Force Indicator

Original

Operating Manual

force Indicator

force Indicator pro

List of Contents

Further information on the Force Indicator Pro can be found on our website www.ast.de.

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1. Intended use

The mobile force-measuring devices **Force Indicator / Force Indicator Pro** serve to indicate forces or weights picked up by strain-gauge sensors (DMS). They are not intended to function as solitary devices for safety-relevant tests or measurements.

2. Method of functioning

The battery-operated display device provides the strain-gauge full bridge of the sensor with a stabilised supply voltage by means of 4 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.

- force Indicator functions only in the **compression direction**.
- force Indicatorpro functions in the **tension and compression direction**, in which case the tension direction is displayed as a positive value and the compression direction as a negative value.

IMPORTANT NOTICE!
The maximum value display **MAX** functions in the positive direction only!

2.1. Intended use of the force transducers

The force transducers (sensors) are intended to be 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 influences

Force transducers are measuring instruments. Depending on the protection class of the sensor they 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:

- 4 AA batteries (HR6 Mignon) or
- 4 rechargeable batteries 1.2 V

Charging of the rechargeable batteries is only possible outside the device.
The device leaves the factory with the batteries inserted. To replace the batteries, the battery compartment is opened using a Phillips screwdriver after which the used batteries can be removed and the new ones installed. It is advisable to remove the batteries if you do not intend to use the device over a longer period of time. The battery status is indicated by a flashing battery icon.

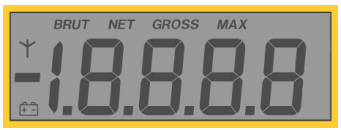
4. Installation and application

- 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

5.1. Switching on the device

1. **ON** actuate



2. Display test

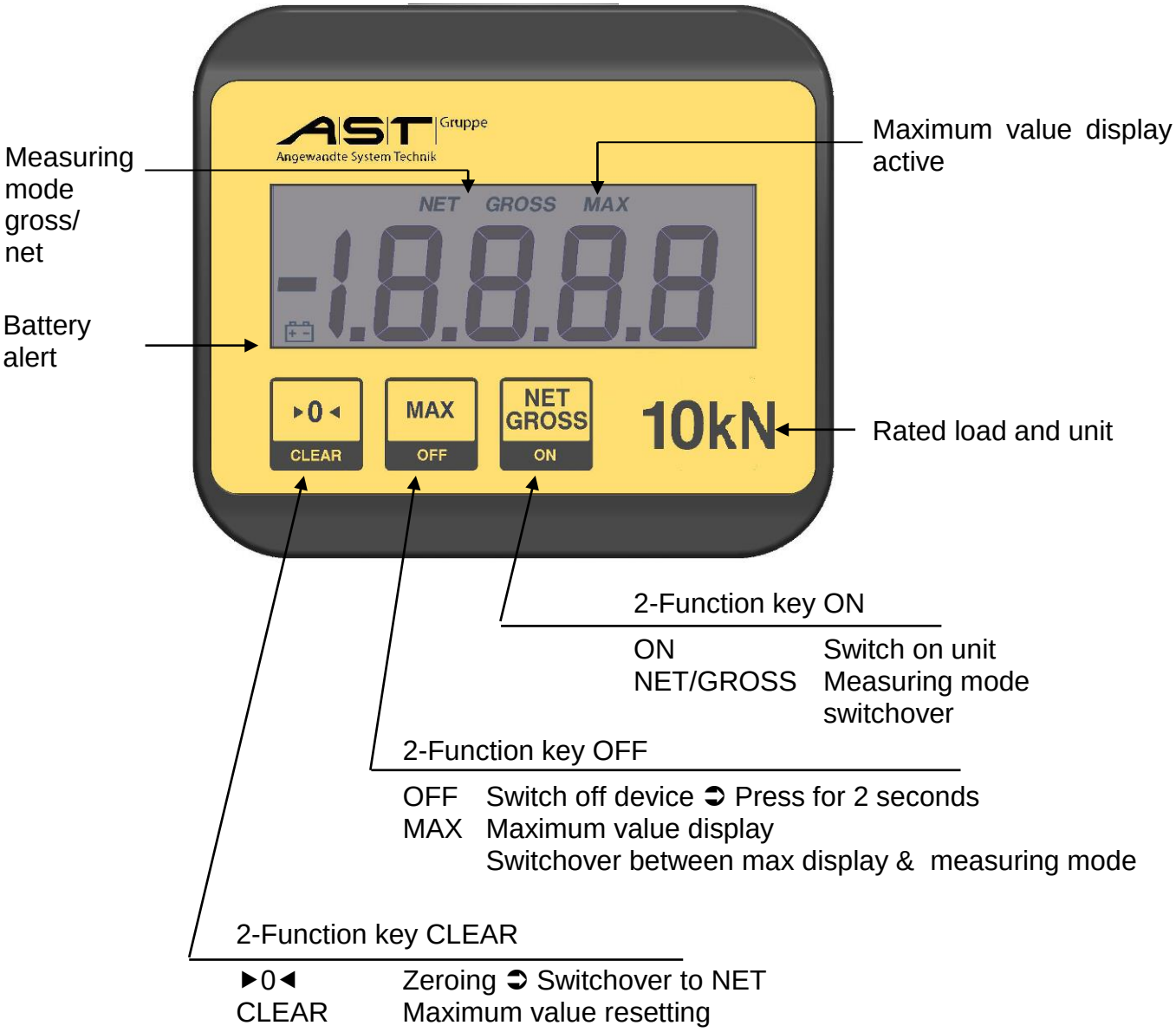
3. Rated load with measurement unit (Example: 10.00 kN)

4. Serial number (Example: 6008)

5. Battery-level display (Example: 5.44 (V))

6. Measuring mode (Example: 0.00)

5.2. Keypad and display



IMPORTANT NOTICE!
When switching off in the **NET** measuring mode the zeroed value remains stored in the memory. In the **GROSS** mode the value will be deleted!
MAX values are always deleted when the device is switched off!

