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# HEINZMANN®

## Electronic Speed Governors

# Signal Transducer

## SG 03



Manual E 97 003-e / 05-03

| | |
|---|---|
|  **Warning** | Read this entire manual and all other publications appertaining to the work to be performed before installing, operating or servicing your equipment.<br>Practice all plant and safety instructions and precautions. |
|  **Danger** | Failure to follow instructions may result in personal injury and/or damage to property.<br>HEINZMANN will refuse all liability for injury or damage which results from not following instructions |
|  **Danger! High Voltage**<br>  **Danger** | **Please note before commissioning the installation:**<br>Before starting to install any equipment, the installation must have been switched dead!<br>Be sure to use cable shieldings and power supply connections meeting the requirements of the *European Directive concerning EMI*.<br>Check the functionality of the existing protection and monitoring systems. |
|  **Danger** | **To prevent damages to the equipment and personal injuries, it is imperative that the following monitoring and protection systems have been installed:**<br>Overspeed protection acting independently of the speed governor<br>Overtemperature protection<br>HEINZMANN will refuse all liability for damage which results from missing or insufficiently working overspeed protection<br>**Generator installation will in addition require:**<br>Overcurrent protection<br>Protection against faulty synchronization due to excessive frequency, voltage or phase differences<br>Reverse power protection |
| | **Overspeeding can be caused by:**<br>Failure of the voltage supply<br>Failure of the actuator, the control unit or of any accessory device<br>Sluggish and blocking linkage |

| | |
|---|---|
|  **Warning** | **Electronically controlled injection (MVC) will in addition require to observe the following:**<br>With **Common Rail** systems a separate mechanical flow limiter must be provided for each injector pipe.<br>With **Pump-Pipe-Nozzle (PPN)** and **Pump Nozzle (PNE)** systems fuel release may be enabled only by the movement of control piston of the solenoid valve. This is to inhibit fuel from being delivered to the injection nozzle in case of seizure of the control piston. |
|  **Warning** | The examples, data and any other information in this manual are intended exclusively as instruction aids and should not be used in any particular application without independent testing and verification by the person making the application. |
|  **Danger** | Independent testing and verification are especially important in any application in which malfunction might result in personal injury or damage to property. |
| | **HEINZMANN** make no warranties, express or implied, that the examples, data, or other information in this volume are free of error, that they are consistent with industry standards, or that they will meet the requirements for any particular application. |
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| | **HEINZMANN** make no warranties for the conception and engineering of the technical installation as a whole. This is the responsibility of the user and of his planning staff and specialists. It is also their responsibility to verify whether the performance features of our devices will meet the intended purposes. The user is also responsible for correct commissioning of the total installation. |

# Contents

Page

# 1 Safety Instructions and Related Symbols

This publication offers wherever necessary practical safety instructions to indicate inevitable residual risks when operating the engine. These residual risks imply dangers to

persons

product and engine

environment.

The symbols used in this publication are in the first place intended to direct your attention to the safety instructions!

**Warning**

This symbol is to indicate that there may exist dangers to the engine, to the material and to the environment.

**Danger**

This symbol is to indicate that there may exist dangers to persons. (Danger to life, personal injury).

**Danger! High Voltage**

This symbol is to indicate that there exist particular danger due to electrical high tension. (Mortal danger).

**Note**

*This symbol does not refer to any safety instructions but offers important notes for better understanding the functions that are being discussed. They should by all means be observed and practiced. The respective text is printed in italics.*

**The primary issue of these safety instructions is to prevent personal injuries!**

Whenever some safety instruction is preceded by a warning triangle labelled “Danger” this is to indicate that it is not possible to definitely exclude the presence of danger to persons, engine, material and/or environment.

If, however, some safety instruction is preceded by the warning triangle labelled “Caution” this will indicate that danger of life or personal injury is not involved.

