



# ViscoScope®

## Process – Viscometer Systeme

### Sensor – Models

**S-1\*\*\*.\*\***

**S-3\*\*\*.\*\***

**VA-100\*.\*\***

**VA-300\*.\*\***



## Manual

Sensor installation in  
hazardous areas  
ATEX + IECEX

# **ViscoScope®**

## **Sensor Installation Manual**



### **Series**

**S-1\*\*\*-\*\***

**S-3\*\*\*-\*\***

**VA-100\*-\*\***

**VA-300\*-\*\***

**For installation under ATEX and IECEx conditions**

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## Index of contents

1. Introduction.....	3
2. System configuration .....	4
2.1. Sensor .....	4
2.2. Transmission cable, blue .....	4
2.3. Safety barriers (Zener barriers;).....	4
2.4. Transmission cable, black .....	5
2.5. Transmitter.....	5
2.6. Assembly .....	5
3. Connection diagrams.....	5
3.1. exemplary Connection diagram Sensor S-1***-** / VA-100*-** with 1 RTD's .....	6
3.2. exemplary Connection diagram Sensor S-3***-** / VA-300*-** with 1 RTD's .....	7
3.3. exemplary Connection diagram Sensor S-3***-** / VA-300*-** with 2 RTD's .....	8
4. Sensor types .....	9
4.1. Sensor type S-1***-** .....	9
4.2. Sensor type VA-100*-** .....	9
4.3. Sensor type S-3***-** .....	9
4.4. Sensor type VA-300*-** .....	9
4.5. Temperature range (process-temperature).....	9
5. Temperaturklassen.....	10
6. Electrical specifications.....	11
6.1. Coils .....	11
6.2. Curcuits.....	11
7. Cable and wire entries.....	11



## 1. Introduction

The ViscoScope® viscometer is an instrument for the measurement of dynamic viscosity within processes.

This manual supplements the manual "ViscoScope® Process Viscometer Systems - Installation and Operation" and provides important information about intrinsically safe installation of the sensor in hazardous areas (Ex).

Please read this manual and the manual "ViscoScope® Process Viscometer Systems - Installation and Operation" carefully in order to avoid errors during the installation of the ViscoScope® viscometer.

Please take local conditions into account when installing the viscometer. The electrical installation must be performed by a qualified electrician.

The ViscoScope® viscometer requires no servicing or maintenance. If damaged, the system must be deactivated immediately. Repairs may only be performed by Fluid.iO Sensor + Control GmbH & Co. KG or an authorized specialist.

Interventions by third parties immediately invalidate the warranty and Fluid.iO Sensor + Control GmbH & Co. KG will accept no liability for any damage and consequential damages resulting from this action.

**Applied EU-standards:**

- EN IEC 60079-0:2018**
- EN 60079-11:2012**
- EN 60079-26:2015**

## 2. System configuration

The system comprises a **sensor, transmission cables, safety barriers** and **transmitter**.

The test object of the Ex certificate is exclusively the sensor. Transmission cables, safety barriers and transmitters are not part of the Ex type examination, but can be obtained from us as accessories.

### 2.1. Sensor

*(Ex approved component)*

The sensor can be installed anywhere in reactors, boilers, tanks, pipes or flow through cells. All standard flanges, fittings, threads or even special flanges are available for use as the process connection. Please refer to the manual "ViscoScope® Process Viscometer Systems - Installation and Operation" for information on the mechanical installation of the sensor.

The sensor housing contains numbered terminal blocks for the electrical connection of the transmission cable. Depending on the sensor model, the transmission cable is connected

- using a connector located on the exterior of the sensor housing cover
- through a PG thread into the sensor housing where it is electrically connected to the terminal blocks

angeschlossen.

### 2.2. Transmission cable, blue

*(Accessoire)*

The blue transmission cable connects the sensor with the safety barriers. It must be laid in the hazardous area (Ex) in accordance with local regulations. Depending on the sensor model, the sensor end of the transmission cable is fitted with a connector or color-coded numbered cores with cable lugs for connection to terminal blocks.

