



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Operating Instructions

Tank Computer NRM 571

Multi-function receiver for remote gauging system
(Max.40 sensors connectable)



Function and system design

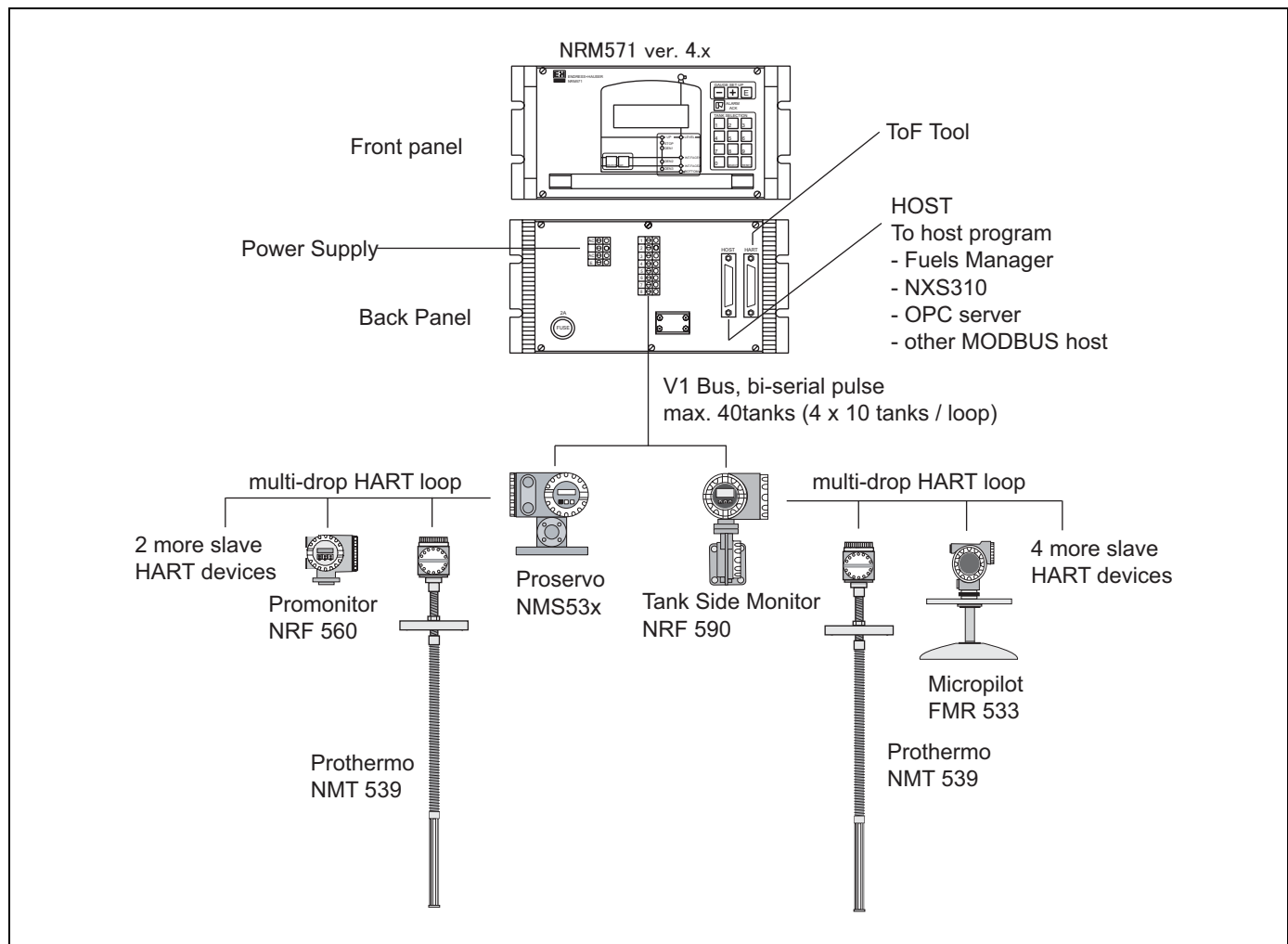


Fig.1 Tank Computer NRM 57x in Endress+Hauser tank gauge device layout

Measuring System

The Tank Computer NRM 571 is a uniquely featured Endress+Hauser tank gauge interface unit designed for relatively small to medium sized tank farms with connectivity to up to 40 tank sensors.

