Operating Manual
EMGZ490A

Tension Amplifier with integrated PROFINET Interface

Version 1.1	11/2016 NS
Firmware Version	V1.00
GSDML file	V1.12+ (08/14)

This operation manual is also available in German.
Please contact your local FMS representative.

Diese Bedienungsanleitung ist auch in Deutsch erhältlich.
Bitte kontaktieren Sie Ihren nächstgelegenen FMS Vertreter.

Table of Content

1 Safety Instructions

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to the equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
Do not stress the equipment over the specification limits neither during assembly nor operation. To do so can be potentially harmful to persons or equipment in the event of a fault to the equipment.

1.1 Description Conditions

a) Danger of health injury or loss of life

Danger

This symbol refers to high risk for persons to get health injury or loss life. It has to be followed strictly.

b) Risk of damage of machines

Caution

This symbol refers to information, that, if ignored, could cause heavy mechanical damage. This warning has to be followed absolutely.

c) Note for proper function

Note

This symbol refers to an important information about proper use. If not followed, malfunction can be the result.

1.2 List of safety instructions

⚠ *Proper function of the Tension Measuring Amplifier is only guaranteed with the recommended application of the components. In case of other arrangement, heavy malfunction can be the result. Therefore, the installation instructions on the following pages must be followed strictly.*

⚠ *Local installation regulations are to preserve safety of electric equipment. They are not taken into consideration by this operating manual. However, they have to be followed strictly.*

⚠ *Bad earth connection may cause electric shock to persons, malfunction of the total system or damage of the electronic unit! It is vital to ensure that proper earth connection is done.*

⚠ *Improper handling of the electronic boards may cause damage to the fragile equipment! Don't use rough tools such as screwdrivers or pliers! Operators handling the electronic boards must wear a well earthed bracelet in order to discharge static electricity.*

⚠ *In order to improve the natural convection and keep the temperature of the amplifiers that are mounted in a cabinet, to a minimum, a distance of at least 15mm (0.6") between the devices must be kept.*

⚠ *During operation the use of not-PROFINET related services such as port scanning, web services, load testing, and other services and protocols should be avoided. There is the possibility of a system overload, if such a service is nonetheless used. The consequence is a connection interruption between EMGZ490A and PLC. The interruption usually lasts between 3-5 seconds. Afterwards, a new connection is automatically established again.*

⚠ *The web interface may only be used in the test mode since data communication can interfere with the PLC. Moreover, one link can be established via a web browser at the same time.*

2 Product Description

2.1 Block Diagram EMGZ490A

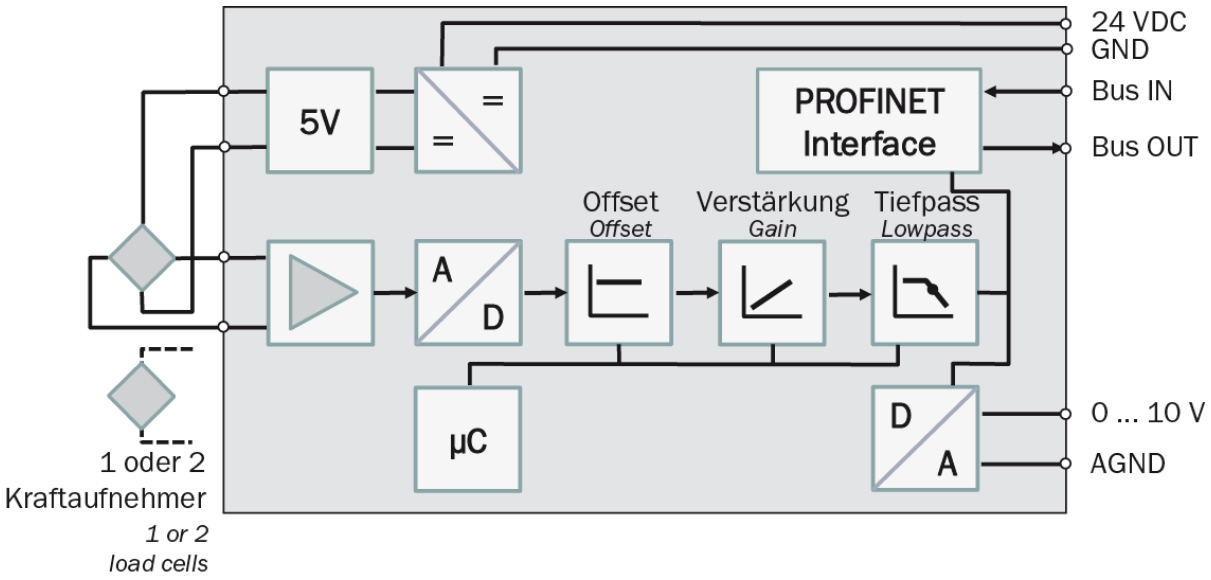


Fig. 1: Block Diagram

2.2 System Description EMGZ490A

The microprocessor-controlled amplifiers of EMGZ490A series are used to amplify, process and transmit force sensor signals to devices connected in a suitable network. The measured force values are accessible via the PROFINET bus and on an analog voltage output. The amplifiers are suitable for tension measurement with all FMS force sensors. Either one or two sensors can be connected to one amplifier.
Device information, parameters or system settings can be accessed via a web browser. Offset compensation and calibration of the system is realized through the web browser which allows you to adjust the amplifier to the most demanding system requirements.

3 Quick Installation Guide

The set-up of the EMGZ490A and force sensors is limited to only the installation procedure, offset compensation and the calibration.

3.1 Preparations for Set-up

1. Read the Operation Manual of your force measuring sensors
2. Check your requirements such as:
   – required measuring units in the system
   –Used outputs (0...10V and Bus)
   –Filter settings for analogue output
3. Draw the wiring diagram for your configuration (ref. to **3.5** "Wiring the Amplifier")

3.2 Installation Procedure

1. Mount the force maesuring sensors to the machine frame (ref. to **chapter 3.4**)
2. Wire the Force Measuring Sensor(s) (ref. to **Fig. 2**)
3. Connect the amplifier to the power supply.
4. The supply voltage must in the range between 18 and 36V DC.
5. Perform offset compensation and calibration (ref. to **chapters 4.1** to **4.3**)
4. If required, do additional settings (**chapter 8.2**)
5. In tegrate the amplifier in the PROFINET-network (**chapter 5**)

3.3 Installation and Wiring

Caution

In order to improve the natural convection and keep the temperature of the amplifiers that are mounted in a cabinet, to a minimum, a distance of at least 15mm (0.6") between the devices must be kept..

Caution

Proper function of the Tension Measuring Amplifier is only guaranteed with the recommended application of the components. In case of other arrangement, heavy malfunction can be the result. Therefore, the installation instructions on the following pages must be followed strictly.

Caution

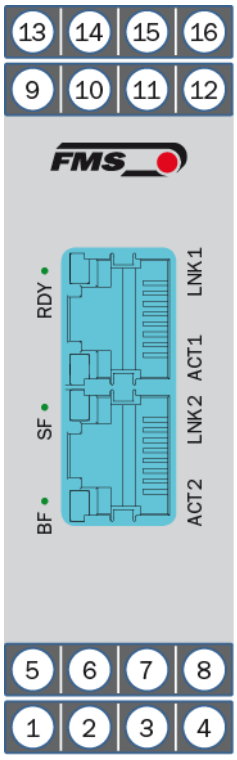
Local installation regulations are to preserve safety of electric equipment. They are not taken into consideration by this operating manual. However, they have to be followed strictly.

3.4 Mounting the Force Sensors

Mounting of the force sensors is done according to the FMS Installation manual which is delivered together with the force sensors.

3.5 Wiring the Amplifier

One or two force sensors can be connected to the measuring amplifier. When using two force sensors, the sensors are internally connected in parallel. The connection between force sensors and measuring amplifier has to be done using a 2x2x0.25mm² [AWG 23] shielded twisted-pair cable. The cable must be installed separate from power lines.



