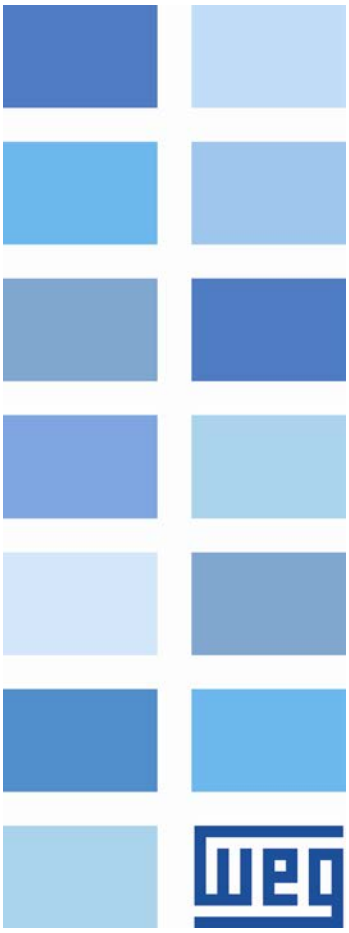
PLC11-02

CFW-11

Programming Manual

Language: English



PLC11-02 Module Programming Manual

Series: CFW-11

Language: English

Software Version: 1.7X

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Parameter	Description [Type]	Adjustable range	Factory setting	User setting	Proprieties	Page
P1200	PLC11 Firmware Version	0 to 655.35	-	-	RO	14
P1201	PLC11 Status	0 = No Program 1 = Saving the Program 2 = Copy Memory Card 3 = Invalid Program 4 = Stopped Program 5 = Running Program	-	-	RO	15
P1202	Scan Cycle	0.0 to 6553.5 ms	-	-	RO	15
P1205	Actual Position (sign)	0 = Negative 1 = Positive	-	-	RO	16
P1206	Actual Position (turns)	-32768 to 32767 revolutions	-	-	RO	16
P1207	Actual Position (fraction)	0.0 to 359.9°	-	-	RO	16
P1208	Lag	0.0 to 6553.5°	-	-	RO	17
P1210	Virtual Pos. (sign)	0 = Negative 1 = Positive	-	-	RO	17
P1211	Virtual Pos. (turns)	-32768 to 32767 revolutions	-	-	RO	17
P1212	Virtual Pos. (fraction)	0.0 to 359.9°	-	-	RO	18
P1215	DI109 to DI106 Status	0000 to 000Fh	-	-	RO	18
P1216	DO106 to DO103 Status	0000 to 000Fh	-	-	RO	18
P1220	CAN Status	0 = Inactive 1 = Auto-baud 2 = CAN Active 3 = Warning 4 = Error Passive 5 = Bus Off 6 = No Bus Power	-	-	RO	19
P1221	Received CAN Telegrams	0 to 65535	-	-	RO	19
P1222	Transmitted CAN Telegrams	0 to 65535	-	-	RO	19
P1223	Occurred CAN Errors	0 to 65535	-	-	RO	20
P1224	Lost CAN Telegrams	0 to 65535	-	-	RO	20
P1225	CANopen Configuration State	0 = Slave 1 = Master	-	-	RO	20
P1226	CANopen Network Status	0 = Inactive 1 = Reserved 2 = Communication Enabled 3 = Error Control Enabled 4 = Guarding Error 5 = Heartbeat Error	-	-	RO	21
P1227	CANopen Node Status	0 = Inactive 1 = Initialization 2 = Stopped 3 = Operational 4 = Preoperational	-	-	RO	21
P1229	Serial Interface Status	1 = No Error 2 = Watchdog Error	-	-	RO	21
P1250	PLC11 Command	0 = Stop Program 1 = Run Program 2 = Delete Program	1		-	21

Parameter	Description [Type]	Adjustable range	Factory setting	User setting	Proprieties	Page
P1251	DI108 Interruption Enabling	0 = Disabled 1 = Falling Edge 2 = Rising Edge	0		-	22
P1252	DI109 Interruption Enabling	0 = Disabled 1 = Falling Edge 2 = Rising Edge	0		-	22
P1253	Time Interruption Period	0 to 65535 ms	0		-	22
P1254	PLC11 Watchdog	0 to 200 ms	200		-	23
P1255	Retentive Marker Reset	0 = Disabled 1 = Resets Markers	0		-	23
P1256	Load Parameters	0 = Disabled 1 = Loads Default	0		-	23
P1257	Copy Function Memory Card	0 = Disabled 1 = Restore Program 2 = Restore Parameters 3 = Restore CAN	0		-	24
P1259	Maximum Lag	0.0 to 6553.5 °	180.0		-	24
P1260	Kp – Proportional Positioning Gain	0 to 200	50		-	25
P1262	Main Encoder Resolution	0 to 4096 ppr	1024		-	25
P1263	Main Encoder Zero Pulse	0 to 359.9 °	0.0		-	25
P1264	Main Encoder Direction	0 = A → B 1 = B → A	1		-	26
P1265	Auxiliary Encoder Resolution	0 to 4096 ppr	1024		-	26
P1266	Auxiliary Encoder Zero Pulse	0 to 359.9 °	0.0		-	26
P1267	Auxiliary Encoder Direction	0 = A → B 1 = B → A	1		-	27
P1268	Auxiliary Encoder Position Feedback	0 = Disabled 1 = Enabled	0		-	27
P1280	Serial Protocol	0 = TP 1 = Modbus RTU (S) 2 = Modbus RTU (M)	1		-	27
P1281	Serial Address	1 to 247	1		-	28
P1282	Serial Baud Rate	0 = 1200 bits/s 1 = 2400 bits/s 2 = 4800 bits/s 3 = 9600 bits/s 4 = 19200 bits/s 5 = 38400 bits/s	3		-	28
P1283	Serial Bytes Config.	0 = 8 bits, no, 1 1 = 8 bits, even, 1 2 = 8 bits, odd, 1 3 = 8 bits, no, 2 4 = 8 bits, even, 2 5 = 8 bits, odd, 2	0		-	28
P1284	Serial Watchdog	0.0 to 999.0 s	0.0		-	29
P1285	CAN Protocol	0 = Disabled 1 = CANopen 2 = Reserved	0		-	29

