

Set IATA

for the measurement of airfreight
IATA Dangerous Goods Regulation Packing Instruction 953



Tripod with AS active probe AS-UAP-IATA

Teslameter FM 302 IATA

- Ranges $\pm 200 \mu\text{T}$, $\pm 20 \mu\text{T}$, $\pm 2 \mu\text{T}$
- compensation function $\pm 75 \mu\text{T}$
- Resolution nanotesla
- Min / Max display
- non-magnetic tripod
- Factory calibration certificate with traceability
- Made in Germany

The Set IATA contains the measuring devices and accessories required for the magnetic inspection of air freight shipments. The Teslameter FM 302 IATA as well as the AS-UAP-IATA axial AS-active-probe have been specially optimized for this measurement.

The limit values to be observed are specified in the IATA Dangerous Goods Regulation Packing Instruction 953. Background information on the measurement can be found in our website under "Search and Find" with "IATA-953".

Teslameter FM 302 IATA

With the Teslameter FM 302 IATA a special version of the Teslameter FM 302 is included in the set. The Teslameter FM 302 IATA has a very large compensation range for the zero function. When used with the AS-active-probe AS-UAP-IATA, fields up to $\pm 75 \mu\text{T}$ can be compensated.

In particular, it is possible, the proportion of the static geomagnetic field can be compensated for the measured value. The sensitivity of the FM 302 IATA can then be switched to x10 or even x100 without the device being overdriven by the earth's magnetic field. As a result, the measured value can be resolved to a few nanotesla when used with the AS-active-probe AS-UAP-IATA.

The minimum and maximum measurement functions make it easy to measure the strongest field deviation produced by a package.

AS active probe AS-UAP-IATA

The limit values ($0.525 \mu\text{T}$) specified in Packing Instruction 953 are very small values. These are far below the Earth's magnetic field (about $45 \mu\text{T}$). With the AS-active-probe AS-UAP-IATA included in the set, such small fields can be easily measured.

The probe has a maximum measuring range of $\pm 200 \mu\text{T}$. By switching the sensitivity of the Teslameter FM 302 IATA, small readings can be further resolved. The measuring ranges are $\pm 20 \mu\text{T}$ (sensitivity x10) and $\pm 2 \mu\text{T}$ (sensitivity x100).

The probe is equipped with a 6 m long cable to bridge longer distances between the instrument and the probe.

In order to easily fix the AS-active-probe AS-UAP-IATA to a tripod, the probe is provided with a suitable bore.



Tripod

A tripod is also part of the set. In order not to falsify the measured values, the tripod is made of non-magnetic materials.

With the tripod, the probe can be correctly aligned with the package to be tested and held during the measurement.

The telescopic legs of the tripod are doubly adjustable. The support arm for the probe is also adjustable in height and also in angle. The maximum probe height is 1,9m from the ground. The test setup can be adjusted individually to the respective size of the packages.

Usage

To measure the tripod is first set up. The AS-active-probe AS-UAP-IATA is screwed to the support arm of the tripod. The other end of the probe cable with the probe plug is connected to the Teslameter FM 302 IATA.

Teslameter FM 302 IATA and AS-active-probe AS-UAP-IATA are delivered calibrated at the factory. After plugging in, the measurement can be started immediately.

For full accuracy and stability of readings, the instrument and probe should run five minutes to warm up.

Supply

The Teslameter FM 302 IATA is powered by a 9 V battery. The operating time is thus > 20 hours. The exact time depends, inter alia, from the AS active probe used.

In addition, power can be supplied via an external 9V power supply or via the USB port.

Control

The Teslameter FM 302 IATA has numerous functions that can be controlled both via the keyboard and via USB interface.



Detailed information on the functions of the keys, the calibrated analogue output, the USB interface and the control software included in the delivery is provided in the separate data sheet of the Teslameter FM 302.

Measuring ranges and display unit

The FM 302 IATA offers the sensitivity levels x1, x10 and x100, which affect both the display and the analog output. Thus, even small readings can be reliably displayed.

