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NEWS

# SINAMICS G120XA: Speed Control with S7-1200 via Modbus RTU

SINAMICS G120XA / V1.0

https://support.industry.siemens.com/cs/ww/en/view/109770380

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## 1 Task

**NOTICE** This reference only can be used in China and India.

### 1.1 Overview

### Introduction

SINAMICS G120XA drives are able to exchange data via the RS485 interface and via Modbus RTU with a SINAMICS S7-1200 controller.

### Overview of the automation task

The figure below provides an overview of the automation task.

Figure 1-1: Overview of the automation task



#### **Solution** 2

#### 2.1 Solution overview

### **Schema Display**

The following figure displays the most important components of the solution: Figure 2-1: Overview of the most important components



### Delimitation

This application does not include a description of

- SINAMICS G120XA version •
- BOP-2, IOP-2, and Smart Access Module operation of SINAMICS G120XA • Basic knowledge of these topics is assumed.

### **Required knowledge**

Basic knowledge on TIA Portal is assumed.



### 2.2 Hardware and Software Components

### 2.2.1 Validity

This application example is valid for

- TIA Portal V15 SP1
- S7-1200 CPU V4.1
- SINAMICS G120XA V4.7.11

### 2.2.2 Used Components

The application was generated with the following components:

### Hardware components

Table 2-1

Component	No.	Article number	Note
SIMATIC S7-1200 1217C DC/DC/DC	1	6ES7217-1AG40-0XB0	V4.1
CM1241 RS422/RS485	1	6ES7 241-1CH32-0XB0	V2.1
SINAMICS G120XA	1	6SL3220-1YD16-0CB0	V4.7.11
Smart Access Module	1	6SL3255-0AA00-5AA0	V01.02.06.01

### Standard software components

Table 2-2

Component	No.	Article number	Note
TIA Portal	1	6AV2103-0AA05-0AA7	V15 SP1

### Sample files and projects

The following list includes all files and projects that are used in this example. Table 2-3

Component	Note
109770380_G120XA_Modbus_communication_with_S7-1200.docx	Project file
109770380_G120XA_Modbus_communication_with_S7-1200.zip	Reference document

## 3 Basics

### 3.1 Basics of Modbus introduction

#### Overview of communication using Modbus RTU communication

Modbus RTU (Remote Terminal Unit) is a standard protocol for communication in the network and uses the RS232 or RS422/485 connection for serial data transmission between Modbus devices in the network.

Modbus RTU uses a master/slave network in which all communication is triggered by a single master device while the slaves can only respond to the request of the master. The master sends a request to a slave address and only the slave with this slave address responds to the command.

**NOTE** Exception: Modbus slave address 0 sends a broadcast frame to all slaves (without slave response).

#### Implementation with SIMATIC S7-1200

The application uses the following system instructions:

- MB\_Comm\_Load
   To configure port for Modbus
- MB\_Master

To communicate as Modbus master

### Figure 3-1: Modbus introduction for S7-1200

Name	Description	Version
S7 communication		V1.3
🕨 🛅 Open user communicati		<u>V4.1</u>
WEB Server		V1.1
Others		
Communication processo		
PtP Communication		<u>V2.4</u>
USS communication		<u>V3.1</u>
MODBUS (RTU)		<u>V3.1</u>
🕨 🛅 Point-to-point		V1.0
USS		V1.1
MODBUS		<u>V2.2</u>
MB_COMM_LOAD	Configure port on the P	<u>V2.1</u>
MB_MASTER	Communicate via the P	<u>V2.2</u>
MB_SLAVE	Communicate via the P	<u>V2.1</u>
GPRSComm: CP1242-7		V1.3
TeleService		V1.9

### 3.2 Overview Modbus RTU system instruction

### MB\_Comm\_Load (S7-1200)

### Description

The *MB\_Comm\_Load* instruction configures a communication module for communication by means of the Modbus protocol. An instance data block is automatically assigned when you add the *MB\_Comm\_Load* instruction in your program.

