USER MANUAL

I/O ZE-P SERIES WITH PROTOCOL PROFINET IO



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CE

ORIGINAL INSTRUCTIONS



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Document revisions



DATE	REVISION	NOTES	AUTHOR
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1. INTRODUCTION

ATTENTION!

This user manual extends the information from the installation manual to the configuration of the device. Use the installation manual for more information.

ATTENTION!

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2. ZE-P SERIES DEVICES

The ZE-P series I/O devices support the Profinet IO protocol

2.1. INFORMATION ABOUT THE PROFINET IO PROTOCOL

Type of protocol: Class A Device, Cyclic Real-time (RT) and Acyclic Data

The device has been tested using the following PLCs: SIEMENS S7 1200 firmware revision 4.3 (Tia Portal 16) CODESYS Runtime 3.5 (Codesys 3.5)

2.2. ZE-2AI-P / ZE-4DI-2AI-2DO-P

The device allowa the use of 2 analog channels that can be individually configured in Voltage or Current.

CODE	ETHERNET PORTS
ZE-2AI-P	1 10/100 Mbit PORT
ZE-4DI-2AI-2DO-P	1 10/100 Mbit PORT



2.2.1. ANALOG INPUT UPDATE TIME

The sampling time is a parameter that can be modified from the hardware configuration of the Profinet IO Master and is unique for both channels.

The range of possible values varies from 10 ms to 300 ms in steps of 1 ms.

Considering that there are 2 channels in total, the measurement update time of a single channel is double the set sampling time.

Depending on the sampling time set, the measurement update times detected (with 2ms Profinet update time) are shown in the following table:

SAMPLING TIME	REAL PROFINET REFRESH		
CONFIGURATION FOR	TIME PER CHANNEL		
CHANNEL 1 AND 2			
10ms	About 60 ms		
20ms	About 80 ms		
40ms	About 120 ms		

2.2.2. RESOLUTION AND MEASUREMENT STABILITY OF THE ANALOG INPUTS

The resolution of the analog digital converter (ADC) depends on the set sampling time, in particular: If the sampling time of the channel is < 150 ms the ADC is set with a resolution of 12 bits If the sampling time of the channel is >= 150 ms the ADC is set with a resolution of 16 bits In addition to the resolution of the measurement, it should be noted that the greater the sampling time, the lower the stability of the measurement.

2.3. ZE-SG3-P

The device allows the use of an analogue channel for strain gauge load cells and 2 digital channels that can be individually configured for input or output.

CODE	ETHERNET PORTS		
ZE-SG3-P	1 10/100 Mbit PORT		

The measurement is carried out with the 4 or 6 wire technique.

The device is equipped with a new noise filter specifically developed to obtain a rapid response time.



2.3.1. LOAD CELL CONNECTION

It is possible to connect the converter to the load cell in 4- or 6-wire mode. 6-wire measurement is preferable for measurement accuracy. The load cell power supply is provided directly by the device.

2.3.2. 4- OR 6-WIRE LOAD CELL CONNECTION

A load cell can have a four-wire or six-wire cable. In addition to having the +/- excitation and +/- signal lines a six-wire cable also has the +/- sense lines. It is a common misconception to think that the only difference between 4- or 6-wire load cells is the possibility of the latter to measure the actual voltage at the load cell. A load cell is compensated to work within specifications in a certain temperature range (usually -10 - +40°C). Since the cable resistance depends on the temperature, the response of the cable to temperature changes must be eliminated. The 4-wire cable is part of the load cell temperature compensation system. The 4-wire load cell is calibrated and compensated with a certain amount of cable connected. For this reason, never cut the cable of a 4-wire load cell. The cable of a 6-wire cell, on the other hand, is not part of the load cell temperature compensation system. The sense lines are connected to the ZE-SG3-P sense terminals, to measure and adjust the actual voltage of the load cell. The advantage of using this "active" system is the possibility of cutting (or extending) the 6-wire load cell cable to any length. It must be considered that a 6-wire load cell will not reach the performance declared in the specifications if the sense lines are not used.

2.3.3. CHECKING THE LOAD CELL OPERATION

Before starting the configuration of the device it is necessary to verify the correctness of the wiring and the integrity of the load cell.

2.3.3.1. CHECKING CABLES WITH A DIGITAL MULTIMETER

First you need to check with the load cell manual that there are about 5V DC between the +Excitation and – Excitation cables. If the cell has 6 wires check that the same voltage is also measured between +Sense and – Sense.

Now leave the cell at rest (without the tare) and check that the voltage between the +Signal and –Signal cables is around 0 V.

Now unbalance the cell by applying a compression force, checking that the voltage between the +Signal and – Signal cables increases until it reaches the full scale (if possible) where the measurement will be approximately:

5* (cell sensitivity) mV.

For example, if the declared cell sensitivity is 2 mV/V, 5 * 2 = 10 mV must be obtained.



In the case of bipolar measurement only (compression/traction) it is necessary to completely unbalance the cell even in traction, in this case the same value must be measured between the +Signal and –Signal cables but with the negative sign:

-5* (cell sensitivity) mV.

2.3.4. CONNECTION OF MORE LOAD CELLS IN PARALLEL

It is possible to connect up to a maximum of 8 load cells (and in any case without ever falling below the minimum 87 Ohms).

It is therefore possible to connect:

NUMBER OF LOAD CELLS IN PARALLEL				
IMPEDANCE OF THE STATED LOAD CELL [Ohm]	MAXIMUM NUMBER OF CONNECTABLE CELLS IN PARALLEL			
350	4			
1000	8			

For the connection of 4 load cells Seneca recommends using the SG-EQ4 product.

To connect 2 or more 4-wire cells in parallel with the SG-EQ4 junction box, use the following diagram:





To connect 2 or more 6-wire cells in parallel with the SG-EQ4 junction box use the following diagram:



For more details, refer to the SG-EQ4 Junction Box accessory manual.

2.3.5. TRIMMING 4-WIRE LOAD CELLS

The figure below shows a diagram of three trimmed load cells.



A variable resistor, independent of the temperature, or a typically 20 Ω potentiometer is inserted in the +Excitation cable of each load cell. There are two ways to trim the load cells. The first method is to adjust the potentiometers by trial, shifting the calibration weights from one corner to another. All the potentiometers must be adjusted so as to set the maximum sensitivity for each cell, turning them all completely clockwise. Then, once



the angle with the lowest output is located, act on the trimmers of the other cells until obtaining the same minimum output value. This method can be very long, especially for large scales where the use of test weights on the corners is not very practical. In these cases the second, more suitable method is to "pre-trim" the potentiometers using a precision voltmeter (at least 4 1/2 digits). You can use the following procedure:

1) Determine the exact mV/V ratio of each load cell, shown in the calibration certificate of the cell itself.

2) Determine the exact excitation voltage provided by the indicator/meter (for example Z-SG), measuring this voltage with the voltmeter (for example 10.05 V).

3) Multiply the lowest mV/V value found (point 1) by the excitation voltage (point 2).

4) Divide the trimming factor calculated in point 3 by the mV/V value of the other load cells.

5) Measure and adjust the excitation voltage of the other three load cells using the respective potentiometer.

Check the results and make a final adjustment by moving a test load from corner to corner.

2.3.6. **PS BUTTON1**

The PS1 button is positioned next to the SW2 dip switch. If pressed for a few seconds it allows you to acquire the Tare (the same function is possible from the command register and digital input).



3. DIP SWITCH

ATTENTION!

THE DIP SWITCH SETTINGS ARE READ ONLY AT THE START. AT EACH CHANGE, IT IS NECESSARY TO RESTART.

3.1. MEANING OF THE DIP SWITCHES FOR THE ZE-2AI-P/ZE-4DI-2AI-2DO-P MODEL

DIP1	DIP2	MEANING			
OFF	OFF	Normal operation: The device loads the configuration from the flash.			
ON	ON	Resets the device to its factory configuration:			
		With IP address 192.168.90.101			
OFF	ON	Disables access to the Web server			
ON	OFF	Reserved			

ATTENTION!

TO INCREASE THE SECURITY OF THE DEVICE DISABLE THE WEBSERVER VIA THE DIP SWITCHES

3.2. MEANING OF THE DIP SWITCHES FOR THE ZE-SG3-P MODEL

SW1 dip switches 1 to 8 are not used and must always be set to the "OFF" state.



THE DEVICES ARE SUPPLIED WITHOUT AN IP ADDRESS (0.0.0.0).

MORE DEVICES CAN THEREFORE BE INSERTED INTO THE SAME PROFINET NETWORK AND IDENTIFIED THROUGH SCAN OF THE PROFINET NETWORK ITSELF

TO SET AN IP ADDRESS (FOR EXAMPLE TO ACCESS THE WEBSERVER OR TO CONNECT TO THE SENECA DISCOVERY DEVICE TOOL) USE THE PROFINET CONFIGURATION ENVIRONMENT OR FORCE THE ADDRESS 192.168.90.101 WITH THE APPROPRIATE DIP SWITCH



The meaning of SW2 dip-switches is as follows:

DIP 3 and DIP 4 must always be set to OFF and their function is RESERVED.

As regards DIP1 and DIP2, refer to the following table:

DIP1	DIP2	MEANING			
OFF	OFF	Normal operation: The device loads the configuration from the flash.			
ON	ON	Resets the device to its factory configuration:			
		(With IP address 0.0.0.0) In this case the STS LED will start flashing to indicate that			
		the device does not have a configured IP address.			
OFF	ON	Disables access to the Web server			
ON	OFF	Forces the device IP address to the standard value of SENECA Ethernet product			
		192.168.90.101			



TO INCREASE THE SECURITY OF THE DEVICE DISABLE THE WEBSERVER VIA THE DIP SWITCHES

4. WEB SERVER

ATTENTION!

BEFORE ACCESSING THE WEB SERBER, DISCONNECT THE DEVICE FROM THE PROFINET NETWORK

ATTENTION!

SOME MODELS ARE SUPPLIED WITHOUT AN IP ADDRESS (0.0.0.0). TO SET AN IP ADDRESS (FOR EXAMPLE TO ACCESS THE WEBSERVER OR TO CONNECT TO THE SENECA DISCOVERY DEVICE TOOL) USE THE PROFINET CONFIGURATION ENVIRONMENT OR FORCE THE ADDRESS 192.168.90.101 WITH THE APPROPRIATE DIP SWITCH

The main purpose of the web server is to:

-Configure the Profinet name of the device without using an external development environment (Tia Portal, Codesys...)

