



# EasyForce / EasyForce Pro

Manual



*easyforce*



*easyforce* pro

## Inhaltsverzeichnis

1. Intended use.....	2
2. Method of functioning .....	2
2.1. Intended use of the force transducers .....	2
2.2. Protection against dangerous environmental influence .....	2
2.3. Maintenance instructions.....	2
3. Power supply.....	2
4. Einbau- und Anwendung.....	2
5. Operation .....	3
6. Error messages .....	3
7. Technische Daten .....	4
8. settings with the ASTAS software.....	4

The software **ASTAS** and further information on the EasyForce/ EasyForce Pro can be found on our website [www.ast.de](http://www.ast.de).

A.S.T. - Angewandte System Technik GmbH, Mess- und Regeltechnik  
Marschnerstraße 26 01307 Dresden  
Phone (03 51) 44 55 30 Telefax (03 51) 44 55 555  
www.ast.de vertrieb.dd@ast.de

## 1. Intended use

The mobile force-measuring devices **EasyForce / EasyForcePro** serve to indicate forces or weights picked up by strain-gauge sensors (DMS). It should not be used as the sole measuring device for safety-related measurements.

## 2. Method of functioning

The battery-operated display device AE 703 provides the strain-gauge full bridge of the sensor with a stabilised supply voltage by means of 3 AA batteries (HR6 Mignon) or four 1.2 V rechargeable batteries. Any change of force acting upon the sensor leads to a change in voltage at its output. The output voltage is digitalised by the display feature and indicated as a force value. The measuring range as well as the display resolution and measurement rate are permanently set and cannot be altered.

**easyforce** works only in compression

**easyforce<sub>pro</sub>** works in tension and compression. The tension direction is displayed positively, the compression direction negatively.

### 2.1. Intended use of the force transducers

The force transducers (sensors) are used for static and dynamic measurement of forces and loads. The force transducers are not safety devices! The safety of machinery, technical facilities and measuring equipment must be implemented by additional security measures! It is the duty of the planning engineer, supplier or user of the machinery and facilities to minimize risks posing hazards to safety, to document potential hazards and to communicate these to the operating personnel. In doing so, the data sheet of the sensor and applicable safety standards need to be observed in addition to the contents of this Operating Manual.

### 2.2. Protection against dangerous environmental influence

Force transducers are measuring instruments. Depending on the protection class of the sensor, it need to be protected from moisture and dirt. It is important to prevent high mechanical stress from occurring caused by sudden jolts or falls, etc. Storage of the sensors is possible within a temperature range of -40°C to +70°C.

### 2.3. Maintenance instructions

The force measuring device contains no parts requiring maintenance. Repairs may only be carried out by the manufacturer.

## 3. Power supply

The device is supplied with power from:

- 3 batteries AA (HR6 Mignon) or
- 3 rechargeable batteries of the same size (1,2V) or
- USB power supply (battery display indicates full battery) or
- USB cable to a powered on PC (battery display indicates USB)

If power is supplied via USB, the inserted batteries/rechargeable batteries are switched off. Rechargeable batteries can only be charged outside the device. In battery mode, the device switches off after 2 hours (factory setting).

The batteries are inserted on delivery. To change the batteries, open the battery compartment with a Phillips screwdriver and replace the batteries. Remove the batteries if you do not intend to use the device for a long time or only want to power it via USB.

Charger, rechargeable batteries and USB mains adapter are available from the manufacturer or dealer.



## 4. Einbau- und Anwendung

- The forces or loads due to be measured must be introduced as closely as possible in the measuring direction using suitable accessories. Torsional and bending moments, off-centre loads and transverse loading may lead to measuring errors.
- When in operation, force transducers are slightly deflected to the measuring direction on the force/load introduction side. Accordingly, installation should proceed in such a way that deflection is not restricted or blocked in any way.
- When being assembled or while measurement is in progress, the force transducers need to be protected by suitable means from mechanical as well as dynamic overloading. Special attention must also be paid to prevent overloading from occurring through acting forces or moments that are not in the measuring direction.
- Optimum measurement results are only attained if the nominal temperature range is adhered to. The speed of ambient temperature change should not be allowed to exceed 5K/h. Heating or cooling of the force transducers or weighing cells on one side should be prevented by suitable means.
- It is of paramount importance to ensure that the encapsulation of the sensitive measuring elements remains preserved inside the housing. Existing cable connection boxes must never be opened!.
- Components bordering on force transducers may have a strong influence on measuring accuracy. If uncertain, check with the manufacturer with regard to specific requirements governing the types to be installed.

## 5. Operation

	key	description	funktion
		Max/min/current value	To switch between the display of max/min/current value
		Zero	To switch between net and gross value To set display (max/min/current value) to zero)
		Unit	Scroll between units (if available)
		Backlight	Switch on the display backlight for a defined time
		On/Off (***)	Switching the device on and off
	+	Ranges	Scroll to next range (if available)
	+	Gross / net	Toggle between not zeroed and zeroed display

### Notes for the operator

**Zero:** The zero value will be deleted when leaving a range. To store pre-loads permanently use the function ZeroLoad cal. The function is disabled when the unit mV/V is active.

