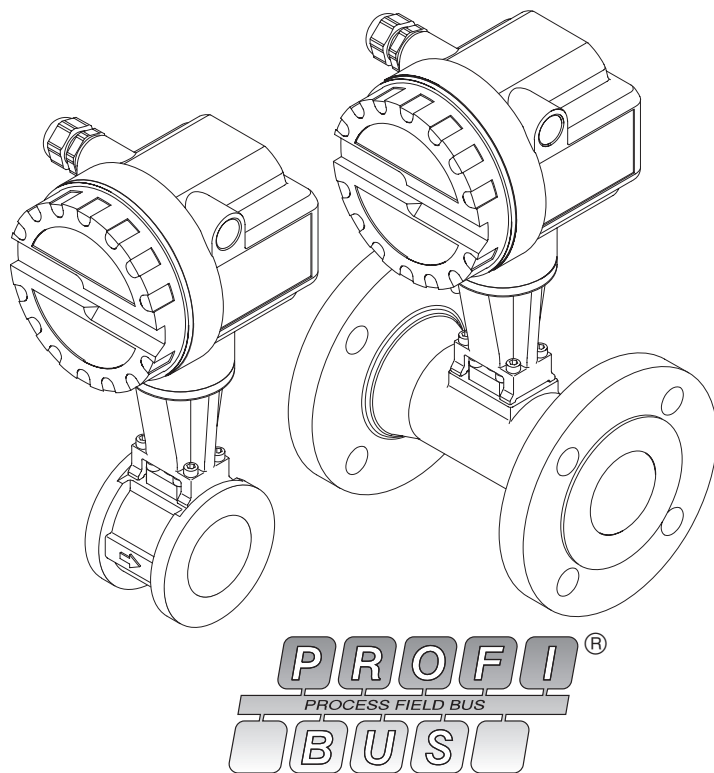
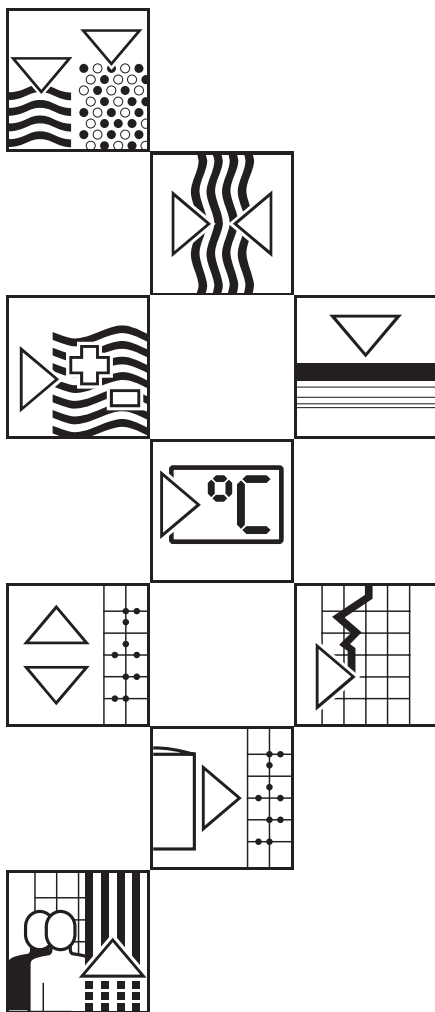


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prowirl 77 **Vortex Flow Measuring System (PROFIBUS-PA)**

Operating Manual



Endress + Hauser
The Power of Know How



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1 Safety Instructions

1.1 Correct usage

- Prowirl 77 is only to be used for measuring the volumetric flowrate of saturated steam, superheated steam, gases and liquids. If the process pressure and temperature are constant, then Prowirl 77 can also indicate the flowrate in units of mass, energy or corrected volume.
- The manufacturer assumes no liability for damage caused by incorrect use of the instrument.
- Instruments which are ordered with hazardous area approvals are supplied with a separate "Ex documentation", which is an integral part of this Operating Manual. The instructions and connected loads provided in this supplement must be closely observed! An appropriate pictogram is shown on the front page of the Ex documentation according to the approval given and the test centre.



