



---

## Position Transmitter TGS 40 (RAM)

### Operating Instructions

Document no. 42/14-50 EN  
Date of issue: 05.2006  
Revision: B

### Manufacturer:

ABB Automation Products GmbH  
Borsigstr. 2  
63755 Alzenau  
Germany

Tel: +49 551 905-534  
Fax: +49 551 905-555  
[CCC-Support.deapr@de.abb.com](mailto:CCC-Support.deapr@de.abb.com)

© Copyright 2005 by ABB Automation Products GmbH  
Modifications reserved

This document is subject to copyright. It is intended to help the user operate the equipment safely and efficiently. The content may not be copied or reproduced either in part or in full without the prior consent of the copyright owner.

---

<b>Table of contents</b> .....	Page
<b>Important information</b> .....	4
<b>1 Safety instructions</b> .....	4
1.1 General safety instructions .....	4
1.2 Declaration of conformity .....	4
<b>2 Description</b> .....	5
2.1 Application .....	5
2.2 Function and system design .....	5
2.3 Functional diagram .....	5
2.4 Connection diagrams .....	6
2.5 Dimensional drawings (dimensions in mm) .....	6
<b>3 Technical data</b> .....	7

## Important information

### Symbols

In order that you can make the best use of this document and to ensure safety during commissioning, operation and maintenance of the equipment, please note the following explanation of the symbols used.

Explanation of the symbols used.

Symbol	Signal Word	Definitions
	<b>DANGER</b>	DANGER indicates an <b>imminently hazardous</b> situation which, if not avoided, <b>will result</b> in death or serious injury. (High level of risk.)
	<b>WARNING</b>	WARNING indicates a <b>potentially hazardous</b> situation which, if not avoided, <b>could result</b> in death or serious injury. (Medium level of risk.)
	<b>CAUTION</b>	CAUTION indicates a <b>potentially hazardous</b> situation which, if not avoided, <b>could result</b> in minor or moderate injury. (Low level of risk.)
	<b>NOTICE</b>	NOTICE indicates a <b>potentially harmful</b> situation which, if not avoided, <b>may result</b> in damage of the product itself or of adjacent objects. (Damage to property)
	<b>IMPORTANT</b>	IMPORTANT indicates useful hints or other special information which, if not observed, could lead to a decline in operating convenience or affect the functionality. (Does not indicate a dangerous or harmful situation.)

As well as the instructions in this document, you must also follow the generally applicable accident prevention and safety regulations.

If the information in this document is insufficient in any situation, please contact our service department, who will be happy to help you.

Please read this document carefully before installation and commissioning.

## 1 Safety instructions

### 1.1 General safety instructions

The devices were designed, produced and tested in accordance with IEC 1010-1 (corresp. to EN 61010-1 and DIN VDE 0411 Part 1 "Safety requirements for electrical measurement, control and laboratory equipment"), CE-certified, and delivered in a safe condition.



#### CAUTION

**When handling these devices (during transport, storage, installation, commissioning, operation, maintenance, and de-commissioning) observe these operating instructions and the information on all type plates, labels and safety instructions attached to the devices.**

The regulations, standards and directives referred to in these operating instructions are applicable in Germany. When using the devices in other countries, the relevant national regulations, standards and directives must be observed.

### 1.2 Declaration of conformity

The requirements of the European directive 94/9/EC are met.

The product conforms with the European Directive (EMC) 89/336/EEC and its amendments and the Low-Voltage Directive 73/23/EEC.

**2 Description**

**2.1 Application**

Conversion of the angular position of a shaft into a load-independent DC signal e. g. for position measurement on relief valves with high temperature.

**2.2 Function and system design**

The angular position is transmitted from the sensor shaft, e.g. of a relief valve, by a magnetic coupling in a non-contacting manner to the transmitter. The magnetic coupling consists of a magnet, mounted on the sensor shaft and an iron loop situated in the instrument. The loop is attached to a shaft which rotates in 2 ball bearings and follows the rotation of the magnet and thus the angular position of the shaft. A mechanical coupling transmits the rotation of the shaft of the iron loop to the shaft of the angular position transmitter, which produces a DC signal of 0...20 mA or 4...20 mA proportional to the angular position.

The sensor system consists of an ASIC with integral Hall elements to convert the rotary motion of an external permanent magnet into a proportional sine-cosine output signal for the range of 90°.

