



JADUAL

AKTA TIMBANG DAN SUKAT 1972

**PERATURAN-PERATURAN TIMBANG DAN SUKAT
(KEWAJIPAN DAN KUASA PENYIMPAN) 1981
(Peraturan 11)**

No. Kelulusan: ATS 16/17

PERAKUAN KELULUSAN TIMBANG/SUKAT/ALAT TIMBANG/ALAT SUKAT

Perihalan	: Tolok Aras Automatik
Pembuat	: Endress+Hauser GmbH + Co. KG Hauptstrasse 1 79689 Maulburg, Germany
Jenama	: Endress+Hauser
Model	: NMR8x
Penentuan teknikal	: Lihat Lampiran 1 (Spesifikasi Teknikal)
Catatan	: Lihat nota

Adalah diperakukan bahawa Tolok Aras Automatik di atas telah diluluskan sebagai sesuai bagi kegunaan perdagangan tertakluk kepada syarat yang berikut:

Sebarang pengubahsuaian alat di atas wajib dimaklumkan kepada Penyimpan Timbang dan Sukat dan ianya tertakluk kepada kelulusan seterusnya.

Tarikh : 22.02.2018

(Penyimpan Timbang dan Sukat)
MAKMAL STANDARD PENGUKURAN KEBANGSAAN

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SIRIM Berhad

Nota :

1. Perakuan ini adalah berkaitan dengan kesesuaian alat diatas bagi kegunaan perdagangan sahaja berkenaan ciri-ciri metrologinya. Ia tidak boleh dijadikan atau membayangkan apa-apa jaminan mengenai keselamatannya dalam penggunaan bagi perdagangan atau selainnya.
2. Kelulusan ini adalah sah bagi tempoh 10 tahun.

LAMPIRAN 1

TECHNICAL SPECIFICATION

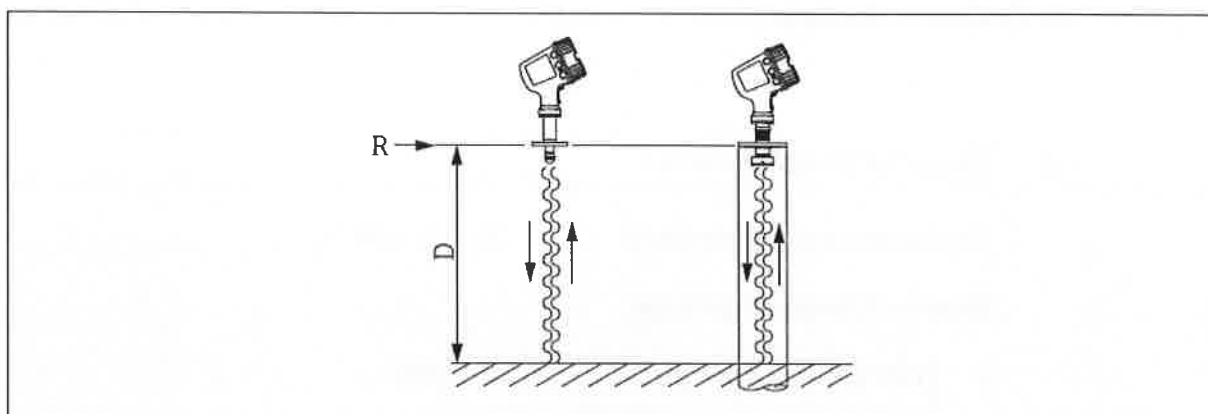
DESCRIPTION	: Automatic Level Gauge
MANUFACTURER	: Endress+Hauser GmbH + Co. KG Hauptstrasse 1 79689 Maulburg, Germany
APPLICANT	: Endress+Hauser (M) Sdn. Bhd. 4 th Floor, Lot 10 Jalan Astaka U8/84, Seksyen U8 40150 Shah Alam, Selangor Darul Ehsan Malaysia
MODEL	: NMR8x

1.0 Principle of Operation of the automatic level gauge

Micropilot NMR8 Series tank gauges are designed for liquid level measurement in storage and process application.

Measuring principle:

Micropilot is a directional level radar, operating based on the "Frequency-Modulated Continuous Wave" principle (FMCW). The radar emits a precise crystal-oscillated, continuously varying frequency wave from the antenna. The wave is reflected off the product surface and received again by the radar system.