1.2 Dangers and Notes

All instruments are designed to meet state-of-the-art safety requirements, have been tested, and have left the works in an operationally perfectly safe condition. The devices were developed according to EN 61010 "Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures". A hazardous situation may occur if the flowmeter is not used for the purpose it was designed for or is used incorrectly. Please carefully note the information provided in this Operating Manual indicated by the pictograms:

Warning!

A "warning" indicates actions or procedures which, if not performed correctly, may lead to personal injury or a safety hazard.

Please strictly observe the instructions supplied and proceed carefully.



Caution!

A "caution" indicates actions or procedures which, if not performed correctly, may lead to faulty operation or destruction of the instrument. Please strictly observe the respective instructions.



Note!

A "note" indicates actions or procedures which, if not performed correctly, may indirectly affect operation or lead to an unexpected instrument response.



1.3 Operational safety

- The Prowirl 77 measuring system fulfills the general safety regulations according to EN 61010 and the interference immunity regulations (EMC) according to European standard EN 50081 Part 1 and 2 / EN 50082 Part 1 and 2 as well as NAMUR recommendations.
- Housing ingress protection IP 67 according to EN 60529.
- A comprehensive self-monitoring feature of the measuring system ensures high operational safety.
- After loss of power supply (which is provided by the field bus), the configuration data of the measuring system remain in the EEPROM (without batteries). The totalizer remains on the value last shown.

1.4 Personnel for Installation, Start-up and Operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorised 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 authorised and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- In case of corrosive fluids, the compatibility of the material of all wetted parts such as measuring pipe, bluff body, sensor and gaskets is to be verified. This also applies to fluids used to clean the Prowirl 77 flowmeter. Endress+Hauser will be pleased to provide you with any help required.
- The installer has to make sure that the measuring system is correctly wired up according to the wiring diagrams. The complete bus system is to be grounded.



There is no longer any contact protection once the housing cover is removed

Please observe all provisions valid for your country pertaining to opening and repair of electrical devices.

1.5 Repairs, Dangerous Chemicals

The following procedures must be carried out before a Prowirl 77 is sent to Endress+Hauser for repair:

- A note must be enclosed with the instrument, containing a description of the fault, the application and the chemical and physical properties of the fluid being measured.
- 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.
- No instrument should be returned to us without all dangerous material being removed first.

Incomplete cleaning of the instrument may result in waste disposal requirements or cause harm to personnel (burns, etc.). Any costs arising from this will be charged to the operator of the instrument.

1.6 Technical Improvements

The manufacturer reserves the right to modify technical data without prior notice. Your local E+H Sales Office will supply you with all current information and any updates to this Operating Manual.

2 System Description

The Prowirl 77 vortex flowmeter measures the volumetric flow of steam, gases and liquids for fluid temperatures in the range of $-200...+400\text{ }^{\circ}\text{C}$ and at nominal pressures of up to PN 160 / ANSI class 600.

Prowirl 77 measures the volumetric flow at operating conditions. If the process pressure and temperature are constant, Prowirl 77 can be programmed to supply the flowrate in mass, energy or corrected volume units.

2.1 Prowirl 77 Measuring System

A measuring system consists of:

- Prowirl 77 transmitter
- Prowirl 77 W, Prowirl 77 F or Prowirl 77 H body

The Prowirl 77 transmitter is available in different versions. The transmitter versions differ in the type of electrical output signals and digital communication capabilities.