Parameter	Description [Type]	Adjustable range	Factory setting	User setting	Proprieties	Page
		3 = CANBUS				
P1286	CAN Address	0 to 127	63		-	29
P1287	CAN Baud Rate	0 = 1 Mbit/s 1 = Reserved 2 = 500 Kbit/s 3 = 250 Kbit/s 4 = 125 Kbit/s 5 = 100 Kbit/s 6 = 50 Kbit/s 7 = 20 Kbit/s 8 = 10 Kbit/s	0		-	29
P1288	CAN Bus off Recovery	0 = Manual 1 = Automatic	0		-	30
P1289	CAN Error Action	0 = Indicate Alarm 1 = Cause Fault	0		-	30
P1300 ⋮ **P1499**	User Parameters	0000 to FFFFh	0		-	30

Note:
RO = Read-only parameter

1 SAFETY INSTRUCTIONS

This Manual contains the information necessary for the correct use of the CFW-11 variable frequency drive with the PLC11 expansion board.

It has been developed to be used by qualified personnel with suitable training or technical qualification for operating this type of equipment.

1.1 SAFETY WARNINGS IN THE MANUAL

DANGER!
The nonobservance of the procedures recommended in this warning can lead to death, serious injuries or considerable equipment damage.

ATTENTION!
The nonobservance of the procedures recommended in this warning can lead to equipment damage.

NOTE!
The text aims at to supply important information for the correct understanding and good operation of the product.

1.2 SAFETY WARNINGS IN THE PRODUCT

The following symbols are attached to the product as safety notes:

High voltages are present.

Components sensitive to electrostatic discharge.
Do not touch them.

Mandatory connection to the protective earth (PE).

Connection of the shield to the ground.

Hot surface.

1.3 PRELIMINARY RECOMMENDATIONS

DANGER!
Only qualified personnel familiar with the CFW-11 variable frequency drive and associated equipment should plan or implement the installation, start-up and subsequent maintenance of this equipment These personnel must follow all the safety instructions included in this Manual and/or defined by local regulations.
Failure to comply with the safety instructions may result in death, serious injury, and equipment damage.

NOTE!
For the purpose of this manual, qualified personnel are those trained and able to:
1. Install, ground, power-up, and operate the CFW-11 according to this manual and to the current legal safety procedures;
2. Use the protection equipment according to the established regulations;
3. Provide first aid.

DANGER!
Always disconnect the input power before touching any electrical component associated to the inverter. Many components can remain charged with high voltages or remain in movement (fans) even after that AC power is disconnected or switched off.
Wait at least 10 minutes to assure a total discharge of the capacitors.
Always connect the equipment frame to the protection earth (PE) at the suitable connection point.

ATTENTION!
Electronic boards have components sensitive to electrostatic discharges. Do not touch directly on components or connectors. If necessary, touch the grounded metallic frame before or use an adequate grounded wrist strap.

Do not perform any high pot test with the inverter.
If necessary, consult WEG

NOTE!
Read the User Manual completely before installing or operating the CFW-11.

2 GENERAL INFORMATION

2.1 ABOUT THE MANUAL

This manual provides the necessary description for the operation of the CFW-11 frequency inverter using the PLC11 expansion board. It must be used together with the CFW-11 user manual and the WLP software manual.

Abbreviations and Definitions

PLC	Programmable Logic Controller
CRC	Cycling Redundancy Check
RAM	Random Access Memory
WLP	Ladder language programming software
USB	Universal Serial Bus

Numerical Representation

The decimal numbers are represented by means of digits without suffix. Hexadecimal numbers are represented with the letter "h" after the number.

2.2 COMPATIBILITY

PLC11-02 V1.4X – CFW11 V1.30 or a version higher.
PLC11-02 V1.4X – WLP V8.30 or a version higher.
PLC11-02 V1.4X – WSCAN V1.90 or a version higher.