The cores at the safety barrier end of the cable are color-coded, numbered and fitted with ferrules.

### 2.3. Safety barriers (Zener barriers;)

*(Accessories)*

The safety barriers are installed in the safe zone on a grounded DIN top-hat rail. The individual safety barrier channels are color-coded and numbered on both sides under the connection openings.

The blue transmission cable is connected to the blue side of the safety barriers in accordance with the color coding and numbering scheme.

The black transmission cable is connected to the black side of the safety barriers in accordance with the color coding and numbering scheme.

## 2.4. Transmission cable, black

*(Accessories)*

The black transmission cable connects the safety barriers with the transmitter. The cores at both ends of the cable are color-coded, numbered and fitted with ferrules..

## 2.5. Transmitter

*(Accessories)*

The transmitter is installed in the safe zone. Depending on the housing and installation type, the black transmission cable is connected to a numbered connector on the transmitter or to numbered terminal blocks inside the housing.

## 2.6. Assembly

All the sensor probes contain a Pt100 for measuring the process temperature. For applications in higher temperatures, an additional Pt100 is installed in the sensor housing (only model S-3\*\*\*\*\_\*\* / VA-300\*\_\*).

4 safety barriers and 7 cores + shielding of the transmission cable are required for the use of the process Pt100.

5 safety barriers and 10 cores + shielding are required when the additional Pt100 is used. The transmission cable is assembled and ready for immediate connection..

# 3. Connection diagrams

The following diagrams show the connection diagrams for all sensor models to all transmitter models.

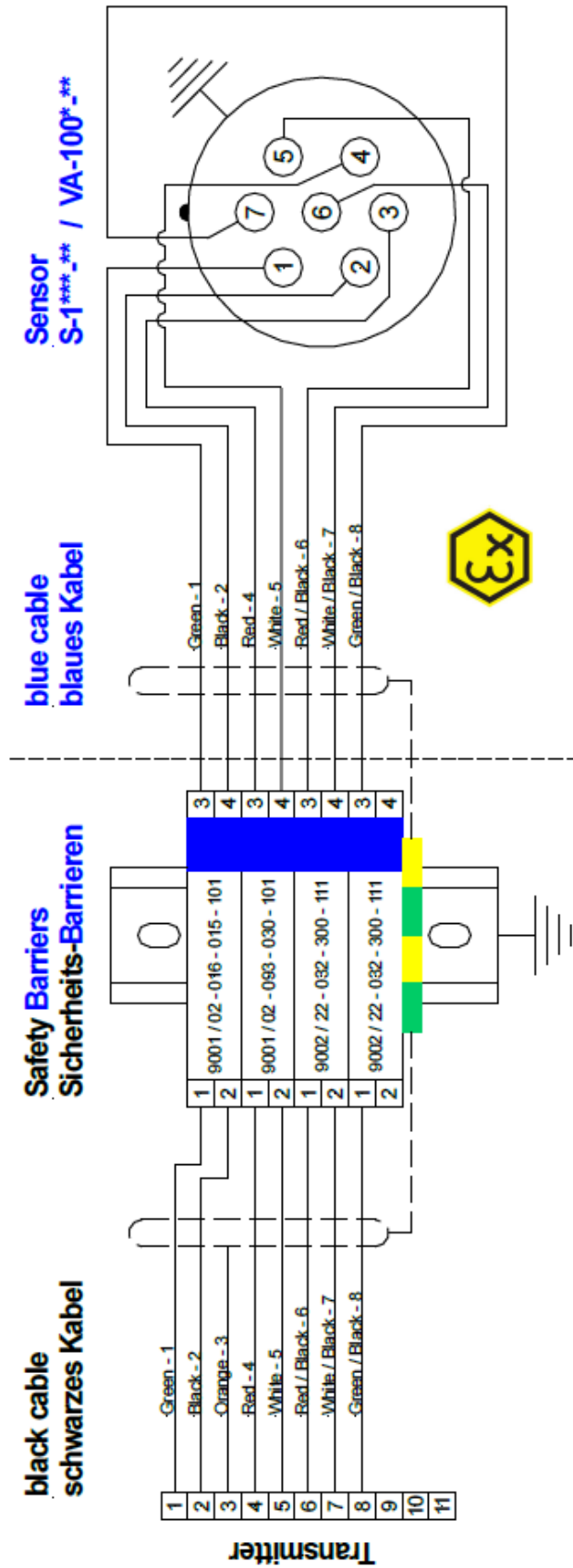
When mounting, ensure that all requirements of DIN EN 60079-11 (Ex-i standard) are met. This sensor must be connected with a safety barrier according to DIN EN 60079-11.