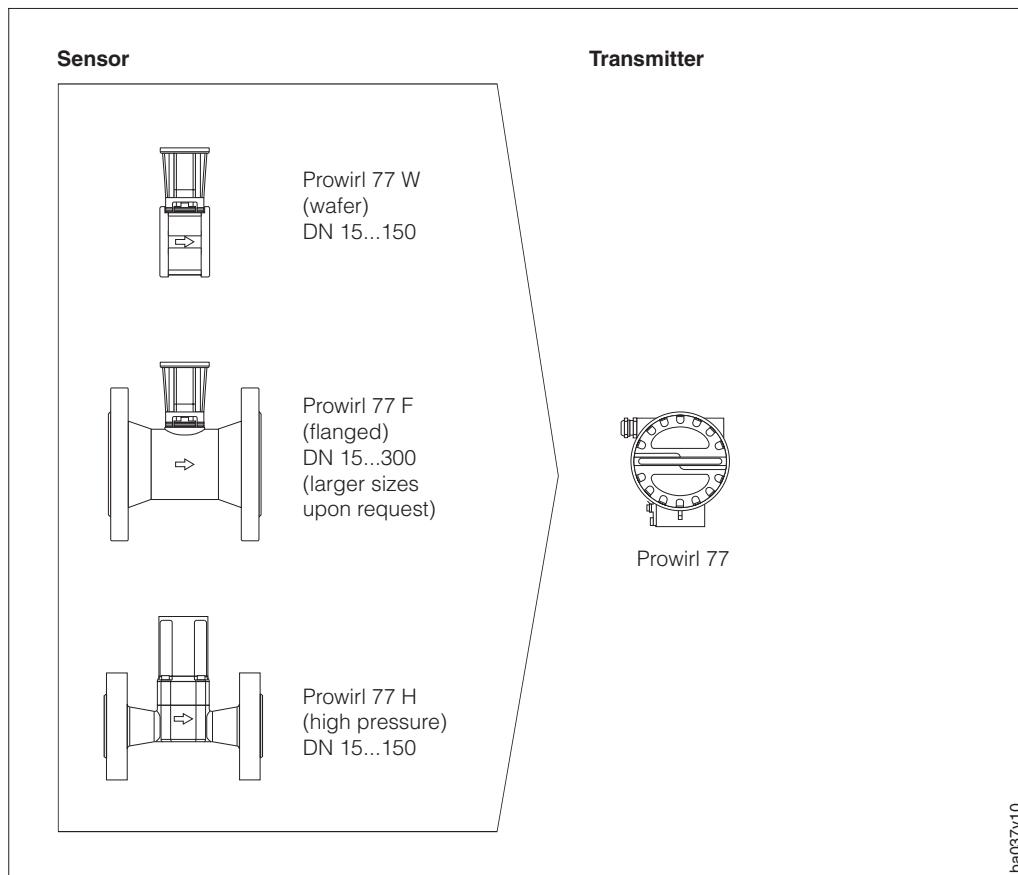


Fig. 1
Prowirl 77 measuring system

This Operating Manual describes the "PROFIBUS-PA" version.

The Prowirl 77 transmitter is available in two other versions:

- Version: "PFM"
- Version: "4...20 mA" (optional with HART)

Operation of those versions is not included in this Operating Manual. Separate Operating Manuals for those instruments are available on request.

The various Prowirl 77 transmitters can be freely combined with all meter body versions. This guarantees flexibility when matching a complete meter to specific industrial process conditions.

3 Mounting and Installation

3.1 General Information

Protection IP 67 (EN 60529)

The instruments fulfil all the requirements for IP 67. The following points must always be observed in order to ensure protection to IP 67 after installation in the field or after servicing:

- Housing gaskets must be clean and undamaged when inserted in the gasket groove. The gaskets may need to be dried, cleaned or replaced.
- All housing screws and the housing cover must be firmly tightened.
- The cables used for connecting must have an outer diameter in the specified range.
- The cable gland must be firmly tightened (see Fig. 2).
- The cable must loop down before entering the cable gland to ensure that no moisture can enter it (see Fig. 2).
- Any unused cable glands are to be replaced with a plug.
- The protective bushing should not be removed from the cable gland.

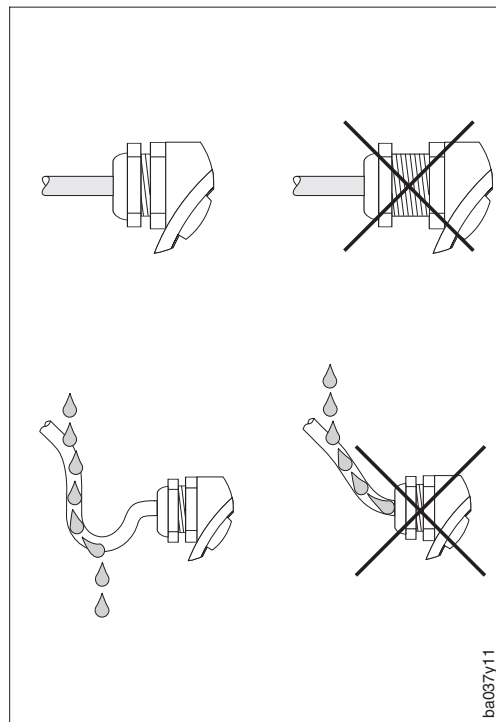


Fig. 2
Protection IP 67

Temperature ranges

- The maximum approved ambient and process temperatures must be observed (see page 56).
- Observe also the instructions on piping insulation and mounting position (see page 11).