3 INTRODUCTION TO THE PLC11

The PLC11 is an expansion board that can be fitted into the CFW-11, adding the functionalities of a PLC and a positioning control to the CFW-11.

The PLC11 main features are:
- ☑ Ladder language programming, by using the WLP software;
- ☑ Access to all the CFW11 parameters and I/O's;
- ☑ 200 configurable user parameters;
- ☑ PLC, Mathematical, control, positioning and Movement blocks;
- ☑ Applicative software transfer and online monitoring via USB;
- ☑ Transfer of the installed applicative software to the PC conditioned to a password;
- ☑ Backup of the applicative software in the FLASH memory card.

3.1 SYMBOLS AND DATA TYPES

%KW	word type constants (16 bit)
%KF	float type constants (32 bit floating point)
%MX	bit marker
%MW	word marker (16 bit)
%MF	float marker (32 bit floating point)
%SX	system bit marker
%SW	system word marker (16 bit)
%IX	digital inputs
%IW	analog inputs (16 bit)
%QX	digital outputs
%QW	analog outputs (16 bit)
%UW	user parameters (16 bit)
%PW	PLC11 system parameters (16 bit)
%PD	drive parameters (16 bit)
%PM	user block parameters (32 bit)
%RW	CANopen network reading word marker (16 bit)
%WW	CANopen network writing word marker (16 bit)
%RB	CANopen network reading byte marker (8 bit)
%WB	CANopen network writing byte marker (8 bit)
%RS	CANopen network reading status word marker (16 bit)
%WS	CANopen network writing command word marker (16bit)

4 PLC11 MEMORY

The maximum size of applicative software is 327,680 bytes.

4.1 USER DATA MEMORY

Table 4.1 *- User Date Memory Map*

Sym.	Description	Range
%MX	Retentive bit markers	6100 ... 6483
%MX	Volatile bit markers	6500 ... 7987
%MW	Retentive word markers	8200 ... 8399
%MW	Volatile word markers	8400 ... 8999
%MF	Retentive float markers	9200 ... 9399
%MF	Volatile float markers	9400 ... 9999
%UW	User parameters	1300 ... 1499
%RW	CANopen network reading word markers	4200 ... 4299
%WW	CANopen network Writing word markers	4600 ... 4699
%RB	CANopen network reading Byte markers	4400 ... 4499
%WB	CANopen network Writing Byte markers	4800 ... 4899

4.2 PHYSICAL INPUTS AND OUTPUTS (HARDWARE)

Table 4.2 *- I/O Memory Maps*

Sym.	Description	Range
%IX	CFW11 digital inputs	1 ... 6
%IX	PLC11 digital inputs	106 ... 109
%QX	CFW11 digital outputs	1 ... 3
%QX	PLC11 digital outputs	103 ... 106
%IW	CFW11 analog inputs	1 ... 2
%QW	CFW11 analog outputs	1 ... 2

NOTE!
%IX108 and %IX109 (PLC11 digital inputs 8 and 9) are fast digital inputs and detect up to 10 kHz pulses.

4.2.1 Analog Inputs

Table 4.3 *- Parameters Related to the Analog Inputs*

Sym.	Description	Related Parameters
%IW1	CFW11 Analog Input 1 (1 sign bit + 15 bits)	P0231: Function P0232: Gain P0233: Signal P0234: Offset P0235: Filter
%IW2	CFW11 Analog Input 2 (1 sign bit + 15 bits)	P0236: Function P0237: Gain P0238: Signal P0239: Offset P0240: Filter

4.2.2 Analog Outputs

Table 4.4 - Parameters Related to the Analog Outputs

Sym.	Description	Related Parameters
%QW1	CFW11 Analog Output 1 (1 sign bit + 15 bits)	P0251: Function P0252: Gain P0253: Signal
%QW2	CFW11 Analog Output 2 (1 sign bit + 15 bits)	P0254: Function P0255: Gain P0256: Signal

4.3 SYSTEM MARKERS

Table 4.5.a - Memory Map of the System Bit Markers - Odd

Sym.	Address		Description
%SX	*Writing/Command (odd)*		
	3101	General Enabling	**0**: It disables the inverter, interrupting the supply for the motor. **1**: It enables the inverter allowing the motor operation.
	3103	Run/Stop	**0**: It stops the motor with deceleration ramp. **1**: The motor runs according to the acceleration ramp until reaching the speed reference value.
	3105	Speed Direction	**0**: It runs the motor in the counterclockwise direction. **1**: It runs the motor in the clockwise direction.
	3107	JOG	**0**: It disables the JOG function. **1**: It enables the JOG function.
	3109	LOC/REM	**0**: The inverter goes to the LOCAL situation. **1**: The inverter goes to the REMOTE situation.
	3111	Fault Reset	**0**: No function. **1**: If in a fault condition, then it executes the inverter reset.
	3121	Active Ramp	**0**: Ramp 1. **1**: Ramp 2.

NOTE!
The system markers %SX3103 and %SX3105 do not have function when movement blocks are used, because those commands are generated internally by these blocks.