**The symbols used in the text do not supersede the safety instructions. So please do not skip the respective texts but read them thoroughly!**

**In this publication the Table of Contents is preceded by diverse instructions that among other things serve to ensure safety of operation. It is absolutely imperative that these hints be read and understood before commissioning or servicing the installation.**

## 1.1 Basic Safety Measures for Normal Operation

- The installation may be operated only by authorized persons who have been duly trained and who are fully acquainted with the operating instructions so that they are capable of working in accordance with them.
- Before turning the installation on please verify and make sure that

  - only authorized persons are present within the working range of the engine;
  - nobody will be in danger of suffering injuries by starting the engine.
- Before starting the engine always check the installation for visible damages and make sure it is not put into operation unless it is in perfect condition. On detecting any faults please inform your superior immediately!
- Before starting the engine remove any unnecessary material and/or objects from the working range of the installation/engine.
- Before starting the engine check and make sure that all safety devices are working properly!

## 1.2 Basic Safety Measures for Servicing and Maintenance

- Before performing any maintenance or repair work make sure the working area of the engine has been closed to unauthorized persons. Put on a sign warning that maintenance or repair work is being done.
- Before performing any maintenance or repair work switch off the master switch of the power supply and secure it by a padlock! The key must be kept by the person performing the maintenance and repair works.
- Before performing any maintenance and repair work make sure that all parts of engine to be touched have cooled down to ambient temperature and are dead!
- Refasten loose connections!

- Replace at once any damaged lines and/or cables!
- Keep the cabinet always closed. Access should be permitted only to authorized persons having a key or tools.
- Never use a water hose to clean cabinets or other casings of electric equipment!

## 1.3 Before Putting an Installation into Service after Maintenance and Repair Works

- Check on all slackened screw connections to have been tightened again!
- Make sure the control linkage has been reattached and all cables have been reconnected.
- Make sure all safety devices of the installation are in perfect order and are working properly!

# 2 Application

The **HEINZMANN** SG 03 transducer is a unit, which converts rotary position to a voltage or current signal. This unit is available in two versions, as SG 03 R with increasing output signal when the input shaft is turned clockwise, and as SG 03 L with increasing output signal when the input shaft is turned counterclockwise.

There are the following ways of application:

**Transducer to measure the fuel rack position (engine power)**

The transducer converts 0 - 45° of angular position to a signal (4 - 20 mA or 1 - 5 V or 1 to 10 V), which can be processed by the power control equipment of the engine.

**Other applications**

The unit can be used wherever a displacement or an angular motion is to be converted to a current or voltage signal.

The unit consists of two parts including a SG 03 A sensor and an SG 03 V amplifier.

# 3 Technical Data

| | | |
|---|---|---|
| Supply voltage | | 12 V DC or 24 V DC |
| max. voltage | | 35 V DC |
| min. voltage | | 10 V DC |
| Residual ripple | | max. 10% at 100 Hz |
| Current consumption | | max. 100 mA |
| Output voltage | adjustable | 1..5 V |
| | or | 1..10 V * |
| Output current | adjustable | 4..20 mA |
| Output voltage impedance | | 100 Ohm |
| Output current impedance | | 56 Ohm |
| Input shaft position angle | | 45 ° |
| Temperature range | | |
| Sensor SG 03 A | | -40°C up to +100°C |
| Amplifier SG 03 V | | -40°C up to +100°C |
| Humidity | | up to 100% |
| Protection grade | | IP 44 |
| Weight | | |
| Sensor SG 03 A | | approx. 0.8 kg |
| Amplifier SG 03 V | | approx. 0.5 kg |

*) only at supply voltage 24 V DC

# 4 Function Mode

The shaft of the SG 03 A sensor part of the transducer incorporates a cam, which changes the distance to a fixed probe during rotation of the shaft. This change in distance is converted to a change in voltage or current at the SG 03 V amplifier output.

Except for the bearing the transducer operates without any contact and thus is free of wear and maintenance.