-Allow the device firmware update



4.1. ACCESS TO THE WEB SERVER

Access to the web server takes place using a web browser and entering the IP address of the device.

On first access the user name and password will be requested.

The default values are:

User Name: admin Password: admin

DEPENDING ON THE DEVICE MODEL AND THE FIRMWARE INSTALLED IN THE DEVICE, IT MAY BE NECESSARY TO ACTIVATE THE DIP SWITCHES TO USE THE WEBSERVER

ATTENTION!

UPON FIRST USE THE IP ADDRESS OF THE DEVICE IS NOT SET (0.0.0.0), IN THIS SITUATION IT WILL NOT BE POSSIBLE TO ACCESS THE WEBSERVER

ATTENTION!

AFTER THE FIRST ACCESS CHANGE USER NAME AND PASSWORD IN ORDER TO PREVENT ACCESS TO THE DEVICE TO UNAUTHORIZED PEOPLE.



ATTENTION!

IF THE PARAMETERS TO ACCESS THE WEB SERVER HAVE BEEN LOST, IT IS NECESSARY TO RESET THE FACTORY-SET CONFIGURATION

ATTENTION!

AVOID INSERTING SPECIAL CHARACTERS IN THE PROFINET NAME OF THE DEVICE

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5. EXAMPLE OF CREATING A PROJECT WITH SIEMENS PLC (TIA PORTAL 16)

Creating a new project:

Vîê	Siemens - C:\Users\Laborato	orio_iot\Docume	ents\Automatio	n\Test	_Prj\Tes	t_Prj		
Pr	ogetto Modifica Visualizza	Inserisci Onli	ne Strumenti	Tool	Finestr	a?		
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1	Chiudi	Ctrl+W						
	Elimina progetto	Ctrl+E						
	Salva	Ctrl+5		4				
	Salva con nome	Ctrl+Maiusc+S		18				
I	Archivia							
	Server di progetti	•						
	Card Reader/memoria USB	•						
	File della memory card	•						
	Avvia controllo di base della co	erenza						
	C:\Users\Laboratorio_iot\Docum	nen\Test_Prj						
	C:\Users\Laboratorio_iot\Docun	n\Progetto2						10110



5.1. INSTALLING THE GSDML FILE

Install the GSDML file of the Seneca product (it is possible to obtain the file on the web page of the device on the <u>www.seneca.it</u> site):

C:\Users\Laboratorio_iot\Documents	\Automation\Test_Prj\Test_Prj	
Progetto Modifica Visualizza Inserisci Online	Strumenti Tool Finestra ?	
📑 📑 🖬 Salva progetto 📑 🐰 🗐 🗎 🗙 🖺	🍸 Impostazioni	nline 🧟 Interrompi collegamento
Navigazione del progetto	Support package	
Dispositivi	Gestisci file di descrizione dispositivo	
	Avvia Automation License Manager	
<u>E8</u>	Visualizza testo di riferimento	
	Diblioteche elebeli	•
🔻 🗋 Test_Prj		
😤 🏼 🎽 Aggiungi nuovo dispositivo		
👌 📠 Dispositivi & Reti		
🕨 🔛 Dispositivi non raggruppati		
🕨 📷 Impostazioni Security		
Funzioni oltre i limiti del PLC		
 Manufactoria 		

Point to the directory where the file is and press OK, then the list of GSD files in the folder will appear:

G	estione file di de	scrizione disposi	tivo			×			
	GSD installati	GSD nel proge	tto						
	Percorso di origin C	\Users\Laboratorio_	iot\Desktop\TE	ST_PROFINET					
	Contenuto del percorso importato								
	🗹 File		Versione	Lingua	Stato	Informazioni			
	GSDML-V2.2-SEN	IECA-R16DI8DO-2	V2.2	Inglese	Non ancora installato				
	<					>			
					Cancella Installa	Annulla			

Click on "install".



5.2. INSERTION OF THE SIEMENS PLC IN THE PROJECT

Now insert the Siemens PLC (in our example a SIEMATIC S7 1200), click on "Add new device ...":







Confirm and the PLC will be added to the rack:



Now click on the PLC and select Profinet interface -> Ethernet addresses

	.ru 121	20 00	DODCJ					
# PLC_1 [CPU 12120	:]	•	8	6 8 1	€ ±			Vista generale dispos
							^	Modulo
	103	102	101	1		2 3	=	
Telaio di montang				_	_			
					2012/12 24-488			
					-		_	 PLC_1
				210				DI 8/DQ 6
				1"	000000			AI 2_1
				11			٠	HSC_1
				*			-	HSC_2
			1				- 10	HSC_3
								HSC_4
								HSC_5
								HSC_6
								Pulse_1
							~	Pulse_2
< 111			> 1	00%		·	- 💷 i	<
PLC 1 [CPU 1212C E	C/DC/E)C]						
Generale Vari	iabile IO		Costanti	di sistema	Testi			
▼ Generale	[~	odidaai E	homot				
Informazioni sul pr	ogetto		numzzi c	nemet				
Informazione catal	ogo		Interfa	ccia collega	ita a			
Identification & Ma	inten		-					
Somme di controll	•				Sottorete:	Non collega	ta in rete	
 Interfaccia PROFINET [X1]					Inserisci n	uova sottoi	ete
Generale								
	_		Protoco	llo IP				
Indirizzi Ethernet								
Indirizzi Ethernet Sincronizzazione d	ell'ora							
Indirizzi Ethernet Sincronizzazione d Modo di funzionam	ell'ora iento					Imposta i	indirizzo IP n	el progetto
Indirizzi Ethernet Sincronizzazione d Modo di funzionam Opzioni avanzate	ell'ora iento	=				Imposta i Inc.	indirizzo IP n	el progetto
Indirizzi Ethernet Sincronizzazione d Modo di funzionam Opzioni avanzate Accesso al server	ell'ora iento web	=				 Imposta i Internet 	indirizzo IP n dirizzo IP:	el progetto 192 . 168 . 0 . 1
Indirizzi Ethernet Sincronizzazione d Modo di funzionam Opzioni avanzate Accesso al servero DI 8/DQ 6	ell'ora iento web	=				 Imposta i Ini Mas 	indirizzo IP n dirizzo IP: chera di	el progetto 192 . 168 . 0 . 1
Indirizzi Ethernet Sincronizzazione d Modo di funzionam Opzioni avanzate Accesso al server DI 8/DQ 6 Al 2	ell'ora iento web	-				Imposta i Im Ma: S	indirizzo IP n dirizzo IP: chera di ottorete:	el progetto 192 . 168 . 0 . 1 255 . 255 . 255 . 0



Set the IP you want (in this case 192.168.90.44) and the PLC subnet:



Move on to the network view:





5.3. INSERTION OF THE PROFINET SENECA IO

On the right, select "Hardware Catalogue" and then under "Additional Field Device" -> PROFINET IO -> I/O -> Seneca R-Series-> Header module (in the example an R-16DI-8DO device is shown):

Catalogo hardware		a 🗈 🕨						
Opzioni								
			S					
			E					
✓ Catalogo			ğ					
		tini Lini	a					
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🕨 🧊 Rileva e controlla		^	are					
🕨 🛅 Periferia decentrata								
Alimentazione e distribuzione della corrente								
🕨 🫅 Apparecchiature	da campo		18					
🔫 🛅 Ulteriori apparec	chiature da campo		8					
🕨 🕨 🚺 Ulteriori dispo	sitivi Ethernet		9					
VI PROFINETIO								
Drives			P					
Encoders								
🕨 🧾 Gateway								
🗕 🗾 🗸			19					
🕨 🧾 Advante	ch Co., Ltd.	≡						
LAUMAS	Elettronica Srl							
🕨 🧾 rt-labs			n					
👻 🛅 Seneca	S.R.L.		5					
👻 🛅 Sene	ca R-series Devices	/						
🕨 🗎 Ma	odulo 🖌		le					
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	R-Ethernet I/O		1					
► 📠 SIEMENS	5 AG							
Sensors		~						
✓ Informazione								
Dispositivo:	17 KOM	^						
R-	Ethernet I/O							
N° di articolo: R-								
Versione: (GSD)	/L-V2.2 -SENECA-R -2	20200729.XML) 💌						
Descrizione:								
R-100 module								
is module								
			1					



Drag the device to the network view:

nline Strumenti Tool Finestra ? K 🔊 🛎 (# ± ?a) 🔃 🖬 😭 🍠 Collega online 🦨 Interrompi collegamento online ફ 🖪 🖪 🗙 🚽 🛛 Stogla progetto» 🙀			To	otally Integrated Au
🛙 🗸 Test_Prj 🕨 Dispositivi & Reti				
		🛃 Vista topolo	gica 🛛 📥 Vista (direte 🚺 Vista d
🗐 🗃 🛃 Collega in rete 🔛 Collegamenti 🛛 Collegamento HM 🔍 💹 🖏 👕 🔛 🗐 🍳 🛨	Vista generale di rete	Collegamenti Comun	icazione IO V	/PN TeleControl
	Dispositivo	Tipo	Indirizzo nella so	Sottorete Sister
	S7-1200 station_1	S7-1200 station		
PLC_1 r CPU 1212C B: Eth. DB HORM	GSD device_1	GSD device		-
Non assegnato	► r	R- Ethernet I/O		
	-			
PN/E_1				
	• •			
	×			
		Deputietà		Discussion
Ganazia			- monhazioni	U Diagnostica

Now associate it to the PLC by clicking with the left mouse on "Not assigned" and then select the PLC:







Click twice on the Seneca device and configure the IP address here too (for example 192.168.90.48):



In Profinet the devices are identified by their name, so right click on the Seneca device and select "Assign device name"

ATTENTION!

AVOID INSERTING SPECIAL CHARACTERS IN THE PROFINET NAME OF THE DEVICE





Scan the network with "Update list" and set (if necessary) the device name with "Assign name".