Table 4.5.b *- Memory Map of the System Bit Markers – Even*

Sym.	Address		Description
%SX	*Reading/State (Even)*		
	3000	General Enabling active	**0:** General Enabling is not active. **1:** General enabling is active and the inverter is ready to run the motor.
	3002	Motor running (RUN)	**0:** The motor is stopped. **1:** The inverter is driving the motor at the set point speed, or executing either the acceleration or the deceleration ramp.
	3004	Speed Direction	**0:** The motor is rotating counterclockwise. **1:** The motor is rotating clockwise.
	3006	JOG	**0:** JOG function inactive. **1:** JOG function active.
	3008	LOC/REM	**0:** Inverter in LOCAL situation. **1:** Inverter in REMOTE situation.
	3010	Fault condition	**0**: The inverter is not in a fault condition. 1: Any fault has been registered by the inverter. **Note:** The fault number can be read by means of the parameter P0049 (Current Fault) or by means of the system marker %SW3310.
	3012	Undervoltage	**0:** No Undervoltage. **1:** With Undervoltage.
	3014	PID operation mode	**0:** In manual mode (PID function). **1:** In automatic mode (PID function).
	3016	Alarm condition	**0:** The inverter is not in an alarm condition. **1:** The inverter is in an alarm condition. **Note:** The alarm number can be read by means of the parameter P0048 (Current Alarm) or by means of the system marker %SW3308.
	3018	In configuration mode	**0:** Inverter operating normally. **1:** Inverter in configuration mode. It indicates a special condition when the inverter cannot be enabled: ☑ Executing the self tuning routine. ☑ Executing the guided start-up routine. ☑ Executing the HMI copy function. ☑ Executing the flash memory card guided routine. ☑ There is a parameter setting incompatibility. **Note:** It is possible to obtain the exact description of the special operation mode at parameter P0692.
	3020	Active Ramp	**0:** Ramp 1. **1:** Ramp 2.
	3032	Start key (1)	**0:** Not pressed. **1:** Pressed during 1 scan cycle.
	3034	Stop key (0)	
	3036	Speed direction key (↻)	
	3038	Local/Remote key	
	3040	JOG key	**0:** Not pressed. **1:** Pressed.
	3064	2Hz Blinker	Alternates between 0 and 1 every 500 ms.
	3066	Applicative Stop/Run Trigger	**0:** Normal condition. **1:** Pulse when P1250 = 1.
	3068	Always 0	**0:** Fixed.
	3070	Always 1	**1:** Fixed.

Table 4.6 *- Memory Map of the System Word Markers*

Sym.	Address / Description	
%SW	*Reading markers/Status (Even)*	
	3300	Motor speed in 13 bit **NOTE!** It uses a 13 bit resolution, i.e., 2000h is equal to the motor synchronous speed. Thus, for a VI pole motor (1200 rpm synchronous speed) if the motor is at 600rpm, this marker will have a value of 4096. $\text{Speed\_rpm} = \frac{(\text{Speed\_13bit})}{8912} \text{x}(\text{Synch\_Speed\_rpm})$ $\text{Speed\_rpm} = \frac{(\%\text{SW3300})}{8912} \text{x}(\%\text{SW3002})$
	3302	Motor synchronous speed [rpm]
	3304	Motor speed [rpm]
	3306	Speed Reference [rpm]
	3308	Alarm
	3310	Fault
	3400	Speed – auxiliary encoder [rpm]
	3402	Control mode **0:** Torque mode **1:** Speed mode **2:** Position mode
	3404	Elapsed scan cycles
	3412	Id current (+/- 100 %)
	3414	Iq current (+/- 100 %)
	3416	Id* current reference (+/- 100%)
	3418	Iq* current reference (+/- 100%)

5 PARAMETER SETTINGS

In the continuation, only the parameters of the CFW-11 frequency inverter that must be programmed according to the PLC user program will be presented.

5.1 CFW-11 CONFIGURATION PARAMETERS

P0100 – Acceleration Time

P0101 – Deceleration Time

P0220 – LOCAL/REMOTE Selection Source

P0221 – Speed Reference Selection – LOCAL Situation

P0222 – Speed Reference Selection – REMOTE Situation

P0223 – FORWARD/REVERSE Selection - LOCAL Situation

P0224 – Run/Stop Selection – LOCAL Situation

P0225 – JOG Selection – LOCAL Situation

P0226 – FORWARD/REVERSE Selection - REMOTE Situation

P0227 – Run/Stop Selection - REMOTE Situation

P0228 – JOG Selection - REMOTE Situation

P0251 – AO1 Function

P0254 – AO2 Function

P0275 – DO1 Function (RL1)

P0276 – DO2 Function (RL2)

P0277 – DO3 Function (RL3)

5.2 PLC11 PARAMETERS

P1200 – PLC11 Firmware Version

Adjustable Range:	0.00 to 655.35	**Factory Setting:**	-

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It indicates the PLC11 firmware version.