Figure 3-2: MB\_Comm\_Load system instruction



### Parameter

The following table shows the parameters of MB\_Comm\_Load

Parameter	IN / OUT	Data type	Default	Description		
REQ	IN	Bool	False	Starts the instruction upon a positive edge of this input.		
PORT	IN	PORT	0	Specifies the communication module which is used for the communication: For S7-1500/S7-1200 the "HW identifier" from the device configuration will be used. The symbolic port name is assigned in the "System constants" tab of the PLC tag table and can be applied from there. Project tree Devices Devices Devices & networks C G120C_Modbusat57-1200 Add new device Devices & networks C G120C_Modbusat57-1200 Add new device Devices & networks C G120C_Modbusat57-1200 Add new device Device configuration C Online & diagnostics C Program blocks Add new block Main [OB1] Modbus_Comm_DB [DB4] System blocks C Technology objects C External source files C PLC tags Show all tags Add new tag table Double click "Show all tags" Switch to "System constants" Switch to "System constants" Switch to "System constants" C Device_2 Hw_Pvm 266 Devices Device_3 Hw_Pvm 267 Devices Devices_4 Hw_Pvm 268 Devices Devices_4 Hw_Pvm 268 Devices Devices Devices_4 Hw_Pvm 268 Devices De		
BAUD	IN	UDInt	9600	Selection of the data transmission rate Valid values are: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bit/s.		

Table 3-1: Parameter list of MB\_Comm\_Load

Parameter	IN / OUT	Data type	Default	Description
PARITY	IN	UInt	0	Selection of parity: • 0 – None • 1 – Odd • 2 – Even
MB_DB	IN/OUT	MB_BASE	-	A reference to the instance data block of the MB_Master or MB_Slave instructions. The MB_DB parameter must be connected with the (static and therefore not visible in the instruction) MB_DB parameter of the MB_Master or MB_Slave instruction.
DONE	OUT	Bool	False	The DONE bit is TRUE for one cycle after the last request has been completed without errors.
ERROR	OUT	Bool	False	The ERROR bit is TRUE for one cycle after the last request has been completed with errors. The error code in the STATUS parameter is only valid in the cycle in which ERROR = TRUE.
STATUS	OUT	Word	16#7000	Error code

### NOTE

The input value used in this application will described in chapter 4.

### MB\_Master (S7-1200)

### Description

The *MB\_Master* instruction communicates as Modbus master via a port configured by the *MB\_Comm\_Load* instruction. An instance data block is automatically assigned when you add the *MB\_Master* instruction in your program. The MB\_DB parameter of the *MB\_Comm\_Load* instruction must be connected to the (static) MB\_DB parameter of the *MB\_Master* instruction.

Figure 3-3: MB\_Master system instruction



Table 3-2: Parameter list of Modbus\_Master

Parameters	Declaration	Data type	Standard	Description
REQ	IN	Bool	FALSE	FALSE = no request TRUE = request to send data to the Modbus slave
MB_ADDR	IN	UInt	-	Modbus RTU station address: The value 0 is reserved for the broadcast of a frame to all Modbus slaves. Only the Modbus function codes 05, 06, 15 and 16 are supported for the broadcast.
MODE	IN	USInt	0	Mode selection: Specifies the type of request (read, write or diagnostics).
DATA_ADDR	IN	UDInt	0	Start address in the slave: Specifies the start address of the data that is accessed in the Modbus slave.
DATA_LEN	IN	Word	0	Data length: Specifies the number of bits or words this instruction is to access. The valid lengths are listed in the table of Modbus functions below.
DATA_PTR	IN/OUT	Variant	-	Data pointer: Points to the flag or DB address for the data to be written or read. As of instruction version V3.0: The parameter may point to an optimized memory area. In the optimized memory area, a single element or an array is permitted with the

Parameters	Declaration	Data type	Standard	Description
				following data types: Bool, Byte, Char, Word, Int, DWord, DInt, Real, USInt, UInt, UDInt, SInt, WChar. Every other data type results in error message 16#818C.
DONE	OUT	Bool	FALSE	The DONE bit is TRUE for one cycle after the last request has been completed without errors.
BUSY	OUT	Bool	-	FALSE – no command active for Modbus_Master TRUE – command for Modbus_Master in progress
ERROR	OUT	Bool	FALSE	The ERROR bit is TRUE for one cycle after the last request has been completed with errors. The error code in the STATUS parameter is only valid in the cycle in which ERROR = TRUE
STATUS	OUT	Bool	0	Error code

NOTE

The input value used in this application will described in chapter 4.

