskovic</b>
Date	<b>12/02/2021</b>
+ Support	<a href="http://support-omron.fr/">http://support-omron.fr/</a>

**NX1P2 controlling MX2 inverter through Modbus RTU serial connection.**

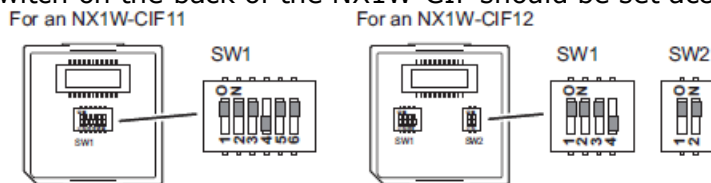
Function	Control up to 32 MX2 inverters through RS485 line																												
File	<a href="#">MX2_Control_Serial.slr</a> Sample program: <a href="#">Sample_MX2_Control_Serial.csm2</a>																												
Controller	NX1P2 with serial option NX1W-CIF11/12 or NX-CIF105																												
Symbol	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <div style="text-align: center;"> <p><b>NX1W-CIF</b></p> </div> <div style="border: 1px solid black; padding: 5px;"> <p align="center">MX2_Control_Serial_Option</p> <table border="0"> <tr><td>Execute</td><td align="right">ENO</td></tr> <tr><td>MX2_Ctrl</td><td align="right">MX2_Ctrl</td></tr> <tr><td>OptionLocationInfo</td><td align="right">MX2_Status</td></tr> <tr><td>Retry</td><td align="right">Error</td></tr> <tr><td>Timeout</td><td align="right">LastErrorID</td></tr> <tr><td>WaitTime</td><td align="right">LastSlaveError</td></tr> <tr><td></td><td align="right">LastModbusError</td></tr> </table> </div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 20px;"> <div style="text-align: center;"> <p><b>NX-CIF</b></p> </div> <div style="border: 1px solid black; padding: 5px;"> <p align="center">MX2_Control_Serial_Unit</p> <table border="0"> <tr><td>Execute</td><td align="right">ENO</td></tr> <tr><td>MX2_Ctrl</td><td align="right">MX2_Ctrl</td></tr> <tr><td>UnitLocationInfo</td><td align="right">MX2_Status</td></tr> <tr><td>PortNo</td><td align="right">Error</td></tr> <tr><td>Retry</td><td align="right">LastErrorID</td></tr> <tr><td>Timeout</td><td align="right">LastSlaveError</td></tr> <tr><td>WaitTime</td><td align="right">LastModbusError</td></tr> </table> </div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 20px;"> <div style="text-align: center;"> <p><u><b>EtherCat</b></u></p> </div> </div> </div>	Execute	ENO	MX2_Ctrl	MX2_Ctrl	OptionLocationInfo	MX2_Status	Retry	Error	Timeout	LastErrorID	WaitTime	LastSlaveError		LastModbusError	Execute	ENO	MX2_Ctrl	MX2_Ctrl	UnitLocationInfo	MX2_Status	PortNo	Error	Retry	LastErrorID	Timeout	LastSlaveError	WaitTime	LastModbusError
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<p>Principe</p>	<p>The Library MX2_Control_Serial allows to control up to 32 MX2 inverters through RS-RS-485 using Modbus RTU protocol.</p>  <p>Structure MX2_Ctrl allow for each slave:</p> <ul style="list-style-type: none"> <li>- to specify the frequency reference, reverse direction</li> <li>- to execute RUN / STOP command individually or to every slave (broadcast)</li> <li>- to read/write parameters.</li> </ul> <p>Structure MX2_Status return for each slave:</p> <ul style="list-style-type: none"> <li>- status RUN, ERR</li> <li>- Communication error</li> <li>- Output frequency and current</li> <li>- Default code</li> </ul> <p>Input <b>STOP_ALL</b> and <b>RUN_ALL</b> send one command to all slave using a broadcast request. The command <b>STOP_ALL</b> will interrupt any process to send the command. Instead of <b>RUN_ALL</b> the command <b>MX2_Ctrl.RUN_Cmd</b> will send the frequency and the reverse dir. Parameters before sending the RUN command to each slave. Thus, inverter will not start at same time. <b>MX2_Ctrl.RUN_Cmd</b> should be used every time when inverters are powered ON.</p>
<p>Configuration of NX1W-CIF</p>	<p>The serial communication mode of CIF Unit/Option should be set to Modbus-RTU Master</p> 