P1201 – PLC11 Status

Adjustable Range: 0 = Without Program
1 = Saving the Program
2 = Copy Memory Card
3 = Invalid Program
4 = Stopped Program
5 = Running Program

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It allows the user to visualize the program status. See next the description of each state:

0: Without Program → When the PLC11 does not have a program installed in its memory.
1: Saving the Program → When the PLC11 is receiving a file from the WLP (User program, user parameter configuration or CAN network configuration) or when the PLC11 is sending this file to the WLP.
2: Copy Memory Card → It occurs after the reception of a file from the WLP (User program, user parameter configuration or CAN network configuration) during the backup of this file in the CFW11 memory card. It also occurs when any option of P1257 (Copy Memory Card Function) is executed.
3: Invalid Program → When the user program is not compatible with the current PLC11 firmware version. In this case it is necessary to download another program!
4: Stopped Program → When there is a valid user program in the PLC11 memory, however, P1250 (PLC11 Command) is set with the option "Stop Program".
5: Running Program → When the user program is being executed.

P1202 – Scan Cycle

Adjustable Range: 0.0 to 6553.5 ms

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It allows the user to monitor the program scan cycle.

P1205 – Actual Position (sign)

Adjustable Range: 0 to 1 **Factory Setting:** -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the sign of the motor current position. 0 means positive and 1 means negative.

P1206 – Actual Position (turns)

Adjustable Range: -32768 to 32767 revolutions **Factory Setting:** -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the number of revolutions of the current motor position.

P1207 – Actual Position (fraction)

Adjustable Range: 0 to 359.9 ° **Factory Setting:** -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the revolution fraction, in degrees, of the current motor position.

P1208 – Lag

Adjustable Range: 0 to 6553.5 °

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the difference, in degrees, between the position reference and the actual position.

P1210 – Virtual Shaft Position (sign)

Adjustable Range: 0 to 1

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the sign of the virtual shaft. 0 means positive and 1 means negative.

P1211 – Virtual Shaft Position (turns)

Adjustable Range: -32768 to 32767 revolutions

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the number of revolutions of the current virtual shaft position.

P1212 – Virtual Shaft Position (fraction)

Adjustable Range: 0 to 359.9 °
Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the revolution fraction, in degrees, of the current virtual shaft position.

P1215 – DI109 to DI106 Status

Adjustable Range: 0000 to 000Fh
Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It Informs the PLC11 digital input status:
- Bit 0: DI106 (least significant bit)
- Bit 1: DI107
- Bit 2: DI108
- Bit 3: DI109 (most significant bit)

P1216 – DO106 to DO103 Status

Adjustable Range: 0000 to 000Fh
Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the PLC11 digital output status:
- Bit 0: DO103 (least significant bit)
- Bit 1: DO104
- Bit 2: DO105
- Bit 3: DO106 (most significant bit)

P1220 – CAN Status

Adjustable Range: 0 = Inactive
1 = Auto-baud
2 = CAN Active
3 = Warning
4 = Error Passive
5 = Bus Off
6 = No Bus Power

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the CAN network current status.

P1221 – Received CAN Telegrams

Adjustable Range: 0 to 65535

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS.
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the number of telegrams received through the CAN network.

P1222 – Transmitted CAN Telegrams

Adjustable Range: 0 to 65535

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It informs the number of telegrams transmitted through the CAN network.

P1223 – Occurred CAN Errors

Adjustable Range: 0 to 65535 **Factory Setting:** -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the number of errors occurred in the CAN network.

P1224 – Lost CAN Telegrams

Adjustable Range: 0 to 65535 **Factory Setting:** -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the number of lost telegrams in the CAN network.

P1225 – CANopen Configuration State

Adjustable Range: 0 = Slave
1 = Master
Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the configuration state of the CANopen network. For more information on the CAN interface and on the CANopen protocol, refer to the CANopen communication and the PLC11 board manuals.

P1226 – CANopen Network Status

Adjustable Range:
0 = Inactive
1 = Reserved
2 = Communication Enabled
3 = Error Control Enabled
4 = Guarding Error
5 = Heartbeat Error

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the state of the CANopen network. For more information on the CAN interface and on the CANopen protocol, refer to the CANopen communication and the PLC11 board manuals.

P1227 – CANopen Node Status

Adjustable Range:
0 = Inactive
1 = Initialization
2 = Stopped
3 = Operational
4 = Preoperational

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs the state of the CANopen network node. For more information on the CAN interface and on the CANopen protocol, refer to the CANopen communication and the PLC11 board manuals.

P1229 – Serial Interface Status

Adjustable Range:
1 = No Error
2 = Watchdog Error

Factory Setting: -

Proprieties: RO

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It informs if the serial communication presents watchdog error.

P1250 – PLC11 Command

Adjustable Range: 0 = Stop Program
1 = Run Program
2 = Delete Program

Factory Setting: 1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It makes it possible for the user to stop the installed applicative, execute it, or delete it.

P1251 – DI108 Interruption Enabling

Adjustable Range: 0 = Disabled
1 = Falling Edge
2 = Rising Edge

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the user to configure the digital input 108 to generate an interruption in the main user program, starting the execution of the program responsible for the use of this fast input. The detection can be configured for falling or rising edge.