### 3.3 Details of G120XA Modbus function

### 3.3.1 Related parameters for Modbus communication

Related parameters for Modbus communication is showed in table 3-3. Table 3-3: Parameter list of Modbus RTU Setting

Parameter	Explanation					
p2020	Fieldbus interface	5: 4800 baud	10: 76800 baud			
	baudrate	6: 9600 baud	11: 93750 baud			
	(Factory setting: 7)	7: 19200 baud	12: 115200 baud			
		8: 38400 baud	13: 187500 baud			
		9: 57600 baud				
p2021	Fieldbus interface add	ress (Factory setting: 1)				
	Valid addresses: 1 24	7.				
	The parameter is only active if address 0 is set at the Contaddress switch.					
	A change only becomes been switched off and switched spin switched off and switched spin	effective after the inverter po witched on again.	ower supply has			
p2024	Fieldbus interface times (Factory	[0] Maximum permissible telegram processing time of the Modbus slave				
	setting: [0] 1000 ms,[2] 0 ms)	[2] dead time between two telegrams				
p2029	Fieldbus interface	[0] number of error-free tel	egrams			
	error statistics	[1] number of rejected teleg	grams			
		[2] number of framing errors				
		[3] number of overrun errors				
		[4] number of parity errors				
		[5] number of starting character errors				
		[6] number of checksum er	rors			
		[7] number of length errors				
p2030=2	Fieldbus interface prot	ocol selection: Modbus RT	U			
p2031	Fieldbus interface	0: No parity				
	Modbus parity	1: Odd parity				
	(Factory setting: 2)	2: Even parity				
p2040	Fieldbus interface monitoring time (Factory setting: 10 s)					
	p2040 = 0: The monitoring is deactivated					

### 3.3.2 Control word 1 (STW1)

### Table 3-4: Control word 1(STW1)

Bit	Significance	Explanation	Signal inter- connection in the inverter		
0	Reserved				
1	Reserved				
2	0 = Quick stop (OFF3)	Quick stop: The motor brakes with the OFF3 ramp down time p1135 down to standstill.	p0848[0] = r2090.2		
	1 = No quick stop (OFF3)	The motor can be switched on (ON command).			
3	0 = Inhibit operation	Immediately switch-off motor (cancel pulses).	p0852[0] = r2090.3		
	1 = Enable operation	Switch-on motor (pulses can be enabled).			
4	0 = Disable RFG	The inverter immediately sets its ramp- function generator output to 0.	p1140[0] = r2090.4		
	1 = Do not disable RFG	The ramp-function generator can be enabled.			
5	0 = Stop RFG	The output of the ramp-function generator stops at the actual value.	p1141[0] = r2090.5		
	1 = Enable RFG	The output of the ramp-function generator follows the setpoint.			
6	0 = Inhibit setpoint	The inverter brakes the motor with the ramp-down time p1121 of the ramp-function generator.	p1142[0] = r2090.6		
	1 = Enable setpoint	Motor accelerates with the ramp-up time p1120 to the setpoint.			
7	Reserved				
8	Reserved				
9	Reserved				
10	0 = No control via PLC	Inverter ignores the process data from the fieldbus.	p0854[0] = r2090.10		
	1 = Control via PLC	Control via fieldbus, inverter accepts the process data from the fieldbus.			
11	1 = Direction reversal	Invert setpoint in the inverter.	p1113[0] = r2090.11		
12	Reserved				
13	1 = MOP up	Increase the setpoint saved in the motorized potentiometer.	p1035[0] = r2090.13		
14	1 = MOP down	Reduce the setpoint saved in the motorized potentiometer.	p1036[0] = r2090.14		
15	Reserved				

### 3.3.3 Status word 1 (ZSW1)

Table 3-5: Status word	1	(ZSW1)	
------------------------	---	--------	--

Bit	Significance	Explanation	Signal inter- connection in the inverter
0	1 = Ready for switching on	Power supply switched on; electronics initialized; pulses locked.	p2080[0] = r0899.0
1	1 = Ready Motor is switched on (ON/OFF1 = 1), no fault is active. With the command "Enable operation" (STW1.3), the inverter switches on the motor.		p2080[1] = r0899.1
2	1 = Operation enabled	Motor follows setpoint. See control word 1, bit 3.	p2080[2] = r0899.2
3	1 = Fault active	The inverter has a fault. Acknowledge fault using STW1.7.	p2080[3] = r2139.3
4	1 = OFF2 inactive	Coast down to standstill is not active.	p2080[4] = r0899.4
5	1 = OFF3 inactive	Quick stop is not active.	p2080[5] = r0899.5
6	1 = Switching on inhibited active	It is only possible to switch on the motor after an OFF1 followed by ON.	p2080[6] = r0899.6
7	1 = Alarm active	Motor remains switched on; no acknowledgement is necessary.	p2080[7] = r2139.7
8	1 = Speed deviation within the tolerance range	Setpoint / actual value deviation within the tolerance range.	p2080[8] = r2197.7
9	1 = Master control requested	The automation system is requested to accept the inverter control.	p2080[9] = r0899.9
10	1 = Comparison speed reached or exceeded	Speed is greater than or equal to the corresponding maximum speed.	p2080[10] = r2199.1
11	1 = Torque limit not reached	Comparison value for current or torque has been fallen below.	p2080[11] = r0056.13 / r1407.7
12	Reserved		p2080[12] = r0899.12
13	0 = Alarm, motor over temperature		p2080[13] = r2135.14
14	1 = Motor rotates clockwise	Internal inverter actual value > 0	p2080[14] =r2197.3
	0 = Motor rotates counter- clockwise	Internal inverter actual value < 0	
15	0 = Alarm, inverter thermal overload		p2080[15] = r2135.15