# 5 Block Diagram

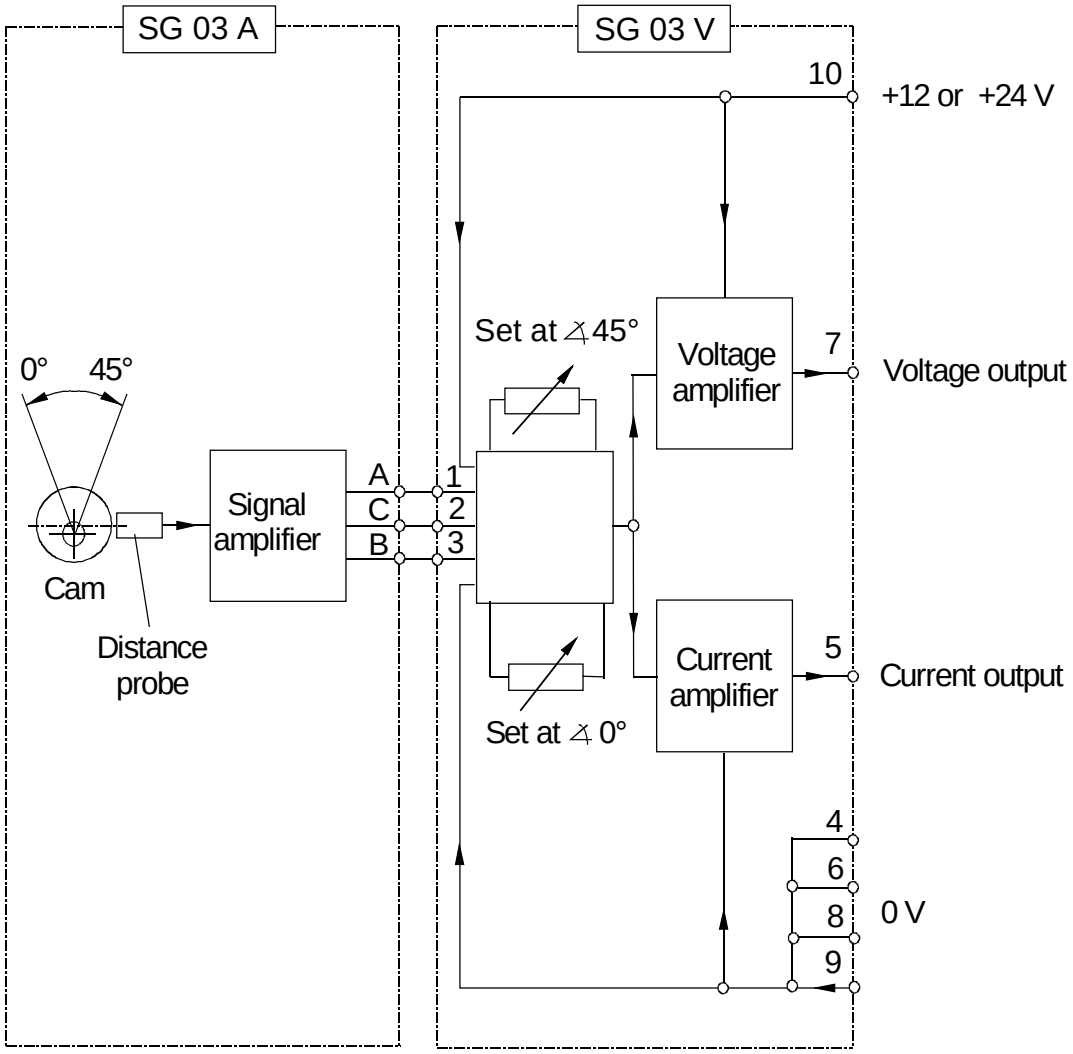



**Fig. 1: Block Diagram**

# 6 Electric Connection

## 6.1 Current Output

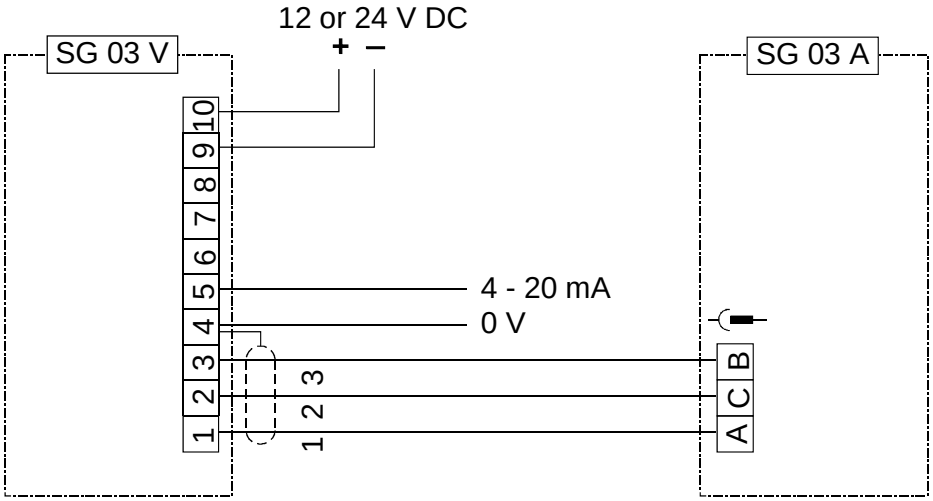
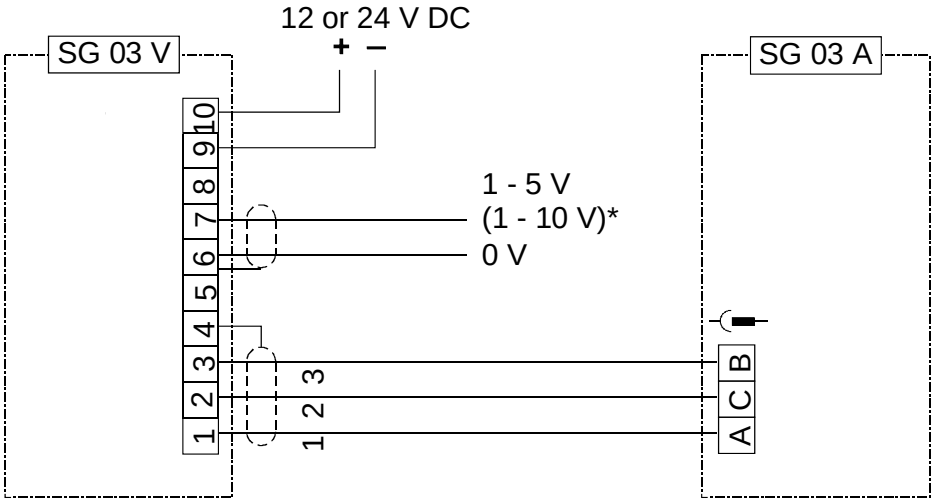



**Fig. 2: Current Output**

## 6.2 Voltage Output




*) only at supply voltage 24 V DC

**Fig. 3: Voltage Output**

Minimum cale size 0,75 $mm^2$

**Warning**

Note the proper connection! The SG 03 A sensor part has no pole protection for technical reasons.