Tank information (level, temperature, density, etc.) are carried on the field bus via the Proservo NMS 53x or Tank Side Monitor NRF 590 to the NRM in the control room. Then, the measured and processed information within the NRM are transmitted to the desired host program

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1 Safety instructions

1.1 Designated use

The Tank Computer NRM 571 is a unique intelligent interface unit, combined with data display, calculation and gauge operating functions, to meet the tough demands of today's tank gauging requirements. Unlike a conventional loop connection field interface unit, the Tank Computer NRM 571 is able to display the measured values of level, interface level, density, pressure and water dip along with gauge status and alarm signals on the integrated LCD display.

The NRM 571 can be connected to up to 40 sensors via V1 bi-serial communication in order to collect measured values. These data can be directly transmitted and /or calculated by an integrated conversion table within the Tank Computer to the host tank gauge program via RS 232C output. With integrated front panel key pads, an operator can directly command gauges without an auxiliary remote controller.

1.2 Installation, commissioning and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility.
- Personnel must absolutely and without fail read and understand this Operating Manual before carrying out its instructions.
- The instrument may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system is to be grounded.
- Please observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.

1.3 Note for Handling

Power cable

- Use cables recommended by Endress+Hauser.
- Be sure to ground the cables. For details, refer to "Device Connections" and "Installation"

Grounding

- Do not remove a ground terminal while power is on.
- For details, refer to "Device Connections"

Handling of NRM

- The Tank Computer NRM may be connected to the peripheral devices described in this manual. For use of these devices, please refer to their respective operating manuals. To avoid accidents and injury, operate this device according to guidelines provided.

1.4 Operational safety

Hazardous area

Measuring systems for use in hazardous environments are accompanied by separate "Ex documentation", which is an integral part of this Operating Manual. Strict compliance with the installation instructions and ratings as stated in this supplementary documentation is mandatory.

- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as well as national and local regulations.

FCC approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Power source

If the device uses a separate power supply, verify that the power supply voltage matches that of the device before turning on power.

External connection

If external connections are required, before connecting the device to an external control circuit, provide protective grounding

Caution!

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.5 Return

The following procedures must be carried out before the NRM 57x is sent to Endress+Hauser for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Endress +Hauser transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example, safety data sheet as per EN 91/155/EEC.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, poisonous, carcinogenic, radioactive, etc.

A copy of the "**Declaration of Contamination**" is included at the end of this operating manual.

Caution!

- No instrument should be sent back for repair without all dangerous material being completely removed first, e.g. in scratches or diffused through plastic.
- Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel (burns, etc.). Any costs arising from this will be charged to the operator of the instrument.

1.6 Disposal

In case of disposal, please separate the different components according to their material consistency.

1.7 Software history

Software version / Date	Software changes	Documentation changes
V 2.00.00 1999	Original software.	
V 4.01.03 06.2005	Density profile data from Proservo removed Rackbus RS-485 input configuration by ToF Tool (V 4.00)	

1.8 Contact addresses of Endress+Hauser

The addresses of Endress+Hauser are given on the back cover of this operating manual. If you have any questions, please do not hesitate to contact your E+H representative.

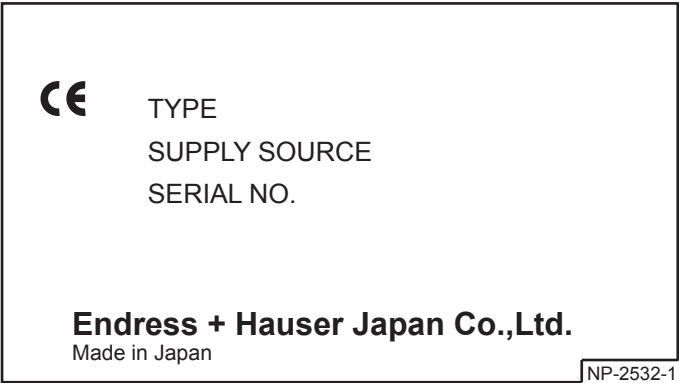
1.9 Notes on safety conventions and symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding symbol in the margin.