Spannungsversorg.		Kraftaufnehmer 1		Kraftaufnehmer 2		Analogausgang	
1	24 VDC	5	+ Speisung BN	9	– Speisung WH	13	± 10 V
2	GND	6	+ Signal GN	10	– Signal YE	14	GND
3	PE	7	– Signal YE	11	+ Signal GN	15	Dig. Eing.
4	Schirmung	8	– Speisung WH	12	+ Speisung BN	16	Schirmung

Power Supply		Load Cell 1		Load Cell 2		Analog Output	
1	24 VDC	5	+ Excitation BN	9	– Excitation WH	13	± 10 V
2	GND	6	+ Signal GN	10	– Signal YE	14	GND
3	PE	7	– Signal YE	11	+ Signal GN	15	Dig. Input
4	Shield	8	– Excitation WH	12	+ Excitation BN	16	Shield

Fig. 2a: Wiring Diagram EMGZ490A.R
Color scheme (IEC60757) and pin codes are valid for FMS components, only!

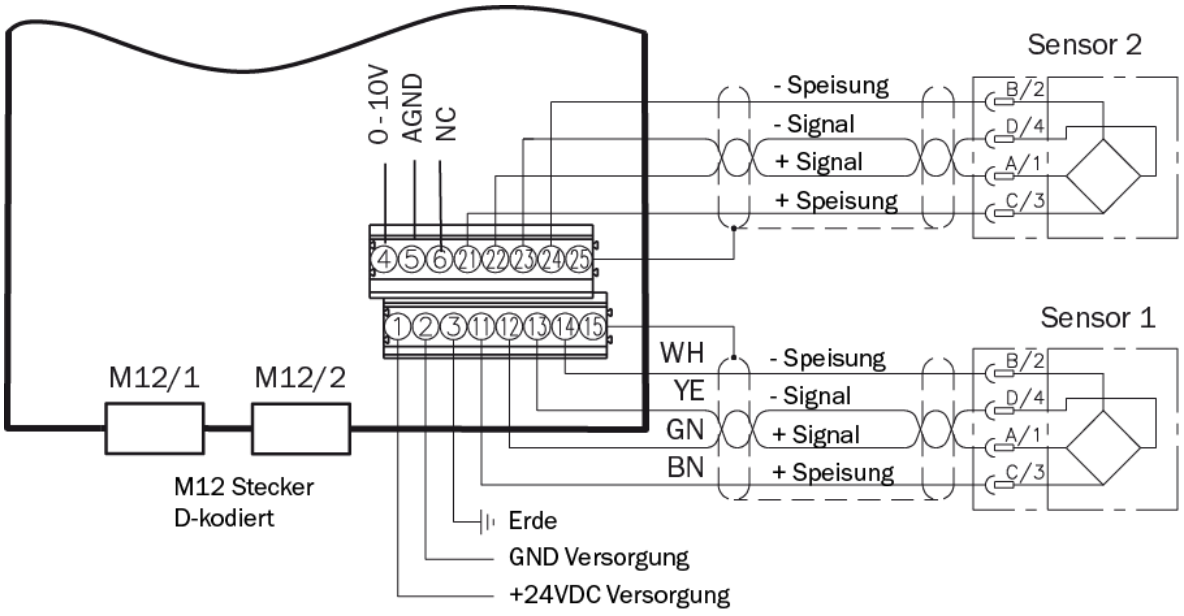


Fig. 2b: Wiring Diagram EMGZ490A.W
Color scheme (IEC60757) and pin codes are valid for FMS components, only!

Signal	Name	PROFINET	EIA T568B	Pin RJ45	Pin M12
TD+	Transmission Data +	YE	WH/OG	1	1
TD-	Transmission Data -	OG	OG	2	3
RD+	Receive Data +	WH	WH/GN	3	2
RD-	Receive Data -	BU	GN	6	4

Fig. 2c: Ethernet Connector
Color scheme (IEC60757) and pin codes are valid for FMS components, only!

Caution

Bad earth connection may cause electric shock to persons, malfunction of the total system or damage of the electronic unit! It is vital to ensure that proper earth connection is done.

Note

The shield should be connected only to the electronic unit. On the force sensor side the shield should stay open.

4 Calibration of the Measuring System

The system calibration can be performed in two ways:

A) over the web interface (see **chapter 8.3**)
B) directly in the PLC

4.1 Offset Compensation

With the Offset Compensation one can compensate the roller weight. This procedure is always performed before the calibration. The force measuring roller should not be loaded while the Offset Compensation is being done.

4.2 Calibration

The Calibrating procedure (setting the Gain), adjusts the controller and load cells so that the display gives you the actual tension value. There are two methods of calibrating the system. The first method uses a defined weight. The second method is based on a calculation method in conjunction with the FMS Calculator. This Calculator can be down loaded from the FMS web page. FMS recommends using the method with the weight (see **Fig. 3**) since it delivers the most accurate results.
To set the Gain, load a rope with a defined weight on the roller. The roller configuration must correspond to the real material path in the machine (wrap angle, distances between the rollers etc.).

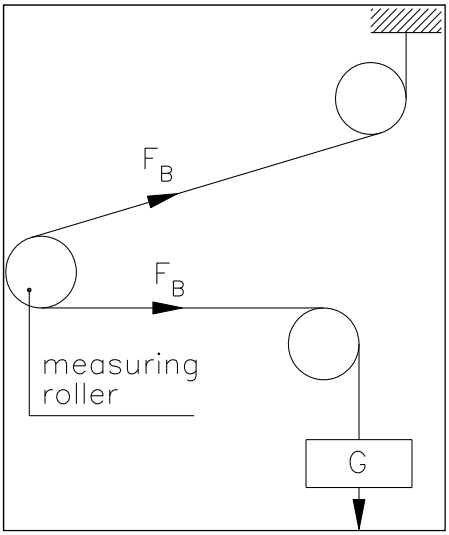


Fig. 3: Calibrating the measuring amplifier C431011e

4.3 Calibration Procedure

1. Activate web interface (ref. to **chapter 8.1**) and call web page „Offset/Calibration over the web browser" (see **chapter 8.3**).
2. Connect volt meter to the voltage output (**Fig. 2**, terminal 13/14)
3. Connect first force sensor to the amplifier (see **Fig. 2**).
4. Check whether a load in measuring direction (red point) results in a positive volt reading. If the reading is negative, change signal wires in the corresponding sensor (**Fig. 2**, terminals 6/7).
5. If applicable, connect second force sensor.
6. Check whether a load in measuring direction (red point) results in a positive volt reading. If the reading is negative, change signal wires in the second sensor (**Fig. 2**, terminals 10/11).
7. Unload measuring roller by removing material or rope from it.
8. Click the key „Adjust Offset".
9. Load the rope with the defined calibration weight (**Fig. 3**).
10. Click the key „Calibrate Gain". With that the calibration is completed.

4.4 Gain

Depending on the wrap angle of the material on the measuring roller the prevailing force is not passed one-to-one to the sensors, with the result that the measured material tension does not correspond to the effective force. In order to account for this error, the measured force is amplified by multiplier (the Gain). The correction adapts the measured force with the effective material force. The Gain Factor (V) is calculated with following formula:

$$V = \frac{F_{sys}\ \text{Digit} * F_{ist}\ \text{N}}{F_{sys}\ \text{N} * F_{ist}\ \text{Digit}}$$

Variables:

F_{sys} N= Installed system force in Newton. This is determined by the number of used force sensors in the measuring roller. With one force sensor, the system force is equal to the nominal force mentioned on the label of the sensor. If the measuring roller contains two sensors the force is twice as large.

F_{sys} Digit= System force as a binary value (max. output of A/D-converter). Here it is a constant with the value 5945. It is independent from the number of used sensors. From a user perspective, the value corresponds to an input signal of 9mV.

F_{ist} N= Acting force on the measuring system in Newton.

F_{ist} Digit= Force measured on the system as binary value (output of A/D-converter). From a user perspective, the value corresponds to a voltage in mV, that the amplifier will receive as an input from the force sensors.

Example:

Fsys N = 1000N; Fist N = 500N; Fist mV = 2.25mV (orr 1486)

$$V = \frac{9\text{mV} * 500\text{N}}{1000\text{N} * 2.25\text{mV}} = 2.000$$

Note

The mV values in the formula can be replaced by the binary values of the measuring system (always 5945). The mV value (9 mV) is thus replaced by 5945. The measured force can be determined using a voltmeter. It replaces the binary value (first digit).