### 3.4 Installation

The figure below shows the hardware configuration of the application:

### CAUTION Wrong wiring can damage the drive!

In this application, the three phase 400V power supply is used. It is a must for you to check the supply voltage; otherwise, the drive can be damaged!

Figure 3-4



Figure 3-5: Modbus communication between CM1241 and G120XA



SINAMICS G120XA: Speed Control with S7-1200 via Modbus RTU Entry-ID: 109770380, V1.0, 03/2019

Figure 3-6 I/O configurations



**NOTE** Due to the default Modbus communication macro control, the ON/OFF2 and Reset command is from digital input, not from the Modbus communication. And other control command and setpoint is from the Modbus communication.

### 4.1 Configure PLC project

Create the PLC project and configure the PLC as table 4-1. Table 4-1: Creation of new project and configuration of the PLC





![](_page_19_Figure_1.jpeg)

No.		Picture	Remarks			
8.	CM 1241 (RS422/485)_1 [Modu	ule]				
	General IO tags Sys	stem constants Texts				
	General  RS422/485 interface	(	Half duplex (RS485) 2-wire operation			
	General	Receive line initial state				
	IO-Link		0			
	Configuration of transmitt	● None ○ Bias with R(B)>R(A)>=0V				
	Conliguration of received					
		Wire break				
			No wire-break check			
			Enable wire-break check			
		Baud rate: 38.4 kbps	38.4 kbps			
		Parity:	Even parity			
		Data bits:	8 bits per character			
		Stop bits:	1			
		Flow control:	None			
		XON character (HEX):	0			
		(ASCII):	NUL			
		XOFF character (HEX):	0			
		(ASCII):	NUL			
		Wait time:	20000 ms			
			it the serves as the DLO leavis in the			
	Set the communication following.	n properties and make	It the same as the PLC logic in the			

### 4.2 G120XA configuration

Table 4-2 Quick Commissioning via Smart Access Module

![](_page_21_Figure_3.jpeg)

No.	Description	Remarks
3.	<ul> <li>G thtp://192.168.1.1</li> <li>Can't n  P  G  P  P  W</li> <li>Siemens Intranet - Siemens Ø Universal Remote Access A</li> <li>Open the browser and input the address <u>http://1</u></li> </ul>	→ Add 92.168.1.1 or <u>https://192.168.1.1</u> to visit the
4	website.	
	New password:	
	••••••	Ű
	Must include number, capital le lowercase. Special character is supported.	etter and s also
	Security: Low	
	ОК	
	Input the new password and then press "OK".	
5.	New password:	
	•••••	1
	Must include number, capital le lowercase. Special character is supported.	ter and also
	Security: Low	
	OK	
	Password created successful Next steps: 1. Enter the new Wi-Fi password launch the connection; 2.Refresh your web application After the password changed successfully, press	ly. ord to on. "OK".

No.	Description	Remarks
6.	SWSGP01 Connected, secured	Select the G120 smart access module and then click "Connect" to connect the wifi.
	G120 smart access_034b0e Secured	
	Connect automatically	
	TP-LINK_79B10A Secured	
	WPS Secured	
	Gecured Hidden Network	
	Network & Internet settings Change settings, such as making a connection metered.	
	Comparison of the second	
7	2/11/2019 3	Input the new password created before and
	Connected, secured	then press "Next".
	G120 smart access_034b0e Secured	
	Enter the network security key	
	Next Cancel	
	FP-LINK_79B10A Secured	
	Gecured WPS	
	Hidden Network     Secured	
	<u>Network &amp; Internet settings</u> Change settings, such as making a connection metered.	
	CA     CA     CA     SWSGP01     Airplane mode     hotspot	
8.	Image: Second	• →
	Construction U P 6 The P P W	Add
	Open the browser and input the address <u>http://1</u> website.	<u>92.168.1.1</u> or <u>https://192.168.1.1</u> to visit the