5.4. CONFIGURATION OF THE PARAMETERS OF THE SENECA DEVICE

It is also possible to directly configure the device IO without any external software. To configure the device, click on the IO so that the "Unit parameters" appear:

Test_Prj → Dispositivi non rago	gruppati 🕨 r 💿 (R- Ether	met I/O]									_ 6
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=	DP-NORM		1	Nome Nome del componente. Il nome può essere modificato secondo le opogie esigenze							
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Set All Digital Inputs NPN/PNP Enable Digital Outputs Fa Set Digital Outputs Fault Ti	Set Digital Inputs Filter Delay [ms]: 0										
Set Digital Output Fault S Set Digital Output Normal	Set All Digital Inputs NPN/PNP										
Guasto all'unità Indirizzi di I/O	Set All Digital Inputs NPN/PNP										
	Set All Digital Inputs NPN/PNP: PNP										-
	Enable Digital Outputs Fault Timeout										
	Enable Digital Outputs Fault Timeo	ut									
	🗌 Ena	ble Digital Outp	iuts Fault Ti	meout							
	Set Digital Outputs Fault Timeout [s]										
	Set Digital Outputs Fault Timeout [4									
	Set Digital Outputs Fault										

At the next start, the PLC will send the desired configuration to the device.





5.5. CONFIGURATION PARAMETERS OF THE GSDML FILE

5.5.1. ZE-2AI-P / ZE-4DI-2AI-2DO-P

AIN Sample Time [ms]

Allows you to set the sampling time of the analog inputs.

The range of possible values varies from 10 ms to 300 ms in steps of 1 ms.

Considering that there are 2 channels in total, the measurement update time of a single channel is double the set sampling time.

Depending on the sampling time set, the measurement update times detected (with 2ms Profinet update time) are shown in the following table:

The resolution of the analog digital converter (ADC) depends on the set sampling time, in particular: If the sampling time of the channel is < 150 ms the ADC is set with a resolution of 12 bits If the sampling time of the channel is >= 150 ms the ADC is set with a resolution of 16 bits

AIN Setup

Input Type: Select if the respective input is a voltage or current input Begin Scale [mV/uA]: measurement scale start, expressed in mV [0-30000 mV] or in uA [0-20000 uA] End Scale [mV/uA]: scale of measurement end, expressed in mV [0-30000 mV] or in uA [0-20000 uA] Begin Eng. Scale: Engineering scale start, associated with the measurement scale start [-32768 - + 32767] End Eng. Scale: Engineering scale end, associated with the start of the measurement scale [-32768 - + 32767]

Example: Input Type = Current Begin Scale = 4000 [uA] End Scale = 20000 [uA] Begin Eng. Scale = 0 End Eng. Scale = 1000

The engineering measure will be 0 with an input of 4 mA, it will be 1000 with an input of 20 mA and will follow a linear trend between these two extremes, for example it will be 500 with an input of 12 mA (50% of the electrical scale)



DIN/DOUT Setup (ZE-4DI-2AI-2DO-P MODEL ONLY)

DIN Input Type: Selects the type of digital input if PNP or NPN

DOUT Fail mode: Selects whether or not to activate the fail state in case of communication timeout. If the PLC no longer communicates for the set Timeout time, then the digital outputs go into the FAIL state.

DOUT Fail Timeout [s]: allows you to set the communication Timeout time in seconds after which the outputs are brought to the FAIL state.

DOUT1/DOUT2 when in fail mode: Sets the state that the digital outputs must have in case of FAIL.

5.5.2. ZE-SG3-P

ATTENTION!

FROM FIRMWARE REVISION 1005 THE DEVICE PARAMETERS CAN ALSO BE CONFIGURED IN REAL TIME FROM THE PLC BY OVERWRITING THE INITIAL CONFIGURATION.

FUNCTION MODE

It allows to configure the basic operation of the device, can be set to factory calibration or to Calibration with standard weight:

FACTORY CALIBRATION

It is used when a load cell with declared sensitivity is available.

In this mode, calibration only consists in acquiring the tare directly in the field with a direct measurement. If it is not possible to acquire the tare with a direct measurement (for example in the case of an already filled silo) it is possible to manually enter the tare value in the desired unit of measurement (kg, t, etc.).

CALIBRATION WITH STANDARD WEIGHT

It is used when a standard weight is available (as far as possible towards the load cell full scale). In this mode the calibration consists in acquiring both the tare and the standard weight directly on the field.

MEASURE TYPE

It allows to configure the operation of the device between:

BALANCE (UNIPOLAR)

It is used when a scale is being created in which the load cell is only compressed, in this case the maximum resolution of the compression measurement is obtained.

COMPRESSION AND TRACTION (BIPOLAR)



It is used when a measurement system (typically of force) is being created that can both compress and extend the load cell. In this case the direction of the force can also be decided, if compression the measurement will have the + sign, if traction it will have the - sign. A typical case of use is to link the direction of the force to the analog output so that, for example, 4mA correspond to the maximum traction force and 20mA correspond to the maximum compression force (in this case the cell at rest will provide 12Ma).

MEASURE UNIT

Sets the unit of measurement for the weighing in g, Kg, etc.

CELL SENSITIVITY

It is the declared cell sensitivity value expressed in mV/V (in most cells it is 2mV/V).

CELL FULL SCALE

It is the full scale value of the cell expressed in the selected unit of measurement.

STANDARD WEIGHT VALUE

It represents the value of the standard weight that will be used in the calibration if the operating mode with standard weight has been chosen.

NOISE FILTER

Enables or disables measurement filtering.

FILTER LEVEL

Allows you to set the measurement filter level according to the following table:

FILTER LEVEL	RESPONSE TIME [ms]
0	2
1	6.7
2	13
3	30
4	50
5	250
6	850
ADVANCED	Configurable

The higher the filter level the more stable (but slow) the weight measurement will be.

If you select the advanced filtering level (Advanced), the configuration will allow you to select the following parameters:

ADC SPEED Selects the ADC acquisition speed from 4.7 Hz to 960 Hz



NOISE VARIATION It is the variation in ADC points due to noise alone (represents the measurement uncertainty due to noise) or how much we expect the measurement to vary (the unit of measurement is in raw ADC points).

FILTER RESPONSE SPEED

Represents a parameter related to the filter response speed, it can vary from 0.001 (slowest response) to 1 (fastest response). Represents the variance of the process.

NET WEIGHT RESOLUTION

It is the resolution with which the value of the net weighing is represented, it can be worth:

MAXIMUM RESOLUTION

It will represent the net weight with the highest possible resolution

MANUAL

It will represent the net weight with the manual resolution set (in engineering units). For example, by setting 0.1 Kg you will get that the net weight can only vary by multiples of 100g.

AUTOMATIC RESOLUTION

It will represent the net weight with a calculated resolution of about 20000 points. Unlike Maximum or Manual resolution, this setting limits also the ADC value and therefore affects all measurements.



Keep in mind that in the "Calibration with standard weight" mode, using the "Manual Resolution", the correct standard weight value may not be perfectly represented:

For example, you have:

Cell full scale 15000 g Standard weight 14000 g Manual Resolution 1.5 g

The value of the standard weight (14000 g) cannot be represented with the resolution in 1.5g steps (14000/1.5g = 9333.333 is not an integer value) so it will be represented as: 9333*1.5g = 13999.5g To avoid this effect, use a resolution that allows the value to be represented (for example 1g or 2g).

SAMPLE PIECE WEIGHT

Sets the weight of a single piece in technical units for the mode. By setting the net weight of a single element in this register, the converter will be able to indicate the number of pieces present in the scales special register according to the relation:



 $Nr Pezzi = \frac{Peso Netto}{Peso Pezzo Campione}$

AUTOMATIC TARE TRACKER

It allows you to enable or disable the automatic tare reset.

ADC VALUE

It allows to set the number of ADC points within which to reset the tare automatically. If after 5 seconds of stable weighing condition the ADC value of the net weight deviates by less than this value then a new tare is acquired.

DELTA WEIGHT

Weight variation that contributes to the definition of "Stable Weight"

DELTA TIME [x100ms]

Time variation that contributes to the definition of "Stable Weight"

STABLE WEIGHT (Stable weighing condition)

The stable weighing condition is used to indicate that the net weight measurement is stable if: The net weight remains within the weight $\Delta peso_netto$ over time $\Delta tempo$ or if the slope of the curve drawn by the net weight is less than $\frac{\Delta peso_netto}{\Delta tempo}$:



You will be prompted to enter Delta Net Weight (**Delta Weight**) (in engineering units) and Delta Time (**Delta Time**) (in 0.1 seconds).

ANALOG OUTPUT WORKING MODE

Select whether the analogue output is linked to the net measurement or controlled by the Profinet io protocol.



ANALOG OUTPUT TYPE

Select whether the analogue output is Voltage or Current

DIGITAL I/O MODE

Configure the device's digital I/O as input or output

FUNCTION

Configure the operation if the I/O is configured as a digital input:

ACQUIRE TARE

In this mode, if the digital input is activated for a time longer than 3 seconds, a new tare value is acquired (in RAM, then it is lost upon restart). It is equivalent to sending the command 49594 (decimal) in the command register.

DIGITAL INPUT

The input is configured as a digital input whose value can be read from the appropriate register.

DIGITAL OUTPUT MODE

In the case of configuring the I/O as a digital output it is possible to choose whether this should be configured as normally open (*Normally Open*) or as normally closed (*Normally Close*)

DIGITAL OUTPUT CONFIGURATION

Here you can choose the behaviour of the digital output:

FULL SCALE CELL

The digital output is activated if the cell has reached the measurement full scale.

THRESHOLD AND STABLE WEIGHT

In this mode, the output activates when the net weight reaches the threshold and the weigh is in a stable weighing condition

STABLE WEIGHT

The stable weighing condition is used to indicate that the net weight measurement is stable if: The net weight remains within the weight $\Delta peso_netto$ over time $\Delta tempo$ or if the slope of the curve drawn by the net weight is less than $\frac{\Delta peso_netto}{\Delta tempo}$:





STABLE WEIGHT

In this mode the output is activated if the weighing is in the stable weighing condition.

COMMANDABLE FROM PROFINET

In this mode the digital output can be controlled by the Profinet IO protocol.