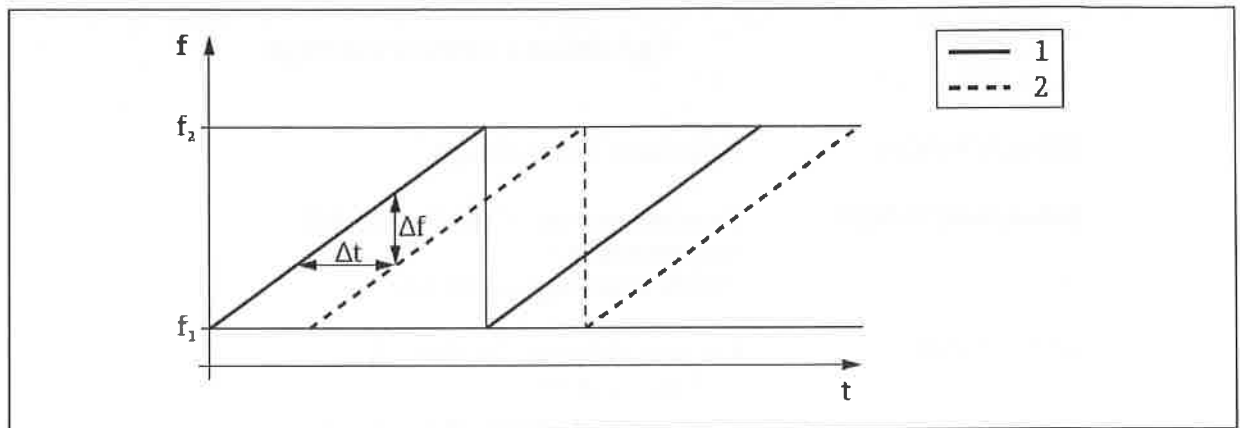
AD023768

1 FMCW principle: Emission and reflection of the continuous wave.

R Reference point of the measurement

D Distance between R and the product surface

The frequency of this wave is precisely modulated in the form of a sawtooth signal between two limit frequencies f_1 and f_2 :



2 FMCW principle: Results of the frequency modulation

- 1 Emitted signal
2 Received signal

Thus, at any given time the frequencies of the emitted and the received signal differ by

$$\Delta f = k \Delta t$$

where Δt is the transit time and k is the known slope of the frequency modulation.

Δt , on the other hand, is determined by the distance D between the reference point R and the product surface:

$$D = (c \Delta t) / 2$$

where c is the speed of propagation of the wave.

In summary, D can be calculated from the measured frequency shift Δf . D is then used to calculate the contents of the tank.

2.0 Essential Characteristics

Temperature range ambient : -25 °C / +55 °C

Maximum measuring range

- Type NMR84 size DN100 : 20 meter
- Type NMR84 size > DN100 : 30 meter
- Type NMR81 : 30 meter

It should be noted that certain applications are possible if and only if a correctly functioning system is implemented for temperature compensation for expansion of the tank shell or stilling well. The actual maximum measuring height is determined per

application. Prior to that the manufacturer shall prove, by calculation and by measurements, that the intended application can be considered legal.

2.1 Indication

- Indication of the measured level, in m or mm, with a resolution of 0.1 mm.
- Indication of status messages, error messages and alarm messages
- Indication of the device locking status.

2.2 Liquid product range

Application of the level gauge is allowed on the following products:

- Liquids, stored under atmospheric conditions, with the restriction that no heavy foam is present; and
- Liquids of which the vapour influence does not affect the legal aspects of the accuracy.

3.0 Conditional Parts

The material of the housing of the level gauge is aluminium or stainless steel.

4.0 Seals

The following seals are applied:

- A seal or sealing sticker has to be place over the key switch after system is configured and sealed and switch is closed;
- The data plate is fixed to the level gauge and secured against removal by seal or it will be destroyed when removed;
- The housing is sealed against opening.

5.0 Identification

Figure 1: Photo of NMR81

Figure 2: Photo of NMR84

Figure 3: Sealing

- Figure 4: Assembly Drawing of NMR8x Housing

Figure 5: NMR81 Sensor

Figure 6: NMR84 Sensor

6.0 Reference

Reference should be made to the following documents for additional information on this equipment:

- NMI (The Netherlands) Type Approval Certificate (T8910 revision 0) and the Documentation folders T8910-1
- OIML R 85-1 & 2, 'Automatic level gauges for measuring the level of liquid in stationary storage tanks