No.	Description	Remarks
9.	C () () http://192.168.1.1/	- ♂ × - ℃  Search
	Image: Semens.         Image: Ima	G120XA USS
	Culck Setur Culck Setur Course	oners
	Press the "Quick Setup" to start the quick commis	sioning.
10.	Ready for switching on - set "ON/OFFF1" = "0/1" (p0840)  Factory reset  Select Configuration to  New configuration is  New configuration  Carrent  Carrent  New Configuration  New Configuration  Carrent  New Configuration	option  ype commended to tory settings.  ation
	Click the "New configuration". This step will do the	e factory reset first.
11.	Setting	
	Waiting for the factory setting.	

No.	Description	Remarks
12.		
	Successfull	
	ouccessiu.	
	ОК	
	When factory setting finished, press "OK".	
3.	<ul> <li>Switching-on inhibited - exit commissioning mode (p0010)</li> </ul>	G120XA USS
_	$\equiv \uparrow$	Application 1
	•	
	Select your application	
	rump	ran neavy-outy
	Low-load L pump: constant 10%	ow-load fan: Overload:150%, verload:110%, Compressor,
	constant e pressure water	tc. extruder, etc.
	supply pump, etc.	
	Do you want to use PID control?	
	1. Select the "Pump" application and do not us	e the PID control.
	2. Then press Next .	
4.	Switching-on inhibited - exit commissioning mode (p0010)     A	G120XA USS
		Motor data
	Select motor standard based on rating plate	
	Select motor standard based on nating plate © EC-Motor (50 Hz, Si units) NFM-Mander (60 Hz - 15 units)	
	Select motor standard based on rating plate © IEC: Motor (50 Hz, St units) NEMA motor (60 Hz, St units) NEMA motor (60 Hz, St units)	
	Select motor standard based on nating pate © IEC Allotor (50 Hz, Si umb) O NEMA motor (60 Hz, US umbs) NEMA motor (60 Hz, Si umbs) Motor type	${ m heter} >$
	Select motor standard based on nating plate  © IEC-Motor (50 Hz, SI units)  NEMA motor (60 Hz, US units)  Notor type  Rated motor carrent	Induct >
	Select motor standard based on rading plate  © IE- Motor (50 Hz, SI units)  NEMA motor (60 Hz, US units)  NetTAM motor (60 Hz, SI units)  Motor type  Rated motor current  Rated motor power	Induct > 5.6 A 2.2 MW
	Select motor standard based on rating pate   Exact Motor (50 Hz, US units)  NEMA motor (60 Hz, US units)  NetMA motor (60 Hz, US units)  Motor type  Rated motor current  Rated motor speed	Indext >           5.6         A           2.2         kw           1425         ge
	Select motor standard based on nating pale	Induct > 5.8 A 2.2 tw 1425 pn 1425 pn 1426 pn
	Select motor standard based on nating pate	Induct > 5.6 A 2.2 kv 1425 gm 400 v 50 Hz Natural vent N
	Select motor standard based on nating plate	Indect > 5.6 A 2.2 KV 1425 gm 400 V 50 He Natural vent V 400 V
	Select motor standard based on nating plate	Indict           5.6           2.2           400           0

No.	Description	Remarks
15.	Switching-on inhibited - exit commissioning mode (p0010)	G120XA USS
	≡↑ I/O confi	juration 1
	0-0-4	• • • *
	Select I/O configuration	
	Modeus R Free Di- CNUTFZ-make D11- D12- D12- D13- D14- D14- D14- D14- D14- D14- D14- D14	Ucentral V Farat -DO1 Genetation -DO2 Ready -RoD3 Auron -ROD3 Seried stual voluer -RO1 Central stual voluer
	N	xt
	1. Click the left arrow or the right arrow to find the	target I/O configuration to "USS control".
	2. Then Press "Next".	5 5
16	Switching-on inhibited - exit commissioning mode (p0010)	G120XA USS /
10.		tors
	o—o—o	• *
	Limit settings Minimum speed	300 /pm
	Maximum speed	
	Ramp-up time	10s
	Ramp-down time	10 s
	OFF3 ramp-down time	0 s
	Current limit	0.5 Ams
	Motor potentiomater settings	
	MolP n_max	1500 rpm
	MotP n_min	-1500 rpm
	Communication Speed settorint selection	Fielders >
	Field has address	
	Field hus have	
	Modhar park	Even extra
	Novt	Even panty /
	1. Input the important parameters, especially for the	te communication parameters.
	2. Then press "Next".	
17.	Switching-on inhibited - exit commissioning mode (p0010)	G120XA USS
	- •	
		auon 💿 🕂
	0-0-0-	<b>0—6</b> ×
	Motor data identification (at standstill)	
	Complete quic	k setup
	L2	0
	Colort the "Motor data identification" for the	identification and press "Operation with the "
	Select the "iviotor data identification" for the motor	identification and press "Complete quick setup".
	Note:	
	The default control mode is vector control. Need I	notor ID identification.

