

# **Operating instructions EMGZ321**

Digital microprocessor-controlled dual-channel measuring amplifier with integrated ETHERNET interface



Read these instructions carefully before commissioning. Keep the document in a safe place.

Further information is available here



https://www.fms-technology.com/en/productfinder/detail/amplifier/EMGZ321

Diese Bedienungsanleitung ist auch in Deutsch erhältlich. Kontaktieren Sie Ihren FMS Vertriebspartner.



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# 2 Safety

Comply with local safety regulations and accident prevention guidelines.

Work relating to the operation, maintenance, retrofitting, repair or adjustment of the appliance described here may only be carried out by qualified specialist personnel. Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the appropriate qualifications for their work:

- You are familiar with the safety concepts of automation technology and are familiar with them as project personnel. OR
- You are the operator of the machine and have been trained in handling the equipment. You are familiar with the operation of the equipment and technologies described in this documentation. OR
- You are a commissioning engineer or responsible for maintenance and have completed training that qualifies you to repair automation systems. You are also authorized to commission, ground and label circuits and devices in accordance with safety engineering standards.

#### 2.1 Intended use

All the safety instructions, operating and installation instructions listed here are intended to ensure the proper functioning of the product. Observe them at all times to ensure safe operation of the equipment. Failure to comply with the safety instructions and use of the appliances outside their specified performance data may endanger the safety and health of persons.

### 2.2 Presentation of the safety instructions



#### 🚹 Danger

indicates a potentially hazardous situation which, if the safety regulations are not observed, could result in death or serious injury.



#### Warning

**Type of hazard and its source** Possible consequences of non-compliance Measure to avert the danger



#### A Caution

Type of hazard and its source

Possible consequences of non-compliance

Measure to avert the danger



#### (i) Note

Note on correct operation Simplification of operation Ensuring the function

#### 2.3 General safety instructions



Marning - risk of breakage

If the force sensor is heavily overloaded, there is a risk of it breaking. This can pose a risk to the system's operating personnel.

Take suitable safety measures to prevent overloading or to protect against any resulting hazards.

The maximum possible loads are noted in the technical data.



#### ▲ Loss of warranty claims

If you make unauthorized modifications, your warranty claims will become void.



# **3 Technical data**

Technical data	
Sensor excitation	5 VDC, max. 60 mA
Temperature drift	< 0.01% / K [0.006% / °F]
Linearity	±0,05 %
Cycle time	1 ms
Operation	keypad, 2-line display
Interface for configuration	Ethernet via web browser
Voltage output	0 to 10 VDC or ±10 VDC min. 1000 Ω, 12 bit
Current output	0/4 to 20 mA, max. 500 Ω, 12 bit
Power supply	24VDC (18 to 36 VDC)
Power consumption	10 W
Temperature range	0 to+ 50°C
Protection class	EMGZ321.R IP40
	EMGZ321.S IP20
	EMGZ321.W: IP54

Table1 : Technical data



# **4 Product information**

### 4.1 Product labeling

The type plate is located on the side of the housing.



Figure1 : Product identification, type plate

Produ	Product labeling			
Pos.	Description			
1	Order code			
3	Nominal voltage Power supply			
4	Serial number			

Table2 : Product labeling,	type	plate
----------------------------	------	-------

### 4.2 Order code



Figure2 : Order code

### 4.3 System description

The EMGZ321 is a dual-channel measuring amplifier for connecting one to four force sensors. In the main application, one force sensor is connected to each channel. This allows the tension on a measuring roller on both sides of the material web to be recorded independently of each other and thus also controlled.

The measuring amplifiers are suitable for tension measurement with all FMS force sensors. Two force sensors A and B are usually connected to the amplifier, whose measured values can be transmitted to the machine control system as individual signals (A and B), as a sum signal (A + B), as a difference signal |A - B| or as an average value (A + B)/2. Device information, parameters or system settings can also be accessed via a web browser. Offset compensation and system calibration can also be carried out via the web browser.



Other applications include, for example, the connection of two measuring rollers with two force sensors each, or the combination with force sensors from the LMGZD series. These examples can be found in the chapter 5.5.1 Connection of two measuring rollers with a total of four force sensors, p.11 f.

### 4.4 Bock diagram



Figure3 : Block diagram EMGZ321

### 4.5 Scope of supply

Included in the scope of supply

- Measuring amplifier
- Operating instructions

Not included in the scope of supply

- AC/DC power supply unit, minimum requirement: EMC immunity specifications EN61000-4-2, 3, 4, 5; EN55024 light industry level, criteria A, e.g. TRAKO TXL 035-0524D
- Cable for power supply

Not included in the scope of supply, available as an accessory from FMS

- Patch cable with RJ45 plugs (straight connector)
- Sensor cable for connecting force sensor and measuring amplifier
- M12 connector, D-coded



# **5** Quick guide / Quick start

Commissioning of the EMGZ321 amplifier is limited to the installation procedure, offset compensation and calibration of the system in these operating instructions.