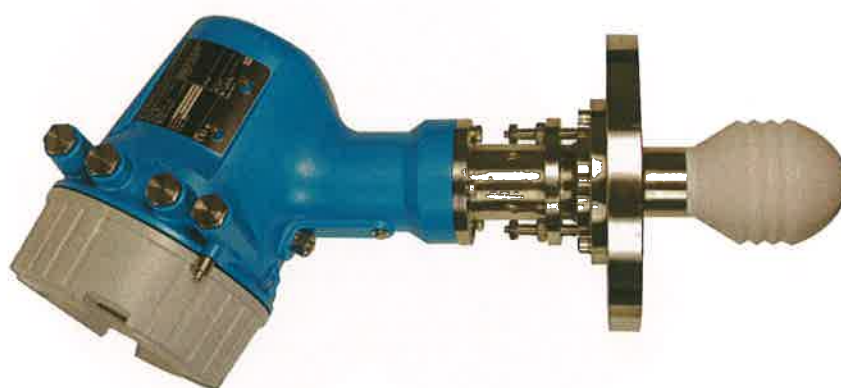
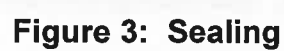


Figure 1: Photo of NMR81



Figure 2: Photo of NMR84





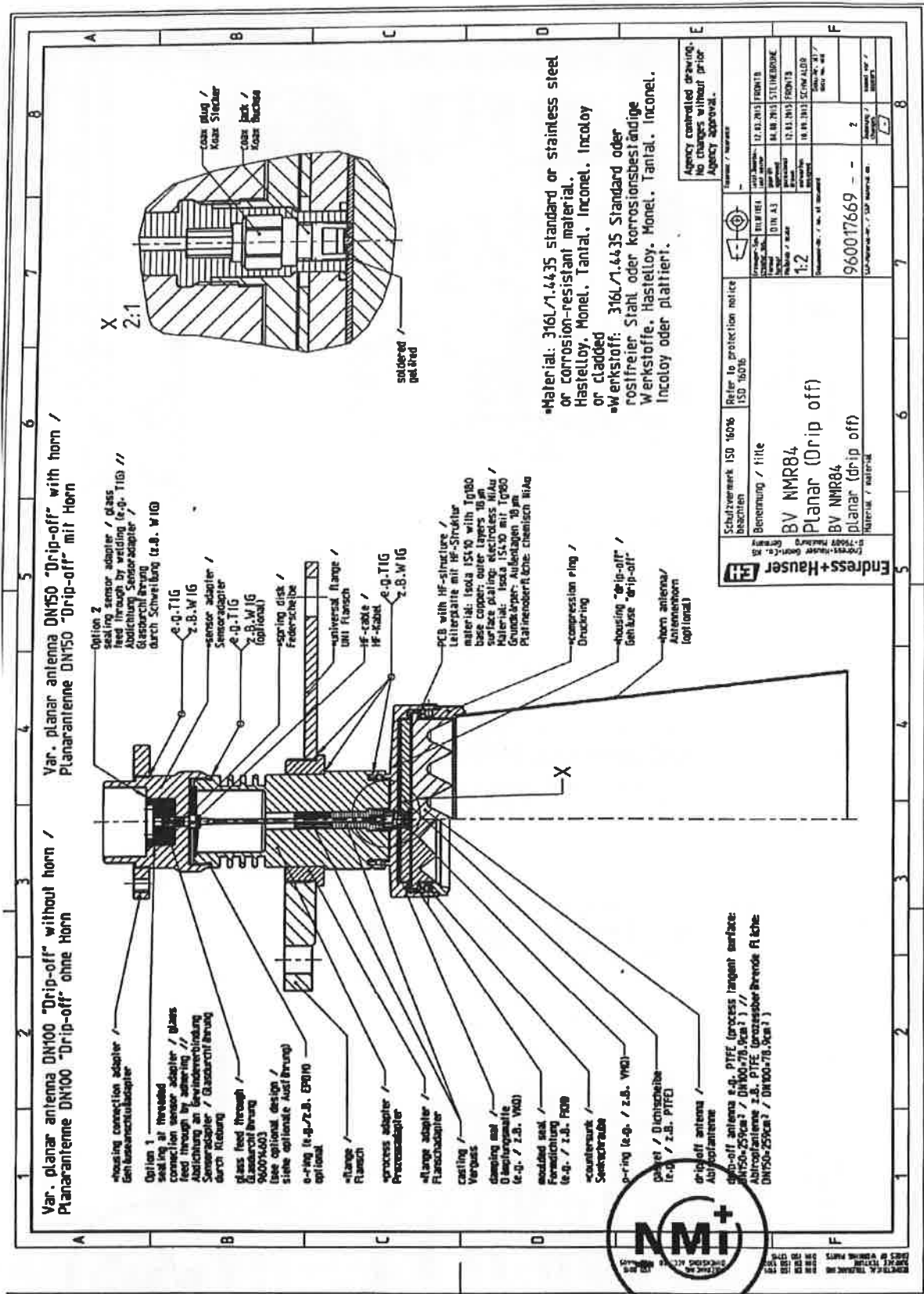


Figure 6: NMR84 Sensor