This calculation method is also used by the FMS Calculator tool. Thus it is possible to use the gain value calculated by the FMS Calculator directly in the calibration. The gain value is then entered in the parameter set of the amplifier (see **chapter 8.2** "Parameter Setting"). In this case the calibration procedure described in **chapter 4.3** can be skipped. However, FMS recommends using the traditional method with the weight (**chapter 4.2** and **4.3**) since it delivers the most accurate results.

4.5 Limit Violations

The amplifier checks the analogue input and output on limit violations. It checks whether the force sensor is mechanically overloaded (overload test). At the output, it is checked whether the voltage output over or under shoots the physically possible value in relation to the amplified input.

A) Overload Test

The overload test is performed with the raw data received from A/D-converter. It is therefore not related to a particular force and can be used regardless of the installed system.

Test Rules:

The FMS force sensors deliver at the rated nominal force at the output 9mV.
The maximum load at the mechanical hard stop is 12.4mV. The amplifier checks the overload in the positive measuring direction (red point) as well as in the negative direction. The limits are therefore 12mV respectively. -12mV. Upon reaching one of these limits, the Status Bit is set to Overload. The status Bit is reset, if the measured value falls 0.5 mV below the limits.

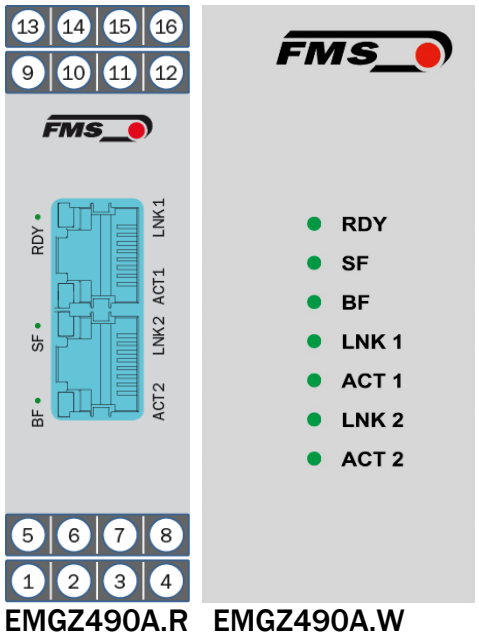
B) Overflow/Underflow Test

Over- or underflow are determined by using the output (calculated with the gain factor). If the output exceeds the maximal possible value, there is an overflow. If it drops below the minimal value, there is an underflow.

Test Rules:

The output voltage varies between 0 and +10 V. For the test a hysteresis of ±10 digits is applied, in order to prevent error bits to respond at any small overflow or underflow. The overflow is thus triggered at the output reaching the theoretically calculated value 10.05V. For the underflow applies value of -0.05V. Upon reaching one of these limits, the corresponding Status Bits are set. The Status Bits are re-set as soon as the output enters the range 0.05V and 9.95V.

4.6 Description of LEDs



EMGZ490A.R EMGZ490A.W

LED	Meaning
LNK 1	Ethernet cable 1 connected with other station
ACT 1	Blinking, if data communication on Ethernet connection 1 active
LNK 2	Ethernet cable 2 connected with other station
ACT 2	Blinking, if data communication on Ethernet connection 2 active
BF	Permanent red if no RJ45 plug is connected Flashes red if communication to PLC is interrupted
SF	n.c.
RDY	Permanent green if power supply is connected and processor works

Fig. 4: Signal LEDs

5 Integration in a PROFINET-network

The force measuring amplifiers of the EMGZ490A series were design to work in an PROFINET-network whereas the amplifier acts as an IO-device (Slave) and die IO-Controller (or PLC) as a master.

5.1 PROFINET Interface

PROFINET RT is supported. The corresponding communication profile will be selected by the IO-controller (Master) via GSD. The EMGZ490A transmits the feedback value in Digit and the Status/Error information Byte. In addition parameters like Offset feedback, Gain feedback, Filter feedback, Filter analogue output and Scaling of the output can be set.

5.2 TCP/IP Configuration

In order to enable data communication between amplifier and a PLC or a web browser, the Ethernet settings must be known. In a PROFINET-network the system designer configures the address for each device and has therefore an overview over the distribution of the addresses in the network. The IP-address is assigned to each device via the PLC. The device must have an IP-address of 0.0.0.0 after power up to enable the assignment of the final IP-address. This is the case after each EMGZ490A restart.

Static IP-address:
A static IP-address is required to enable the PLC accessing a web interface. The IP-address of 0.0.0.0 cannot be used for this purpose, as this address is treated in a special way according to TCP / IP–specification. Devices with this IP will not response, if an inquiry over the web browser is started.

5.3 System Start-up

At system start-up, the communication between IO-controller (PLC) and IO-devices is established and necessary parameters are set. The parameterisation is only performed, if the system is accordingly configured. Otherwise, the locally stored configuration in EMGZ490A is used. Parameters can always be changed via the web interface.

5.4 Data Exchange

The EMGZ490A uses the typical PROFINET communication methods. For rapid transmission of the measured data cyclic data traffic is used. For the parameterisation acyclic data traffic is used. For the transmission of limit violations also the cyclic data traffic is used.

6 Configuration

The configuration of the EMGZ490A can be performed either over a web interface or over PROFINET. In both case the same parameters are configured.

6.1 Description of Parameters

PROFINET Filter

Use: The amplifier provides a low-pass filter for PROFINET data to prevent noise and interferences being overlaid to the PROFINET output. This parameter determines the cut off frequency of the filter. The lower the cut off frequency, the more sluggish the output will be. The PROFINET Filter is independent of the analogue output filter.

Unit	Parameter Range		Selection	Default
	Min	Max		
Hz	0.1	200.0	-	10.0

Analog Output Filter

Use: The amplifier provides a low-pass filter to prevent noise and interferences being overlaid to the analogue output signal. This parameter determines the cut off frequency of the filter. The lower the cut off frequency, the more sluggish the signal at the analogue output will be. The Analogue Output Filter is independent of the PROFINET Filter.

Unit	Parameter Range		Selection	Default
	Min	Max		
Hz	0.1	200.0	-	10.0

Tension Unit

Use: This parameter determines the unit used in the system. The label on the sensor specifies the nominal force always in N.

Note: By changing the units to ***lb*** the whole unit system will change from metric to imperial units.

Unit	Parameter Range		Selection	Default
	Min	Max		
	-	-	N kN lb g kg	N

Tension at Max. Output

Use: This parameter defines what force value (N, kN, lb, g, kg) corresponds to the maximum output of the amplifier (10V).

Note: By changing the units to ***lb*** the whole unit system will change from metric to imperial units.

Unit	Parameter Range		Selection	Default
	Min	Max		
N, kN, g, kg, lb[1]	0	200'000.000	-	1000.000

[1] The display shows the unit of measure that was previously selected.

Offset

Use: The value determined with the adjustment procedure *Offset Compensation* is stored as a Digit value in the parameter *Offset*. The offset value is used to compensate the weight of the measuring roller.

Unit	Parameter Range		Selection	Default
	Min	Max		
-	-8000	8000	-	0

Gain

Use: This parameter stores the value determined with the Procedure *Calibration* in the parameter *Gain*.

Unit	Parameter Range		Selection	Default
	Min	Max		
	0.100	20.000	-	1.000

System Force

Use: The System Force determines the measuring capability of your measuring roller. E.g. if two 500 N sensors are installed in your measuring roller, enter 1000N. If only one 500N sensor is used, enter 500N. If sensors with sheaves are used (e.g. RMGZ-Series), 500N must be entered.

Unit	Parameter Range		Selection	Default
	Min	Max		
N, kN, g, kg, lb[1]	0	200'000.000	-	1000.000

[1] The display shows the unit of measure that was previously selected..

6.2 Cyclic Data Traffic

After a successful system boot the IO-controller and associated IO-devices can start exchanging cyclic process data. The following table shows which data are transmitted and in which form.