Table 1 shows the resulting ranges and the transfer factors for the analog output.

probe	ranges factors with Teslameter FM 302 range x1, x10, x100										
AS-UAP-IATA:	x1	200,00 μ T	2,0000 G	2,0000 Oe	159,15 A/m	1,5915 A/cm					
	x10	20,000 μ T	200,00 mG	200,00 Oe	15,915 A/m	159,15 mA/cm					
	x100	2,0000 μ T	20,000 mG	20,000 mOe	1,5915 A/m	15,915 mA/cm					

Table 1

probe	transfer factors with Teslameter FM 302 range x1, x10, x100	
AS-UAP-IATA:	x1	2 V / 200 μ T
	x10	2 V / 20 μ T
	x100	2 V / 2 μ T

Table 2

Units

- T – Tesla
- G – Gauss
- Oe – Oersted
- A/m – Ampere per Meter
- A/cm – Ampere per Centimeter

For conversion of magnetic units see our application note “PE005 – Magnetic units of measurement and their conversion”.

Application Notes

On our website (<http://www.projekt-elektronik.com/applikation.php>) under Application you can find many additional documents with information, hints and examples for measuring of magnetic fields.

Questions?

Do you have any question about a measuring task? Call us, we would be pleased to advice you.

As manufacturer of this system we can fulfill your desires about developing AS-active-probes, changing of measurement range or other needs. Please call us or send us an email.

Gladly we accept your suggestions,

your PE – Team.

Technical data for Teslameter FM 302 IATA (without AS-active probe)

Measurement uncertainty DC	5 min warm up and after zeroing with zero function in x1: <math><0.1\% \pm 2 \text{ Digit}</math> (by 23 °C ± 1 °C) in x10: <math><0.1\% \pm 5 \text{ Digit}</math> (by 23 °C ± 1 °C) in x100: <math><0.1\% \pm 20 \text{ Digit}</math> (by 23 °C ± 1 °C)
Adjustable offset	Offset adjustable with zero function > ± 7500 Digit in the most insensitive area B3 (x1) corresponding > ± 75 μT when using the AS-UAP-IATA
Zero drift	typical ± 2 Digit/K (DC) in range B2 (x10) corresponding ± 2 nT/K when using the AS-UAP-IATA

other technical data equal to Teslameter FM 302 (see data sheet Teslameter FM 302)

Technical data for AS active probe AS-UAP-IATA

Ranges (with FM 302)	$\pm 2 \mu\text{T}$; $\pm 20 \mu\text{T}$; $\pm 200 \mu\text{T}$
Case length	137 mm
Case width	28 mm
Case thickness	17 mm
Bore for attachment	$\varnothing 6.3$ mm
Transfer factor	1 V / 100 μT
Bandwidth (-3 dB)	0 – 500 Hz
Linearity error	<math><0.8\% \pm 0.2 \mu\text{T}</math> (by 25 °C)
Temperature coefficient	max. $\pm 0.1\%/K$ (10 °C to 50 °C)
Zero drift	max. ± 10 nT/K
Hysteresis	max. 0.1 % from the measured value
magnetic flux density	max. $\pm 200 \mu\text{T}$, bzw. 140 μT_{eff}
Noise	typ. 6 nT _{PP} (DC – 10 Hz, 50 s)
Operation temperature range	+5 °C to +50 °C
Storage temperature range	-10 °C to +60 °C
Max. relative humidity	70 % to +35 °C
Power	± 3 V by FM 302, AS-probe adapter, AS-Adapter 3 or PLC
Length of cable	6 m

Technical data Tripod

Material	nonmagnetic
Attachment probe	bolt M6
Adjustable probe height	0 – 1.9 m over ground
Transport length	72 cm
Weight	1.2 kg (including carrying bag)

included in delivery of Set IATA

Teslameter FM 302 IATA

- in case with replacement battery
- Factory calibration certificate
- 1.8 m USB cord
- CD with driver and control software

AS-active probe AS-UAP-IATA

- in case
- Factory calibration certificate

Tripod

- in carrying bag

Instructions

- with supplement measurement according to IATA 953