Safety conventions	
	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument
	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument
	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned
Explosion protection	
	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate, it can be installed in an explosion hazardous area
	Explosion hazardous areas Symbol used in drawings to indicate explosion hazardous areas. – Devices located in and wiring entering areas with the designation “explosion hazardous areas” must conform with the stated type of protection
	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. – Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas
Explosion protection	
	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied
	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied
	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system
	Protective grounding (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment
	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice

2 Identification

2.1 Nameplate



2.2 Product structure

10	Model type				
	1	Panel mounted type			
	2	Desktop type			
	9	Special version			
20	Power supply				
	1	AC85 ~ 264 V, 50/60Hz			
	9	Special version			
30	Input				
	D	V1 Serial Pluse (software ver. 4.x density Profile)			
	Y	Special version			
40	Output				
	A2	RS232C			
	Y	Special version			
50	Tank table				
	14	Basic version(100 points)			
	99	Special version			
60	Tank data configuration				
	0	Not required (customer configuration)			
	1	Required (factory configuration)			
NRM571-					
Complete product designation					

2.3 Scope of delivery

- Instrument according to the version ordered
- ToF Tool (operating program)
- Operating manual (this manual)

2.4 Operating Manual (BA 005N, this booklet)

Describe the installation and commissioning of the Tank Computer NRM 57x .

2.5 Certificates and Approvals

CE mark, declaration of conformity

The instruments is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate. The instrument complies with the applicable standards and regulations and thus complies with the statutory requirements ofthe EG directives.
Endress+Hauser confirms the successful testing of the instrument by affixing to it the CE mark.

2.6 Registered trademark

HART®
Registered trademark of HART Communication Foundation, Austion, USA
ToF®
Registered trademark of the company Endress+Hauser GmbH+Co.KG, Maulburg, Germany

3 Installation

3.1 Incoming acceptance, transport, storage

3.1.1 Incoming acceptance

Check the packing and contents for any signs of damage.

Check the shipment, make sure nothing is missing and that the scope of supply matches your order.

3.1.2 Transport



Caution!

Follow the safety instructions and transport conditions for instruments of more than 4.5kg

3.1.3 Storage

Pack the measuring instrument so that it is protected against impacts for storage and transport. The original packing material provides the optimum protection for this.

The permissible storage temperature is

- -10 to +60 °C

3.2 Installation Conditions

3.2.1 Dimensions, Weight

The Tank Computer NRM can be used as a rack mount type or desktop type depending on installation conditions.

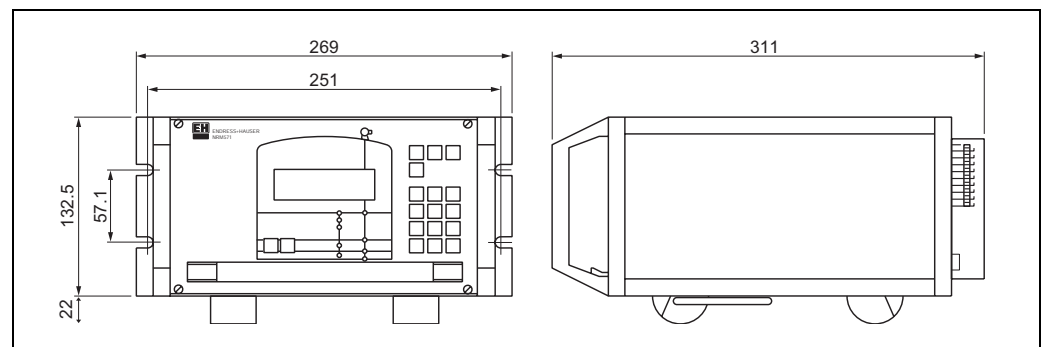


Fig 2. NRM dimension

Weight

About 4.5 kg

3.2.2 Panel Cut

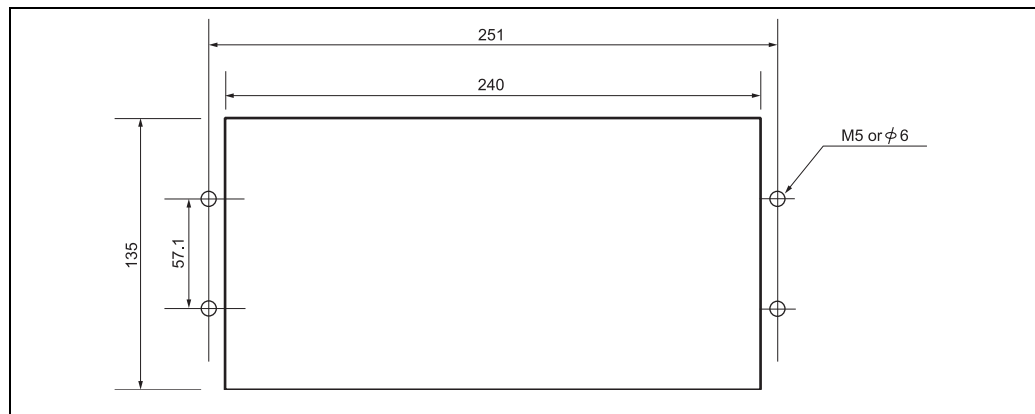


Fig 3. NRM rack mount panel cut dimension

Note!