Cyclic Data					
User Data	**Data Type**	**Range**	**Format**	**Unit**	**Description**
Feedback Value in ADC	int (signed 16 Bit)	-32768 to 32767	±#0	-	Fetched value form A/D-converter
Feedback Value in Newton	signed long (signed 32 Bit)	±200‘000‘000	±#0.000	N	Filtered feedback value re-calculated in Newton
Feedback Value in Pound	signed long (signed 32 Bit)	±200‘000‘000	±#0.000	lb	Filtered feedback value re-calculated in Pounds
Feedback Value in Unit	signed long (signed 32 Bit)	±200‘000‘000	±#0.000	N, kN, g, kg lb	Filtered feedback value re-calculated in the configured unit
Status	byte (unsigned 8 Bit)	-	-	-	The status includes information about the current process or operating mode. Each bit represents a separate event. The condition is active, if the bit is set Bit 0 = Overload (LSB) Bit 1 = Output Overflow Bit 2 = Output Underflow

6.3 Acyclic Data Traffic

After a successful system boot the IO-controller and associated IO-devices can start exchanging acyclic data. The table below shows which parameters and instructions are transmitted.

Index	Access Mode [1)]	Parameter Instruction	Data Type	Range	Data Format	Unit	Description
0x01	R	Device-ID	unsigned int (unsigned 16 Bit)	0 to 65535	#0	-	Request Device Type
0x02	R	Version	unsigned int (unsigned 16 Bit)	1 to 10000	#0.00	-	Request Firmware Version
0x10	R/W	Low pass filter feedback active(PROFINET)	byte (unsigned 8 Bit)	0 bis 1	0	-	Switch filter on/off 0 = off; 1 = on Non-remanent: the set value will be lost after each re-start
0x11	R/W	Low pass filter Analogue Output active	byte (unsigned 8 Bit)	0 to 1	0	-	Switch filter on/off 0 = off; 1 = on Non-remanent: the set value will be lost after each re-start
0x20	R/W	Offset	int (signed 16 Bit)	±8‘000	#0	-	Offset
0x21	R/W	Gain	unsigned int (unsigned 16 Bit)	0 to 20000	#0.000	-	Gain
0x22	R/W	System Force	unsigned long (unsigned 32 Bit)	0 to 200‘000‘000	#0.000	N	The system force is the maximum permissible force in the measuring system

Index	Access Mode [1]	Parameter Instruction	Data Type	Range	Data Format	Unit	Description
0x23	R/W	Scaling Analogue Output	unsigned long (unsigned 32 Bit)	0 to 200‘000‘000	#0.000	N	Determines at which force the analog output reaches its maximal value of 10V
0x24	R/W	Cut-off frequency low pass filter feedback (PROFINET)	unsigned int (unsigned 16 Bit)	1 to 2000	#0.0	Hz	Cut-off frequency of PROFINET filter
0x25	R/W	Cut-off frequency low pass filter Analogue output	unsigned int (unsigned 16 Bit)	1 to 2000	#0.0	Hz	Cut-off frequency of analogue output filter
0x30	W	Offset compensation	-	-	-	-	Calculate offset and store value
0x31	W	Calibration	signed long (signed 32 Bit)	±200‘000‘000	±#0.000	N	Calibrate the amplifier with weight in N (must correspond with the used weight for calibration).

1) R = read, W = write, R/W = read and write.

7 PROFINET Communication

With the acyclic data exchange one can set parameters, configure or read status information. This is accomplished with Read-/Write-frames via standard IT services using UDP / IP.

7.1 General Function

The Read-/Write-instructions can be triggered if a connection between controller and IO-device was established; say a "Connect" was done.

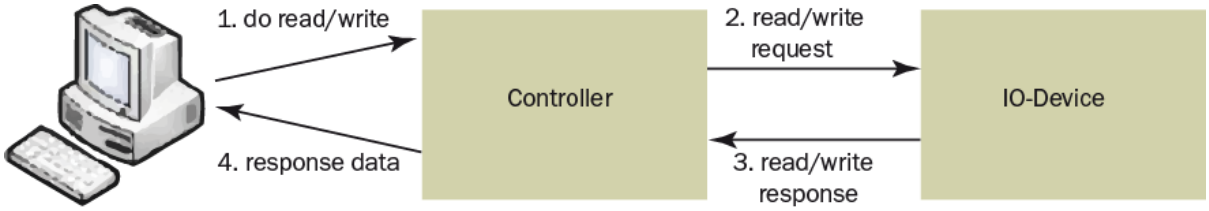


Fig. 5: Read- / Write-cycle

The computer with the corresponding application can now request a read or write cycle to the data model of the controller. The controller will execute the read-/write-instruction via PROFINET and send back the status or the data to the computer.

7.2 Services and Protocols

The EMGZ490A is certified in accordance with the PROFINET standard version 2.2 Conformance Class B and can be loaded according to PROFINET Netload Test1, Netload-Class 1.

The following services and protocols are used:

- PROFINET IO with RT communication
- Cyclic I/O
- Parameters
- Network diagnostics via IP (SNMP)
- Topology information (LLDP) with LLDP-MIB

Likewise, all other services which are required for PROFINET are admitted. In addition, other services may be used, provided that they do not exceed the network load for normal operation specified in Netload Class 1.

7.3 Limitations

In order for the EMGZ490A to not reach system limitations, one should avoid the use of some services during operation. These services are:

- Port scanning
- Web services
- Stress tests
- As well as all other not-PROFINET related services and protocols
- The use of ring topology is not permitted.

> ***Caution***
>
> ***During operation the use of not-PROFINET related services and protocols should be avoided. There is the possibility of a system overload, if such a service is nonetheless used. The consequence is a connection interruption between EMGZ490A and PLC. The interruption usually lasts between 3-5 seconds. Afterwards, a new connection is automatically established again.***

7.4 Functional Blocks, Example

Three functional blocks (FB1, FB2, FB3) were configured. These FBs were loaded to the controller

Name	Description	Function
FB1	FMS_READ_FB	Reads a data package from the specified slot and index
FB2	FMS_WRITE_FB	Writes a data package from the specified slot and index
FB3	FMS_CYCLIC_FB	Reads cyclic data and writes it to a DB

The functional blocks are fetched cyclically, and if a read or write-instruction is required, it is carried out. In PROFINET usually the organisational block OB1 is used, which is fetched once every cycle. The sequence of function calls is shown in the following diagram:

The individual FBs read or write their data to data blocks, which are listed below

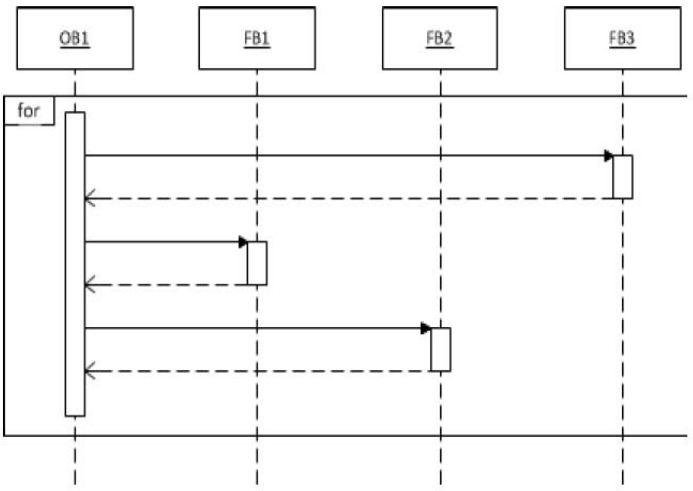


Fig. 6: Functional Blocks FB1 – FB2 E490012

7.5 Data Blocks

In a controller, data blocks can be configured. As FBs they can be easier apply and monitored by the computer. Basically data blocks are structures that may contain different variables. Below three data blocks (DB1, DB2, DB3) were defined.

DB1 – FMS_ACYCLIC_DB:

Name	Type	Start Value	Comment
Index	INT	0	FMS specific index
VALUE_READ	DINT	L#0	Input value
VALUE_WRITE	DINT	L#0	Output value

DB2 – FMS_TRIGGER_DB:

Name	Type	Start Value	Comment
READ_TRIGGER	BOOL	FALSE	Trigger acyclic read instruction
WRITE_TRIGGER	BOOL	FALSE	Trigger acyclic write instruction

DB3 – FMS_CYCLIC_DB:

Name	Type	Start Value	Comment
ACT_VAL_ADC	WORD	W#16#0	Feedback in ADC
ACT_VAL_NEWTON	DWORD	DW#16#0	Feedback in Newton
ACT_VAL_POUND	DWORD	DW#16#0	Feedback in Pound
ACT_VAL_UNIT	DWORD	DW#16#0	Feedback in configured unit
STATUS	BYTE	B#16#0	Operation status

The following graph (**Fig. 7**) shows the connection between FBs and DBs, respectively how the access from FB to individual DBs is done.

