



# Installation Instructions

## DMGZ-Series

Force sensor for compressive and tensile force measurement

Document Version 4.10  
Issue Date / Author 01/2020 / NS



**Diese Bedienungsanleitung ist auch in Deutsch erhältlich.  
Bitte kontaktieren Sie Ihre nächstgelegene FMS Vertretung.**

# 1 Table of contents

<b>1</b>	<b>TABLE OF CONTENTS .....</b>	<b>2</b>
<b>2</b>	<b>SAFETY INSTRUCTIONS.....</b>	<b>3</b>
2.1	Presentation of safety information .....	3
2.1.1	Danger that could result in minor or moderate injuries.....	3
2.1.2	Note regarding proper function .....	3
2.2	General safety information .....	3
<b>3</b>	<b>PRODUCT INFORMATION.....</b>	<b>4</b>
3.1	Product description .....	4
3.2	Functional description .....	4
3.3	Scope of delivery.....	4
3.4	Order code .....	5
<b>4</b>	<b>INSTALLATION.....</b>	<b>6</b>
4.1	Electrical connections .....	6
<b>5</b>	<b>TECHNICAL DATA .....</b>	<b>8</b>
5.1	Dimensions .....	9

## 2 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.

### 2.1 Presentation of safety information

The following safety symbols appear in this manual.

#### 2.1.1 Danger that could result in minor or moderate injuries



Danger, warning, caution

Failure to follow wiring instructions in this manual may result in equipment damage or personal injury.

#### 2.1.2 Note regarding proper function



Note

Note regarding proper operation  
Simplification of operation  
Ensuring function

### 2.2 General safety information



The force sensors may not be stressed over the specification limits neither during assembly nor operation. The unit's overload protection value may not be exceeded.



The attachment points for the force sensor on the machine frame must be properly designed. The bearings need to be appropriately mounted.



For proper installation and operation, follow the electrical wiring diagram and instructions in this manual.

## 3 Product information

### 3.1 Product description

The force sensors of the DMGZ-Series feature compact dimensions and flexible installation options. The force sensors of the DMGZ-Series are designed for the measurement of axial forces in thrust rods or ropes. The internal threads allow for easy installation of push rods or ring bolts.

### 3.2 Functional description

The force sensor of the DMGZ-Series work with the measuring principle of the double bending beam. The substantial overload protection translates to eliminated / minimized calibration issues due to machine upset conditions. The movement of the bending beams, which is proportional to the applied force, is detected by strain gauges arranged in a full bridge circuit and then converted into an electrical signal. This simple measurement principle delivers precise results even with small forces.

### 3.3 Scope of delivery

#### Included in scope of delivery

force sensor, straight connector (female)

#### Options

H14 right-angle connector in scope of supply, replaces straight connector

H16 temperature range up to 120 °C (248 °F)

H18 with water tight, straight connector, replaces original connector

H29 resistant against aggressive media, especially acids (please specify), up to 120 °C (248 °F)

H30 resistant against aggressive media, especially hydrocarbons (please specify) up to 120 °C (248 °F)

H31 for vacuum applications to 1E-7 hPa , 1E-5 Torr, temperature range up to 120 °C (248 °F)

#### Accessories

Prefabricated cable (specify length) with connector (straight or right-angle)

### 3.4 Order code

DMGZ-Series : Order code			
<b>DMGZ</b>	<b>300A</b>	<b>.50k</b>	<b>.H14.H16</b>
			Options
			Nominal force rating in kN
			Size, design revision A
			Series

Figure 1: order code

Datasheet\_DMZG\_series.indd

## 4 Installation

Force sensors are defined as “partly completed machinery” according to the Directives 2006/42/EC, article 2. In order to assure a proper functionality of the parts and assure the essential safety requirements of operators working with it, the following conditions for the assembly must be met:



The force sensor may not be stressed over the specification limits neither during assembly nor operation. The unit's overload protection value may not be exceeded.



The mounting points for the force sensor on the machine frame must be properly designed. The bearings need to be appropriately mounted.



For proper installation and operation, follow the electrical wiring diagram and instructions in this manual.



### Axial force

The force sensor is mounted so that the resulting force acts in the direction of the axis.