THRESHOLD WITH HYSTERESIS

In this mode the output is activated when the net weight reaches the threshold, the alarm is cancelled when the net weight falls below the Threshold-Hysteresis value:





5.6. I/O ZE-2AI-P / ZE-4DI-2AI-2DO-P DATA

Define the PLC tags directly in the "standard tag table":

vi	Siemens - C:\Users\Laboratorio_lot\Documentsv\utomation\le	est_Prj\Test_Prj								
P	Progetto Modifica Visualizza Inserisci Online Strumenti To	ool Finestra ?								
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	Navigazione del progetto	Test Prj → PLC 1 [CPU 1212C DC/DC/D	C] → Variabili	PLC → Tabella	delle va	riabili st	andard	[36]		
	Dispositivi		-							
	Dispositivi									
		🛫 🛫 🖻 🖭 🙄 🛍								
Ĭ		Tabella delle variabili standard								
e e	💌 🔄 Test_Prj 📃 🔨	Nome	Tipo di dati	Indirizzo	Ritenz	Acces	Scrivi	Visibil	Commento	
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Ē	Dispositivi & Reti									
E E	PLC_1 [CPU 1212C DC/DC/DC]									
15	Configurazione dispositivi									
E.	🗓 Online & Diagnostica									
	🕨 🔙 Blocchi di programma									
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	Sorgenti esterne									
	🔻 🔁 Variabili PLC									
	🝇 Mostra tutte le variabili									
	🚔 Aggiungi nuova tabella delle variabili									
	🎬 Tabella delle variabili standard [36] 🔪									
	🕨 🛅 Tipi di dati PLC									
	🔻 🔜 Tabella di controllo e di forzamento									
	🗳 Aggiungi nuova tabella di controllo									
	Tabella di forzamento				_	_	_			

Now let's add the variables related to the IO, the addresses are shown here (for example for the ZE-4DI-2AI-2DO-P model):

Vista g	Vista generale dispositivi										
		-	1	1		1					
- Y	Modulo	Telaio	Posto	Indirizzo I	Indirizzo Q	Tipo	N° di articolo				
	▼ ze2ai4di2dop	0	0			ZE-2AI-4DI-2DO-P	ZE-2AI4DI2DO-P				
	PN-IO	0	0 X1			ze2ai4di2dop					
	AIN ENG1	0	1	14		AIN ENG.					
	DIN/DOUT_1	0	2	5	1	DIN/DOUT					
		0	3								
		0	4								

So:

Bytes I1 to I4 contain the analog inputs in engineering format (i.e. after scaling) (IW1 for analog input 1 and IW3 for analog input 2)

Byte I5 contains the status of the 4 digital inputs, i.e. I5.0 the DIN1, I5.1 the DIN2, I5.2 the DIN3 etc...

Q1 contains the status of the 2 digital outputs, i.e. Q1.0 the DOUT1 and Q1.1 the DOUT2.

We define the 2 analog inputs, the 4 digital inputs and the 2 digital outputs in the table of the standard variables:



Т	Tabella delle variabili standard											
		Nome	Tipo di dati	Indirizzo	Ritenz	Acces	Scrivi	Visibil	Comment			
1		AIN1	UInt 🔳	%IW1 💌		~		\checkmark				
2	-00	AIN2	UInt	%IW3								
3	-00	DIN1	Bool	%15.0								
4	-00	DIN2	Bool	%I5.1				\checkmark				
5	-00	DIN3	Bool	%15.2				\checkmark				
6	-00	DIN4	Bool	%15.3								
7	-00	DOUT1	Bool	%Q1.0			\sim					
8	-00	DOUT2	Bool	%Q1.1			\sim					
9		<aggiungi></aggiungi>				V	V	V				

Now compile, send the project and go online with the PLC.

Once online, press the glasses icon to update the status of the variables.

Pro	getto_	R8AI8DIDO_000	PLC_1 [CPU 1	212C DC/DC/DC]	Tabella di con	trollo e di forzam	ento 🕨	Tabella d
ý	💣 и	🥂 📝 🌆 🕫 🖉	5 🖉 🍞 👕					
	i	Nome	Indirizzo	Formato visualizz	Valore di controllo	Valore di comando	9	Commer

Under the "Control value" column you can read the I/O value in real time.

To control the outputs, it is necessary to enter "TRUE" or "FALSE" in the "Command value" column and then press the icon with the lightning bolt to order the writing. Note the status of the LED relating to the commanded output.

In the "Control value" column, the status of the outputs is also read in real time.

ZE-2AI-P MODEL

SLOT	No. OF BYTES	TYPE	INFO
AIN ENG	4	READ	Representsthe measurementsthe two analog scaled in engineering



AIN (optional)	4	READ	RepresentsthemeasurementsoftheanalogsinmV/uAByte[0][1] = AIN1 valueByte[2][3] = AIN2 value
DIAGNOSTIC (optional)	1	READ	Allows to detect the anomaly status related to the analog measures. The interpretation is to be carried out in bits as follows: bit .0 = NOT USED bit .1 = AIN1 underflow bit .2 = AIN1 overflow bit .3 = AIN2 underflow bit .4= AIN2 overflow



ZE-4DI-2AI-2DO-P MODEL

SLOT	No. OF BYTES	TYPE	INFO
AIN ENG	4	READ	Represents the measurements of the two analog scaled in engineering units. The scale values can be set via the hardware configuration of the Profinet IO Master. Byte[0][1] = AIN1 value Byte[2][3] = AIN2 value
DIN/DOUT	2	<i>1 BYTE READ 1 BYTE WRITE</i>	Represents the states of the digital inputs and digital outputs. READ: bit .0 = DIN1 bit .1 = DIN2 bit .2 = DIN3 bit .3 = DIN4 WRITE: bit .0 = DOUT1 bit .1 = DOUT2
AIN (optional)	4	READ	Represents the measurements of the two analogs in mV/uA Byte[0][1] = AIN1 value Byte[2][3] = AIN2 value
DIAGNOSTIC (optional)	1	READ	Allows to detect the anomaly status related to the analog measures. The interpretation is to be carried out in bits as follows: bit .0 = NOT USED bit .1 = AIN1 underflow bit .2 = AIN1 overflow bit .3 = AIN2 underflow bit .4= AIN2 overflow



5.7. I/O ZE-SG3-P DATA

Define the PLC tags directly in the "standard tag table":

₩	Siemens - C:\Users\Laboratorio_iot\Documents\Automatic	n\Te	est_Prj\Test_Prj							
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	Dispositivi									
F			Tabella delle variabili standard							
9	🔻 🔄 Test_Prj	^	Nome	Tipo di dati	Indirizzo	Ritenz	Acces	Scrivi	Visibil	Commento
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Ĩ	📩 Dispositivi & Reti									
E E	PLC_1 [CPU 1212C DC/DC/DC]									
b	Configurazione dispositivi									
- E	😓 Online & Diagnostica									
	🕨 🛃 Blocchi di programma									
	Oggetti tecnologici	_								
	Sorgenti esterne	-								
	🔻 🌄 Variabili PLC									
	a Mostra tutte le variabili									
	🗳 Aggiungi nuova tabella delle variabili									
	💥 Tabella delle variabili standard [36] 🛌									
	🕨 🛅 Tipi di dati PLC									
	🔻 🥅 Tabella di controllo e di forzamento									
	Aggiungi nuova tabella di controllo									
	Fill Tabella di forzamento									

Let's now add the variables relating to the IO.

ATTENTION!

FROM FIRMWARE REVISION 1005 THE DEVICE PARAMETERS CAN ALSO BE CONFIGURED IN REAL TIME FROM THE PLC BY OVERWRITING THE INITIAL CONFIGURATION.

For instance, by default you have:

			📇 Vista	topologic	a 🛛 🔒 Vista di ret	e 🛛 🛛 🔐 Vista disposi	tivi	Opzioni
Vista generale dispositivi								
- Modulo	Telaio	Posto	Indirizzo I	Indirizz	Тіро	N° di articolo	Fir	✓ Catalogo
ze-r-sg3-p	0	0			ZE/R-SG3-P Etherne	ZE/R-SG3-P	F	<trova></trova>
PN-IO	0	0 X1			ze-r-sg3-p			Filtro Profilo:
Weight (Integer)_1	0	1	6885		Weight (Integer)			
DIN/DOUT_1	0	2	1	1	DIN/DOUT			Analog Input Configuration
	0	3						
•	0	4						Analog Output Configuration
	0	5						
•	0	6						
	0	7						Digital I/O Configuration
	0	8						Digital I/O Conliguration
	0	9						Weight (rioat)
								22/k-3G5-F Ethernet I/O

Therefore, the Weight slot (integer) is created by default:

SLOT "WEIGHT (INTEGER)"

This slot contains only write variables:



SLOT WEIGHT (INTEGER)	OFFSET (BYTE)	DATA TYPE	Read/Write	Notes
NET WEIGHT	0-1-2-3	4 Byte Signed Integer	Read	Net Weight in integer format
GROSS WEIGHT	4-5-6-7	4 Byte Signed Integer	Read	Gross Weight in integer format
TARE WEIGHT	8-9-10-11	4 Byte Signed Integer	Read	Tare Weight in integer format
NO. PIECES	12-13	2 Byte Unsigned	Read	Pieces count number
ADC RAW	14-15-16-17	4 Byte unsigned Integer	Read	24 Bit ADC RAW

SLOT DIN/DOUT

The DIN/DOUT slot contains the digital variables relating to the DIN1 and DIN2 inputs (read) and the DOUT1 and DOUT2 variables (write) relating to the outputs.

