



JADUAL

AKTA TIMBANG DAN SUKAT 1972

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

No. Kelulusan: ATS 15/17

PERAKUAN KELULUSAN TIMBANG/SUKAT/ALAT TIMBANG/ALAT SUKAT

Perihal	: Alat Pengukuran Suhu Dalam Tangki
Pembuat	: Endress+Hauser Yamanashi Co., Ltd. 862-1 Mitsukunugi Sakaigawa-cho Fuefuki-shi Yamanashi 406-0846 Japan
Jenama	: Endress+Hauser
Model	: Prothermo NMT539
Penentuan teknikal	: Lihat Lampiran 1 (Spesifikasi Teknikal)
Catatan	: Lihat nota

Adalah diperakukan bahawa Alat Pengukuran Suhu Dalam Tangki di atas telah diluluskan sebagai sesuai bagi kegunaan perdagangan tertakluk kepada syarat-syarat yang berikut:

Syarat-syarat kelulusan :

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

Tarikh : 16.11.2017

(Penyimpan Timbang dan Sukat)
MAKMAL STANDARD PENGUKURAN KEBANGSAAN

DR. OSMAN HJ. ZAKARIA
Pengarah Kanan
Institut Metrologi Kebangsaan Malaysia
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

Appendix 1

TECHNICAL SPECIFICATION

DESCRIPTION	: Temperature Measurement Equipment In Tank
MANUFACTURER	: Endress+Hauser Yamanashi Co., Ltd. 862-1 Mitsukunugi Sakaigawa-cho Fuefuki-shi Yamanashi 406-0846, Japan.
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	: Prothermo NMT539

1.0 Construction

Prothermo NMT539 is a temperature measuring equipment used in tank farms (tank thermometer). It is a multielement temperature device for determination of the average temperature from single measured spot temperatures, fixed connected to a transducer without display (see Figure 1).

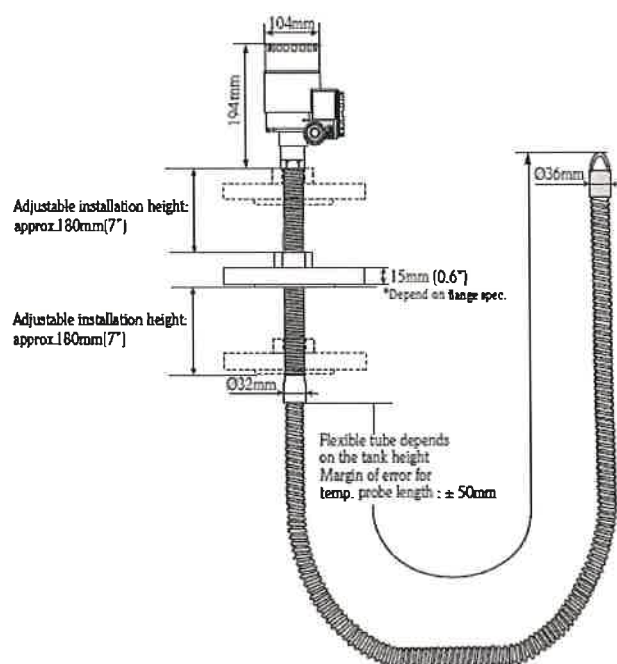


Figure 1: Construction of Prothermo NMT539

Communication is done by HART-Bus-connection to a Tank Side Monitor NRF590 (Figure 2) or to a level gauge Proservo NMS53x (Figure 3).