<p>Configuration NX-CIF105</p>	<table border="1"> <thead> <tr> <th colspan="2">Item name</th> </tr> </thead> <tbody> <tr><td>Event Level Setting/Event 1</td><td>Drop data by buffer full</td></tr> <tr><td>Event Level Setting/Level Setting of Event 1</td><td>Observation</td></tr> <tr><td>Event Level Setting/Event 2</td><td>Parity error</td></tr> <tr><td>Event Level Setting/Level Setting of Event 2</td><td>Observation</td></tr> <tr><td>Event Level Setting/Event 3</td><td>Framing error</td></tr> <tr><td>Event Level Setting/Level Setting of Event 3</td><td>Observation</td></tr> <tr><td>Event Level Setting/Event 4</td><td>Overrun error</td></tr> <tr><td>Event Level Setting/Level Setting of Event 4</td><td>Observation</td></tr> <tr><td>Transmission Buffering Enable/Disable Setting/Ch</td><td>Enable</td></tr> <tr><td>Baud Rate/Ch1 Baud Rate</td><td>9600 bps</td></tr> <tr><td>Signal Wire/Ch1 Signal Wire</td><td>2-wire</td></tr> <tr><td>Data Bit Length/Ch1 Data Bit Length</td><td>8 bits</td></tr> <tr><td>Parity/Ch1 Parity</td><td>No parity</td></tr> <tr><td>Stop Bit/Ch1 Stop Bit</td><td>1 bit</td></tr> <tr><td>Flow Control/Ch1 Flow Control</td><td>None</td></tr> <tr><td>Flow Control Target/Ch1 Flow Control Target</td><td>SEND&amp;RECEIVE</td></tr> <tr><td>Number of Characters to Determine the End/</td><td>200</td></tr> <tr><td>Ch1 Number of Characters to Determine the End</td><td></td></tr> </tbody> </table>	Item name		Event Level Setting/Event 1	Drop data by buffer full	Event Level Setting/Level Setting of Event 1	Observation	Event Level Setting/Event 2	Parity error	Event Level Setting/Level Setting of Event 2	Observation	Event Level Setting/Event 3	Framing error	Event Level Setting/Level Setting of Event 3	Observation	Event Level Setting/Event 4	Overrun error	Event Level Setting/Level Setting of Event 4	Observation	Transmission Buffering Enable/Disable Setting/Ch	Enable	Baud Rate/Ch1 Baud Rate	9600 bps	Signal Wire/Ch1 Signal Wire	2-wire	Data Bit Length/Ch1 Data Bit Length	8 bits	Parity/Ch1 Parity	No parity	Stop Bit/Ch1 Stop Bit	1 bit	Flow Control/Ch1 Flow Control	None	Flow Control Target/Ch1 Flow Control Target	SEND&RECEIVE	Number of Characters to Determine the End/	200	Ch1 Number of Characters to Determine the End														