#### **5.1** Preparations for parameterization

- 1. Carefully read the operating instructions for the force sensor used
- 2. Check your requirements for the system, e.g:
  - o Units of measurement used in the system
  - Outputs used (current or voltage output)
- 3. Filter settings for actual force values and analog output
- 4. Create the connection diagram for your specific system arrangement

#### 5.2 Assembly sequence

- **1.** Install the force sensors (for installation details, please refer to the installation instructions for the force sensors)
- 2. Connect the force sensors to the amplifier, see 5.3 Installation and electrical connections, p.9
- 3. Connect the amplifier to the supply voltage. The power supply must be in the range of 18 to 36 VDC.
- 4. Perform offset compensation and calibration, see 6 Calibration of the measuring system, p.14
- 5. If necessary, change the parameter settings, see 8 Configuration, p.21ff.

#### 5.3 Installation and electrical connections



# Warning

To improve natural convection and keep the heating of the amplifiers as low as possible, appliances installed in a built-in cabinet should be at least 15 mm apart.





The function of the tension amplifier is only guaranteed if the components are arranged in the correct order. Otherwise, serious malfunctions may occur. The installation instructions on the following pages must therefore be strictly observed







The local installation regulations serve to ensure the safety of electrical systems. They are not included in these operating instructions. However, they must be observed in all cases.

### 5.4 Installing the force sensors

The force sensors are installed in accordance with the installation instructions for the respective products. The installation instructions are supplied with the force sensors.

#### 5.5 Electrical connections

Two or four force sensors can be connected to the EMGZ321. When using four force sensors, two are connected internally in parallel. The connection between force sensor and amplifier is realized with a 2x2x0.25mm<sup>(2)</sup> [AWG 23] shielded, twisted pair cable.



Figure 4 : Electrical connection, terminal assignment



### 5.5.1 Connection of two measuring rollers with a total of four force sensors



Figure5 : Two measuring rollers, each with two force sensors





Figure6 : Electrical connection of two measuring rollers, each with two force sensors, terminal assignment

When connecting 2 force sensors, the corresponding connecting wires in the terminals must be connected in parallel.

Color specifications (according to IEC60757) and coding only apply to FMS components!

5.5.2 Connection of two force sensors from the LMGZD-series



Figure7 : Electrical connection of two force sensors from the LMGZD series, each with two measuring ranges, terminal assignment





Figure8 : Electrical connection LMGZD-series, terminal assignment

When connecting 2 force sensors, the corresponding connecting wires in the terminals must be connected in parallel.

Color specifications (according to IEC60757) and coding only apply to FMS components!





Poor earthing can lead to electric shocks to persons, faults in the overall system or damage to the measuring amplifier! Good earthing must be ensured in all cases.



Note

The shielding may only be connected on the measuring amplifier side. The shielding must be left open at the force sensor connection.



# 6 Calibration of the measuring system

You can perform the calibration in two ways:

- via the web interface
- directly on the measuring amplifier

#### 6.1 Offset compensation

Offset compensation is used to compensate for the weight of the measuring roller and the roller bearings and to "zero" the measuring system.

Offset compensation must always be carried out before the actual calibration. The measuring roller must not be loaded during the process.

6.1.1 Directly on the device



- 1. Press for longer than 3 seconds.
- 2. The display shows: Offset Sensor A



- 3. Press the button to start the procedure
- 4. Offset compensation runs automatically. As soon as the display shows "Offset A corrected", the process for channel A is complete



- 5. Use  $\checkmark$  to switch to channel B.
- 6. Repeat steps 3 and 4.

### 6.2 Setting the amplification or gain factor)

Calibration is used to match the amplification factor with the force sensors. After calibration, the displayed force corresponds to the actual force acting on the material. Two calibration methods are available. The first calibration method described here uses a defined weight. There is also a mathematical method for amplification. The calibration method using the weight is simple and provides more accurate results because it simulates the material flow (see figure below) and considers the actual conditions in the machine.





Figure9 : Simulation of the material flow with a defined weight

### 6.3 Perform calibration on the device

- 1. Simulate the later web path of the material over the measuring roller with a cord or rope.
- 2. Hang a known weight on the rope. The weight should correspond approximately to the later material tension.
- 3. Make sure that the rope runs EXACTLY in the center of the measuring roller. If it runs off-center, the measurement result will be inaccurate!