No.	Description	Remarks
No. 18.	Description         Quick setup successfully finished! <ul> <li>Save quick setup settings to permanent memory</li> <li>Do not save quick setup settings to permanent memory</li> </ul> Go to Jog to do Motor Test         Back to main menu	Remarks
- 10	Select the "Save quick setup settings to perma Test".	anent memory" and then click "Go to Jog to do Motor
19.	Switching-on Inhibited - set "OC/OFF3" = "1" (p0848, p0849)  Actual speed Actual torque Actual current Overload utilization  Please make sure that there is no person in the vicinity of the motor.  Speed  Hand JOG  Concentration  Decode "Concentration"	G120XA USS Jog 1 0.00 rpm 0.00 Nm 0.00 A 0.00 % 600.00 rpm 600.00 rpm 2000.00rpm
20.	Attention You can use this function only when strictly observing the safety instructions for operating inverters. Failure to observe may cause risks of personal injury or device damage. Before switching on the motor, make sure that there is no person in the vicinity of the motor. OK Cancel	

No.	Description	Remarks
	Press "OK".	
21.	Please make sure that there is no person in the vicinity of the motor Speed 600.00rpm Hand JOG Press the CW command or CCW command units	til the motor ID identification finished.
22.	Ready for switching on - set "ON/OFF1" = "0/1" (p0840)	G120XA USS
	$\equiv \uparrow$	og (Stale
	Actual speed	0.00 rpm
	Actual torque	0.00 Nm
	Actual current Overload utilization	0.00 A
	A Please make sure that there is no person in the vicinity of the motor.	
	Speed	150.00 rpm
	•	
	600.001pm	3000.00rpm
	Hand JOG 🔥 🐧	Free Control
	Press the "Free Control".	
23.	Attention	
	Returning the control to the normal setpoint and command sources may lead to dangerous situations, if the safety instructions are not strictly observed. To avoid unintentional motor start, make sure that before terminating the control function, no ON-commands are active from other command sources.	
	ОК	
	Cancel	
	Press "OK".	

### 4.3 Program PLC logic

In this application example, the SINAMICS G120XA drive is controlled by S7-1217 CPU via Modbus communication. To achieve this control, the following instructions have been added to the program:

- MB\_COMM\_LOAD(FB1080)
- MB\_MASTER(FB1081)

These FBs are called in the "Modbus\_Com"(FB1) function block.

The figure 4-1 shows the program structure.

Figure 4-1 Program structure

![](_page_29_Figure_8.jpeg)

![](_page_30_Figure_1.jpeg)

![](_page_30_Figure_2.jpeg)

![](_page_31_Figure_1.jpeg)

![](_page_32_Figure_1.jpeg)

No.	Description							Remarks			
		N	ame	Data type	Address		Retain	Acces	Writa	Visibl Co	
	1		LoadReq	Bool	%M0.0	-		<b></b>	<b></b>		
	2	-00	ComReq	Bool	%M0.1			<b></b>	<b></b>		
	3		LoadDone	Bool	%M0.2			<b></b>	<b></b>		
	4	-00	ModbusError	Bool	%M0.3			<b></b>	<b></b>		
	5	-00	SlaveDone	Bool	%M0.4			<b></b>	<b></b>		
	6	-00	SlaveBusy	Bool	%M0.5			<b>~</b>	<b>~</b>		
	7	-00	Baudrate	UDInt	%MD4			<b></b>	<b></b>		
	8	-00	Parity	UInt	%MW2				$\checkmark$		
	9	-00	SlaveAddress	UInt	%MW8			<b>~</b>	<b>~</b>		
- 11	10	-00	SlaveMode	USInt	%MB1			<b>~</b>	<b>~</b>		
	11	-00	DataAddress	UDInt	%MD12			<b></b>	<b></b>		
	12	-00	DataLength	UInt	%MW10			<b></b>	<b></b>		
	13	-00	ModbusStatus	Word	%MW16			<b></b>	<b></b>		
	14	-00	Control	Word	%MW18			<b></b>	<b></b>		
	15		<add new=""></add>					$\checkmark$	<b>V</b>	<b>V</b>	
Ē	Edit	the ta	o table as the scree	nshot.							
12	▼ □	Sinami Add Dev PLC	cs G120XA with S7-1200 via M I new device ices & networks <b>1 [CPU 1217C DC/DC/DC]</b> Device configuration Online & diagnostics Program blocks Add new block Main [OB1] Modbus_Com [FB1] System blocks		×			o functi		k	
	s	<b>DB</b> stance	Data block Name Modbus_Com Number 1 Manual M	as a single instance, the function n instance data block.			"Modb "OK" t autom	us_Con o create atically.	1_DB" the da	and press ta block	