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<p>Node Location</p>	<p>The input variable <b>OptionLocationInfo</b> or <b>UnitLocationInfo</b> should be linked to the logical address of the CIF using the Display Node Location Port provided by the contextual menu of the I/O Map.</p> <p>To get the Node Location Information:</p> <ul style="list-style-type: none"> <li>- Right-click on CIF item</li> <li>- Select Display Node Location Port</li> <li>- Create a variable <b>OptionLocationInfo</b> or <b>UnitLocationInfo</b> according to the CIF used (Unit or Option)</li> </ul> <div data-bbox="375 1164 758 1534"> </div> <table border="1" data-bbox="375 1568 1524 2004"> <thead> <tr> <th>Position</th> <th>Port</th> <th>R/W</th> <th>Data Type</th> <th>Variable</th> </tr> </thead> <tbody> <tr> <td></td> <td>▼ CPU/Expansion Racks</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Built-in I</td> <td>▶ Built-in I/O Settings</td> <td></td> <td></td> <td></td> </tr> <tr> <td>OptionB</td> <td>▼ Option Board Settings</td> <td></td> <td></td> <td></td> </tr> <tr> <td>OptionB</td> <td>▼ NX1W-CIF01</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>▶ Node location</td> <td></td> <td>_sOPTBOARD_ID</td> <td>OptionLocationInfo</td> </tr> <tr> <td>NXBusM</td> <td>▼ NX Bus Master</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5" style="text-align:center">OU</td> </tr> <tr> <td>Unit1</td> <td>▼ NX-CIF101</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>▶ Node location</td> <td></td> <td>_sNXUNIT_ID</td> <td>UnitLocationInfo</td> </tr> </tbody> </table> <div data-bbox="750 1713 1109 2004"> </div>		Position	Port	R/W	Data Type	Variable		▼ CPU/Expansion Racks				Built-in I	▶ Built-in I/O Settings				OptionB	▼ Option Board Settings				OptionB	▼ NX1W-CIF01					▶ Node location		_sOPTBOARD_ID	OptionLocationInfo	NXBusM	▼ NX Bus Master				OU					Unit1	▼ NX-CIF101					▶ Node location		_sNXUNIT_ID	UnitLocationInfo
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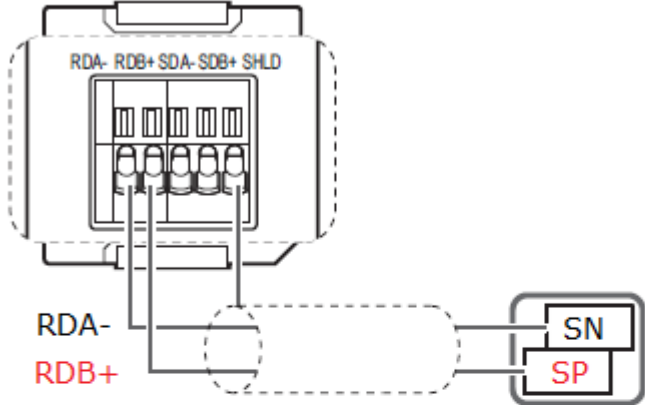
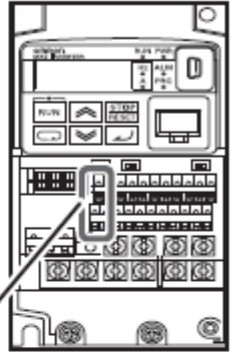