- 4. Press the button for longer than 3 seconds.
- 5. The display shows: Adjust Gain A1
- 6. Press
- 7. The display shows: NomForcA 1000.0 N with the text flashing.
- 8. Here you enter the sum of the nominal forces of the force sensors connected to this channel. The nominal force of a force sensor can be found on its type plate.
- 9. Change the value using the buttons



#### (j) NOTE



and

Pressing and holding the button will accelerate the change.





- 10. Confirm the change with
- 11. The display now shows the expected weight force, e.g. Calibra. 250.0 N
- 12. The expected weight force refers to one channel or one side of the roller. Only half of the attached weight should be displayed here. Please note that the value is displayed in Newtons (N)!
- 13. Change the value of the expected force using the buttons







#### i note

The gain factor is changed in the background.



Pressing the buttons once briefly will only change the respective value slightly and you may not notice any change in the display.

Pressing and holding the button will accelerate the change, making it clearly visible.



14.Confirm the change with 15.With the display "Calibra complete" the process is complete.



16.Use V to switch to channel B. 17.Repeat steps 7. to 15. for channel B



# 6.4 Calibration with the web browser

The following procedure must be carried out accordingly for sensor A and sensor B.

- **1.** Connect the measuring amplifier to the laptop and open the web browser, then open the "Offset/Calibration" web page. See 9 Web interface, page 30ff.
- 2. Connect the first force sensor. See 5.5 Electrical connections, page 10ff.
- 3. The measurement signal must be positive when a load is applied in the direction of measurement. If negative, the signal lines of the relevant force sensor must be swapped at the terminal block. See 5.5 Electrical connections, page 10ff.
- 4. Connect the second force sensor. See 5.5 Electrical connections, page 10ff.
- 5. The measurement signal must be positive when a load is applied in the direction of measurement. If negative, the signal lines of the relevant force sensor must be swapped at the terminal block. See 5.5 Electrical connections, page 10 ff.
- 6. Make sure the measuring roller is not loaded and that it turns freely.
- 7. Click on "Adjust Offset" in the web browser. 6.2 Setting the amplification or gain factor), page 14ff.
- 8. Simulate the later web path of the material over the measuring roller with a cord or rope.
- 9. Hang a known weight on the rope. The weight should correspond approximately to the later material tension.
- 10. Make sure that the rope runs EXACTLY in the center of the measuring roller. If it runs off-center, the measurement result will be inaccurate!
- 11. Enter half of the attached weight under "Weight."
- **12**. Note the entry in N. **1** kg corresponds to approx. **10** N.
- **13**.Click on "Calibrate Gain **1**" in the web browser.
- **14**. The gain factor is recalculated in the background.



# 7 Operation



Figure10 : Operating elements and display

User i	User interface				
Pos.	Description				
1	Control panel for navigation				
2	LCD display				
3	Parameterization, press and hold > 3 sec., corresponding LED display lights up				
4 Calibration, press and hold > 3 sec., associated LED display lights					
5	5 Offset compensation, press and hold > 3 sec., corresponding LED displa lights up				
6	Increase values, holding the button accelerates the change				
7	"Scroll" in the parameters or the views				
8	Enter or confirmation button				
9	"Scroll" in the parameters or the views				
10	Decrease values, holding the button accelerates the change				

#### Table3 : Operating elements and display

The language of the user interface can be set to German or English using the corresponding parameter.



# 7.1 Display

You can switch between different display values by navigating with buttons

- A = Force on channel A
- B = Force on channel B

or

S = Sum of the channels A+ B

D = Difference of the channels |A-B|

### 7.2 Default settings

The default settings of the EMGZ321 can be restored as follows:

"factory setting" parameter, see 8.3System parameter group page24 ff or

By simultaneously pressing the buttons the power supply to the measuring amplifier.



while switching on or applying

#### 7.3 Relay outputs

These can be used, for example, to control a signal tower / signal light on the system. For example, the tension could be monitored in 2 steps:

Relay 1				
Parameters	Display	Parameter setting		
Relay output 1	Relay 1	Chk A		
Condition Limit 1	LimCond1	>Limit		
Value Limit 1	Limit 1	100.0		

Table4 : Example relay 1

Relay 2				
Parameters	Display	Parameter setting		
Relay output 2	Relay 2	Chk A		
Condition Limit 2	LimCond2	>Limit		
Value limit 2	Limit 2	120.0		

Table5 : Example relay 2



In the example, relay 1 would be energized as soon as tension value A rises above 100 N. This could activate the orange lamp, for example.

If the tension value continues to rise above 120 N, relay 2 would also pick up and could activate the red lamp.

### 7.4 Digital inputs, switching the amplification factors

This function is used, for example, when the system is operated with different material gradients. If the wrap angle changes, the gain factor must normally be redetermined by the calibration. This procedure is time-consuming and only makes sense if the changes to the wrap angle only occur infrequently. If you change back and forth between two web paths very frequently, the two corresponding gain factors can be stored in the respective parameters. See 8.1Amplifier parameter group, page 21ff.