### **Important!**

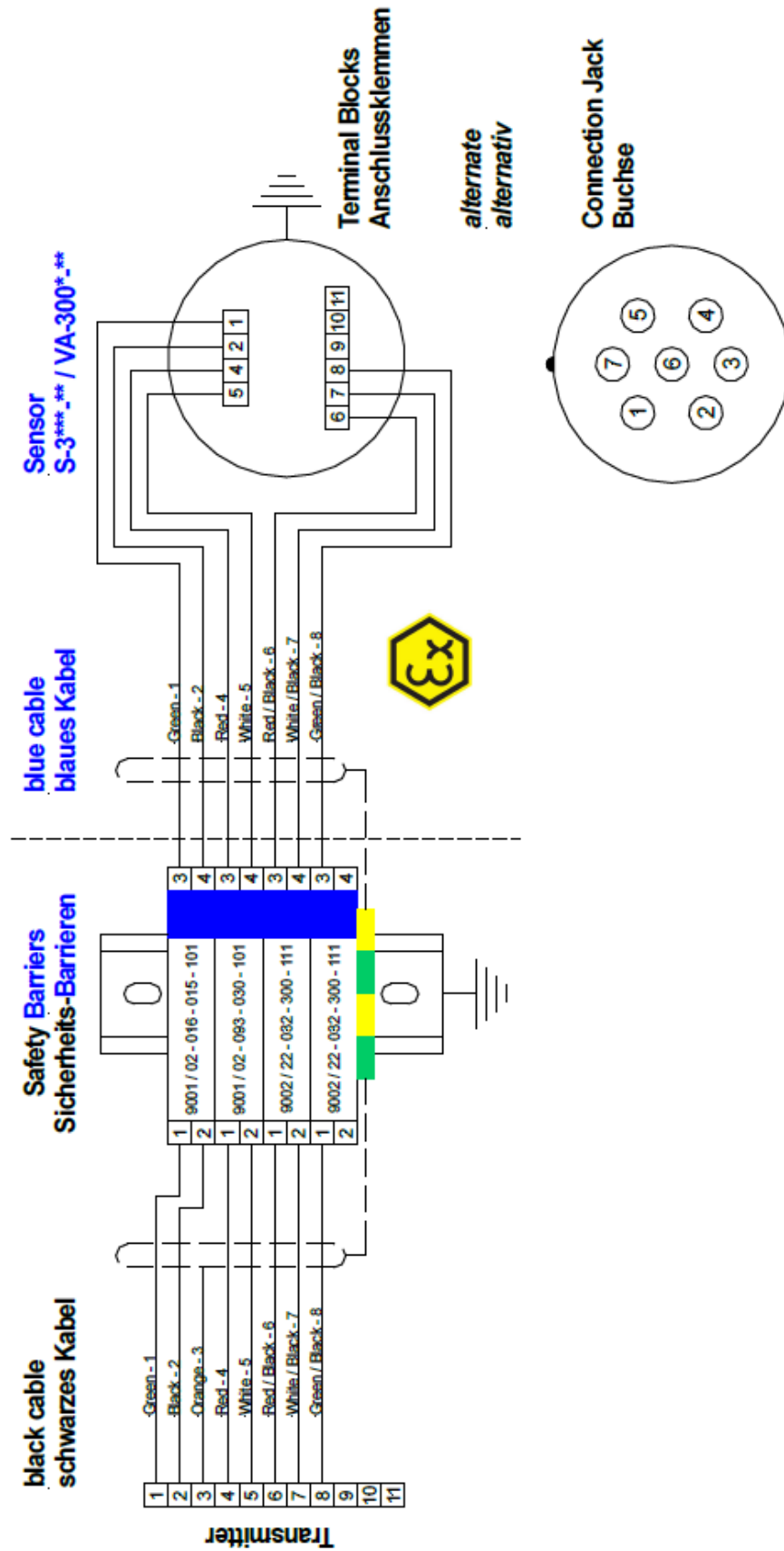
Equipotential bonding between the safety barriers and the sensor must be ensured according to the local conditions!