Attention! It is only possible to configure a digital channel as DIN or DOUT:

SLOT DIN/DOUT	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
DIN1	0.0	BIT	READ	Digital Input 1 value
DIN2	0.1	BIT	READ	Digital Input 2 value

SLOT DIN/DOUT	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
DOUT1	0.0	BIT	WRITE	Digital Out 1 value
DOUT2	0.1	BIT	WRITE	Digital Out 2 value

The following optional slots can also be added:

Slot Analog Input Configuration

These are variables used to modify the weight measurement configuration parameters in real time:



User Manual

SLOT ANALOG INPUT CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
FUNCTION MODE	0	1 Byte Unsigned	Write	"0" = Factory Calibration "1" = Calibration with standard weight
MEASURE TYPE	1	1 Byte Unsigned	Write	"0" = Compression and traction (Bipolar) "1" = Balance (Unipolar)
MEASURE UNIT	2	1 Byte Unsigned	Write	0 = Kg 1 = g 2 = t 3 = lb 4 = l 5 = N 6 = bar 7 = atm 8 = other
CELL SENSIBILITY	3-4-5-6	4 Byte Floating Point	Write	Cell Sensibility in [mV/V]
CELL FULLSCALE	7-8-9-10	4 Byte Floating Point	Write	Cell Full Scale
STANDARD WEIGHT VALUE	11-12-13-14	4 Byte Floating Point	Write	Standard Weight value
NOISE FILTER	15	1 Byte Unsigned	Write	"0" = disable "1" = enable
FILTER LEVEL	16	1 Byte Unsigned	Write	"0""6" = Filter Level "7" = Advanced
ADC SPEED	17	1 Byte Unsigned	Write	"0" = 960 Hz "1" = 300 Hz "2" = 150 Hz "3" = 100 Hz "4" = 60 Hz "5" = 12 Hz "6" = 4.7 Hz



NOISE VARIATION	18-19-20-21	4 Byte Floating Point	Write	ADC Points variation
FILTER RESPONSE SPEED	22-23-24-25	4 Byte Floating Point	Write	"0.01" = Max Slow Response "1" = Max Fast Response
NET WEIGHT RESOLUTION	26	1 Byte Unsigned	Write	"0" = Automatic "1" = Manual "2" = Maximum
MANUAL RESOLUTION	27-28-29-30	4 Byte Floating Point	Write	Manual Resolution Value
SAMPLE PIECE WEIGHT	31-32-33-34	4 Byte Floating Point	Write	Single Piece Weight
AUTOMATIC TARE TRACKER	35	1 Byte Unsigned	Write	"0" = disable "1" = enable
ADC VALUE	36-37-38-39	4 Byte Unsigned Integer	Write	Tracker ADC Value
DELTA WEIGHT	40-41-42-43	4 Byte Floating Point	Write	Stable condition Delta Weight
DELTA TIME	44-45	2 Byte Unsigned Integer	Write	Stable condition Delta Time [x100ms]

SLOT ANALOG INPUT CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
CONFIGURATION APPLAYED	0-1	2 Byte Unsigned Integer	Read	"0" = configuration on-going "1" = configuration applayed



SLOT Analog Output (NOT USABLE ON THE R-SG3-P MODEL)

It is the variable related to the analog output in voltage/current, it accepts the value in uA or mV

SLOT ANALOG OUTPUT	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
Analog Output	0-1	2 Byte Unsigned Integer	Write	Usable only if the parameter "ANALOG OUTPUT WORKING MODE" is configured in "Commandable from Profinet"
				Output value in [mV] from 0 to 10500 or [uA] from 0 to 21000

SLOT Analog Output Configuration (NOT USABLE ON THE R-SG3-P MODEL)

These are variables used to modify the analog output configuration parameters in real time:

SLOT ANALOG OUTPUT CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
ANALOG OUTPUT WORKING MODE	0	1 Byte Unsigned Integer	Write	"0" = Linked to Weight % "1" = Commandable from Profinet
ANALOG OUTPUT TYPE	1	1 Byte Unsigned Integer	Write	"0" =Output configured in voltage mode "1" = Output configured in current mode

SLOT ANALOG	OFFSET (BYTE)	DATA	Read/Write	Values
OUTPUT		TYPE		
CONFIGURATION				



CONFIGURATION	0-1	2 Byte	Read	"0" = configuration
APPLAYED		Unsigned		on-going
		Integer		"1" = configuration
				applayed

SLOT CMD

These are variables that allow you to send commands to the device and know the status of the command.

SLOT ANALOG OUTPUT CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
COMMAND VALUE	0-1	2 Byte Unsigned Integer	Write	See Table below

COMMAND (DECIMAL) Values	FUNCTION
0	No Command
43948	Reboot the device
49594	Acquires the tare in RAM (at reboot is lost)
49914	Acquires the tare in Flash for the calibration procedure in both operating modes (factory calibration and with sample weight)
50700	Acquires the sample weight value in Flash for calibration with standard weight
50773	Acquires the tare value from the register MANUAL TARE (only for the factory calibration mode)
49151	Reset the maximum net weight
45056	Reset the minimum net weight

Note that if you need to send the same command 2 or more times, you must first insert the "0" command because the command are executed on change.



SLOT ANALOG OUTPUT CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
COMMAND VALUE (STATUS)	0-1	2 Byte Unsigned Integer	Read	"0" Command executed ≠ "0" Command Pending

SLOT DIAGN

It contains the diagnostic variable

SLOT	OFFSET (BYTE)	DATA	Read/Write	Values
DIAGNOSTIC		TYPE		
DIAGNOSTIC	0-1	2 Byte Unsigned Integer	Read	BIT 0 LSBIT Bit 0 = 1 THRESHOLD AND STABLE WEIGHT for DIDO 1 BIT 1 Bit 1 = 1 FULL SCALE CELL BIT 2 (RO) Bit 2 = 1 NET WEIGHT < 0 BIT 3 (RO) Bit 3 = 1 THRESHOLD AND STABLE WEIGHT for DIDO 2 BIT 4 (RO) Bit 4 = 1 Stable weight BIT 5-6 Not used BIT 7 (RO) Bit 7 = 1 Threshold with hysteresis for DIDO 1 BIT 8 (RO) Bit 8 = 1 automatic tare tracker (if enabled) BIT 9 (RO) Bit 9 = 1 Threshold with hysteresis for DIDO 2



SLOT Digital I/O Configuration

SLOT DIGITAL I/O CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
DIGITAL 1 I/O MODE	0	1 Byte Unsigned	Write	"0" = Digital Input Mode "1" = Digital Output Mode
DIGITAL 1 INPUT FUNCTION	1	1 Byte Unsigned	Write	"0" = Acquire Tare "1" = Digital INput
DIGITAL 1 OUTPUT MODE	2	1 Byte Unsigned	Write	"0" = Normally Open "1" = Normally Close
DIGITAL 1 OUTPUT CONFIGURATION	3	1 Byte Unsigned	Write	 "0" = Cell Full Scale "1" = Threshold and Stable Weight "2" = Stable Weight "3" = Commandable from Profinet "4" = Threshold with hysteresis
DIGITAL 1 I/O THRESHOLD OUTPUT	4-5-6-7	4 Byte Floating Point	Write	Threshold Value
DIGITAL 1 I/O HYSTERESIS OUTPUT	8-9-10-11	4 Byte Floating Point	Write	Hysteresis Value
DIGITAL 2 I/O MODE	12	1 Byte Unsigned	Write	"0" = Digital Input Mode "1" = Digital Output Mode
DIGITAL 2 I/O FUNCTION	13	1 Byte Unsigned	Write	"0" = Acquire Tare "1" = Digital INput
DIGITAL 2 I/O OUTPUT MODE	14	1 Byte Unsigned	Write	"0" = Normally Open "1" = Normally Close
DIGITAL 2 I/O OUTPUT CONFIGURATION	15	1 Byte Unsigned	Write	 "0" = Cell Full Scale "1" = Threshold and Stable Weight "2" = Stable Weight "3" = Commandable from Profinet "4" = Threshold with hysteresis



DIGITAL 2 I/O THRESHOLD OUTPUT	16-17-18-19	4 Byte Floating Point	Write	Threshold Value
DIGITAL 2 I/O HYSTERESIS OUTPUT	20-21-22-23	4 Byte Floating Point	Write	Hysteresis Value

SLOT DIGITAL I/O CONFIGURATION	OFFSET (BYTE)	DATA TYPE	Read/Write	Values
CONFIGURATION APPLAYED	0-1	2 Byte Unsigned Integer	Read	"0" = configuration on-going "1" = configuration applayed

SLOT WEIGHT (FLOAT) It shows the weight measurement variables in 32-bit floating point format.

SLOT WEIGHT (FLOAT)	OFFSET (BYTE)	DATA TYPE	Read/Write	Notes
NET WEIGHT	0-1-2-3	4 Byte Floating Point	Read	Net Weight in float format
GROSS WEIGHT	4-5-6-7	4 Byte Floating Point	Read	Gross Weight in float format
TARE WEIGHT	8-9-10-11	4 Byte Floating Point	Read	Tare Weight in float format
MAX Net Weight	12-13-14-15	4 Byte Floating Point	Read	Max Net Weight from reboot or reset command
MIN Net Weight	16-17-18-19	4 Byte Floating Point	Read	Min Net Weight from reboot or reset command



5.8. COMPILATION AND SENDING OF THE PROJECT TO THE SIEMENS PLC

Now that the devices are configured, all that remains is to compile and send the configuration to the PLC.

				ON!
	ALWATS DU	A FULL HARDWARE COM	CE:	IN BEFORE SENDING A PROJECT TO THE
	💑 Dispositivi &	Reti		E.
-	 PLC_1 [CPU Dispositivi n Impostazion Funzioni oltr Dati comuni Informazioni Lingue & Ris Version Com 	Sostituisci dispositivo Apri Apri nel nuovo editor Apri blocco/tipo di dati PLC Taglia Copia Incolla	F7 Ctrl+X Ctrl+C Ctrl+V	
	Accessi online	× Elimina	Canc	
	🕨 🤄 Card Reader/me	Rinomina 🛫 Vai alla vista topologica	F2	
		👫 Vai alla vista di rete		
		Compila Carica nel dispositivo Carica backup del dispositivo online S Collega online	► Ctrl+K	Hardware e software (soltanto modifiche) Hardware (soltanto modifiche) Hardware (compilazione completa) Software (soltanto modifiche)
		Interrompi collegamento online	Ctrl+M	Software (compilazione completa)
		🖞 Online & Diagnostica	Ctrl+D	Software (resetta riserva di memoria)
		in a second second second second		A

Before sending the project to the PLC, you are asked to select the ethernet interface and start the search, in order to select the PLC and press "Load".