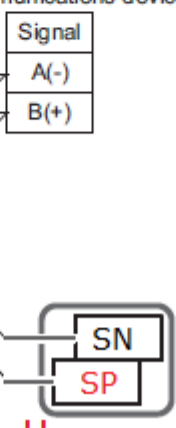
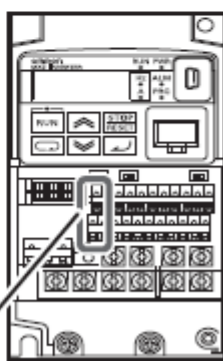
Setting

Dip switch on the back of the NX1W-CIF should be set according to your configuration



CIF11		CIF12		Setting	Setting description
SW	No.	SW	No.		
SW1	1	SW1	1	ON	With terminating resistance
	2		2	ON	Two-wire type
	3		3	ON	Two-wire type
	4		4	OFF	(Not used)
	5	SW2	1	ON	With RS control for receive data
	6		2	ON	With RS control for send data

RS485 configuration

<p>Wiring</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>RS-422A/485 Option Board NX1W-CIF11/CIF12</p>  </div> <div style="text-align: center;"> <p>3G3MX2-V1</p>  </div> </div> <div style="display: flex; justify-content: space-around;"> <table border="1" data-bbox="438 750 678 1220"> <thead> <tr> <th>Terminal No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr><td>A1</td><td>SDA-</td></tr> <tr><td>B1</td><td>SDB+</td></tr> <tr><td>A4</td><td>RDA-</td></tr> <tr><td>B4</td><td>RDB+</td></tr> <tr><td>A3</td><td>TERSDA-</td></tr> <tr><td>B3</td><td>TERSDB+</td></tr> <tr><td>A6</td><td>TERRDA-</td></tr> <tr><td>B6</td><td>TERRDB+</td></tr> <tr><td>A8</td><td>FG</td></tr> <tr><td>B8</td><td>FG</td></tr> </tbody> </table> <div style="text-align: center;"> <p>Shield</p>  </div> <div style="text-align: center;"> <p>Two-wire serial communications device</p>  </div> <div style="text-align: center;"> <p>3G3MX2-V1</p>  </div> </div> <p style="text-align: center; color: red; font-weight: bold;">Attention !!</p>			Terminal No.	Signal	A1	SDA-	B1	SDB+	A4	RDA-	B4	RDB+	A3	TERSDA-	B3	TERSDB+	A6	TERRDA-	B6	TERRDB+	A8	FG	B8	FG		
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<p>Utilization</p>	<p>Frequency, current and status information are refreshed only if the inverter slave number bit is set to ON in the ScanList (MX2Ctrl.Scanlist[slaveNo])</p>																										
<p>Manual</p>	<p>MX2 Inverter <a href="#">I570 User manual</a></p>																										

**Function Block MX2\_Control\_Serial**

Input Variables

Name	Type	values	Function
Execute	BOOL	OFF-ON	ON = FB execution
OptionLocationInfo	_sOPTBOARD_ID		Device type designation Loc. information from I/O map
UnitLocationInfo	_sNXUnit_ID		
PortNo	USINT	1 or 2	
MX2_Ctrl	_sMX2_Ctrl		
Timeout	UINT	0-9999	Delay before rising the MX2_Ctrl.COMM_Err flag ex : UINT#5 to UINT#20 (500ms to 2s)
Retry	USINT	0-9999	Max Retry number to read/write lecture/écriture max (in case of error) ex : UINT#2
WaitTime	TIME	0-9999	Delay between requests Ex : T#20ms to T#30ms

Note : It is advisable to allow a short delay between the exchanges (waitTime) to avoid that a request of the master is contiguous to the previous answer. In the same way, parameter C078 of the MX2 drives allows to add a delay before sending the response. The WaitTime delay is related to the chosen transmission rate. At 9600bps, select a delay between 20 and 30ms.

Input/output Variable

Nom	Type	value	Function
MX2_Ctrl	_sMX2_Ctrl	Structure	MX2 Control Command

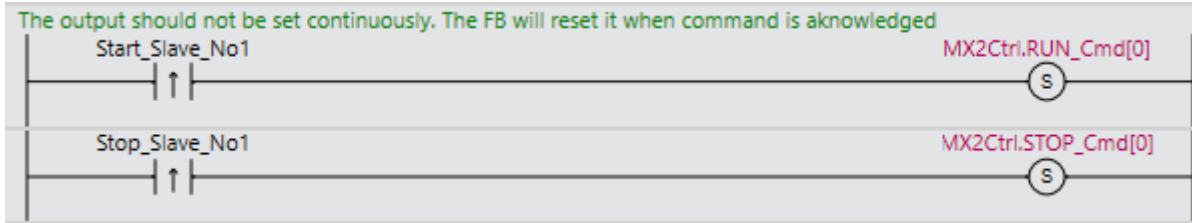
\_sMX2\_Ctrl Structure

ScanList	BOOL[1-32]	Slave status to be read	Bit 1 = slave 1 Bit 32= slave 32
Rev_Direction	BOOL[1-32]	Reverse direction	
RUN_Cmd	BOOL[1-32]	RUN command	
STOP_Cmd	BOOL[1-32]	STOP command	
ClearErr_Cmd	BOOL[1-32]	Error clear command	
Frequency	UINT[1-32]	Frequency	
Freq_Cmd	BOOL[1-32]	Frequency ref write command	
Acceleration	UINT[1-32]	Acceleration	
ACC_Cmd	BOOL[1-32]	Acc write command	
Deceleration	UINT[1-32]	Deceleration	
DEC_Cmd	BOOL[1-32]	Dec write command	
RUN_All	BOOL	RUN all MX2 simultaneously (broadcast)	
STOP_All	BOOL	STOP all MX2 simultaneously (broadcast)	
Timeout	UINT	Timeout delay (all slaves)	
Parameter	UINT	Parameter address to read/write	
SetValue	UINT	Read/Write value	
WriteParam	BOOL	Write command	
ReadParam	BOOL	Read command	
SlaveTargeted	UINT	Slave destination of the read/write command	

**WARNING !**

The command bits are reset when the command has been executed.  
 Be careful not to force the bit continuously otherwise the status reading will no longer be performed.