3.2 Installation

A vortex flowmeter requires a fully developed flow profile as a prerequisite for measuring volume accurately. The following points must therefore be noted when mounting the Prowirl 77 in the pipeline.

Pipe inner diameter

When ordering, ensure that the nominal diameter and pipe schedule (DIN/ANSI/JIS) are correct, since calibration of the flowmeter and therefore the achievable accuracy of the measuring point are dependent on these specifications.

Inlet and outlet sections

To ensure an undisturbed flow profile, the vortex flowmeter should be mounted upstream of any flow disturbances such as pipe elbows, reducers or valves, otherwise the longest possible section of piping should be between the disturbance and the flowmeter. The figures on the left show the *minimum section of straight piping* downstream of the disturbance as multiples of the nominal diameter of the pipe in DN. If two or more flow disturbances are located upstream, then the longest inlet section recommended should be used.

There must also be a straight outlet section of sufficient length downstream from the flowmeter to ensure that the vortices are properly developed.

Flow conditioner

With limited space and large pipes, it is not always possible to use the inlet sections given above. In such cases the specially developed perforated plate flow conditioner (see page 53 ff.) can be fitted as shown on the left. The flow conditioner is held between two piping flanges and centred with the flange bolts. It reduces the length of the inlet section downstream from flow disturbances to $10 \times \text{DN}$ while maintaining high accuracy measurement.

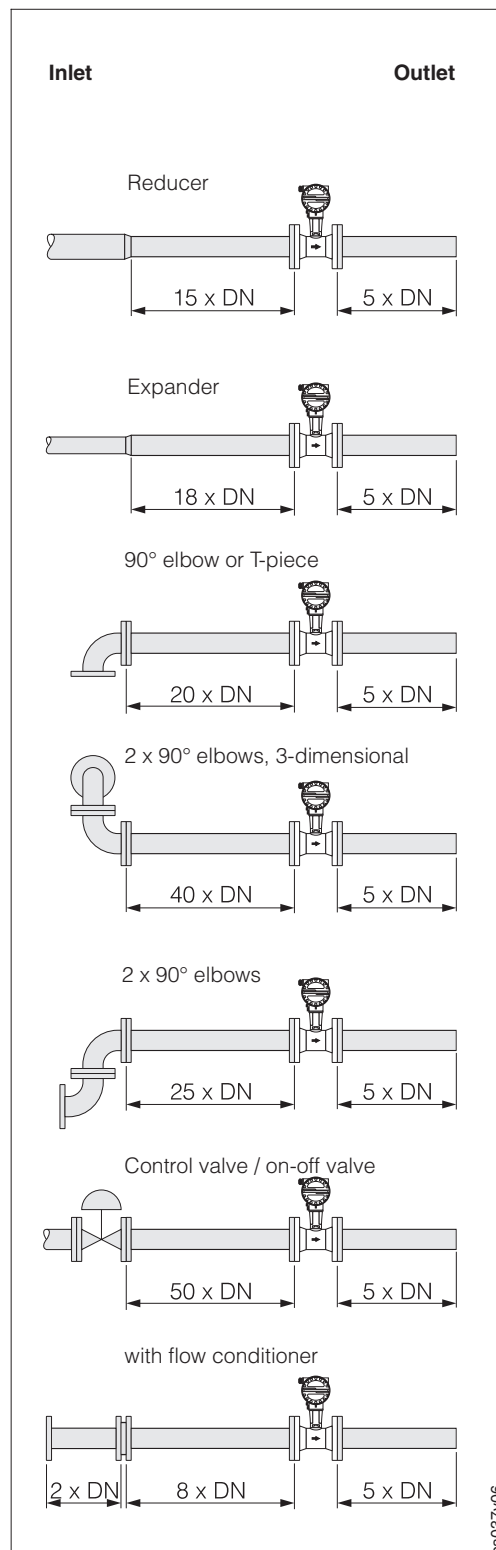


Fig. 3
Inlet and outlet piping
requirements

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/798006122045006076>