P1252 – DI109 Interruption Enabling

Adjustable Range: 0 = Disabled
1 = Falling Edge
2 = Rising Edge

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the user to configure the digital input 109 to generate an interruption in the main user program, starting the execution of the program responsible for the use of this fast input. The detection can be configured for falling or rising edge.

P1253 – Time Interruption Period

Adjustable Range: 0 to 65535 ms
Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It allows the user to configure a time period for the PLC11 to generate an interruption in the main user program, starting the execution of the program responsible for the use of this time interruption. If this parameter is set to zero, then the time interruption is disabled.

P1254 – PLC11 Watchdog

Adjustable Range: 0 to 200 ms
Factory Setting: 200

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It is the maximum time allowed for a total scan of the main program. If the scan time exceeds this limit, then the PLC11 watchdog fault occurs.

P1255 – Retentive Marker Reset

Adjustable Range: 0 = Disabled
1 = Resets Markers
Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It allows the user to reset the retentive markers applied in the user program.

P1256 – Load Parameters

Adjustable Range: 0 = Disabled
1 = Loads Factory Settings

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the user to load the PLC11 parameters PLC11 (1200 to 1499) with the factory settings.

P1257 – Copy Memory Card Function

Adjustable Range: 0 = Disabled
1 = Restore Program
2 = Restore Parameters
3 = Restore CAN

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the user to restore the file containing:
- Applicative;
- User parameter configurations:
- CAN network configurations.

In case it is installed in the CFW11 flash memory card.
Every time any of the files mentioned above is transferred from the WLP to the PLC11, a backup in the flash memory card is automatically performed, unless the card is not connected to the inverter or it is defective.

P1259 – Maximum Lag

Adjustable Range: 0.0 to 6553.5°

Factory Setting: 180.0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It is the maximum allowed error between the position reference and the actual position, without a fault trip in the inverter.

NOTE!
It acts when the inverter is executing positioning tasks.

P1260 – Kp – Proportional Positioning Gain

Adjustable Range: 0 to 200 **Factory Setting:** 50

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
PLC11 positioning controller gain.

NOTE!
It acts when the inverter is executing positioning tasks.

P1262 – Main Encoder Resolution

Adjustable Range: 0 to 4096 **Factory Setting:** 1024

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It defines the resolution of the PLC11 main encoder.

P1263 – Main Encoder Marker

Adjustable Range: 0.0 to 359.9° **Factory Setting:** 0.0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the PLC11 to shift the main encoder marker position via software.

P1264 – Main Encoder Direction

Adjustable Range:	0 = A → B 1 = B → A	**Factory Setting:**	1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It defines the direction of the main encoder pulses.

P1265 – Auxiliary Encoder Resolution

Adjustable Range:	0 to 4096	**Factory Setting:**	1024

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It defines the resolution of the PLC11 auxiliary encoder.

P1266 – Auxiliary Encoder Marker

Adjustable Range:	0.0 to 359.9°	**Factory Setting:**	0.0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the PLC11 to shift the auxiliary encoder marker position via software.

P1267 – Auxiliary Encoder Direction

Adjustable Range: 0 = A → B; 1 = B → A
Factory Setting: 1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It defines the direction of the auxiliary encoder pulses.

P1268 – Auxiliary Encoder Position Feedback

Adjustable Range: 0 = Disabled; 1 = Enabled
Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
When this option is enabled, the position feedback is done by the auxiliary encoder.

P1280 – Serial Protocol

Adjustable Range: 0 = TP; 1 = Modbus RTU (S); 2 = Modbus RTU (M)
Factory Setting: 1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It configures the RS-485 interface communication protocol.

0: "TP" → PLC11 runs as slave on the TP network.
1: "Modbus RTU (S)" → PLC11 runs as slave on the Modbus RTU network.
2: "Modbus RTU (M)" → PLC11 runs as master on the Modbus RTU network. In this case, to send and receive data via network, it is necessary to program ladder blocks for Modbus RTU communication, using WLP software.

P1281 – Serial Address

Adjustable Range: 1 to 247

Factory Setting: 1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It sets the address of the RS-485 interface in the communication network of this PLC11 board.

P1282 – Serial Baud Rate

Adjustable Range:
0 = 1200 bits/s
1 = 2400 bits/s
2 = 4800 bits/s
3 = 9600 bits/s
4 = 19200 bits/s
5 = 38400 bits/s

Factory Setting: 3

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It adjusts the RS-485 interface baud rate.

P1283 – Serial Bytes Configuration

Adjustable Range:
0 = 8 bits, no, 1
1 = 8 bits, even, 1
2 = 8 bits, odd, 1
3 = 8 bits, no, 2
4 = 8 bits, even, 2
5 = 8 bits, odd, 2

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It sets the number of bits, the parity, and the number of stop bits of the RS-485 interface.

P1284 – Serial Watchdog

Adjustable Range: 0.0 to 999.0 s

Factory Setting: 0.0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It allows the programming of a time limit for the detection of serial interface communication error. In case the PLC11 remains without receiving valid telegrams longer than the time programmed in this parameter, it will be considered that a communication error happened, the alarm A800 will be showed on the HMI (or F801 fault, depending on the programming done at P1289). After being powered up, the inverter starts counting this time from the first received valid telegram. The value 0.0 disables this function.