Example of Start/Stop command:



Output Variables

Nom	Type	valeurs	Fonction
ENO	BOOL	OFF-ON	ON = FB execution
MX2_Status	_sMX2_Status	structure	Inverter status
Error	BOOL	OFF-ON	Execution error on R/W instruction
LastErrorID	WORD	0-FFFF	Last execution error
LastSlaveInErr	UINT	1-32	Last slave in error
LastMdb_Exception	WORD	01-22	Last Modbus exception sent by the slave. 01, 02 : function not supported 03 : incorrect format 21 : Register address error 22 : no access in RUN or ERR mode

\_sMX2\_Status Structure

RUN	BOOL[1-32]	Inverter in RUN mode	Bit 1=slave 1 Bit 32=slave 32
Comm_Err	BOOL[1-32]	Communication error	
ERR	BOOL[1-32]	Slave response error	
StatusCode	UINT[1-32]	Inverter status 0: Initial status                      6: DC braking 2: Stopping                              7: Retrying 3: Running                                8: Tripping 4: Free-run stop                        9: Undervoltage (UV), 5: Jogging	
FreqOutput	UINT[1-32]	Output frequency	
FaultCode	UINT[1-32]	MX2 Default Code(see below)	
FaultStatus	UINT[1-32]	Status when fault occurred	
MultiFuncInput	UINT[1-32]	Status of Multifunction inputs	

List of inverter trip factors (FaultCode)

Upper part of trip factor code (indicating the factor)		Lower part of trip factor code (indicating the inverter status)	
Name	Code	Name	Code
No trip factor	0	Resetting	0
Over-current event while at constant speed	1	Stopping	1
Over-current event during deceleration	2	Decelerating	2
Over-current event during acceleration	3	Constant-speed operation	3
Over-current event during other conditions	4	Accelerating	4
Overload protection	5	Operating at zero frequency	5
Braking resistor overload protection	6	Starting	6
Overvoltage protection	7	DC braking	7
EEPROM error	8	Overload restricted	8
Undervoltage protection	9		
Current detection error	10		
CPU error	11		
External trip	12		
USP error	13		
Ground-fault protection	14		
Input overvoltage protection	15		
Inverter thermal trip	21		
CPU error	22		
Main circuit error	25		
Driver error	30		
Thermistor error	35		
Braking error	36		
Safe Stop	37		
Low-speed overload protection	38		
Operator connection	40		
Modbus communication error	41		
Easy sequence error (invalid instruction)	43		
Easy sequence error (invalid nesting count)	44		
Easy sequence execution error 1	45		
Easy sequence user trip 0 to 9	50 to 59		
Option error 0 to 9	60 to 69		
Encoder disconnection	80		
Excessive speed	81		
Position control range trip	83		

## Documentations


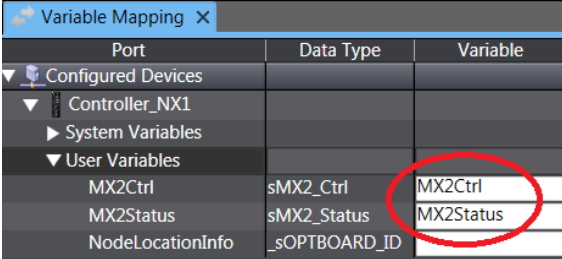
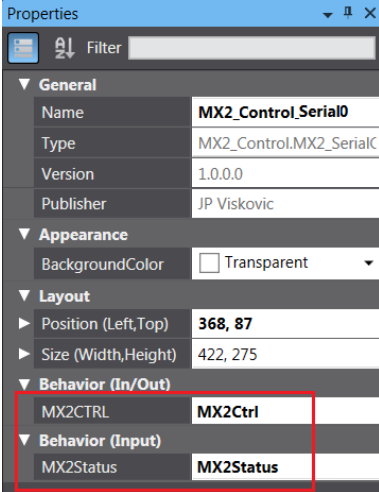
[Manual W579 Option Board du contrôleur NX1P2](#)