Thickness of rack mount installation panel shall be more than 2mm.

3.2.3 Installation environment

- Temperature : 0 to +50°C
- Humidity (no condensation) : 20 to 80 %

3.2.4 Electricity

- Input voltage : AC85 to 264V
- Input frequency : 50 / 60 Hz
- Power consumption : 13 VA
- Ground resistance : 10 ohm or less

3.3 Electrical connection

Terminal connections for power, field sensors, service tools and host CPU are located on the back panel of the NRM.

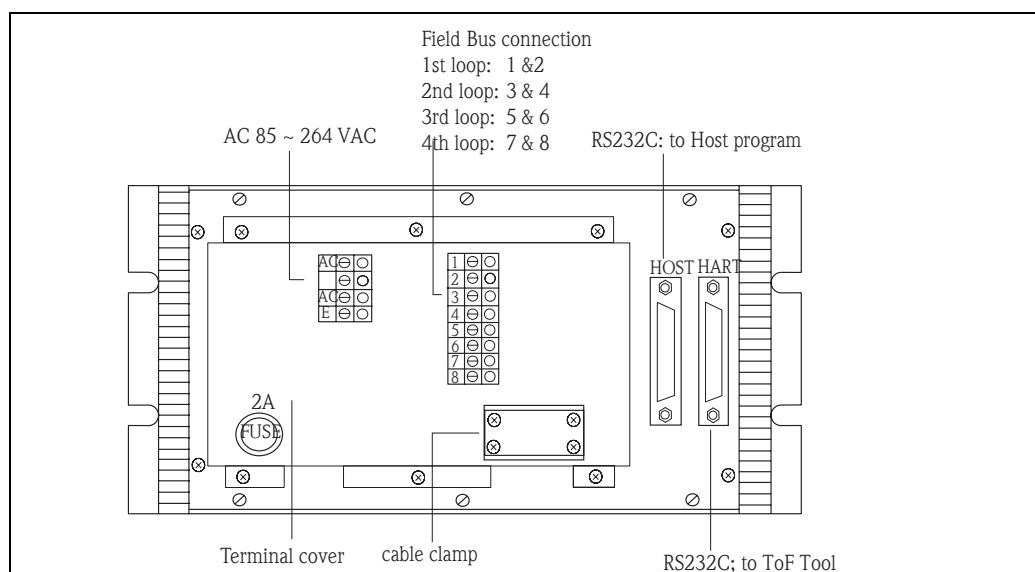


Fig 4. NRM terminal connection

- Fuse:2A
- Terminal cover:Be sure to install this cover after wiring.
- Cable clamp:Fix a cable by its shielded portion.
- Connector for host:RS 232C connector for host (D-SUB 25S)
- Connector for HART maintenance:For maintenance (D-SUB 25S)

3.4 Device Connections

Prepare a separate power supply (AC) for sensors.



Warning!
Be sure to disconnect power to NRM before connecting the devices.

3.4.1 Sensor Communication

Sensor type	Signal Input	Refer to
NMS, TGM, TMD, MX/MS	V1 serial bus (V1, MDP)	3.4.2 V1 serial bus communication