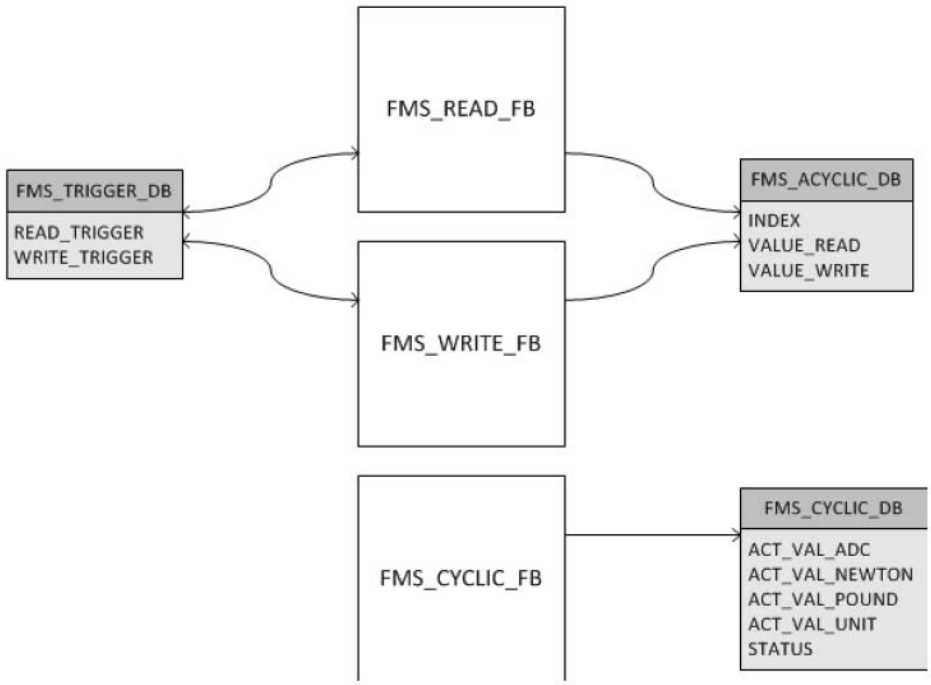


Fig. 7: Connection between functional blocks and data blocks E490013

7.6 Trigger Read-/Write-instructions

Proceed as follows to initiates a Read-/Write-instruction by the controller:

- **Read-instruction:** The index "FMS_ACYCLIC_DB." INDEX must be written to the variable table of the SIMATIC Manager or in an application in the controller. Using a one-time write trigger "FMS_TRIGGER_DB". READ_TRIGGER a read command can be forced. The trigger is automatically reset. If the read command was successful, the data of the index is stored in the DB "FMS_ACYCLIC_DB". VALUE_READ and can be picked up from the variable table or the application

- **Write-instruction:** The index "FMS_ACYCLIC_DB." INDEX must be written to the variable table of the SIMATIC Manager or in an application in the controller. Moreover, the value "FMS_ACYCLIC_DB". VALUE_WRITE be set. Using a one-time write of the trigger „FMS_TRIGGER_DB“.WRITE_TRIGGER a write-instruction can be forced. The trigger is automatically reset.

7.7 Configuration File GSDML

Thus, the acyclic data traffic can operate independently from the cyclic, and the two don't interfere with each other, a new module in the PROFINET IO-device configuration was introduced. The graph (**Fig. 8**) shows the actual module configuration:

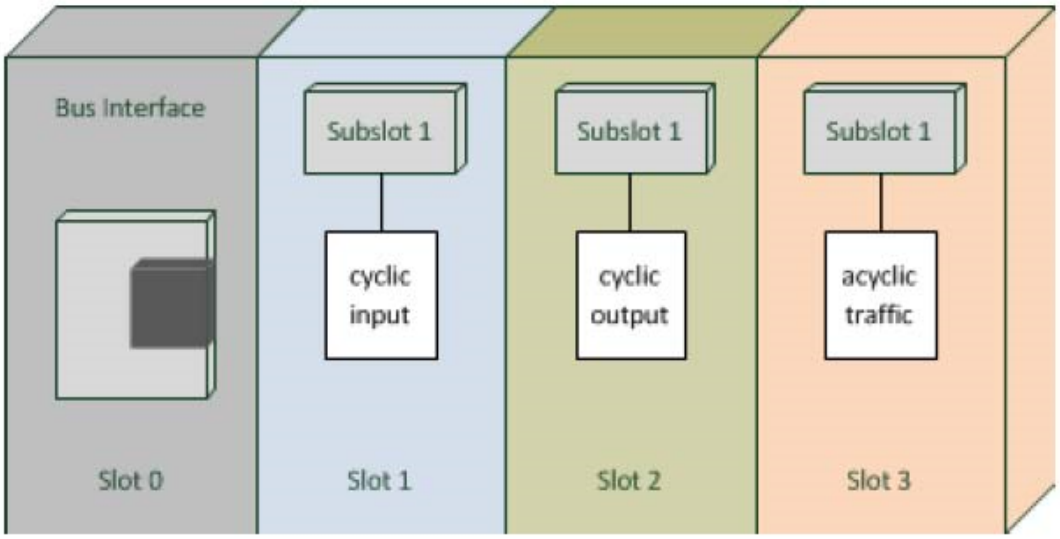


Fig. 8: Module configuration EMGZ E490014

Each slot corresponds to a module!

8 Web Interface

8.1 Access to the Amplifier over a Web Interface

Parameter setting and calibration of the system can be performed over a web interface. Using the web interface requires knowledge of the IP address. Your IT system administrator can provide information about the assigned addresses. After entering the IP address in your web browser the home page of EMGZ490A will appear (see **Fig. 10**).

> ***Caution***
> ***The web interface may only be used in the test mode since data communication can interfere with the PLC. Moreover, one link can be established via a web browser at the same time.***

> ***Note***
> ***If you have connected a PLC to this amplifier, the PLC has be be on or at least set to „on hold“. If the PLC is turned off, the web interface is disabled for safety reasons.***

The **Home** page provides information on general device attributes like serial number and the software version

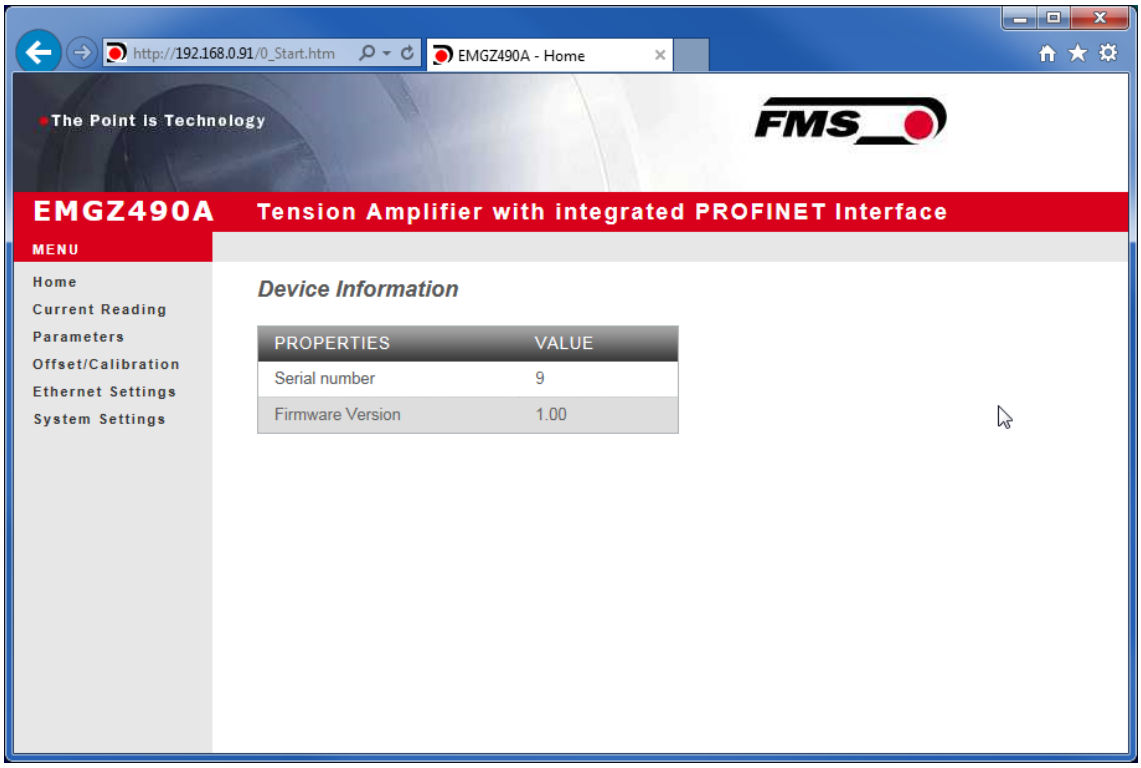


Fig. 10: Home page with device information

With the menu on the left side of the screen you can navigate through the web page.