Caricamento avanzato)					
	Nodi di accesso c	onfigurati di "PLC_1"				
	Dispositivo	Tipo di dispositivo	Posto c	Tipo di interfa	Indirizzo	Sottorete
	PLC_1	CPU 1212C DC/D	1 X1	PN/IE	192.168.90.44	PN/IE_1
		Tipo di interfaccia F	PG/PC:	PN/IE		
		Interfaccia f	PG/PC:	Broadcom N	etLink (TM) Gigabit Etl	nernet 💌 💎 🛽
×	Collegamen	to con l'interfaccia/la sotte	orete:	PN/IE_1		
		1° dat	eway:	_		•
	Selezionare il sist Dispositivo	ema di destinazione: Tipo di dispositivo	Tipo di	interfaccia Inc	Visualizza tutti i nod lirizzo	li compatibili Dispositivo di des.
	Dispositivo	Tipo di dispositivo	Tipo di	interfaccia Inc		Dispositivo di des
r = 5	-	-	PN/IE	Inc	lirizzo di accesso	-
🔄 LED lampeggia						
						Avvia ricerca
Informazioni sullo stato	online:				📃 Visualizza solo m	essaggi di errore
🔒 Dispositivo accessil	bile trovato r16di8do					
🕦 Ricerca terminata. S	ono stati trovati 1 no	odi compatibili su 3 nodi a	ccessibili			
Richiamo informazio	oni sui dispositivi in c	orso Luca Èstata rilavata 1 pro	bloma			
Scansione e richies	ta informazioni conci	use. E stato nievato i pro	piema.	· · · ·		
					Cari	ca Annulla



Once the project has been sent, RUN the PLC:



And go On-Line so as to check if there are any errors:



If everything is correct you will get a green icon next to the Seneca device:

Navigazione del progetto	
Dispositivi	
▼ Test_Prj	
🗳 Aggiungi nuovo dispositivo 🔪	_
🚠 Dispositivi & Reti	
PLC_1 [CPU 1212C DC/DC/DC]	
🛐 Configurazione dispositivi	
😓 Online & Diagnostica	
🕨 🔙 Blocchi di programma	
🕨 🏣 Oggetti tecnologici	
🕨 🔙 Sorgenti esterne	1
🕨 🌄 Variabili PLC	
🕨 📴 Tipi di dati PLC	
🕨 🥅 Tabella di controllo e di forzamento	
🕨 📴 Backup online	
🕨 🔄 Traces	
🕨 🛄 Dati proxy dei dispositivi	
📴 Informazioni sul programma	
🔄 Elenchi di testi di segnalazione PLC	
🕨 🧰 Moduli locali	
🕨 🫅 Periferia decentrata	
🔻 🖳 Dispositivi non raggruppati	\cap
🔻 🛄 r 🔤 [R-	
🛐 Configurazione dispositivi	
😓 Online & Diagnostica	
🚛 r 🔤 [R-🔤 Ethernet I/O]	
16DI-8DO_1	
🕨 📷 Impostazioni Security	
Funzioni oltre i limiti del PLC	
🕨 🎑 Dati comuni	
Informazioni sul documento	
Lingue & Risorse	
Accessi online	



6. EXAMPLE OF CREATING A PROJECT WITH PLC CODESYS

Create a new standard project:



6.1.1. INSERTION OF THE CODESYS PLC IN THE PROJECT

Configure the PLC by selecting it in the tree on the left and then browsing the network:

Test.project - CODESYS		
File Modifica Visualizza Progetto Compilazio	e In linea Debug Tools Finestre Guida Automation Server	
19 ☞ ■ ● ∽ ∼ % № ∞ × A % 4	🏡 圓 領 領 領 圖 圖 + 音 圖 Application (Device Logica PLC) + 🧐 領 🖒 🗉 🔏 (目 短 短 短 短 後 中 第 市 形	
Dispositivi 👻 🕂 🗙	Device X	
Test Test Operation CODESYS Control for Raspberry Pi SL	Impostazioni comunicazioni Sfoglia la rete Gateway 🔻 Dispositivo 👻	
Logica PLC Societary Application	Applicazioni Sfoglia la rete	
Gestore libreria	Salva e ripristina	
🖹 🎉 Configurazione di attività 🖹 🍪 MainTask	File Gateway	
요. PLC_PRG SoftMotion General Axis Pool	Log Catenoy Catenoy LAB_JOT	
- \$ 14C - \$ 14C - \$ SPI - \$ \$ Options_A_B (GPIOns A/B) - \$ Operwire	Impostazioni PLC IP-Address: localhost	
	Shell PLC Port 1217	
Scamera device ↓ Camera device ↓	Utenb e gruppi	
	Diritti di accesso	

Select the PLC after scanning the network:

Seleziona dispositivo		×
Selezionare il percorso di rete al controllo:		
Gateway-1	Nome del dispositivo: raspberrypi Wink	
	Indirizzo del dispositivo: 0301.A02C	
	Driver blocco: UDP	
	Fornitore del sistema di destinazione: 35 - Smart Software Solutions GmbH	
	Nome del sistema di destinazione: CODESYS Control for Raspberry Pi SL	
	'	
	<u>Q</u> K Annulla	

The PLC is now connected to the system:



Sfoglia la rete Gateway 👻	Dispositivo 👻	
	Gateway	
	Gateway-1 ~	[0301.A02C] (attivo)
	IP-Address: localhost	Nome del dispositivo: raspbenypi
	Port: 1217	Indirizzo del dispositivo: 0301.A02C
		Target ID: 0000 0010
		Tipo di sistema di destinazione: 4102
		Fornitore del sistema di destinazione: 3S - Smart Software Solutions GmbH
		Versione del sistema di destinazione: 3.5.16.0

Now that the PLC has been detected, move on to insert a Profinet port on standard Ethernet: Right click on device and "add device":



Then add the Profinet IO Master:



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Double click on Ethernet, set the Ethernet port and the IP address of the PLC (in this case use 192.168.90.44):



Set also the address range for the Profinet peripheral, double click on PN_Controller:

File Modifica Visualizza Progetto Compilazio h 🗃 🔲 📾 🗠 🕫 👗 ា 🏦 🗙 🚧	ne Inlinea Debug Too	ls Finestre Guida Auto	mation Server Device: Logica PLC1 🔹 😂 🎯 🕟 💼 🔏 🗐 🖓 🖓 👘
spositivi	Device PN_Co	ntroller 🗙 😁 Ethernet	
Test Device (CODESYS Control for Raspberry PI SL)	Generale	Nome Stazione cont	troller
B-O Application	Panoramica	Parametro IP slave	predefinito
Gestore libreria	Topologia	Primo Indirizzo IP	192 . 168 . 90 . 2
PLC_PRG (PRG)		Ultimo Indirizzo IP	192 . 168 . 90 . 254
= S AlanTask	Media Redundancy	Maschera di Sottorete	255 . 255 . 255 . 0
PLC_PRG	PNIO mapping I/O	Gateway	192 . 168 . 90 . 1
Profinet_CommunicationTask	PNIO IEC Objects	IO stato provider / co	onsumatore
Ethernet (Ethernet)	Log	Arresto applicazi	one> Sostituire i valori
PN_Controller (PN-Controller)	Stato	Aggiungi al mapp	oing I/O
241 &	Informazione	Dati porta	
B GPIOS A B (GPIOS A/B)		Port-001 Sta	azione/Porta Peer
Onewire Camera device		Lu	nghezza del cavo v Tipo MAU
K <vuoto></vuoto>			



6.1.2. INSTALLING THE GSDML FILE

Now you need to connect the Seneca slave device PROFINET IO to the profinet master (controller). First install the GSD file of the Seneca IO. Select Tools->Device Repository:



Now import the GSD file by selecting Profinet IO Slave and then Install:

osizione	System Repository (C:\ProgramData\CODESYS\Devices	5)				~	<u>M</u> odifica
escrizioni	dispositivi installati						
itringa per	r una ricerca full-text	Produttore:	<tutti i="" prod<="" th=""><th>uttori></th><th></th><th>~</th><th><u>I</u>nstalla.</th></tutti>	uttori>		~	<u>I</u> nstalla.
Nome				Produttore	Versione	Descrizione:	<u>D</u> isinstel
🖭 🚹 Va	arie						Esporta
🖉 🔗 Az	zionamenti SoftMotion						
- 🗊 B.	us di campo						
🖻 - 📓	Adattatore Ethernet						
⊞-ca	M CANbus						
0 G	CANopen						
	Dispositivi IO-Link						
B Be	a EtherCAT						
€	EthernetIP						
· · 6	Home&Building Automation						
	U J1939						
€ - K	IS Modbus						
	# Profibus		/				
B-#	# Profinet IO						
Œ	Adattatore Ethernet						
e	- IIII Dispositivo Profinet IO						
	Master Profinet IO						
e	Slave Profinet IO						
	ADAM-6100PN Compact I/O			Advantech Co., Ltd.	SW=V 1 2 1, HW=1	ADAM-6100PN IO module	
	CIFX Profinet Device			3S - Smart Software Solutions GmbH	SW=V3.x, HW=2	CODESYS PLC running as Profinet Dev	
	Codesys Plc PN Device			3S - Smart Software Solutions GmbH	SW=V1.0.0, HW=1	Codesys PLC configured as a Profinet	
	CODESYS Profinet Device			3S - Smart Software Solutions GmbH	3.5.13.0	CODESYS PLC running as Profinet Dev	
	위U EL6631-0010 V2.0			Beckhoff	SW=V1.00, HW=V1.00	PROFINET I/O device - EtherCAT slav V	
<						>	

Now point to the correct folder and press OK. Codesys has now added the GSD file correctly.

At this point you can scan the network in search of Slave devices (Device).



First compile the project and log in to the PLC:

Test.project* - CODESYS Ele Modifice Visualizze Brogette Compilez	one Inlines Debug Tools	Finantea Guida Automation Server		
	14 (제 위 위 위 제 (읍)을	Application [Device: Logica PLC]	- CE 93	43 +33 ● ■ ■ 号
ispositivi 👻 🖣 🗙	Device X		Login (ALT+F8)	
Test Test Device (CODESYS Control for Raspberry PI SL)	Impostazioni comunicazioni	Sfogla la rete Gateway • Dispositivo •		
Digita PLC Publication	Applicazioni			
Gestore libreria PLC_PRG (PRG)	Salva e ripristina			
Configurazione di attività SiminTask	File		Gateway	• •
린 PLC_PRG 응 양 Profinet_CommunicationTask	Log	Gateway-1	~ ~	[0301_A02C] (attivo)
PN_Controller.CommCycle	Impostazioni PLC	IP-Address: localhost		Nome del dispositivo: respisenvol
Ethernet (Ethernet)	Shell PLC	Ports		Indirizzo del dispositivo:
SoftMotion General Axis Pool	Utenti e gruppi	1217		Target ID:
- 3 IC - 3 SPI	Diritti di accesso			0000 0010
GPIOs_A_B (GPIOs A/B)	Diritti relativi ai simboli			Tipo di sistema di destinazione: 4102
Camera device	IEC Objects			Fornitore del sistema di destinazione: 35 - Smart Software Solutions GmbH
······································	Elenco attività			Versione del sistema di destinazione: 3.5.16.0
	Stato			



6.1.3. INSTALLATION OF THE SENECA PROFINET IO

Now that you are connected to the PLC, run the scan to find the devices:

Dispositivi		+ + ×	Device PN_Con	ntroller 🗙 💮 Ethernet	
Test Test G M Device [Connetto] (CODESYS Contro Devic	l for R	■ aspberry Pi SL)	Generale	Nome Stazione cont	roller
Application [Arresto]			Panoramica	Parametro IP slave	xedefinito
Gestore Ibreria			Topologia	Primo Indirizzo IP	192 . 168 . 9
PLC_PRG (PRG)				Ultimo Indirizzo IP	192 . 168 . 9
Configurazione di attivita			Media Redundancy	Maschera di	255 255 2
d) PLC PRG			PNIO mapping I/O	Gateway	200 1 200 1 2
😑 😏 🥸 Profinet_Communica	tionTa	sk	internet program	predefinito	192 . 168 . 9
PN_Controller.Com	mCycle		PNIO IEC Objects	10-1-1-1-1-1-1	
😔 🧐 Profinet_IOTask				Arreste applicati	ansumatore Sostituira i
Ethernet (Ethernet)			LOG	Ancico applicazi	vie - 1/0
PN_Controller (PN-Controller	X	Taglia	Stato	Mggiongrainnapp	ang tro
- G > tac	85	Copia		Dati porta	
- G à SPI	18	Incolla	Informazione		
- 🕤 🛤 🥃 GPIOs_A_B (GPIOs A/B)	×	Elimina		Portool Su	izione/Porta Peer
- 🕒 🍐 Onewire				Lu	nghezza del cavo
🖹 😳 🏅 Camera device		Refactoring			
⊂ K <vuoto></vuoto>	6	Proprietà			
	盜	Aggiungi oggetto			
	\mathbf{a}	Aggiungi cartella			
,		Trova dispositivi			
		Acknowledge Diagnosis			
		Acknowledge Diagnosis Subtree			
	Cî 🕹	Modifica oggetto			
		Modifica oggetto con			
		Modifica mapping I/O			
		Importa i mapping dal file csv			
			essaggi - Errori 0 totali 0 avviso	A. 6 messaccio/	

In the list of devices, select the Seneca IO and then "Copy to project":

Nome dispositivo	Tipo di dispositivo	Nome stazione	Numero d'ident.
r16di8do	R-16DI-8DO Ethernet I/O	r16di8do	16#8000000
r16di8do_1	16DI-8DO		16#01000000
Nessun dato di identificazione. Verifi	care l'indirizzo I Vendor-ID: 0x002A, Product-ID:	: 0x0202 lab-iot	error: IP address conflic
Nessun dato di identificazione. Verifi	care l'indirizzo I Vendor-ID: 0x002A, Product-ID:	0x0202 lab-iot	error: IP address conflic
			/
M IP automatico <> Reset	Lampeggio LED Deterr Show only unname	Id stations	ra differenze rispetto al proc



At this point you have added the device to the project:



6.1.4. CONFIGURATION OF THE PARAMETERS OF THE SENECA IO

If you want to change the IO configuration parameters, you can set them from here:

positivi	→ 쿠 X	Device PN_Contro	oller 🔐 Ethernet 🕅 r16di8do	∑ 👔 r16d	li8do_1 🗙	
Test Evice [Connetto] (CODESYS Control for Raspberry Pi SL)	•	Generale	Informazioni Modulo			
😑 🗐 Logica PLC		PNTO Module mapping T/O	Numero d'ident. 16#0.100	0000		
Application [Esegui]		r nao riodaic inopping yo				
 Image: Sector Bib Prima Image: Sector Prima PLC_PRG (PRG) 		PNIO Module IEC Objects	Numero slot	1		
😑 🌃 Configurazione di attività		Stato	Impostazioni			
⊖- 😌 🥸 MainTask - 🌐 PLC_PRG		Informazione	🖛 Imposta tutti i valori standard	reggi tu	utti valori	™∰ Sc
Operation Technology Profinet_Communication Technology		L	Parametri	Valore	Tipo dati	Valori con
PN_Controller.CommCycle			Set Digital Inputs Filter Delay [ms]			
- 😏 🍪 Profinet_IOTask			Set Digital Inputs Filter Delay [ms]	0	Unsigned 16	030
= 😏 🏢 Ethernet (Ethernet)			Set All Digital Inputs NPN/PNP	-		
PN_Controller (PN-Controller)			Set All Digital Inputs NPN/PNP	PNP 030	Bit	
🖻 😏 🚮 r 16di8do (R-16DI-8DO Ethernet I/O)			Enable Digital Outputs Fault Timeout	_		
😏 🗐 r16di8do_1 (16DI-8DO)			Enable Digital Outputs Fault Timeout	0	Bit	01
😔 🖢 SoftMotion General Axis Pool 📃 💦			Set Digital Outputs Fault Timeout [s]			
G & IPC			Set Digital Outputs Fault Timeout [s]	0	Unsigned 16	065535
- G & SPI			Set Digital Output Fault States			
- 🖸 🛤 🔵 GPIOs_A_B (GPIOs A/B)			DO.1	0	Bit	01
- G & Onewire			DO.2	0	Bit	01
🖹 😏 🏅 Camera device			DO.3	0	Bit	01
			DO.4	0	Bit	01
			DO.5	0	Bit	01
			DO.6	0	Bit	01
			DO.7	0	Bit	01
			DO.8	0	Bit	01
			Set Digital Output Normally Open/Close			
			DO.1	0	Bit	01
			DO.2	0	Bit	01
			DO.3	0	Bit	01
			DO.4	0	Bit	01
			DO.5	0	Bit	01
			DO.6	0	Bit	01
			DO.7	0	Bit	01
			00.8	0	Dia	0.4

Check that everything is correct by compiling and running the PLC.



The PLC (Raspberry-pi) is quite slow and not real time, consequently it cannot manage the profinet at maximum speed so we modify the values by setting safety parameters:







6.1.5. READING AND WRITING THE SENECA IO FROM CODESYS

Now see how it is possible to read and write IO on the Seneca device.

To write and read the status of the IO you have to insert a few code lines under PRG.

In the program, read the inputs from the %IW2 address and write in the %QB0 address as it is obtained from here:

File Modifica Visualizza Progetto Compilazio	ne Inlinea Debug Tools	Finestre Guida Autom	ation Server					
) 📽 📓 📾 🗠 🗠 🖄 📾 🔛 🖌 🖓 🌿	🚰 III, M. M. M. 🖷 🛅 -	📑 🔛 Application [De	vice: Logica PLC]	• 05 05 → =	19 10 19	ta *a \$ ¢ ∰	(日間)	
spositivi 👻 🛱 🗙	👔 r16di8do_1 🗙 🗃 Etherne	et 🔐 PN_Controller	r 16d8do	Device		i 🎲 MainTask	1	Profinet_Communi
Test 💌	Ganarala	Find		Filter Visualizza tu	tti	- 4	Add FB	or IO Channel
Device (CODESYS Control for Raspberry Pi SL)	Generale					-		
- Elli Logica PLC	PNIO Module mapping I/O	Variabile	Mapping	Canale	Indirizzo	Тіро	Unità	Descrizione
Application		8- 🐐		DI Channel 116	%IW2	UINT		
B R C PRC (PRC)	Stato			Inputs PS	%186	Enumeration of BYTE		
Configurazione di attività				DO Channel 18	%Q80	USINT		
E S MainTack	Informazione	*		Outputs CS	%187	Enumeration of BYTE		
A) a c poc								
Profest CommunicationTack								
PN Controller CommCycle								
St Profinet IOTack								
Ethernet (Ethernet)								
fill PN Controller (PN-Controller)								
Figure 160 Part 160 P								
r 16di8do 1 (16DI-8DO)								
SoftMotion General Axis Pool								
- 2 IFC								
- SPI								
- B GPIOs_A_B (GPIOs A/B)								
Onewire								
- > Camera device								
		1						

Declare an 8-bit (Word) variable for the 16 inputs and one byte for the 8 outputs. In the program, instead, read the inputs from %IW2 and write the outputs on %QB0:

 File Modifica Visualizza Progetto Compilaz 	one In linea Debug Tools Finestre Guida Automation Server	
e 🕞 🖬 🕼 🗠 🗠 🐇 🖻 🛝 🗙 🕼 🎼	🛓 🚰 । 📕 🐄 🎕 🖄 🛗 🛅 🕤 📅 । Application [Device: Logica PLC]	Q Q → = 4(10 m m m)
Dispositivi 👻 🛱 🗙	r 16dl8do_1 💮 Ethernet 🔐 PN_Controller 📢 r 16dl8do	Device PLC_PRG X
STart Start Source (CODESY Schurd for Rasperry P. S.) Sol Loga R.C Solution R.C Solution Sol	PROGRAM ELC_ERG Varinguts : MORD: Naringuts : MORD: BID_VOR DUTPUTS	VARIABLES DECLARATION
Initiation (1:101-100-100-10-10-10-10-10-10-10-10-10-1	1 VerInputs:-1102; 2 000:=VerOutputs; PROGRAM	

Go into login and start.



The value of the inputs can be read here:

Test.project - CODESYS								
File Modifica Visualizza Progetto Compilazione Inlinea	Debug Tools	Finestre Guida Automat	ion Server					
🛅 🛩 🖬 😹 🗠 🖙 🏦 🎟 🙁 🗙 🍓 🍇 📕 🐄	* * 🖼 🐘	- 🏦 🎬 Application [Devic	e: Logica PLC] 🔹 😂 😽 🕞	 N [0: 9: 6; 4] 	= 8 + 5	1		
Dispositivi	- ∓ ×	r16d8do_1	thernet PN_Controller	r 16di8do	Device	PLC_PRG x 😸	MainTask	Profinet_C
🖷 🔄 Test	-	Device_Application_PLC_PR	G					
Device [Connetto] (CODESYS Control for Raspberry Pi SL)		Espressione				Tipo dati	Valore	Valore prepa
= 1 Logica PLC		@ VarInputs				WORD	0	
= O Application [Esegui]		VarOutputs				BYTE	0	
Gestore Ibrena								
Configuratione di attività								
🖹 😏 🚱 MainTask								
B) PLC_PRG								
🖻 😏 🥵 Profinet_CommunicationTask								
PN_Controller.CommCycle								
- S S Profinet_IOTask								
Ethernet (Ethernet)		1 VarInputs 0	:-%IW2 0 :					
 S I (164846 (R-1601-800 Ethernet 1/0) 		2 • %QB0 0 :-VarO	utputs 0 RETURN					
• II r16d8do 1 (16DI-8DO)								
😔 🏅 SoftMotion General Axis Pool								
😌 👗 12C								

while to write the outputs you just set the byte value in the "prepared value" column, for example by writing 255 decimal = 11111111 binary all the outputs will be brought to 1:



And then with "Write values" all the outputs are activated correctly.