Figure11 : Two material gradients with different wrap angles

#### 7.4.1 Level control of the digital inputs



Figure 12 : Level-controlled inputs



# 8 Configuration

The EMGZ321 can be configured either via the web browser or the user interface on the device.

These parameters are organized into 4 parameter groups:

- Amplifier parameter group Basic functions of the measuring amplifier
- Output parameter group Configuration of the analog outputs
- Relay parameter group Configuration of the relay outputs
- System parameter group system settings, mainly for communication

#### 8.1 Amplifier parameter group

Offset A			LCD: Offset A	
Offset B			LCD: Offset B	
<b>Purpose:</b> The values determined with the <b>Offset A</b> and <b>Offset B</b> adjustment procedures are saved in the form of a digital value in the <i>Offset A</i> are parameter. The value is used to compensate for the roller weight				B adjustment the Offset A and B oller weight
Unit	Parame	ter range	Selection	Default
ont	Min	Max		Derduit
Digit	-8000	+8000	-	0

Nominal fo	rce Force sens	sor A	LCD: NomForcA		
Nominal force Force sensor B			LCD: NomForc.B		
Purpose:	<b>Purpose:</b> The parameter saves the sum of the nominal forces of the connected force sensors. If two force sensors are connected to one channel, you must enter the sum of the two nominal forces. The nominal force is noted on the rating plate of the force sensors. It must be entered individually for channels A and B.				
Unit	Para	meter range	Selection	Default	
Chit	Min	Max		Deraut	
N, kN, g, kg, lb <sup>1)</sup>	1.0	100'000.0	-	1000.0	

Gain A1, A2	2	LCD: Gain A1 and	A2
Gain B1, B2	2	LCD: Gain A1 and A2	
<b>Purpose:</b> The amplification factors determined with the calibration adjustment procedure are saved in the parameters Gain A1, A2, B1, B2. Two parameter sets (Gain A1/B1 and Gain A2/B2) can be saved.			tion adjustment 31, B2. Two saved.
Unit	Parameter range	Selection	Default



	Min	Max		
-	0.100	20.000	-	1.000

<sup>1)</sup>The LCD displays the unit of measurement that was previously selected.

# 8.2 Output parameter group

Output 1			LCD: Output 1					
Output 2			LCD: Output 2					
Purpose:	These parameters determine the measured values that are applied to the outputs and displayed on the LCD. The user can choose between the sum or differential signal of sensors A and B or the individual values of A and B. The latter setting allows individual monitoring of the forces on the left and right side of the measuring roller.							
Unit	Parameter range		Selection	Default				
•••••	Min	Max						
			Force <b>IA-BI</b>	Output 1=				
			Force A+B Force <b>IA-BI</b>					
-	-	-	Force A Output 2=					
			Force B	Force A+B				

Output mode 1				LCD: Out1Mode		
Purpose:	The Off1Mode parameter is used to specify whether a current or voltage output is to be used at output 1. The signal can be further processed in PLC controls or PID controllers.					
Unit	Parameter range		Solation		Dofault	
Onic	Min	Max	Selection		Delduit	
			+	·/- 10V		
			0 to 10V		+/-10V	
-	-	-	0 t	o 20mA	./ 101	

Output mode 2			LCD: Out2Mode			
<b>Purpose:</b> Sets the type of voltage output on channel 2.						
Unit	Parameter range		Selection		Default	
Onic	Min	Max	Selection	Delduk		
-	-	-		0 to 10V +/- 10V	0 to 10V	



Force at the output			LCD: Out1Ten LCD: Out2Ten			
Purpose:	<b>Purpose:</b> These parameters are used to determine the force display that is shown when the analog output is at maximum.					
Unit	Parameter range			election	Default	
onit	Min	Max	J	Delduit		
N <sup>1)</sup>	0.1	100'000.0		-	1000.0	

Filter			LCD: Out1Filt LCD: Out2Filt				
Purpose:	The EMGZ321 amplifier has a low-pass filter to filter out unwanted interference that is superimposed on the output signal. This parameter is used to set the cut-off frequency of the filter. The lower the cut-off frequency, the slower the output signal. This low-pass filter is independent of the display filter.						
Unit	Parame	ter range	Selection Default				
offic	Min	Max	0000000	boldan			
Hz	0.1	200.0	-	10.0			



# 8.3 System parameter group

The system parameter group lists general parameters that affect the operation of the amplifier but do not influence its actual measurement performance.