**Auto-Tare:** When the device is switched on, the display is set to zero. Pressing the “zero” key will switch between net and gross value in the display.

The Auto-Tare-Function can be turned off by using the PC-Software “ASTAS”. This feature is included in all devices from Firmware-Version 1.5.4. (more under ASTAS)

**Unit:** Scroll between units that have been enabled in Ranges. If there is only one unit enabled the key has no function. In case the value to be displayed exceeds the possible range, the device switches to the next possible unit.

Example:  $99\,999\text{g} + 15\text{g} = 100.01\text{kg}$  If the value to be displayed is falling, there will be no switching back into the initial unit.

**Backlight:** The duration can be adjusted in Device setup.

## 6. Error messages

"ADC error"	The input signal exceeds the input range of the ADC	<ul style="list-style-type: none"> <li>- No sensor connected</li> <li>- Damaged sensor cable</li> <li>- Moisture in or at the sensor connector</li> <li>- Sensor extremely overloaded</li> <li>- Sensor overloaded/under loaded</li> </ul>
"Overload" / "Underload"	The input signal exceeds the span as defined in ranges with the parameters Overload (+) and Overload (-)	
Display of current value is flashing	The unit tries to display more than 99999 parts.	- new adjustment of selective digits in setup..
■ ■ ■ ■ ■	The calculation result in incomputable values (mathematic overflow).	<ul style="list-style-type: none"> <li>- Sensitivity exceeds the computable range</li> <li>- - other causes see ADC error</li> </ul>
"T" (flashing)	A TEDS sensor with invalid data has been detected.	- Check TEDS data from sensor
"usb" (not in capital letters)	Error in PC connection	- Retry by re-connection the USB-cable!

## 7. Technische Daten

## EasyForce

Accuracy Class	% F <sub>nom</sub>	0.2
Force transducer		
Nominal force (F <sub>nom</sub> )	kN	0,1/ 0,2/ 0,5/ 1/ 2/ 5/ 10/ 20/ 50/ 100/ 200
Maximum operating force (F <sub>G</sub> )	% F <sub>nom</sub>	150
Breaking force (F <sub>B</sub> )	% F <sub>nom</sub>	> 300
Lateral limit force (F <sub>Q</sub> )	% F <sub>nom</sub>	50
Relative linearity deviation (d <sub>lin</sub> )	%	≤ 0.5
Relative reversibility error (v)	%/ 10K	≤ 0.5
Temperature effect on zero signal (TK <sub>0</sub> )	%/ 10K	≤ 0.5
Temperature effect on sensitivity (TK <sub>C</sub> )	%/ 10K	≤ 0.5
Relative creep over 30 minutes (d <sub>cr, F+E</sub> )	%	≤ 0.5
Reference temperature (T <sub>ref</sub> )	°C	+23
Nominal temperature range (B <sub>T, nom</sub> )	°C	-25 ... +60
Service temperature range (B <sub>T, G</sub> )	°C	-30 ... +70
Storage temperature range (B <sub>T, S</sub> )	°C	-40 ... +70
Protection class (EN 60529)		IP 67
Instrument		
Digit height	mm	14
Display range		4 ½-digit range
Display modes		instantaneous, min/max, overload
Measurement rate (averaging)		50
Power supply	1/s	3xAA (inserted)
Dimensions (W x H x D)	mm	82,1x 161,7 x 53,8
Protection class (EN 60529)		IP 54

## EasyForcePro

Accuracy Class	% F <sub>nom</sub>	0.1
Force transducer		
Nominal force (F <sub>nom</sub> )	N kN	10/ 20/ 50/ 100/ 200/ 500 1/ 2/ 5/ 10/ 20/ 50
Maximum operating force (F <sub>G</sub> )	% F <sub>nom</sub>	150
Breaking force (F <sub>B</sub> )	% F <sub>nom</sub>	> 300
Lateral limit force (F <sub>Q</sub> )	% F <sub>nom</sub>	10
Relative linearity deviation (d <sub>lin</sub> )	%	≤ 0.5
Relative reversibility error (v)	%/10K	≤ 0.5
Temperature effect on zero signal (TK <sub>0</sub> )	%/10K	≤ 0.5
Temperature effect on sensitivity (TK <sub>C</sub> )	%/10K	≤ 0.5
Relative creep over 30 minutes (d <sub>cr, F+E</sub> )	%	≤ 0.5
Reference temperature (T <sub>ref</sub> )	°C	+23
Nominal temperature range (B <sub>T, nom</sub> )	°C	-25 ... +60
Service temperature range (B <sub>T, G</sub> )	°C	-30 ... +70
Storage temperature range (B <sub>T, S</sub> )	°C	-30 ... +70
Protection class (EN 60529)		IP 42
Instrument		
Digit height	mm	14
Display range		4 ½-digit range
Display modes		instantaneous, min/max, overload
Measurement rate (averaging)		50
Power supply	1/s	3xAA (inserted)
Dimensions (W x H x D)	mm	82,1x 161,7 x 53,8
Protection class (EN 60529)		IP 54

## 8. settings with the ASTAS software

The software **ASTAS** is the universal tool for configuration and simple measured value acquisition including evaluation.