3.4.2 V1 Serial bus

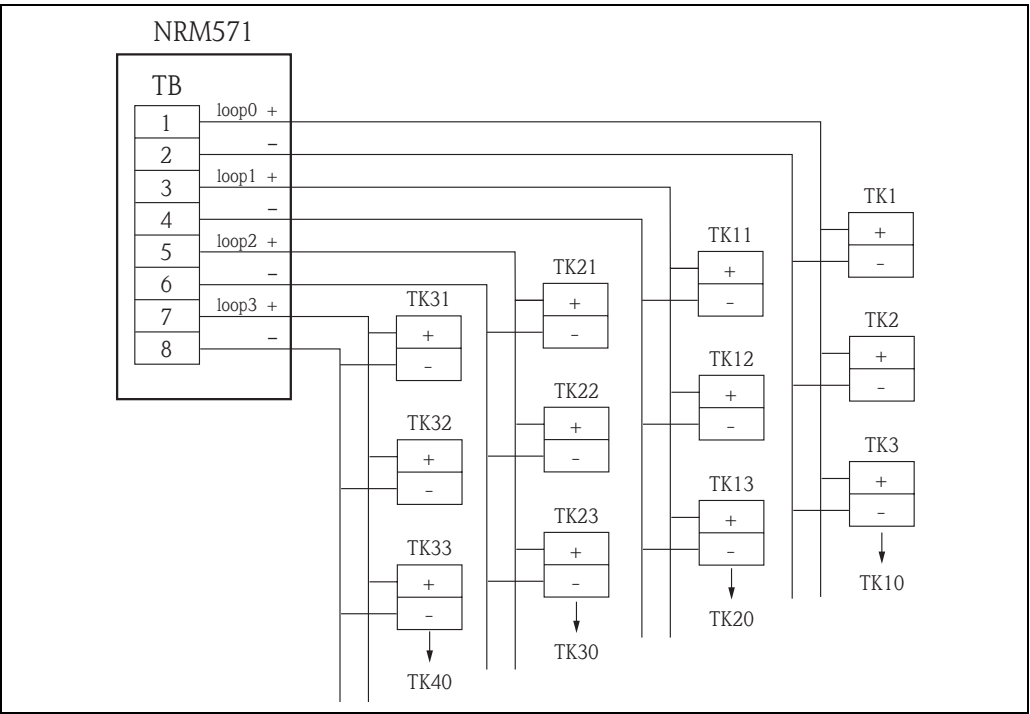


Fig 5. V1 Communication

This connection diagram shows a configuration in which 40 sensors (NMS/ TGM/ TMD(MX/MS)) are connected. As for sensor connection, refer to sensors' operating manual for where cable should be connected. There are 4 loops (1-2, 3-4, 5-6, 7-8). Each loop can connect 10 sensor maximum. Different types of signals cannot be mixed but different types of sensors can exist in one loop.



Note!
If the sensor communication is DX, maximum of 1 sensor can be connected per loop.

3.4.3 Host Communication

3.4.3.1 RS232C Communication

The RS232C output (host communication) uses the connector (D-SUB25S)

3.4.4 Power Supply

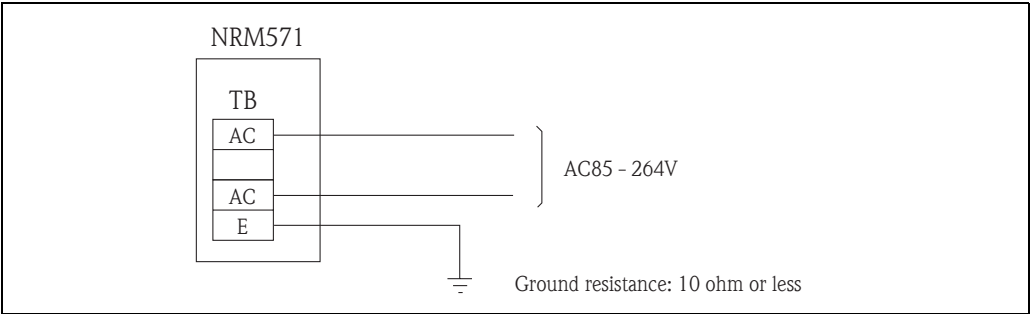


Fig 6. Power Supply

3.5 Wiring

communcation	Cable material	Recomended
V1 serial bus (sensor to NRM)	Twisted pair cable	IEC 60708
Power cable (sheath)	PVC = Polyvinyl Chloride PE = Polyethylene	Use wires capable of withstanding 600V

3.5.1 Shield cable Covering

Remove an extra 20 mm of the coating from the shield portion of the shield cable so that it can be fixed to the rear panel using a cable clamp.