password				LCD: Passwo	rd			
Purpose:	Settings on the tension amplifier can be protected with a password. If password protection has been selected (select Yes), the system will request the password each time a parameter is changed. The password itself cannot be changed. It is always <b>3231</b>							
Unit	Parame	rameter range		Selection	Default			
Onic	Min	Max			Delduit			
_	-	_	No No					
	Yes							

Language				LCD: Language		
Purpose:	The language on the display can be selected with this parameter. There are two languages to choose from: English and German. The menu navigation in the web browser is always in English.					
Unit	Parame	ter range	ç	Selection	Default	
onne	Min	Max		boloodon	Boldan	
-	-	-	English German		English	

LCD contrast			LCD: Contrast		
<b>Purpose:</b> The <i>Contrast</i> parameter changes the contrast of the LCD display to achieve optimum readability.					
Unit	Parameter range		Selection	Default	
Shire	Min	Max		Dolduit	
%	1	100	-	65	



Units of measurement				LCD: Unit		
<b>Purpose:</b> The unit of measurement to be used is set here. The nominal force of the force sensor on the rating plate is always specified in N.						
Note: If you select <i>Ib</i> (pound), the system changes from metric to imperial units of measurement.						
Unit	Parame	ter range		Selection	Default	
onne	Min	Max		Scicotion	Doldalt	
				N		
			kN			
-	-	-	g N			
			kg			
				lb		

Display filter				LCD: Dis. filt					
Purpose:	The amplifier has a low-pass filter to filter out unwanted interference on the display. This can be used to stabilize excessively fast or fluctuating display values on the LCD. This parameter determines the cut-off frequency of the filter. The low-pass filter of the display is independent of the filter for the amplifier output (see 7.5 "Description of output parameters").								
Unit	Parameter range Selection Default								
Offic	Min	Max							
Hz	0.1	10.0		-	1.0				

Ethernet	IP address			LCD: IP Add	r.	
Purpose:	This parameter can be used to assign an IP address to the amplifier. The user can then communicate with an EMGZ321 embedded in a network via a web browser. The IP address must be entered in four blocks (IP BI. 1; IP BI. 2; IP BI. 3; and IP BI. 4)					
Unit	Parame	ter range	S	election	Default	
Onic	Min	Max			Dordan	
	000.000	255.255.			192.168.	
-	000.000	255.255		-	000.090	



Subnet mask Address				LCD: Subnet		
Purpose:	The parameter assigns the subnet mask in the Ethernet network to the EMGZ321. The user can communicate with the amplifier in the network via a web browser. The subnet mask must be entered in four blocks (Sub Bl. 1; Sub Bl. 2; Sub Bl. 3; and Sub Bl. 4)					
Unit	Parameter range			election	Default	
onne	Min	Max	Ociccuon		Doludit	
	000.000	255.255.			255.255.	
-	000.000	255.255		-	255.000	

LAN spee	d		LCD: LANspeed		
<b>Purpose:</b> Determines the data rate between the amplifier and the receiver, e.g. switch, hub or PC.					
Unit	Parame	ter range	Selection		Default
Onic	Min	Max			Doldalt
MRPS	_	100		100	
	_	_		10	100

Default (factory settings)			LCD: Default				
<b>Purpose:</b> This menu item is a command. It can be used to restore the factory settings. If <i>Not</i> set is selected, all parameters remain as set by the user. If Yes is selected, the factory settings are loaded							
Unit	Parame	ter range		Selection	Default		
onic	Min	Max					
-	-	-		Not set Yes	Not set		



System information			LCD: System Info		
Purpose:	The System Info parameter contains all system-relevant information to identify the product and recognize its software version. The data stored here is used for service purposes. This information must be available when contacting the FMS service department				
Unit	Parameter range		Selection	Default	
onic	Min	Max		Bolduit	
				Device type.	
			Device	Software	
-			Version	version.	
			SerialNo	FMS serial number.	



## 8.4 Relay parameter group

The two relay outputs are software-controlled. They are electrically potential-free. They can be individually programmed and check various limit value violations

Relay out	put 1		LCD: Relay 1		
Relay output 2			LCD: Relay 2		
Purpose:	The two relay one of the fou violated.	outputs can be conf Ir conditions describ	igured individually ed below and trigg	r. They can evaluate ger an alarm if they are	
Unit	Parar	neter range	Selection	Default	
onic	Min	Max	0010001011	boladic	
			Chk A+B Disabled	Relay output 1= Disabled	
-	-	-	Chk B Chk IA-BI	Relay output 2= Disabled	

#### Chk A

Activate relay if sensor A violates the limit value (limit 1, or Limit 2 depending on selection).

#### Chk B

Activate relay if sensor B violates the limit value (limit 1, or Limit 2 depending on selection).

#### Chk A+B

Activate relay if the sum (A+B) violates the limit value.