![](_page_34_Figure_1.jpeg)

SINAMICS G120XA: Speed Control with S7-1200 via Modbus RTU Entry-ID: 109770380, V1.0, 03/2019

### 4.4 Operation

Table 4-4 describes how to use this project to run the drive.

#### Table 4-4

No.		Des	cription				Remarks	
1.	Project tree Devices					Double cl table_1" t	ick the "Watc o open it.	:h
	👻 📑 Sinamie	cs G120XA with S7-1200 v	via Modbus					
	Add	new device						
	🚠 Dev	ices & networks						
	T PLC	1 [CPU 1217C DC/DC/DC]						
	191	Device configuration						
	<b>9.</b> C	Online & diagnostics						
	► 📮 F	Program blocks						
		echnology objects						
		internal source files						
		C tags						
		- Show all tags						
		a show an tags						
		Add new tag table						
		Delault tag table [44]						
		CC data types						
	- 68 V	vatch and force tables						
		Add new watch table						
		Force table						
		Watch table_1						
		online backups						
2.	Sinamics G120	XA with \$7-1200 via Mo	odbus 🕨 PL(	C_1 [CPU 12	17C DC/DC/DC] ► V	Vatch and force t	ables 🕨 Watch t	able_1
	🥩 💉 🔐 😼	🤊 🗓 🕫 🖧 😤 🕿	2) 1					
	i Nam	e		Address	Display format	Monitor value	Modify value	4
	1 // Send from	PLC to drive			1		,	
	2 <b>"Loa</b>	dReq"		%M0.0	Bool			
	3 Bau	drate"		%MD4	DEC			
	4 Pari	ty"		%MW2	DEC			
	5							
	6 Con	nReq"		%M0.1	Bool			
	7 "Slav	/eAddress"		%MW8	DEC			
	8 Slav	/eMode"		%MB1	DEC			
	9 Dat	a Address		%MD12	DEC	_		
	10 Dat	trol"	<u> </u>	%/////8	Hex	-		-
	12			John To	i i ca			
	13 // Receive fro	m drive to PLC						
	14 Loa	dDone"		%M0.2	Bool			
	15 Mod	lbusError"		%M0.3	Bool			
	16 "Slav	/eDone"		%M0.4	Bool			
	17 "Slav	/eBusy"		%M0.5	Bool			
	18 Mod	lbusStatus"		%MW16	Hex			
	Monitor the	watch table.		* 1 1				