The web page **Current Reading** shows the actual values of the amplifier. The first line "**Tension**" shows the tension at the input in the configured unit of measure. In the second line "**Output**" indicates the output voltage shown in Volt.

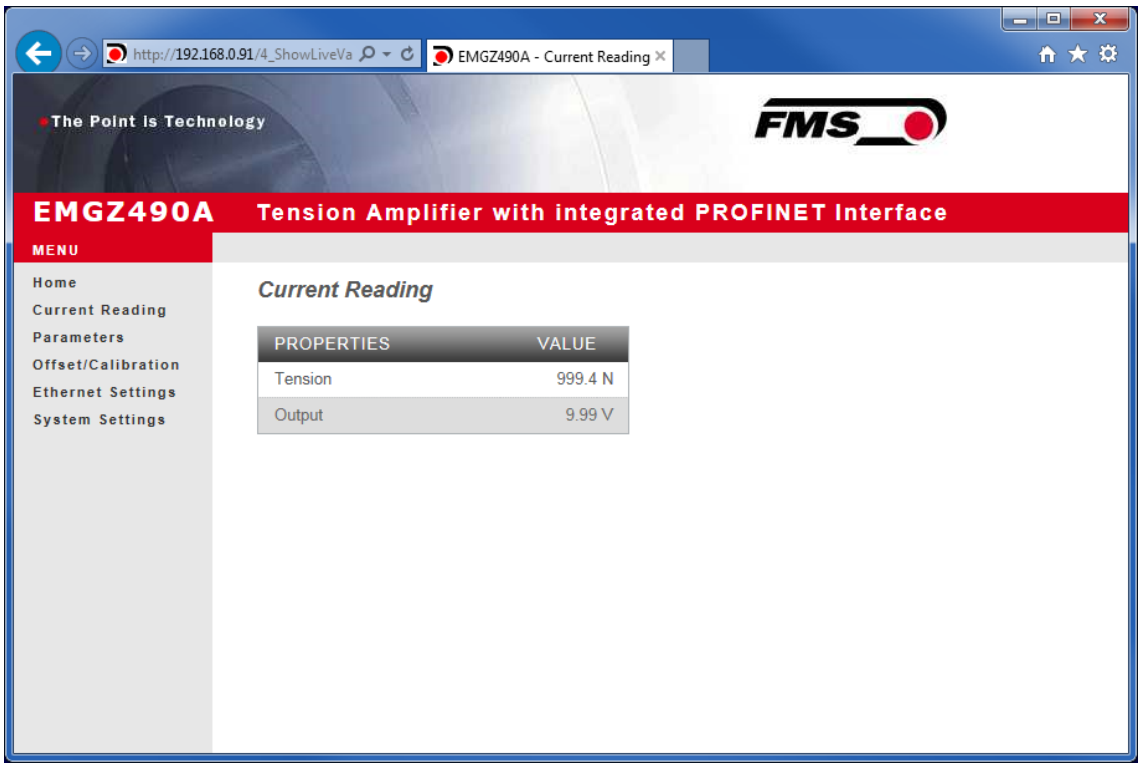


Fig. 11: Current Reading

8.2 Parameter Setting

The web page **Parameters** provides the possibility to configure the amplifier via the web interface. It is to notice that in a PROFINET-environment this is usually done via the PLC

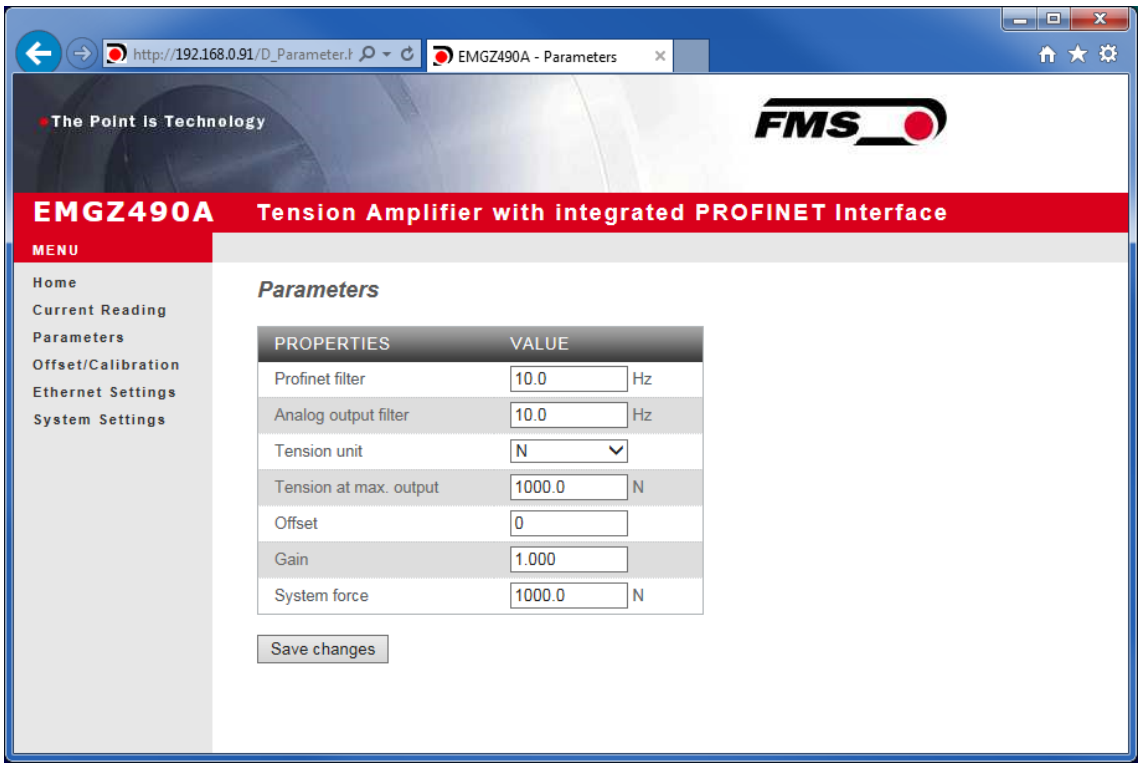


Fig. 12: Parameter list

8.3 Offset Compensation and Calibration via Web Browser

.For gain adjustment the page **Offset / Calibration** is available. This page offset compensation and calibration. These functions are also available via the PLC. If the offset and gain values known, they can be entered directly to these parameters.