P1285 – CAN Protocol

Adjustable Range:
0 = Disabled
1 = CANopen
2 = Reserved
3 = CANBUS

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It configures the network communication protocol. For more information on the CAN interface and on the CANopen protocol, refer to the CANopen communication and the PLC11 board manuals.

P1286 – CAN Address

Adjustable Range: 0 to 127

Factory Setting: 63

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
∟ 51 PLC11
∟ 130 System Parameters

Description:
It configures the address in the CAN network.

P1287 – CAN Baud Rate

Adjustable Range:
0 = 1 Mbit/s
1 = Reserved
2 = 500 Kbit/s
3 = 250 Kbit/s
4 = 125 Kbit/s
5 = 100 Kbit/s
6 = 50 Kbit/s
7 = 20 Kbit/s
8 = 10 Kbit/s

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It configures the baud rate of the CAN network.

P1288 – CAN Bus off Recovery

Adjustable Range:
0 = Manual
1 = Automatic

Factory Setting: 1

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It configures the way the PLC11 recovers when a Bus Off occurs in the CAN network.

P1289 – CAN Error Action

Adjustable Range:
0 = Alarm
1 = Fault

Factory Setting: 0

Proprieties:

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 130 System Parameters

Description:
It configures how the CAN network must react if any error occurs.

P1300 – User Parameters

P1499 – User Parameters

Adjustable Range:	0 to FFFFh	**Factory Setting:**	0

Proprieties: Configured via WLP

Access groups via HMI:

01 PARAMETER GROUPS
└ 51 PLC11
└ 131 User Parameters

Description:
They are general purpose user parameters.

5.3 ALARM DESCRIPTION

Alarm	Description	Possible Causes and Recommendations
A162: Incompatible PLC Firmware	It signalizes that the firmware of the PLC11 and the CFW-11 are incompatible.	☑ Incompatible firmware versions of the PLC11 and of the CFW-11.
A163: Break Detect AI1	It indicates that the AI1 current (4-20mA or 20-4mA) reference is out of the 4 to 20mA range.	☑ Broken AI1 cable; ☑ Bad contact at the signal connection to the terminal strip.
A164: Break Detect AI2	It indicates that the AI2 current (4-20mA or 20-4mA) reference is out of the 4 to 20mA range.	☑ Broken AI2 cable; ☑ Bad contact at the signal connection to the terminal strip.
A165: Break Detect AI3	It indicates that the AI3 current (4-20mA or 20-4mA) reference is out of the 4 to 20mA range.	☑ Broken AI3 cable; ☑ Bad contact at the signal connection to the terminal strip.
A166: Break Detect AI4	It indicates that the AI4 current (4-20mA or 20-4mA) reference is out of the 4 to 20mA range.	☑ Broken AI4 cable; ☑ Bad contact at the signal connection to the terminal strip.
A700: Detached HMI	☑ Refer to the SoftPLC Manual.	
A702: Inverter Disabled	☑ Refer to the SoftPLC Manual.	
A704: Two Movements Enabled	☑ Refer to the SoftPLC Manual.	
A706: Not Programmed Reference SoftPLC	☑ Refer to the SoftPLC Manual.	
A800: Timeout for Serial Communication	It indicates the equipment stopped receiving valid serial telegrams for a period longer than the one programmed in P1284.	
A806[1]: CAN Without Supply	A CAN protocol was enabled through the parameter P1280, but there is no 24V supply at the interface.	☑ For more information refer to the PLC11 CANopen communication manual.
A808[1]: Bus Off	A buss off error was detected at the CAN interface.	☑ For more information refer to the PLC11 CANopen communication manual.
A810[1]: CANopen Communication Error	The CANopen protocol error control has detected communication error.	☑ For more information refer to the PLC11 CANopen communication manual.