If there is a plug connection on the sensor housing, opening the sensor housing will void the warranty. If there is a PG screw connection on the sensor housing, only the sensor housing cover may be removed for the purpose of cable connection.

3.1. exemplary Connection diagram Sensor S-1\*\*\*-\*\* / VA-100\*-\*\* with 1 RTD's

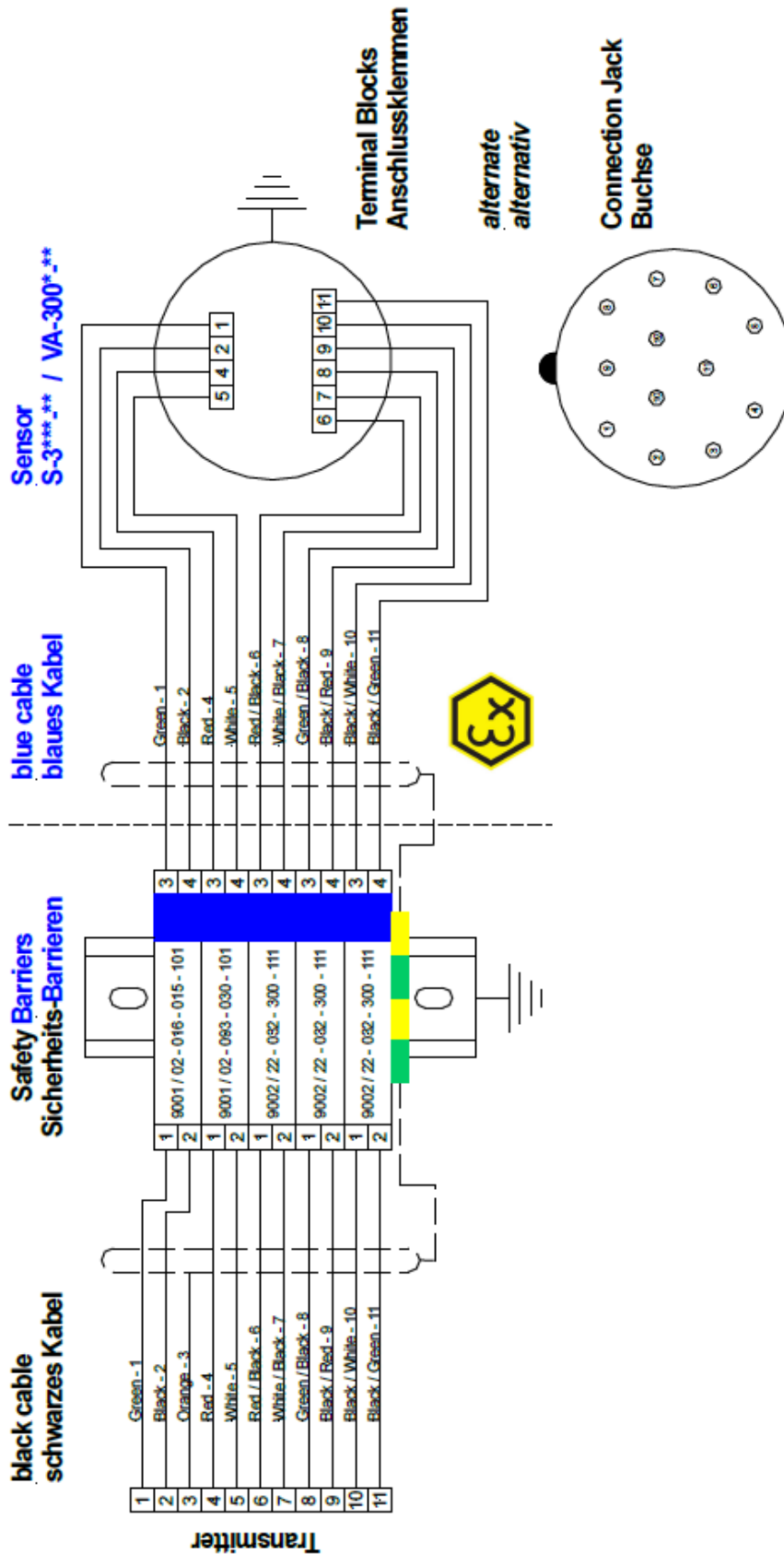


3.2. exemplary Connection diagram Sensor S-3\*\*\*-\*\* / VA-300\*-\*\* with 1 RTD's





3.3. exemplary Connection diagram Sensor S-3\*\*\*-\*\* / VA-300\*-\*\* with 2 RTD's



## 4. Sensor types

Letters and numbers completing the full name of the sensor and identifying the design and area of application of the sensor are inserted at the position \*\*\*.

### 4.1. Sensor type S-1\*\*\*.\*\*

* Position	Refers to	Values
1.* and 2.*	Sensor design	10, 20, 1F
3.*	Viscosity range	C, B, S
4.* und 5.*	Temperature range	BT

### 4.2. Sensor type VA-100\*.-\*\*

* Position	Refers to	Values
1.*	Viscosity range	C, B, S
2.* und 3.*	Temperature range	BT

### 4.3. Sensor type S-3\*\*\*.\*\*

* Position	Refers to	Values
1.* and 2.*	Sensor design	10, 11, 20, 21, 50, 51, 60, 61, 1F
3.*	Viscosity range	L, M, H, X, S
4.* und 5.*	Temperature range	LT, ST, HT, XT

### 4.4. Sensor type VA-300\*.-\*\*

* Position	Refers to	Values
1.*	Viscosity range	L, M, H, X, S
2.* und 3.*	Temperature range	LT, ST, HT, XT

### 4.5. Temperature range (process-temperature)

BT	< 80°C	< 176°F	≅ T6