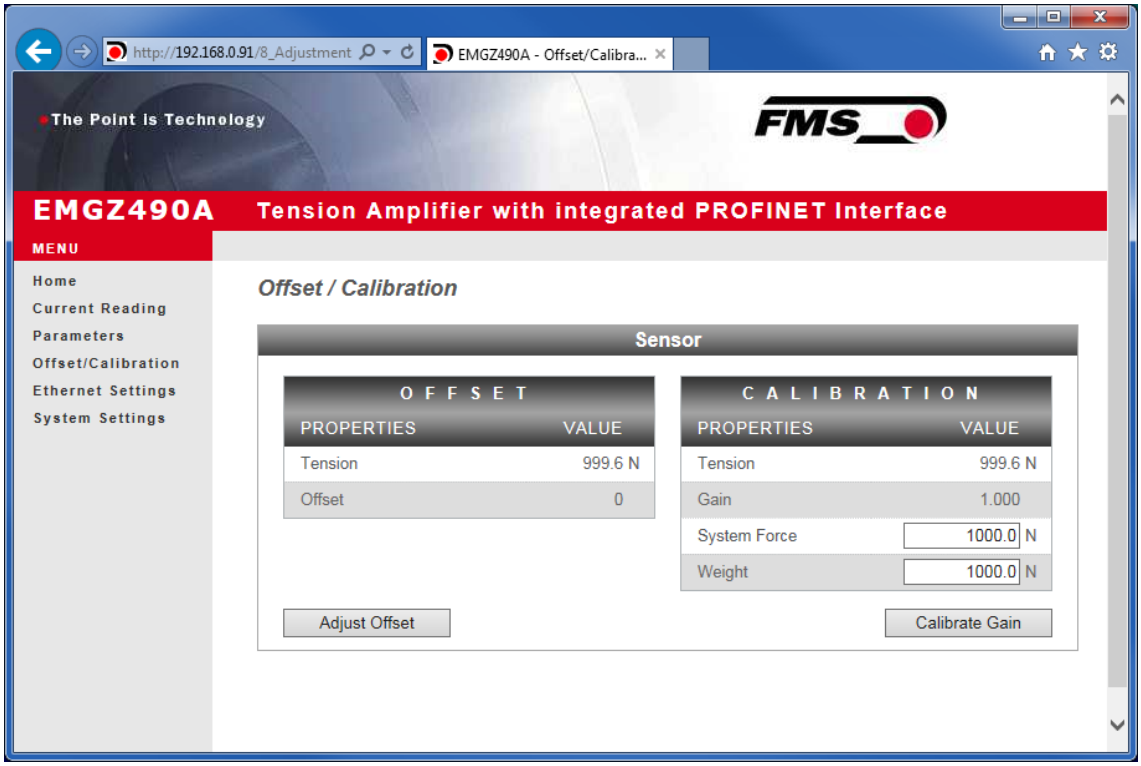


Fig. 13 Offset Compensation and Calibration

8.4 Ethernet Settings

This page displays the actual TCP / IP-configuration. It cannot be changed via the web interface. Changes to this configuration have to be done via your PLC.

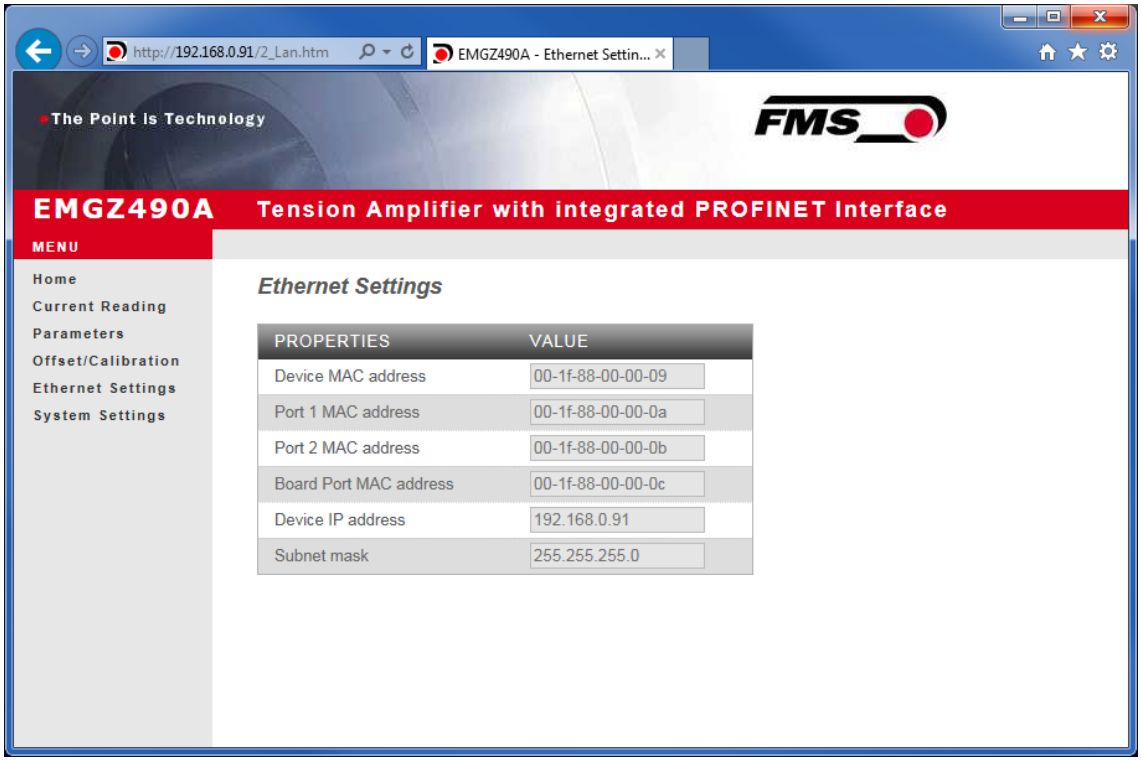


Fig.14: Ethernet Settings

8.5 System Settings

Via the page **System Settings**, the internal firmware version is displayed. Furthermore, a new firmware can be up-loaded.