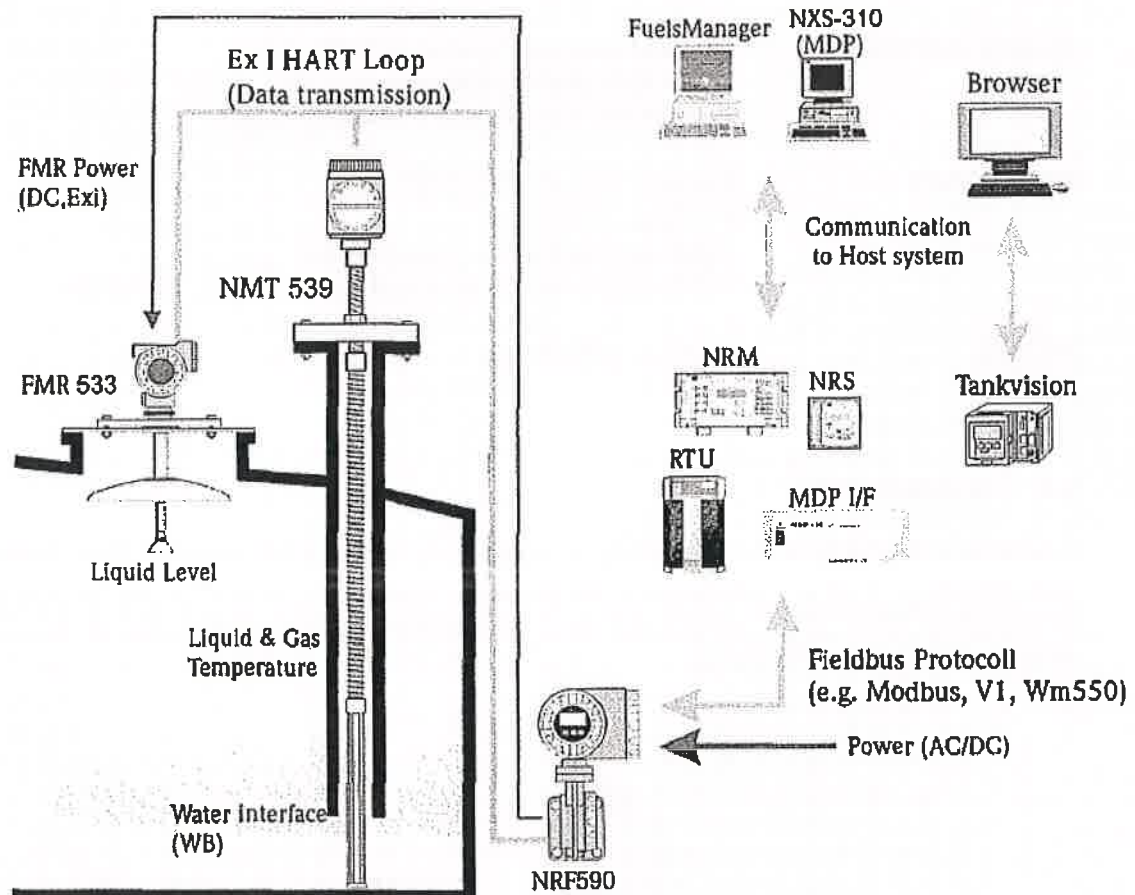


Figure 2: Configuration with Tank Side Monitor NRF590

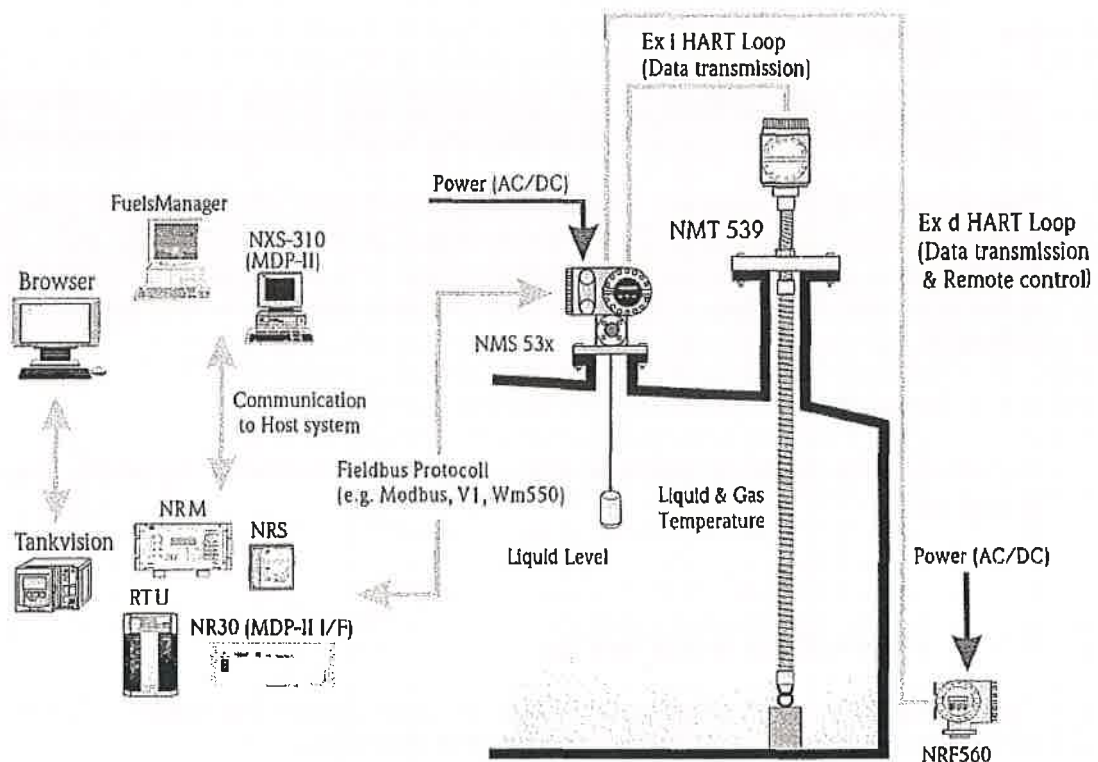


Figure 3: Configuration with level gauge Proservo NMS53x

2.0 Measuring Transducer

The temperature transducer (resistance thermometer chain) consists of maximum 16 serially connected measuring resistors with Pt100, 1/10 DIN Class B characteristics, in a flexible protection tube, each with a separate feedback wire. The feedback wires of the single measuring resistors are electrically connected at the bottom of the measuring transducers and are operated in a modified 3-wire circuit.

The first measuring resistor is located at the lowest point of the measuring transducer, located about 100 mm above the bottom end of the measuring transducer. The bottom end of the measuring transducer is normally fixed at a distance of 400 mm above the tank bottom.

The remaining measuring resistors are evenly (maximum distance 300 mm) distributed over the length of the measuring transducer. The maximum length of the temperature transducers is 40 m. The temperature transducer is connected to a converter unit via a pluggable connection.

The measuring transducer can additionally be equipped with a capacitive water-bottom sensor.

3.0 Measuring Processing

3.1 Hardware