## 6.3 Wiring in the SG 03 A Sensor Part

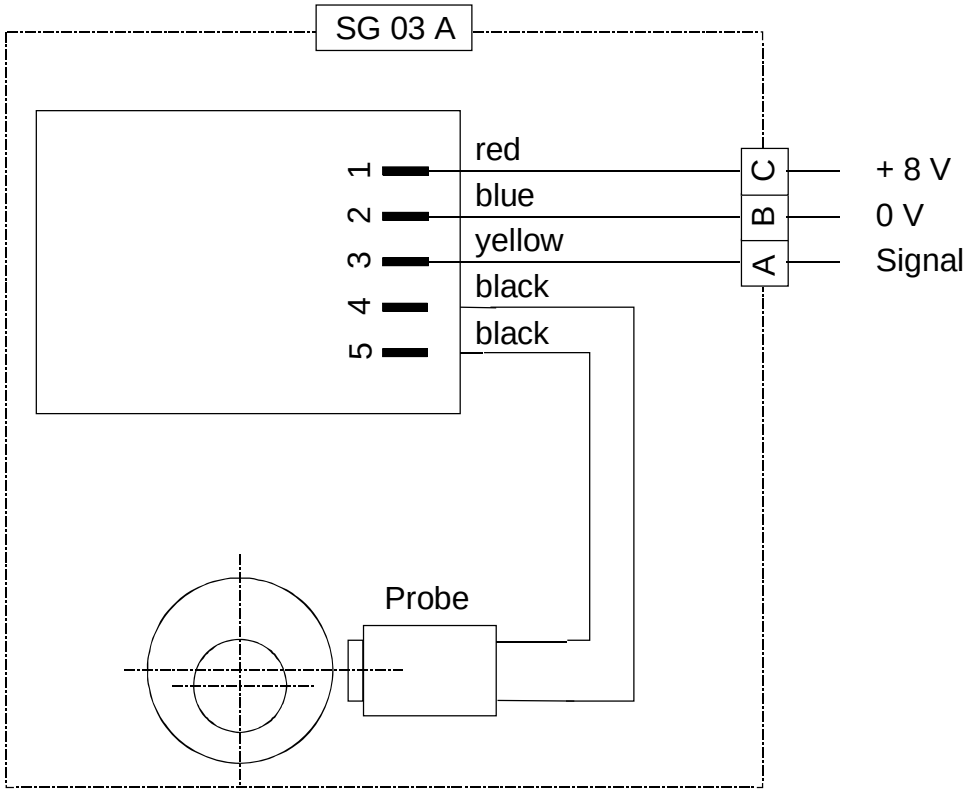



**Fig. 4: Wiring in the SG 03 A Sensor Part**

# 7 Dimensions

## 7.1 SG 03 A Sensor Part

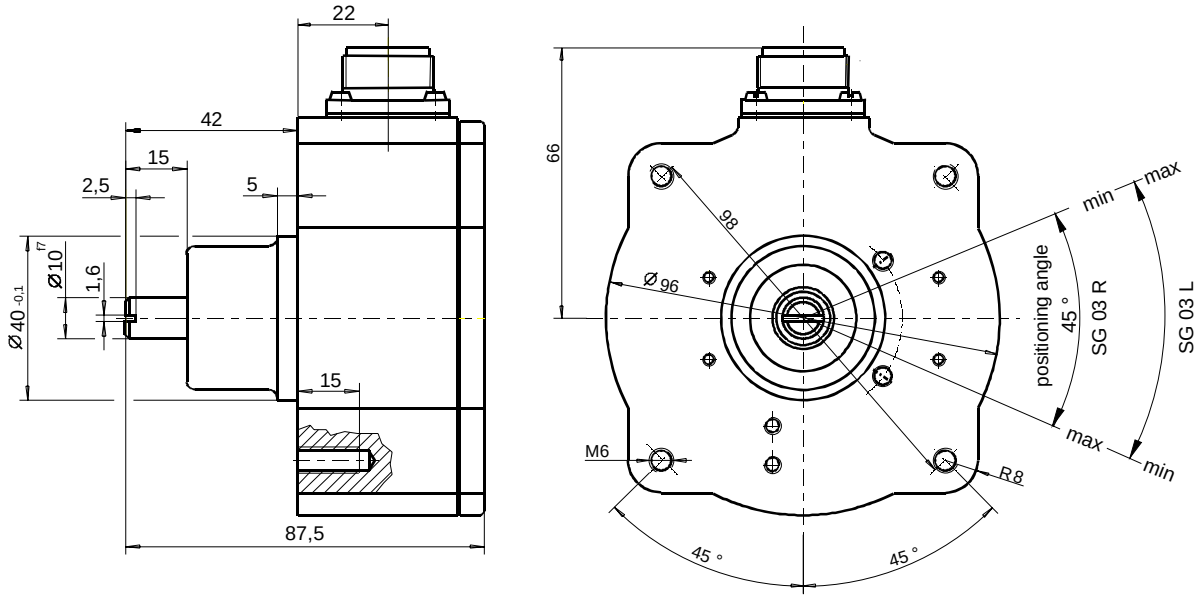



**Fig. 5: SG 03 A Sensor Part**

## 7.2 SG 03 V Amplifier

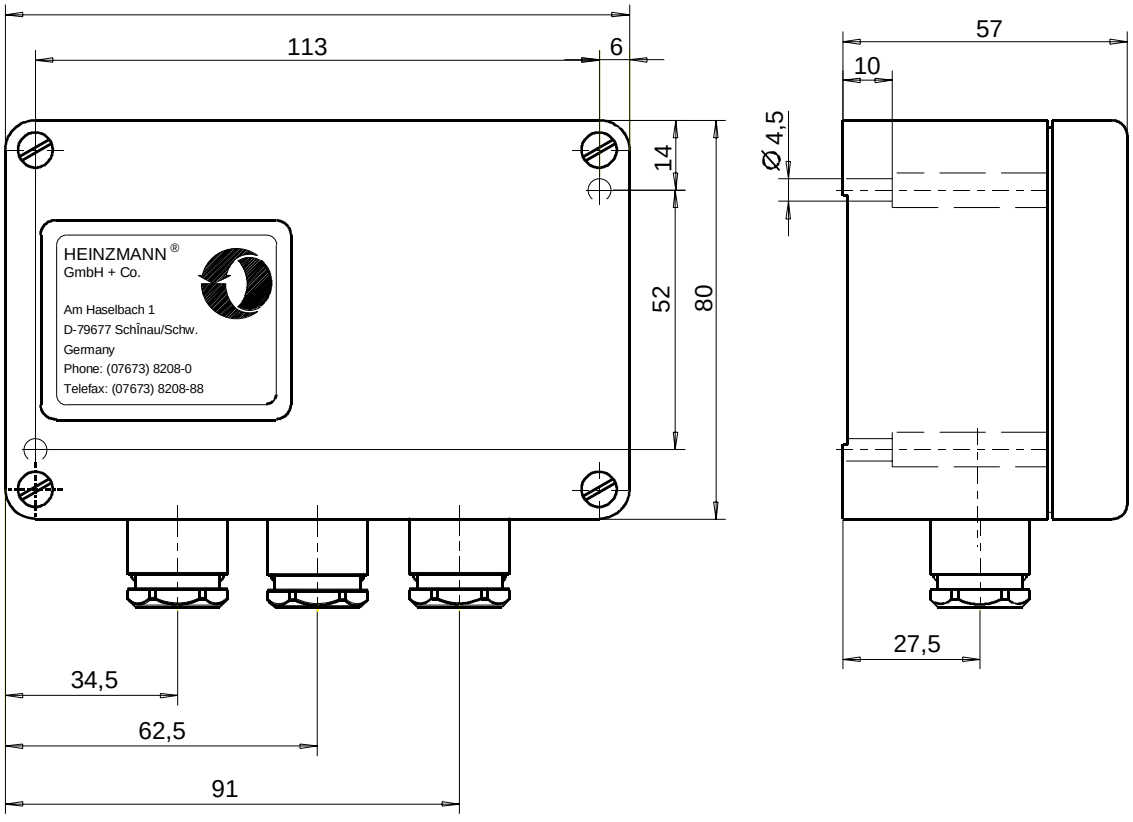



**Fig. 6: SG 03 V Amplifier**

# 8 Adjustment

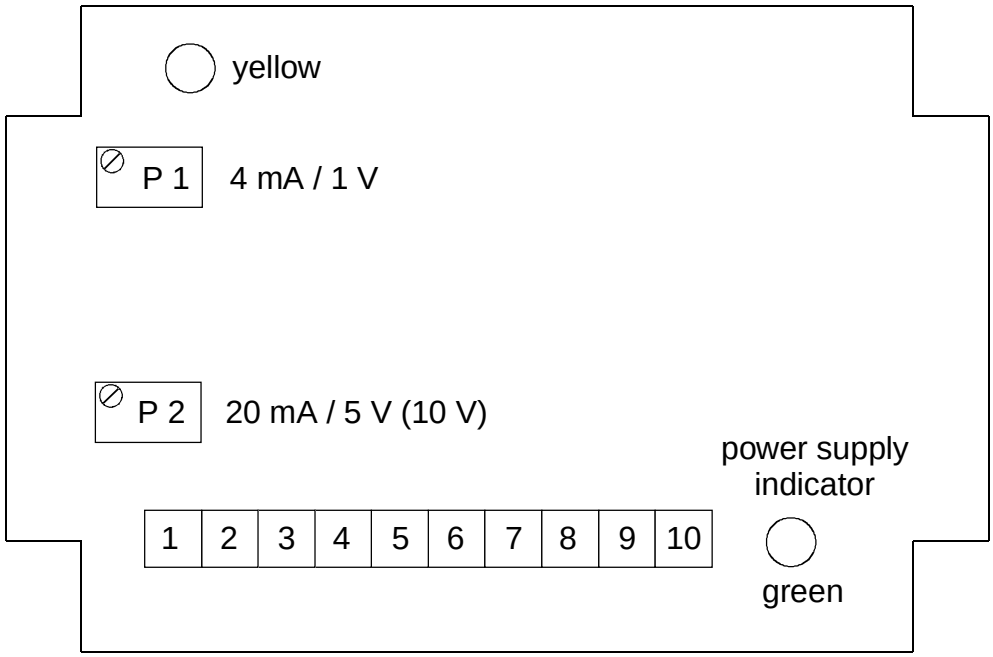



**Fig. 7: Adjustement SG 03 V**

## 8.1 Transducer for Current Output

The unit is pre-adjusted for: 0° ⇔ 4 mA
45° ⇔ 20 mA

If another adjustment is desired, or less than the entire sensor rotation is used, adjustment is accomplished as follows:

a) Connect an amperemeter to output terminals 4 (-) and 5 (+) and energize the unit with 12 or 24 V power supply as shown is section 5.1.

b) For SG 03 R turn SG 03 A sensor shaft ccw (for SG 03 L cw) to minimum travel position and adjust potentiometer P1 to 4 mA output signal. The yellow LED must just light.

c) For SG 03 R turn SG 03 A sensor shaft cw (for SG 03 L ccw) to maximum travel position and adjust potentiometer P2 to desired output current level.