LT	< 150°C	< 302°F	≅ T6...T3
ST	< 300°C	< 572°F	≅ T6...T3
HT	< 450°C	< 842°F	≅ T6...T3
XT	Not for use in hazardous areas (Ex)		

## 5. Temperaturklassen

The following table provides information about the temperatures at which the sensor can be used.

Temperature class	Max. process temperature <sup>1)</sup>	Max. permissible surface temperature on operating equipment	Ambient temperature at the sensor housing
T3	350°C	200°C	-40°C...185 C
T4	135°C	135°C	-40°C ...120°C
T5	100°C	100°C	-40°C ...85 C
T6	85°C	85°C	-40°C ...70°C

1) If the max. permissible surface temperature on the operating equipment is exceeded due to the process temperature, with a safety margin of 15K, you must select a different sensor design or take suitable on-site measures to prevent the temperature rising above this level (e.g. cooling with inert gas). The cooling function is not covered by the ViscoScope® certification. It must be certified separately

### ATTENTION:

When using the sensor in ambient temperature ranges significantly above +80 °C, cooling of the sensor connection head to temperatures below +100 °C must be applied.

The user (customer) must ensure by suitable measures (e.g. cooling with inert gas / thereby air pressure with max. 0.7 bar) that the temperature in the connection head of the sensor does not exceed the value of +100 °C.

The cooling function is not part of this EU(EC) type examination certificate and must be certified separately.