A816: Axis not Referenced	It happens in the attempt to execute an absolute positioning without the execution previously of the home position routine.	☑ Use the HOME block to perform the search of the machine home position.
A818: Two Enabled Movements	It occurs when 2 or more positioning or movement blocks are being enabled simultaneously.	☑ Create interlocking logics in order to avoid simultaneous activation of positioning or movement blocks.
A820: Invalid Movement Data	It occurs when there is any incorrect value for speed, acceleration, etc.	☑ Verify which is the parameter or marker that is being used for the configuration of the speed or the acceleration of a positioning block that contains a value equal to 0.
A822: Disabled Inverter	It occurs when a positioning or a movement block is activated and the inverter is not enabled.	☑ Analyze whether the user program contains the programming regarding the drive enabling through the system marker %SX3101. ☑ Verify whether the inverter is configured in the local mode or in the remote mode, so that the PLC11 has control over the logic command.
A824: Disconnected HMI	It occur s when an RTC block is activated and the HMI is not connected to the inverter. NOTE! The real time clock – RTC – is in the HMI.	☑ Verify whether the HMI is properly connected to the inverter.
A826: Wrong CRC	It occurs when there was an error in the transmission of the PLC11 user program.	☑ Retransmit it again. ☑ Analyze noise issues.
A828: Memory Card Timeout	It occurs when the CFW11 flash memory card takes more than 50 ms to answer to the PLC11; It occurs when the CFW11 flash memory card has not accepted the PLC11 command.	☑ Verify whether the CFW11 flash memory card is correctly connected to the CFW11.
A830: Invalid PLC11 Application	It appears when the PLC11 is installed in the CFW11 and there is no user program installed, or the user program is incompatible with the current PLC11 version.	☑ It may occur when there is a PLC11 firmware updating. ☑ Retransmit the user program.
A832: Stopped PLC11 Application	It occurs when there is a valid user program in the PLC11 board and the PLC11 command (P1250) is in "Stop Prog."	☑ Set P1250 to (1) "Run Prog."
A834: Disconnected Memory Card	It happens during the Copy function (P1257) or while transferring a file from the WLP to the PLC11, if the CFW11 flash memory card is not connected.	☑ Verify whether the flash memory card is correctly connected to the CFW11.
A836: Motor Running	It occurs if during the Copy function (P1257) or during the transferring of a WLP file to the inverter, the inverter is sending a command to run the motor.	☑ Disable the inverter during the Copy function or during the transferring of a WLP file to the PLC11.
A838: Speed reference not programmed for PLC	It occurs when a positioning or a movement block is enabled, but the speed reference is not configured for PLC11 (P0221 or P0222).	☑ Configure the parameter P0221 or P0222 so that the PLC11 generates the reference for the inverter.
A844: Timeout for CANBUS communication	It indicates the equipment stopped receiving valid CAN telegrams for a period longer than the one programmed in CANBUS configuration.	

[1] These events will be considered alarms only if the parameter P1289 were programmed with the option "0 – Indicate Alarm". Further information on these faults can be obtained in the CANopen communication manual for the PLC11.

5.4 FAULT DESCRIPTION

Fault	Description	Possible Causes and Recommendations
F161: Timeout PLC11 CFW-11	It signalizes the communication loss between the PLC11 board and the CFW11.	☑ Bad contact at the connection between the PLC11 and the CFW11; ☑ Problems in the applicative software; ☑ Defective PLC11 board.
F185: Precharge Contac Fault	It indicates fault at the Pre-charge Contactor.	☑ Pre-charge contactor defect.

F228: Serial Communication Timeout	☑ Refer to the RS-232 / RS-485 Serial Communication Manual.	
F229: Anybus Offline	☑ Refer to the Anybus-CC Communication Manual.	
F230: Anybus Access Error	☑ Refer to the Anybus-CC Communication Manual.	
F701: Detached HMI	☑ Refer to the SoftPLC Manual.	
F801: Timeout for Serial Communication	It indicates the equipment stopped receiving valid serial telegrams for a period longer than the one programmed in P1284.	
F807[2]: CAN Without Supply	A CAN protocol was enabled through the parameter P1280, but there is no 24V supply at the interface.	☑ For more information refer to the PLC11 CANopen communication manual.
F809[2]: Bus Off	A buss off error was detected at the CAN interface.	☑ For more information refer to the PLC11 CANopen communication manual.
F811[2]: CANopen Communication Error	The CANopen protocol error control has detected communication error.	☑ For more information refer to the PLC11 CANopen communication manual.
F817: Lag Error	It occurs when the difference between reference and the actual position exceeds the error programmed in P1259.	☑ The acceleration value is higher than the recommended for the system. ☑ Verify whether the encoder is wired correctly.
F821: Invalid PLC Firmware	It occurs when the firmware CRC is not valid. This prevents the operation of the PLC11.	☑ Try cycling the power of the equipment. ☑ Request to WEG the replacement of this equipment firmware.
F823: Disconnected HMI	It occurs when an RTC block has been enabled and the HMI is not connected to the inverter. NOTE! The real time clock is in the HMI.	☑ Verify whether the HMI is properly connected to the inverter.
F825: PLC11 Flash Fault	It may occur by enabling the Copy function (P1257) or during the transferring of any file from the PC to the PLC11.	☑ Try executing the operation again.
F827: Memory Card with Invalid Data	It occurs when the Copy function (P1257) is enabled and data contained in the flash memory board is not valid or is incompatible with the correct PLC11 firmware version.	☑ Retransmit the user program.
F829: PLC11 Watchdog	Internal error in the PLC11 applicative. Interruption Ladder applicative too big or with a high calling frequency. It occurs when the Copy function (P1257) is enabled and data contained in the flash memory board is not valid or is incompatible with the correct PLC11 firmware version.	☑ Change the calling period of the interruptions. ☑ Reduce the size of the interruption programs.
F845: Timeout for CANBUS communication	It indicates the equipment stopped receiving valid CAN telegrams for a period longer than the one programmed in CANBUS configuration.	

[2] These events will be considered faults only if the parameter P1289 were programmed with the option "1 – Fault".
Further information on these faults can be obtained in the CANopen communication manual for the PLC11.

NOTE!
The range from 950 up to 999 is destined to the user faults and alarms.