The P2 max. adjustment has no influence on the min. output value, if 4 mA is adjusted as minimum level. Otherwise recheck upper and lower level settings and adjust as necessary.

## 8.2 Transducer for Voltage Output

The unit is pre-adjusted for: 0° ⇔ 1 V
45° ⇔ 5 V (10 V)

If another adjustment is desired, or less than the entire sensor rotation is used, adjustment is accomplished as follows:

a) Connect a voltmeter to output terminals 4 (-) and 7 (+) and energize the unit with 12 or 24 V power supply as shown in section 5.2.

b) For SG 03 R turn SG 03 A sensor shaft cw (for SG 03 L ccw) to maximum travel position and adjust potentiometer P2 to desired high output voltage level.

c) For SG 03 R turn SG 03 A sensor shaft ccw (for SG 03 L cw) to minimum travel position and adjust potentiometer P1 to desired low output voltage level.

d) Recheck upper and lower level settings and adjust as necessary.

# 9 Order Specifications

The order designation is as follows:

| | |
|---|---|
| SG 03 R | increasing output signal for cw sensor shaft rotation |
| SG 03 L | increasing output signal for ccw sensor shaft rotation |

Output signal specification:

| | |
|---|---|
| voltage | 1..5 V resp.<br>1..10 V (only at supply voltage 24 V DC) |
| or current | 4..20 mA |

The user is recommended to include the interconnecting cable between SG 03 A sensor part and SG 03 V amplifier when ordering:

Cable for SG 03, length . . . cm.

# 10 Trouble Shooting

| Symptoms | Possible Causes |
|---|---|
| no signal on current or voltage output | 1. power supply voltage missing or too low.<br>2. short-circuit in the cabling. |
| max. current or voltage values are not reached | 1. power supply voltage level too low<br>2. sensor travel utilisation below 25°. |

# 11 Order Specifications for Manuals

There is no charge for our technical manuals ordered in reasonable quantities.

Order the necessary manuals on our speed governors from your nearest HEINZMANN location.
(Please click on “HEINZMANN location” to see the list of our subsidiaries and agents in the world).

**Please include the following information:**

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