#### Chk IA-BI

Activate relay if the absolute value of the difference **IA-BI** violates the limit value.

#### Disabled

Disabled deactivates the relay output. It always remains in the off state.



Condition	Limit 1		LCD: LimCond1 <sup>4)</sup>			
Condition Limit 2			LCD: LimCond2 <sup>4)</sup>			
Purpose: The LimCond1 parameter determines whether the relay should be activated if the value stored under Limit is exceeded (> Limit) or fallen below (< Limit). This also applies analogously to the LimCond2 parameter.						
Unit	Parameter range		Selection	Default		
Unit	Min	Max		Doladit		
				LimCond 1=		
_		_	< Limit	< Limit		
-	-	-	> Limit	LimCond 2=		
				> Limit		

Limit 1			LCD: L	imit 1	4)	
Limit 2	LCD: Limit 2 <sup>4)</sup>					
Purpose:	The parameter <i>Limit 1</i> stores a threshold value. If it is exceeded or not reached (depending on the selected limit value condition), the relay function is triggered. Same applies to <i>limit 2</i> .					
Unit	Paran	neter range	Selection	า	Default	
Onic	Min	Max	00100101	•	Deladit	
N <sup>1)</sup>	0.1	200'000.0	-		100.0	

<sup>1</sup>)The LCD displays the unit of measurement that was previously selected.

<sup>4)</sup>These parameters are only displayed if the relay function has been selected.

<sup>5)</sup> These functions can only be assigned once to a relay. Uses one relay is already using the function, it is no longer available for the other relay and is therefore not displayed in the selection. The *Disabled* selection can be assigned to both relays.



# **9 Web interface**

You can also configure the amplifier using a PC or laptop. The PC is connected to the amplifier via a peer-to-peer connection.

#### 9.1 Peer-to-Peer connection with laptop

For this connection, your laptop must be assigned an IP address in the static block (not obtained via DHCP).

The IP address of the amplifier is set to 192.168.000.090 at the factory.

#### 9.2 Assign static IP-address to laptop

The example shows the configuration for Windows 10 (with German interface). The display may vary depending on the operating system.

- 1. Connect PC and amplifier with an RJ-45 patch cable
- 2. Start PC and amplifier
- 3. Click on the start button of your PC (bottom left corner of your screen)



- 4. Click settings
- 5. Click network and internet

	Wind	dows-Einstellungen		
	Einstellung su	chen	Q	
cker, Maus		<b>Telefon</b> Android-Smartphone oder iPhone verknüpfen		Netzwerk und Internet WLAN, Flugzeugmodus, VPN



6. Select Ethernet in navigation on the left hand side of the screen

enstellungen	
@ Startseite Ethernet	
Einstellung suchen	dt
Verbunden	Adapteroptionen andern
Ethernet	Di por n
Status	Netzwerk- und Freigabecenter
s wran	Windows-Finewalt
Ethernet	Hife anforders
? DFU	Feedback senders
e VPN	
Flugzeugmodus	

7. Select change adapter options



- 8. select the desired adapter (of the Ethernet socket used on your laptop), here in the example: Ethernet, Unidentified network
- 9. double-click to select



**10.Select properties** 



etzwerk	Freigabe				
Verbindur	ng herstellen	über:			
📄 Re	altek PCIe G	ibE Family Controller			
Diese Ve	rbindung ven	wendet folgende Eleme	Konf	igurierer	n
	Client für Mic Datei- und Dr Trend Micro I QoS-Paketpli Internetprotol	rosoft-Netzwerke ruckerfreigabe für Micro NDIS 6.0 Filter Driver aner Koll, Version 4 (TCP/IP	osoft-Netzv	verke	^
	Microsoft-Mui Microsoft-LL[	ltiplexorprotokoll für Ne DP-Treiber	tzwerkada	pter	~
□ ⊥ ⊻ ⊥ <	Microsoft-Mul Microsoft-LL[	ltiplexorprotokoll für Ne DP-Treiber	tzwerkada	pter >	<b>,</b>
□ ⊥ ✓ ⊥ < Insta	Microsoft-Mu Microsoft-LLC	ltiplexorprotokoll für Ne DP-Treiber Deinstallieren	tzwerkada Eigen	pter >	, ✓

11. Internet protocoll, Version 4 (TCP/IPv4)

Igemein	
IP-Einstellungen können automatise Netzwerk diese Funktion unterstüt: Netzwerkadministrator, um die gee	ch zugewiesen werden, wenn das zt. Wenden Sie sich andernfalls an den igneten IP-Einstellungen zu beziehen.
O IP-Adresse automatisch bezie	hen
Folgende IP-Adresse verwend	len:
IP-Adresse:	192.168.0.88
Subnetzmaske:	255.255.255.0
Standardgateway:	
ODNS-Serveradresse automatis	ch beziehen
Folgende DNS-Serveradresser	n verwenden:
Bevorzugter DNS-Server:	
Alternativer DNS-Server:	
Einstellungen beim Beenden i	überprüfen
	Erweitert
	OK Abbrechen

12. Activate "Use the following IP address"

- 13. Please check with your IT department which address you may enter here.
- 14. Enter an IP address here.
- 15. Subnet mask is filled in automatically
- 16.Confirm with OK.
- **17**. The laptop is now ready to communicate with the amplifier.