[Manual W540 Interface Unit NX-CIF](#)

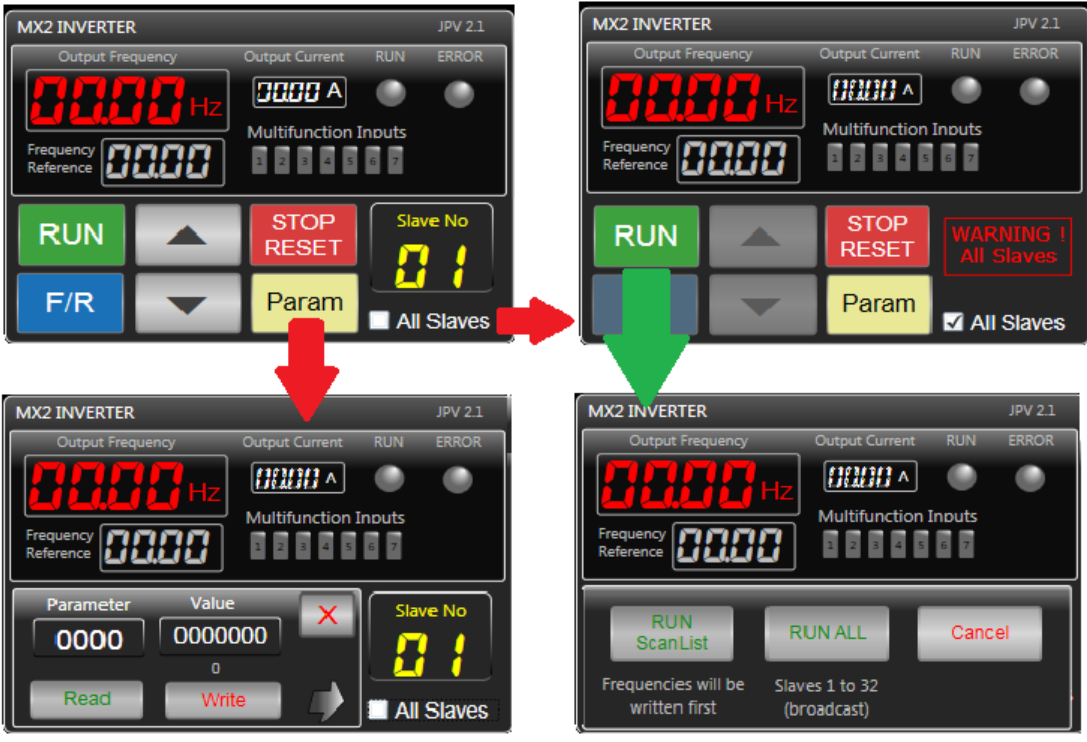
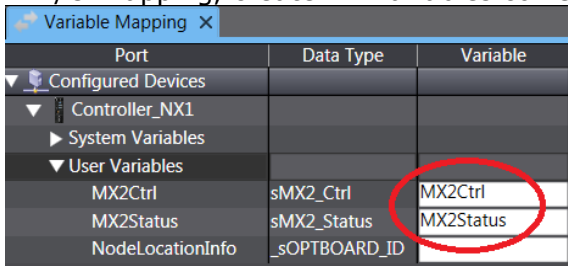
[Manual I570 Variateur MX2](#)