No.		Descript		Remark	s							
3.	Sinamics (	G120XA with S7-1200 via Modbus 🕨	PLC_1 [CPU 121	I7C DC/DC/DC] → Wa	atch and force tal	bles 🔸 Watch ta	ble_1					
	₹ ₹ u.	ž 💅 🇓 🐔 🖧 😤 📬					<i>a</i>					
	1 // Send :	Name from PLC to drive	Address	Display format	Monitor value	Modify value	💅 Сог					
	2	"LoadReq"	%M0.0	Bool	FALSE	TRUE	<b>N</b>					
	3	"Baudrate"	%MD4	DEC	0	38400	🖂 📐					
	4	"Parity"	%MW2	DEC	0	2	_ 💌 🔺					
	5	"ComPag"	E 8440 1	Rool								
	7	"SlaveAddress"	%MW8	DEC	0							
	8	"SlaveMode"	%MB1	DEC	0							
	9	"DataAddress"	%MD12	DEC	0							
	10	DataLength	%MW10	DEC	0							
	11	"Control"	%MW18	Hex	16#0000							
	13 // Receiv	ve from drive to PLC										
	14	"LoadDone"	%M0.2	Bool	TRUE							
	15	"ModbusError"	%M0.3	Bool	FALSE							
	16	"SlaveDone"	%M0.4	Bool	FALSE							
	17	"SlaveBusy"	%M0.5	Bool	FALSE							
	19	Woobusstatus	<add news<="" td=""><td>TIEX</td><td>10#0000</td><td></td><td></td></add>	TIEX	10#0000							
	1. Modi	fy the following variables.										
	2 "Load	JRea" – TRUE										
	2. LUat											
	3. Bau	drate = 38400										
	4. "Parit	ty" = 2										
4.	Sinamics	G120XA with S7-1200 via Modbus 🕨	PLC_1 [CPU 12	217C DC/DC/DC] 🕨 \	Natch and force	tables 🕨 Watch	table_1					
		1 E 4 E 4 4 4 100 000										
	= = <i>u</i>				A design of the second s	11.17	4					
	1 // Send	from PLC to drive	Address	Display format	Monitor value	Modify value	7					
	2	"LoadReg"	%M0.0	Bool	TRUE	FALSE						
	3	"Baudrate"	1 %MD4	DEC	▼ 38400							
	4	"Parity"	%MW2	DEC	2							
	5				_							
	6	ComReq	%M0.1	Bool	FALSE							
	8	SlaveMode"	%MW8	DEC	0							
	9	"DataAddress"	%MD12	DEC	0							
	10	"DataLength"	%MW10	DEC	0							
	11	"Control"	%MW18	Hex	16#0000							
	12											
	13 // Recei	ve from drive to PLC	81 MO 2	Baal	TT TT	-						
	14	"ModbusError"	%M0.2	Bool								
	16	"SlaveDone"	%M0.4	Bool	FALSE							
	17	"SlaveBusy"	%M0.5	Bool	FALSE							
	18	"ModbusStatus"	%MW16	Hex	16#0000							
	19		<add new=""></add>									
	When the	ne "LoadDone" is TRUE, the	en modify t	he "LoadReq" t	to FALSE.							
5	Sinamics	G120XA with \$7-1200 via Modbus ▶	PLC 1 [CPU 1]	217C DC/DC/DC] > 1	Natch and force	tables 🕨 Watch	table 1					
5.												
	ally ally in a											
	学 👻 11.											
	i	Name	Address	Display format	Monitor value	Modify value	4					
	1 // Send	from PLC to drive	×110.0	De el	E su ss	_						
	2	LOADKED "Baudrate"	%M0.0	DEC	38400							
	4	"Parity"	%MW2	DEC	2							
	5											
	6	"ComReq"	%M0.1	Bool	FALSE	TRUE	🗹 🤺					
	7	"SlaveAddress"	%MW8	DEC	0	2	A     A					
	8	"SlaveMode"	%MB1	DEC	0	1						
	9	"DataAddress"	%MD12	DEC	0	40101						
	10	"Control"	%MW10	DEC	16#0000	16#0100						
	17	Control		TIEX	10#0000	10#0100						
	Modify t	he related setting to set the	e speed set	point.								

#### 5 Related literature

No.	Description					Remarks		
6.	Sinamics G120XA with S7-1200 via Modbus + PLC_1 [CPU 1217C DC/DC/DC] + Watch and force tables + Watch table_1							
	# # 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
	i	Name	Address	Display format	Monitor value	Modify value	4	
	1 // S	end from PLC to drive						
	2	"LoadReq"	%M0.0	Bool	FALSE			
	з	"Baudrate"	%MD4	DEC	38400			
	4	"Parity"	%MW2	DEC	2			
	5							
	6	"ComReq"	%M0.1	Bool	TRUE			
	7	"SlaveAddress"	%MW8	DEC	2			
	8	"SlaveMode"	%MB1	DEC	1			
	9	"DataAddress"	%MD12	DEC	40101	40100		
	10	"DataLength"	%MW10	DEC	1			
	11	"Control"	%MW18	Hex	16#0100	16#047E		
	12							
	Modify the related setting to set the control command.							
7.	Enable the ON/OFF2 command from the digital input.							

## 5 Related literature

Table 5-1

	Торіс	Title / Link
\1\	Siemens Industry Online Support	http://support.industry.siemens.com
\2\	Download page of this entry	https://support.industry.siemens.com/cs/ww/en/view/1097703 80
\3\		

## 6 Contact

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## 7 History

Table 7-1

Version	Date	Modifications
V1.0	03/2019	First version