5.3. Overload indicator

Overload display
10% above nominal force of sensor
(positive load direction)

Underload display
10% below nominal force of sensor
(negative load direction)

5.4. Battery status

Battery icon flashes: Replace battery soon
Battery icon on: Replace battery immediately

6. Technical data

Force Indicator

Accuracy Class	**% F_{nom}**	**0.5**
Force transducer		
Nominal force (F_{nom})	kN	0.1/ 0.2/ 0.5/ 1/ 2/ 5/ 10/ 20/ 50/ 100/ 200
Maximum operating force (F_G)	% F_{nom}	150
Breaking force (F_B)	% F_{nom}	> 300
Lateral limit force (F_Q)	% F_{nom}	50
Relative linearity deviation (d_{lin})	%	≤ 0.5
Relative reversibility error (v)	% / 10K	≤ 0.5
Temperature effect on zero signal (TK_0)	% / 10K	≤ 0.5
Temperature effect on sensitivity (TK_C)	% / 10K	≤ 0.5
Relative creep over 30 minutes ($d_{cr, F+E}$)	%	≤ 0.5
Reference temperature (T_{ref})	°C	+23
Nominal temperature range ($B_{T, nom}$)	°C	-25 ... +60
Service temperature range ($B_{T, G}$)	°C	-30 ... +70
Storage temperature range ($B_{T, S}$)	°C	-40 ... +70
Protection class (EN 60529)		IP 67
Instrument		
Digit height	mm	20.5
Display range		4-digit range
Display modes		Instantaneous/max. value, unit, overload
Measurement rate (averaging)	1/s	16
Power supply		4xAA (inserted)
Dimensions (W x H x D)	mm	118 x 102 x 35
Protection class (EN 60529)		IP 54

Force Indicator Pro

Accuracy Class	**% F_{nom}**	**0.5**
Force transducer		
Nominal force (F_{nom})	N	10/ 20/ 50/ 100/ 200/ 500
Maximum operating force (F_G)	kN	1/ 2/ 5/ 10/ 20/ 50
Breaking force (F_B)	% F_{nom}	150
Lateral limit force (F_Q)	% F_{nom}	> 300
	% F_{nom}	10
Relative linearity deviation (d_{lin})	%	≤ 0.5
Relative reversibility error (v)	% / 10K	≤ 0.5
Temperature effect on zero signal (TK_0)	% / 10K	≤ 0.5
Temperature effect on sensitivity (TK_C)	% / 10K	≤ 0.5
Relative creep over 30 minutes ($d_{cr, F+E}$)	%	≤ 0.5
Reference temperature (T_{ref})	°C	+23
Nominal temperature range ($B_{T, nom}$)	°C	-25 ... +60
Service temperature range ($B_{T, G}$)	°C	-30 ... +70
Storage temperature range L ($B_{T, S}$)	°C	-30 ... +70
Protection class (EN 60529)		IP 42
Instrument		
Digit height	mm	20.5
Display range		4-digit range
Display modes		Instantaneous/max. value, unit, overload
Measurement rate (averaging)	1/s	16
Power supply	mm	4xAA (inserted)
Dimensions (W x H x D)		118 x 102 x 35
Protection class (EN 60529)		IP 54

7. EC Declaration of Conformity

A.S.T. - Angewandte System Technik GmbH
Mess- und Regeltechnik

AST Gruppe
Angewandte System Technik

EG-Konformitätserklärung
EC Declaration of Conformity

No. 19/16

Hersteller: Manufacturer:	A.S.T. - Angewandte System Technik GmbH Mess- und Regeltechnik
Anschrift: Adress:	Marschnerstraße 26, 01307 Dresden Bundesrepublik Deutschland
Produktbezeichnung:	Force Indicator / Force Indicator pro
Product description:	Force Indicator / Force Indicator pro

Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

2014/30/EU Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit.
Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Die Konformität mit der Richtlinie 2014/30/EU wird nachgewiesen durch die Einhaltung folgender harmonisierter Normen:
Conformity to the Directive 2014/30/EU is assured through the application of the following harmonised standards:

Störfestigkeit: Interference resistance:	DIN EN 61000-6-2:2006-03
Störaussendung: Emitted interference:	DIN EN 61000-6-3:2011-09 EN 55011:2011-04

Die verwendeten Kraftaufnehmer entsprechen hinsichtlich ihrer Festigkeit (Punkt 4.1.2.3) den Bestimmungen der Richtlinie für **Maschinen (2006/42/EG).**
The used force transducers correspond in her strength to the provisions of the Machinery Directive.

Dresden, den 08.09.2016

i. A. Heinrich

gez. Dr.-Ing. Gerd Heinrich
Qualitätsmanagementbeauftragter

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