#### 9.3 Connect device with laptop

- 1. Open any web browser: Microsoft Internet Explorer, Mozilla Firefox, Edge, Chrome, or similar...
- 2. The factory setting for the IP address of the amplifier is 192.168.0.90.
- 3. If nothing has been changed, enter this IP address in the input field (e.g. http://192.168.0.90) and confirm with "Enter".
- 4. The user interface of the web interface appears.



# 9.4 Surface of the web interface



#### Figure13 : Homepage with device information

The Home page provides information about general device properties such as the serial number and software version.

The menu on the left-hand side of the screen allows you to navigate around the page.

The Point is Techn	6.0.91/6_5 ₽ - ≧ C × 💽 EMGZ321	- Current Reading 🗙	fms_
EMGZ321	Digital Microproce	essor Controlled	Two Channel Amplifier
Home Current Reading	Current Reading		
Remote Control	PROPERTIES	VALUE	
Parameters	Tension A + B	1071 N	
Ethernet Settings	Tension A - B	943 N	
System Settings	Tension A	1007 N	
	Tension B	64 N	

Figure14 : Current Reading (current measured values)

The Current Reading website shows all the current values of the amplifier.



	3.0.91/F_Parameter.htr 🔎 🗕 🖒 🗙 🧕	EMGZ321 - Parameters		h ★ 3
The Point is Techno	ology	FI	ns 🜒	
EMGZ321	Digital Microproce	ssor Controlled Two Ch	annel Amplifier	
MENU				
Home	Parameters			
Current Reading				the second s
Parameters	A			OPERATIONS
Offset/Calibration	PROPERTIES	VALUE	1012	Save Changes
Ethernet Settings	Sensor A - Unset	1000.0	Digit	J
System Settings	Sensor A - Nominal Force	1000.0	N	
	Sensor A - Gain 1	1.000		
	Sensor A - Gain 2	1.000		
	Sensor B - Offset	0	Digit	
	Sensor B - Nominal Force	1000.0	N	
	Sensor B - Gain 1	1.000		
	Sensor B - Gain 2	1.000		
		OUTPUT GROUP		
	PROPERTIES	VALUE		
	Output 1 - Sensor Selection	Tension A - B	·*	
	Output 1 - Mode	+/-10V	-	
	Output 1 - Tension	1000.0	N	
	Output 1 - Filter	10.0	Hz	
	Output 2 - Sensor Selection	Tension A + B	-	
	Output 2 - Mode	010V		
	Output 2 - Tension	1000_0	N	
	Output 2 - Filter	10.0	Hz	
		RELAY GROUP		
	PROPERTIES	VALUE	-	
	Relay 1 - Function	Check Tension A + B		
	Relay 1 - Limit Condition	iension < Limit		
	Relay 1 - Tension Limit		N	
	Relay 2 - Function	Uneck Absolute Value Tension A - B	·	
	Relay 2 - Limit Condition	rension > Limit		
	Relay 2 - Tension Limit	100.0	N.	

Figure15 : Parameters

The Parameters page offers the option of configuring the amplifier via the web interface.



#### **i** Confirmation of the entry

To confirm your entry, always use the "save changes" button and NOT the Enter key.



The Point is Technol	ogy	EMS		
		rms		
MGZ321	Digital Microprocessor Co	ntrolled Two Channel Amplifier		
NU				
me	Offset / Calibration			
urrent Reading	Sensor A			
rameters				
fset/Calibration	OFFSET	CALIBRATION		
hernet Settings	PROPERTIES VALUE	PROPERTIES VALUE		
ystem Settings	Tension 1007 N	Tension 1007 N		
	Offset 0	Gain 1 1.000		
		Gain 2 1.000		
		Nominal Force 1000.0 N		
		Weight 1000.0 N		
	Adjust Offset	Calibrate Gain 1 Calibrate Gain 2		
	rujur onot			
	Sensor B			
	OFFSET	CALIBRATION		
	PROPERTIES VALUE	PROPERTIES VALUE		
	Tension 64 N	Tension 64 N		
	Offset 0	Gain 1 1.000		
		Gain 2 1.000		
		Nominal Force 1000.0 N		
		Weight 1000.0 N		
	Adjust Offset	Calibrate Gain 1 Calibrate Gain 2		

Figure16 : Offset compensation and calibration

The Offset/Calibration page is available for adjusting the amplifier. This page can be used to adjust the offset and then perform the calibration.