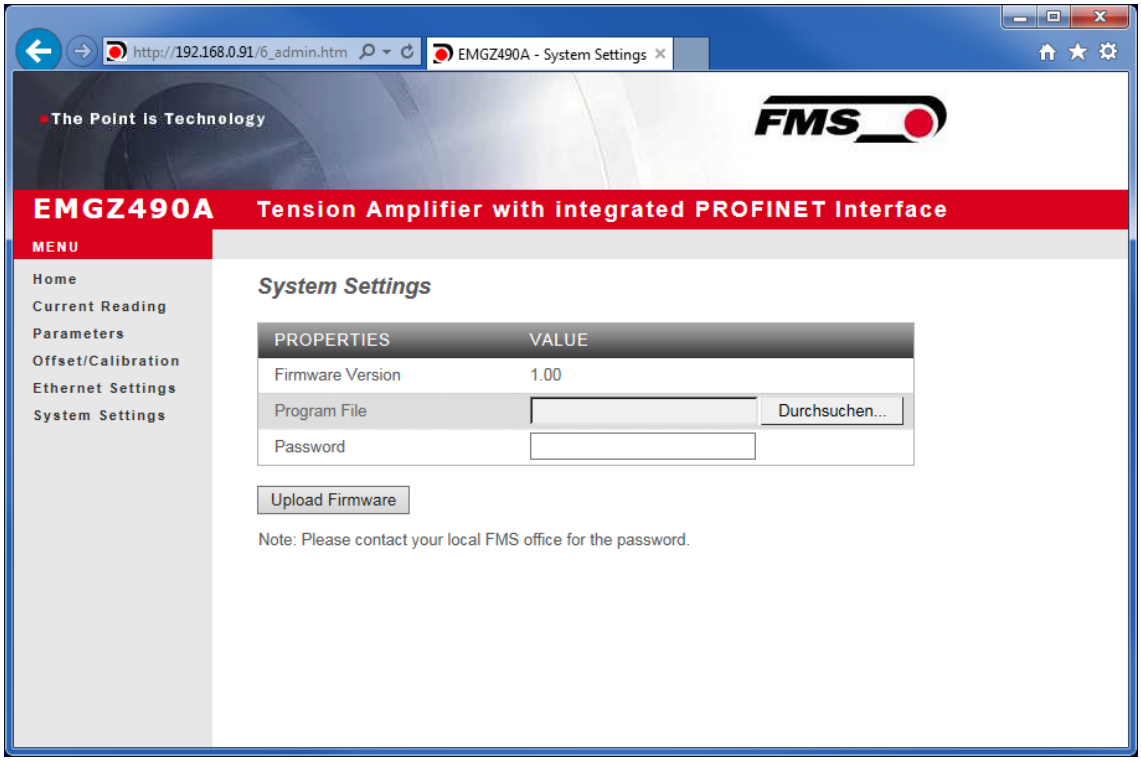


Fig. 15: System Settings

9 Dimensions

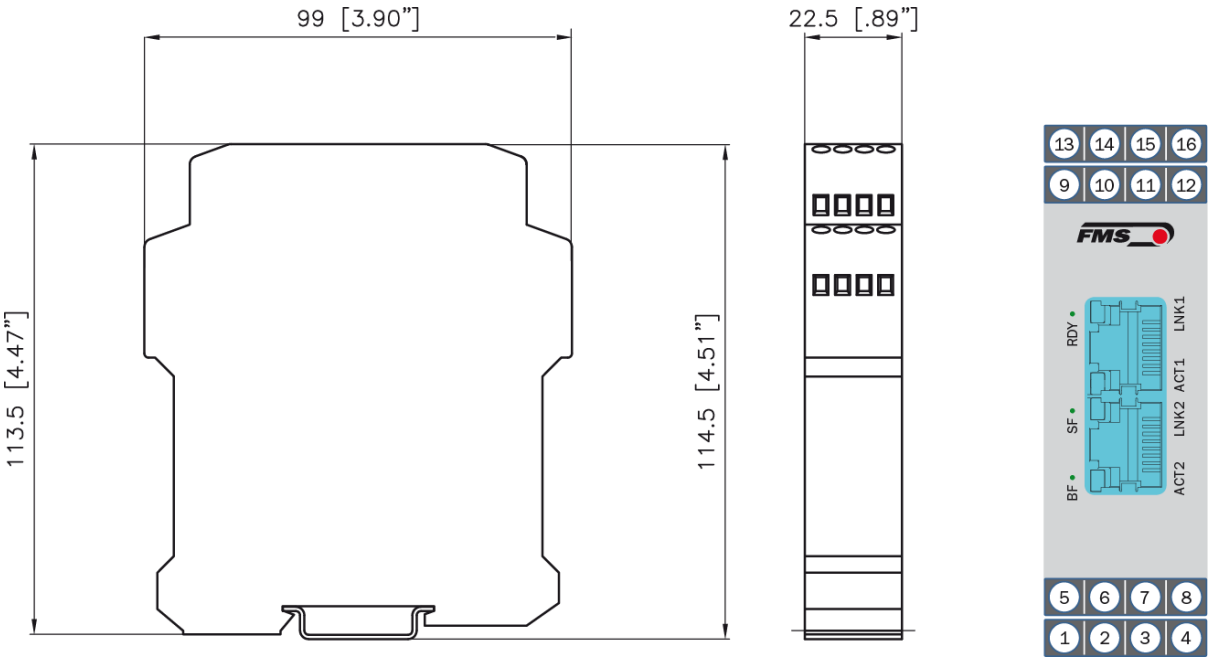


Fig. 16: Dimensions EMGZ490A.R

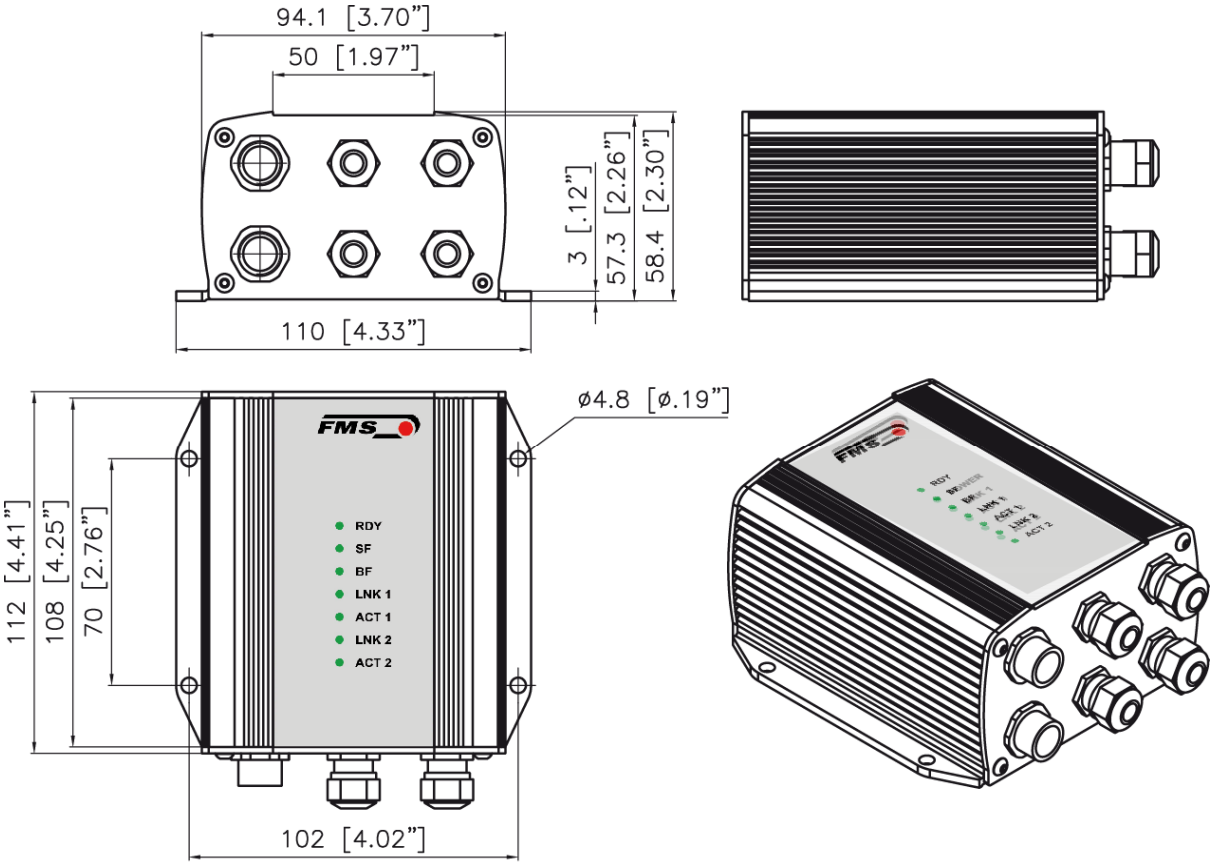


Fig. 17: Dimensions EMGZ490A.W

10 Technical Specification

10.1 PROFINET Characteristics

Function	Description
PROFINET IO RT	To follow
PROFINET Device Stack	v2.3.0.0
Cyclic traffic (RT)	Cyclic data exchange RT-Class 1, ≥1ms cycle time, Transmission of measuring data (ADC, Force, etc.)
Acyclic traffic (RPC)	Acyclic data exchange over RPC (TCP/IP) Transmission of configuration data
Alarm support	Transmission und receiving of alarm information
LLDP	Link Layer Discovery Protocol, for proximity detection
DCP	Discovery and Configuration Protocol, request and config.of IP, Device-name etc. over network layer
SNMP	Simple Network Management Protocol, for configuration of devices, is not required in CC-A, only from release CC-B

10.2 Technical Features

Function	Description
Switch-solution	2-Port, RJ45
Device ID via MAC-address	Setting device-ID over MAC-address resp. configuration of MAC-address via external IO-Pin
Remote Flash Update	Specially developed Flash-update for up-loading new firmware
Web service	Measuring data can be requested via http, EMGZ490A can be configured and adjusted.

10.3 Hardware Specification

Funktion	Description
Number of Channels	1 channel for 2 force sensors
Sensor Supply	5 VDC, max. 30mA, high stability
Input Signal Range	0...9mV (max. 12.5mV)
Resolution of A/D-Converter	+8191/-8192 Digit (14Bit)
Analogue Output	0...10V min. 1.2kΩ
Resolution of D/A-Converter	0...4096 (12 Bit)
Measuring Error	<0.05% FS
Cycle for Data Exchange	≥ 1ms
Interface Connectors	2 x RJ-45
Parameter Setting	over PROFINET or web interface
Certification	PROFINET specification V2.1, CC-B
POFINET IO net load guide line	Version 1.0, Nov. 2010; Order No. 7.302
Power Supply	24VDC (18...36VDC) / 5W
Temperature range	-10...60°C (14...140°F)
Weight	130 gr, [0.28 lbs]

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