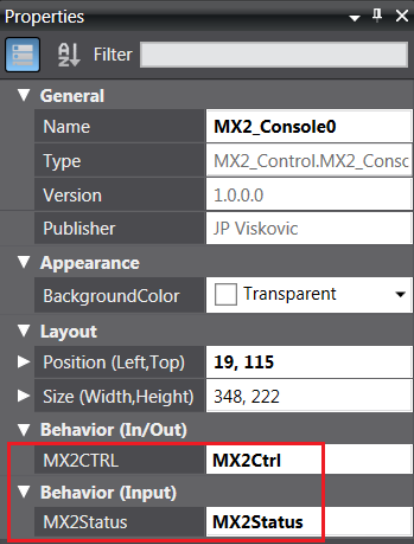


**IAG MX2\_Control\_Serial**

Function	Display the status of MX2 inverters (max 32)
File	<a href="#">MX2_Control_Serial.iag</a>
HMI	Sample program : <a href="#">Sample_MX2_Control_Serial.csm2</a>
HMI	NA5 series
Preview	
Condition of use	<p>The IAG MX2_Console should be used with the function block provided in the NX library <a href="#">MX2_Control_Serial.slr</a></p> <p>IAG integration in the project :</p> <ol style="list-style-type: none"> <li>In I/O mapping, create NA variables corresponding to NX variables</li> </ol>  <ol style="list-style-type: none"> <li>Allocate these variables to the IAG (in window Properties)</li> </ol> 
Restrictions	MX2 status are displayed as soon as declared in the ScanList of MX2_Control_Serial.

IAG MX2\_Console

Function	Display a monitoring console																								
File	<a href="#">MX2_Control_Serial.iag</a>																								
HMI	NA5 series																								
Preview	 <p>The preview shows four screenshots of the MX2 INVERTER HMI interface (JPV 2.1):</p> <ul style="list-style-type: none"> <li><b>Top Left:</b> Normal monitoring screen. Displays Output Frequency (0000 Hz), Output Current (0000 A), RUN (green), and ERROR (grey) indicators. Includes buttons for RUN, F/R, STOP/RESET, Param, and All Slaves.</li> <li><b>Top Right:</b> Warning state. A red box displays "WARNING ! All Slaves".</li> <li><b>Bottom Left:</b> Parameter editing screen. Shows Parameter (0000) and Value (0000000) fields with Read and Write buttons.</li> <li><b>Bottom Right:</b> Broadcast control screen. Features RUN ScanList, RUN ALL, and Cancel buttons. A note states: "Frequencies will be written first Slaves 1 to 32 (broadcast)".</li> </ul>																								
Condition of use	<p>The IAG MX2_Console_Serial should be used with the function block provided in the NX library <a href="#">MX2_Control_Serial.slr</a>.</p> <p>IAG integration in the project :</p> <ol style="list-style-type: none"> <li>In I/O mapping, create NA variables corresponding to NX variables</li> </ol>  <p>The Variable Mapping window shows the following configuration:</p> <table border="1" data-bbox="459 1370 1029 1635"> <thead> <tr> <th>Port</th> <th>Data Type</th> <th>Variable</th> </tr> </thead> <tbody> <tr> <td>Configured Devices</td> <td></td> <td></td> </tr> <tr> <td>Controller_NX1</td> <td></td> <td></td> </tr> <tr> <td>System Variables</td> <td></td> <td></td> </tr> <tr> <td>User Variables</td> <td></td> <td></td> </tr> <tr> <td>MX2Ctrl</td> <td>sMX2_Ctrl</td> <td>MX2Ctrl</td> </tr> <tr> <td>MX2Status</td> <td>sMX2_Status</td> <td>MX2Status</td> </tr> <tr> <td>NodeLocationInfo</td> <td>_sOPTBOARD_ID</td> <td></td> </tr> </tbody> </table> <ol style="list-style-type: none"> <li>Allocate these variables to the I'AG (in window Properties)</li> </ol>	Port	Data Type	Variable	Configured Devices			Controller_NX1			System Variables			User Variables			MX2Ctrl	sMX2_Ctrl	MX2Ctrl	MX2Status	sMX2_Status	MX2Status	NodeLocationInfo	_sOPTBOARD_ID	
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<p>Restrictions</p>	<p>Frequency, current, Multifunction input &amp; status of the selected MX2 will be refresh as soon as it has been declared in the ScanList of MX2_Control_Serial.</p> <p>The <b>All slaves</b> option allow to start/stop all inverters at same time. Write parameter will also be applied to all slaves (broadcast).          When All slaves is selected, the RUN command offer two options:</p> <ul style="list-style-type: none"> <li>- Write frequency and send RUN command to each MX2 inverter (after a power restart, frequency reference is cleared)</li> <li>- RUN all inverter (1 to 32) using a unique broadcasted command.</li> </ul> <p>IAG should have same main version number than the NX1P library.</p>