### CAUTION

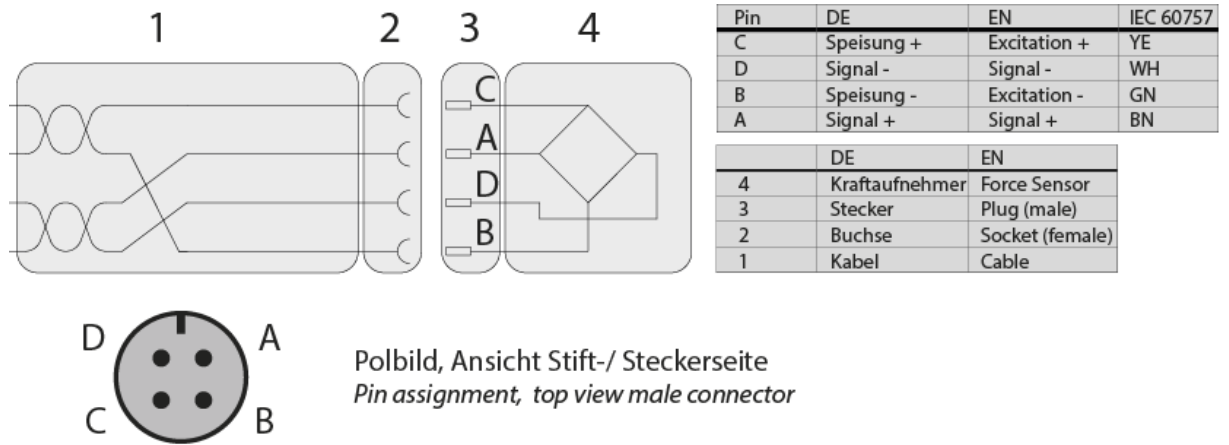
The for sensor with connection thread must be protected against torsional force when fastening the nut on the shoulder (indicated in the drawing with „SW“).

*Figure 2: Fixed and floating bearing installation, illustrated with different types of bearings*  
C\_BA\_Manual.ai

### 4.1 Electrical connections

Connection between the Force Measuring Rollers and machine controller is realized by means of a  $2 \times 2 \times 0.25 \text{ mm}^2$  cable. The cable must be installed separate from power lines.

Connect the shield only on the side of the amplifier.



Farbangaben (IEC60757) und Codierung gelten nur für FMS Komponenten!  
*Color scheme (IEC60757) and pin codes are valid for FMS components, only!*

**Figure 3: pin assignment M12** *Pin\_Assignment\_Sensorkabel\_Farben\_Stecker.ai*

## 5 Technical data

Technical data	
Sensitivity	1.8 mV/V
Tolerance of sensitivity	<± 0.5 %
Accuracy class	±0.5% of nominal force rating
Temperature coefficient	±0.1%/10K
Temperature range	-10 to +60°C
Input resistance	350Ω
Excitation voltage	1 to 7 VDC
Overload protection	10 times nominal force
Material	Stainless steel
Protection class	IP42
Electrical connection	Male flange connector, Amphenol 4-pole
Measuring range	30:1