7. LOAD CELL CALIBRATION (ZE-SG3-P MODEL ONLY)

Calibration of the load cell can take place via the device webserver or by sending commands to the COMMAND register via Profinet.

There are two ways of calibrating the cell: via factory parameters and via sample weight. In calibration with factory parameters it is necessary to acquire only the tare value so that the device provides the net weight. For calibration with sample weight it is necessary to acquire the tare and the sample weight (also taking care to enter the value in technical units).

7.1. LOAD CELL CALIBRATION THROUGH THE WEBSERVER



TO PROCEED WITH CALIBRATION OF THE CELL THROUGH THE WEBSERVER YOU MUST HAVE PREVIOUSLY SET THE CELL PARAMETERS FROM THE GSDML FILE.

To calibrate the load cell through the webserver, access the "TEST AND LOAD CELL CALIBRATION" section . Depending on the two modes chosen between factory calibration or with sample weight, it will be possible to proceed according to the selected mode:

S SENEC	X ZE-SG3-P (web	server)	
Status	TEST AND LOAD CELL CALIBR	ATION PAGE:	
Setup		VALUE	UNIT MEASURE
Test and	TEST WITH FUNCTION MODE: FACTORY CALL	BRATION	
Load Cell	ADC RAW FILTERED	838	
Calibration	NET WEIGHT	-39246.91406	[8]
_	GHOSS WEIGHT	-38330.58984	[8]
Update FW/	PIECE COUNT MAY NET WEICHT	0	[4]
Configuration	MIN NET WEIGHT	-30340.05078	[8]
	STATUS REGISTER	00200.10000	191
	FULLSCALE CELL		
	STABLE WEIGHT		
	NEGATIVE WEIGHT		
	DIGITAL INPUT 1		
	DIGITAL INPUT 2		
	ACQUIRE TARE (RAM)	RESET MAX	RESET MIN
	LOAD CELL CALIBRATION		
			VALUE
	FUNCTION MODE: FACTORY CALIBRATION		
	TARE ACQUISITION		FROM FIELD V
	TARE ACQUISITION(FLASH)		



7.1.1. CELL CALIBRATION WITH FACTORY PARAMETERS VIA WEBSERVER

In cell calibration with factory parameters it is not necessary to use a standard weight as reference is made to the parameters acquired in the factory.

The necessary data are:

-The cell sensitivity

-The cell full scale

For the cell calibration procedure it is necessary to acquire the tare. The tare can be entered manually in technical units (if known) or it can be acquired from the field.

7.1.1.1. ACQUISITION OF THE TARE FROM THE FIELD VIA WEBSERVER

- 1) Enter the "Test and load cell calibration" web server page
- 2) Replace the tare on the cell
- 3) Wait for the measurement to stabilize
- 4) Press the "TARE ACQUISITION (FLASH)" button

LOAD CELL CALIBRATION

 VALUE

 FUNCTION MODE: FACTORY CALIBRATION

 TARE ACQUISITION

 TARE ACQUISITION(FLASH)

7.1.1.2. MANUAL ENTRY OF THE TARE MANUAL VIA WEBSERVER

It is not always possible to acquire the tare value from the field (for example in the case of already filled silos), in these cases it is possible to introduce the tare weight in technical units.

LOAD CELL CALIBRATION

		VALUE
FUNCTION MODE: FACTORY CALIBRATION		
TARE ACQUISITION	_	MANUAL INSERTION V
TARE VALUE [g]	50.00000	750
SET MANUAL TARE (FLASH)		

To acquire the tare value, press the "SET MANUAL TARE (FLASH)" button.



7.1.2. CELL CALIBRATION WITH A SAMPLE WEIGHT VIA WEBSERVER

In cell calibration with a standard weight it is necessary to know:

-The cell sensitivity

-The cell full scale

-A standard weight (so that Standard weight + Tare are as close as possible to the cell full scale)

- 1) Enter the "Test and load cell calibration" web server page
- 2) Replace the tare on the cell
- 3) Wait for the measurement to stabilize
- 4) Press the "TARE ACQUISITION (FLASH)" button

LOAD CELL CALIBRATION

FUNCTION MODE: CALIBRATION WITH STANDARD WEIGHT

TARE ACQUISITION(FLASH)

STANDARD WEIGHT ACQUISITION(FLASH)

- 5) Replace the Tare + Sample Weight
- 6) Wait for the measurement to stabilize
- 7) Press the "STANDARD WEIGHT ACQUISITION (FLASH)" button

7.2. LOAD CELL CALIBRATION VIA PROFINET

The device provides a "COMMAND" register which allows sending commands from the PLC.

For the calibration of the load cell the procedure changes depending on the type of operating mode that was chosen in the configuration.

The device (and cell) configuration can be done in real time.

7.2.1. FACTORY PARAMETERS CELL CALIBRATION VIA PROFINET

In cell calibration with factory parameters it is not necessary to use a standard weight as reference is made to the parameters acquired in the factory.

The necessary data are:

-The cell sensitivity -The cell full scale

The tare can be entered manually in technical units (if known) or it can be acquired from the field.





7.2.1.1. CELL CALIBRATION WITH FACTORY PARAMETERS AND WITH TARE ACQUIRED FROM THE FIELD VIA PROFINET

- 1) Place the tare on the load cell
- 2) Wait for the measurement to stabilize
- 3) Write the decimal value 49914 in the COMMAND variable
- 4) The device saves the new tare value in flash
- 5) The load cell is calibrated

7.2.1.2. MANUAL ENTRY OF THE TARE MANUAL VIA PROFINET

It is not always possible to acquire the tare value from the field (for example in the case of already filled silos), in these cases it is possible to introduce the tare weight in technical units.

In the GSDML file there is the Use Manual Tare field and then Tare Value in which to insert the tare value in technical units.

Send the command: 50773 (decimal) in the COMMAND register the manual tare is acquired.

7.2.2. CELL CALIBRATION WITH A SAMPLE WEIGHT VIA PROFINET

In cell calibration with a sample weight the necessary data are:

-The cell sensitivity

-The cell full scale

-The value (in technical units) of the sample weight that will be used

Furthermore, it is necessary to have a Sample weight (so that Sample weight + Tare are as close as possible to the full scale of the cell)

- 1) Place the tare on the load cell
- 2) Wait for the measurement to stabilize
- 3) Write the decimal value 49914 in the COMMAND variable
- 4) The device saves the new tare value in flash
- 5) Place the standard weight on the load cell
- 6) Wait for the measurement to stabilize
- 7) Write the decimal value 50700 in the COMMAND variable
- 8) The device saves the new standard weight value in flash
- 9) The load cell is calibrated



8. SEARCH AND MODIFICATION OF THE DEVICE IP WITH SENECA DISCOVERY TOOL

You can also get the IP address that has been set by using the "Seneca Discovery" tool.

The software can be downloaded from:

https://www.seneca.it/en/linee-di-prodotto/software/easy/sdd

Pressing the "search" button starts the search for all Seneca devices present in the network even if with IP addresses not compatible with the current PC configuration:

*	IP	Mode	MAC	Ping	Name	Hostname	Firmware	CRC	Commands	
€	192.168.86.95	DHCP	00:A7:C5:F1:11:92	2 ms	R-16DI-8DO	192.168.86.95	997.1014	OK	Assign	
₽	192.168.90.199	STATIC	C8:F9	Different Subnet	Z-KEY	192.168.90.199	126.0	OK	Assign	
€	192.168.85.8	STATIC	C8:F9	4 ms	Z-KEY	1	119.0	OK	Assign	
₽	192.168.85.106	STATIC	C8:F9	4 ms	Z-PASS2-S	2	2940.343	OK	Assign	
Ð	192.168.84.156	STATIC	00:22	2 ms	Cloud BOX	1 6	7800.112	OK		
Ð	192.168.85.198	STATIC	C8:F9	2 ms	Z-PASS2-S	2	2940.335	OK	Assign	
€	192.168.84.192	STATIC	C8:F9	2 ms	Z-TWS4	2	2940.331	OK	Assign	
€	192.168.85.7	STATIC	C8:F9	2 ms	Z-PASS2		3900.240	OK	Assign	
₿	192.168.85.200	STATIC	C8:F9	3 ms	Z-TWS4	2	2940.220	OK		
Ð	192.168.85.69	STATIC	00:50	2 ms	Cloud BOX		7800.200	OK		
Ð	192.168.84.155	STATIC	00:22	2 ms	Cloud BOX	c sca	7800.111	OK		
€	192.168.85.103	STATIC	C8:F9	2 ms	Z-PASS2	1 3	3900.250	OK	Assign	
€	192.168.100.101	DHCP	C8:F9	Different Subnet	Z-PASS2	192.168.100.101	3900.240	ОК	Assign	

It is now possible to change the address by pressing the "Assign" button:

Assign IP	x
	IP
✓ Static IP	192.168.86.95
Netmask	Gateway
255.255.255.0	192.168.86.1
Assign	Cancel



The software works on layer 2 level and it is therefore not necessary to have an Ethernet configuration compatible with the device you are looking for.

ATTENTION!

UPON FIRST USE THE IP ADDRESS OF THE DEVICE IS NOT SET (0.0.0.0). IN THIS SITUATION IT WILL NOT BE POSSIBLE TO SEARCH FOR THE DEVICE WITH THE SENECA DISCOVERY TOOL SOFTWARE



9. FIRMWARE UPDATE

The firmware update can be performed via the web server in the appropriate section.

ATTENTION!

BEFORE ACCESSING THE WEB SERVER, DISCONNECT THE DEVICE FROM THE PROFINET NETWORK

ATTENTION!

NOT TO DAMAGE THE DEVICE DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION.

ATTENTION!

SOME MODELS ARE SUPPLIED WITHOUT AN IP ADDRESS (0.0.0.0). TO SET AN IP ADDRESS (FOR EXAMPLE TO ACCESS THE WEBSERVER OR TO CONNECT TO THE SENECA DISCOVERY DEVICE TOOL) USE THE PROFINET CONFIGURATION ENVIRONMENT OR FORCE THE ADDRESS 192.168.90.101 WITH THE APPROPRIATE DIP SWITCH