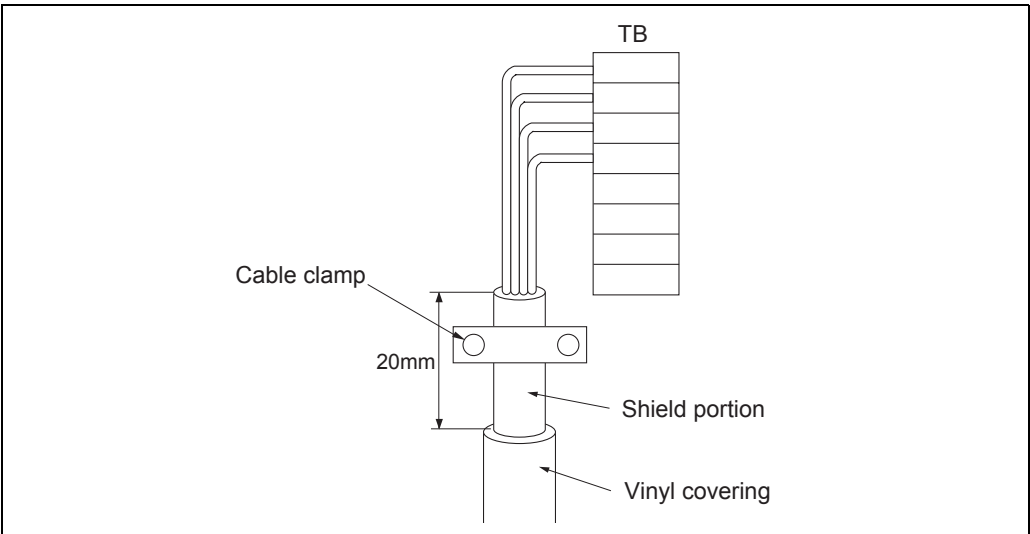


Fig 7. Shield cable covering

After the wirings are completed, install the attached terminal block cover.

4 Operation

4.1 Preparing for Operation

4.1.1 Check before power-on



Caution!

Before power-on please note the following:

- The input power voltage must be within the rated voltage range.
- The cable must be correctly connected to the terminal block.
- The fuse on the rear surface of the Tank Computer NRM 571 has the rated current (2A).

4.1.2 Power-on

Turn on the power to switch or breaker which is provided by user.

4.1.3 Power-off

Turn off the power switch provided by the user.

To disconnect, turn off the power for the Proservo NMS 53x and the Tank Gauging TGM 4000.

4.1.4 Initial Set Values

In the Tank Computer NRM 571, basic data required for operation is registered in the internal matrices. Since default values are written to the attached matrices before shipment, these settings should be changed according to the user's needs.

For basic steps in setting these values, please refer to "Initial Adjustment".

4.2 Operation

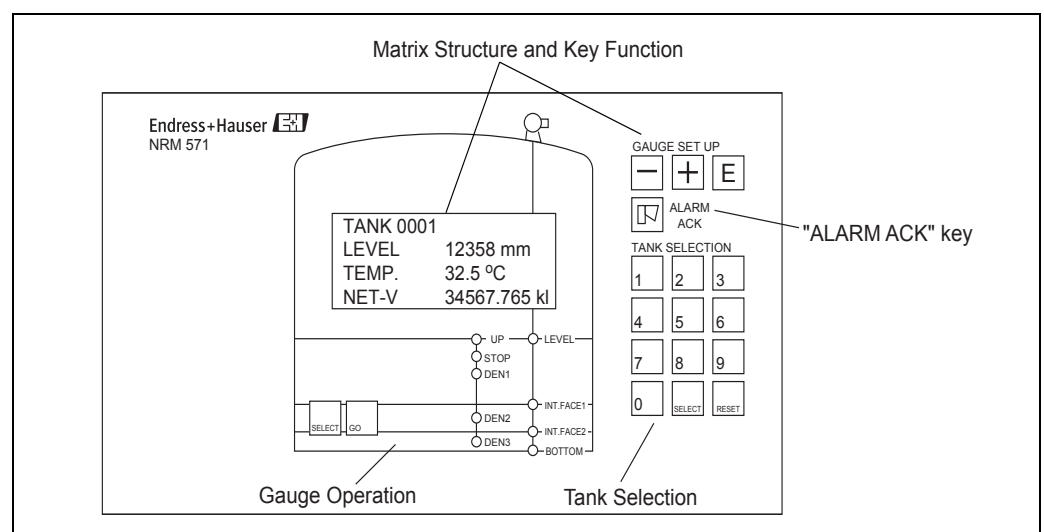


Fig 8. NRM Front Panel2

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