Table 1: technical data



## 5.1 Dimensions

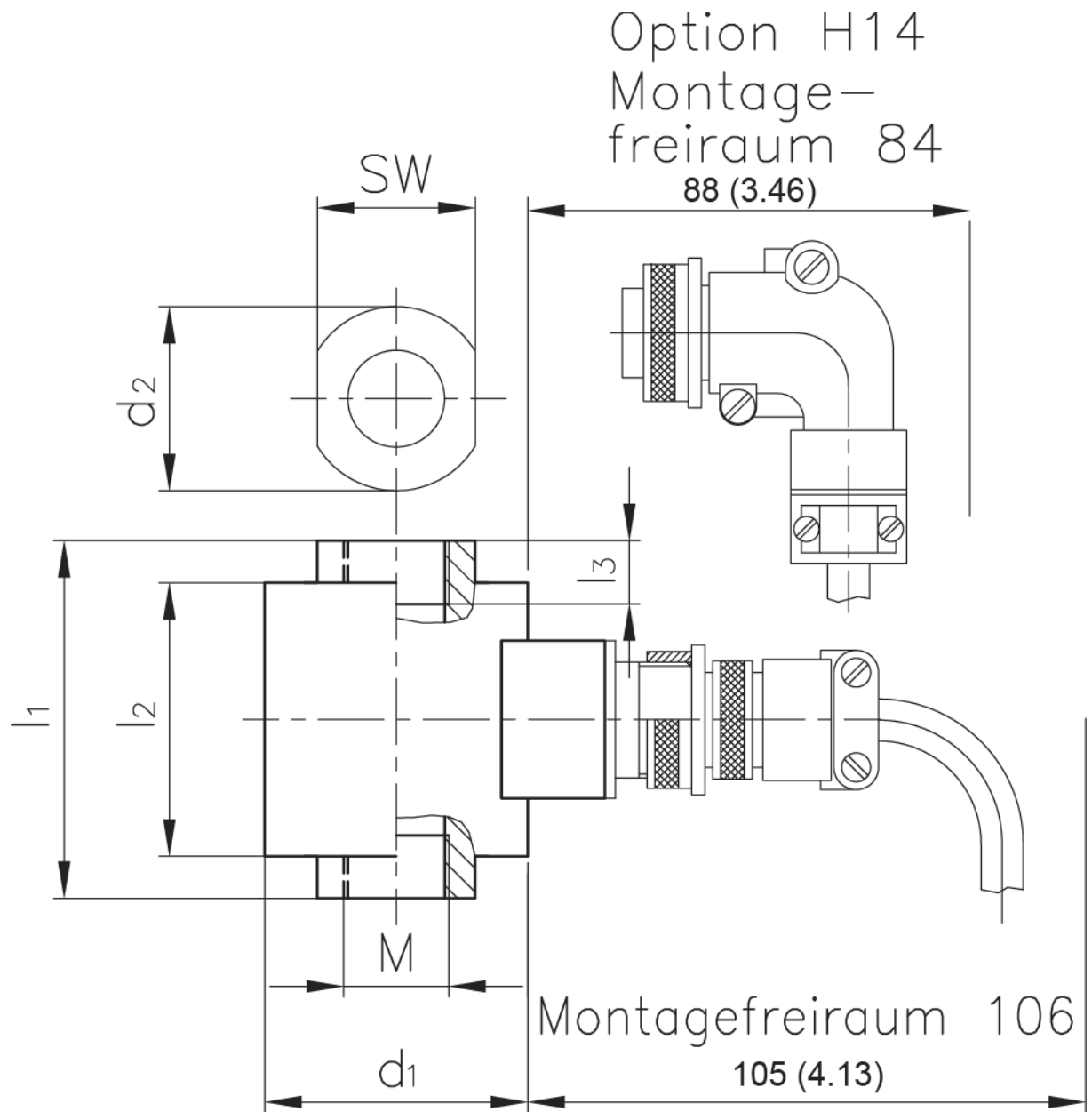


Figure 4: Dimensions

DMGZ\_Bemassung.ai

DMGZ-Series : Dimensions							
Size	Dimensions mm (.in)						
Type	d1	d2	l1	l2	l3	M	SW
<b>DMGZ200A</b>	50 (1.9685)	38 (1.4961)	68 (2.6772)	52 (2.0472)	20 (0.7874)	M20 x 1.5	30 (1.1811)
<b>DMGZ300A</b>	60 (2.3622)	48 (1.8898)	76 (2.9921)	60 (2.3622)	20 (0.7874)	M30 x 2	36 (1.4173)

DMGZ-Series : Nominal forces, Overload protection, Deflection, Weight						
Size	Nominal force N (.lbf)	Overload protection		Deflection mm (.in)	Weight kg (.lbs)	
		compressive	tensile			
<b>DMGZ200A</b>	300 (67)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	500 (112)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	1000 (224)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	1200 (269)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	2500 (562)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	3000 (674)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	5000 (1124)	10x	10x	0.15 (0.0059)	0.78 (1.7196)	
	10k (2248)	10x	6x	0.15 (0.0059)	0.78 (1.7196)	
	20k (4496)	10x	3x	0.15 (0.0059)	0.78 (1.7196)	
<b>DMGZ300A</b>	50k (11240)	3x	3x	0.15 (0.0059)	1.05 (2.3149)	

Figure 5: dimensions

Datasheet\_DMZG\_series.indd





**FMS Force Measuring Systems AG**  
Aspstrasse 6  
8154 Oberglatt (Switzerland)  
Tel. 0041 1 852 80 80  
Fax 0041 1 850 60 06  
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  
fmsusa@fms-technology.com

**FMS (UK)**  
Aspstrasse 6  
8154 Oberglatt (Switzerland)  
Tel. +44 (0)1767 221 303  
fmsuk@fms-technology.com

**FMS (Italy)**  
Aspstrasse 6  
8154 Oberglatt (Switzerland)  
Tel. +39 02 39487035  
fmsit@fms-technology.com