The converter unit consists of the processing unit, power supply, connectors with a filtering unit and optionally a C/F- converter unit for the water-bottom measurement.

The processing unit consists of the measurement point multiplexer, amplifier, constant current source, 16bit ADC, 16 bit single-chip CMOS microcomputer with 256kB flash memory and also the HART-Bus interface. Two precision resistors fix the characteristic curve at 49 and 200 Ohm. A third 100 Ohm precision resistor is used for the function error detection.

3.2 Software

According to the NMT539 software description V01_04 dated 2008/04/09. Version 01.5x is approved.

4.0 Measurement Value Display

The display of the measurement value is done in the connected Tankside Monitor NRF590 or in the Servo Level Gauge Proservo NMS53x.

5.0 Technical Data

Measuring range	: -20 °C to +120 °C
Minimum measuring range	: -20 °C to + 75 °C
Minimum immersion depth	: 500 mm
Settling time t_{90}	: 30 min (water)
Ambient temperature range	: -40 °C to +85 °C

6.0 Calibration Error limits

- Error limits for the minimum measuring range : 0.5 °C
- Error limits for the temperature trasducer : 0.3 °C
- Error limits for the electronic display device : 0.2 °C

7.0 Identification

Figure 4: Photo of Prothermo NMT539

8.0 Reference

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

- PTB (Germany) Type-approval certificate, Reference No: PTB-7.6-4033598



Figure 4: Photo of Prothermo NMT539