 $(\mathbf{i})$ 

#### **i** Confirmation of the entry

To confirm your entry, always use the "save changes" button and NOT the Enter key.





Figure17 : Ethernet settings

This page shows the current TCP/IP configuration. It cannot be changed via the web interface, only read.

A ttp://192.168	.0.91/4_admin.htm 🔎 🗕 🖉 🕽	EMGZ321 - Firmware Up	late ×	÷	
The Point is Techno	ology		FMS_		
EMGZ321	Digital Micropro	cessor Controlle	d Two Channel Amplifier		
Home Current Reading	System Settings				
Remote Control	PROPERTIES	VALUE		OPERATIONS	
Parameters	Password	No		Save Changes	
Ethernet Settings	Display Language	English	-		
System Settings	Contrast intensity	65	%		
	Unit	Ň	×		
	Display Filter	10	Hz		

Figure18 : System settings





Figure19 : Remote control

Via this interface, you can access the corresponding sub-functions such as "Offset and calibration" and the parameter settings with a few mouse clicks.





Figure20 : Dimensions EMGZ321.W











Figure 21 : Dimensions EMGZ321.R





Figure 22 : Dimensions EMGZ321.S



# **11** Troubleshooting / fault rectification

Troubleshooting / fault rectification					
Error image	Possible cause	Solution			
Output values are not as expected	Roller weight not correctly compensated	Repeat offset compensation procedure (see chapter 6.3)			
	Incorrect nominal force Forget to enter both nominal forces of sensor A and sensor B.	Repeat the calibration procedure and enter the correct values. For example, if the roller is equipped with two 250N sensors, enter 250N for sensor A and 250N for sensor B.			
	Wrong reinforcement determined	Repeat calibration procedure			
	Incorrect gain set when using gain switching	Check "Digital inputs" and gain switching.			
Sensor A or B shows values that are >>0.1, although the measuring roller is unloaded.	Output set to current value 420mA.	Set the correct output mode. Set the parameter Off1Mode to 020mA if necessary.			
Output value of sensor A or B unstable	Cut-off frequency of the output filter set too high.	Reduce the cut-off frequency			
Output values of sensor A or B unstable	Earthing problem (PE) has poor contact.	Check earthing strands or cable shields for poor contact.			
	Electrical interference on sensor cable	Check the contacting of the shields. Use stranded cable pairs.			
Relay outputs do not behave as desired.	Limit values set incorrectly	Check parameters LimCond and Limit 1 and 2 for plausible values			
LCD display is dark.	No supply voltage present	Check wiring			

Table 6 : Troubleshooting



# **12** Service

#### **12.1** Maintenance

FMS force sensors are maintenance-free. However, depending on the type of rolling bearing used, it may be necessary to relubricate them.

- 1. Remove one lid.
- 2. Clean the bearing of dirt and old lubricant.
- 3. Use lubricant according to the manufacturer's instructions.

If the force sensors are installed from the inside of the frame, the entire roller with the force sensors must be removed from the machine frame so that the closed covers can be removed.

#### **12.2** Waste disposal

Force sensors that are no longer usable must be disposed of separately from household waste in accordance with national and local regulations for environmental protection and recycling.



# **13** Standards, guidelines

### **13.1** EU Declaration of Conformity

FMS Force Measuring System AG declares that our products (force sensors, measuring amplifiers) comply with the basic requirements set out in the

- Directive 2014/30/EU (EMC Directive) and the
- RoHS Directive 2011/65/EU

and, in accordance with the labeling obligation, have received the

- CE marking

The following standards were applied:

- EN 61000-6-4
- EN 61000-6-2

### **13.2** Machinery Directive, Declaration of Incorporation

FMS Force Measuring Systems AG declares that the

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU

do not apply to our products (force sensors, measuring amplifiers).

When installing these products in systems that are affected by the application of these directives, commissioning is prohibited until it has been established that the system complies with the provisions of the directives.

### 13.3 Address of the manufacturer

FMS Force Measuring Systems AG Aspstrasse 6 8154 Oberglatt

Switzerland





FMS Force Measuring Systems AG Aspstrasse 6 8154 Oberglatt (Switzerland) Tel.+ 41 44 852 80 80 info@fms-technology.com www.fms-technology.com

**FMS USA, Inc.** 2155 Stonington Avenue Suite 119 Hoffman Estates, IL 60169 (USA) Tel. +1 847 519 4400 Fax +1 847 519 4401 fmcure@ime\_toohoology.com fmsusa@fms-technology.com