Integral electronic circuits of different layouts transform this signal into digital or analog data for transmission to displays or control units.

**RAM36**

RAM series has no moving parts within its housing. The system is activated by an external stainless steel actuator incorporating a small permanent magnet. The actuator must be fixed to the driving shaft of a rotating device. This layout has no friction. It requires no individual torque. The housings are in aluminium.

**2.3 Functional diagram**

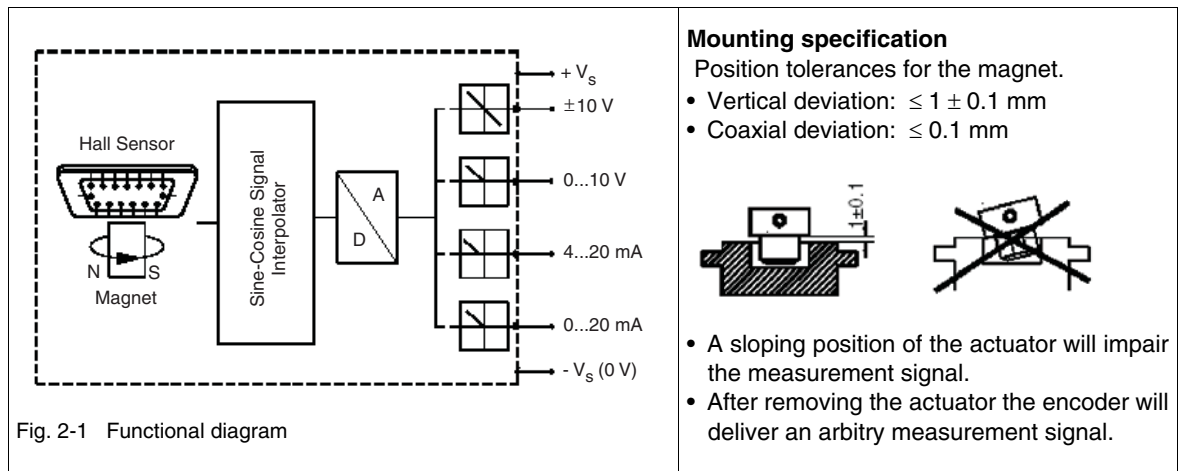


Fig. 2-1 Functional diagram

**2.4 Connection diagrams**

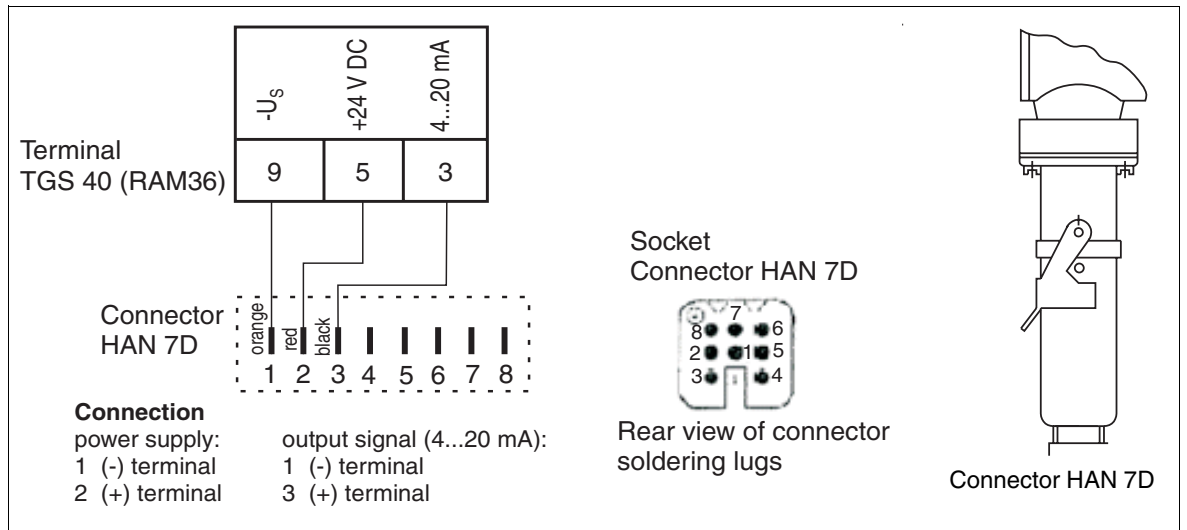
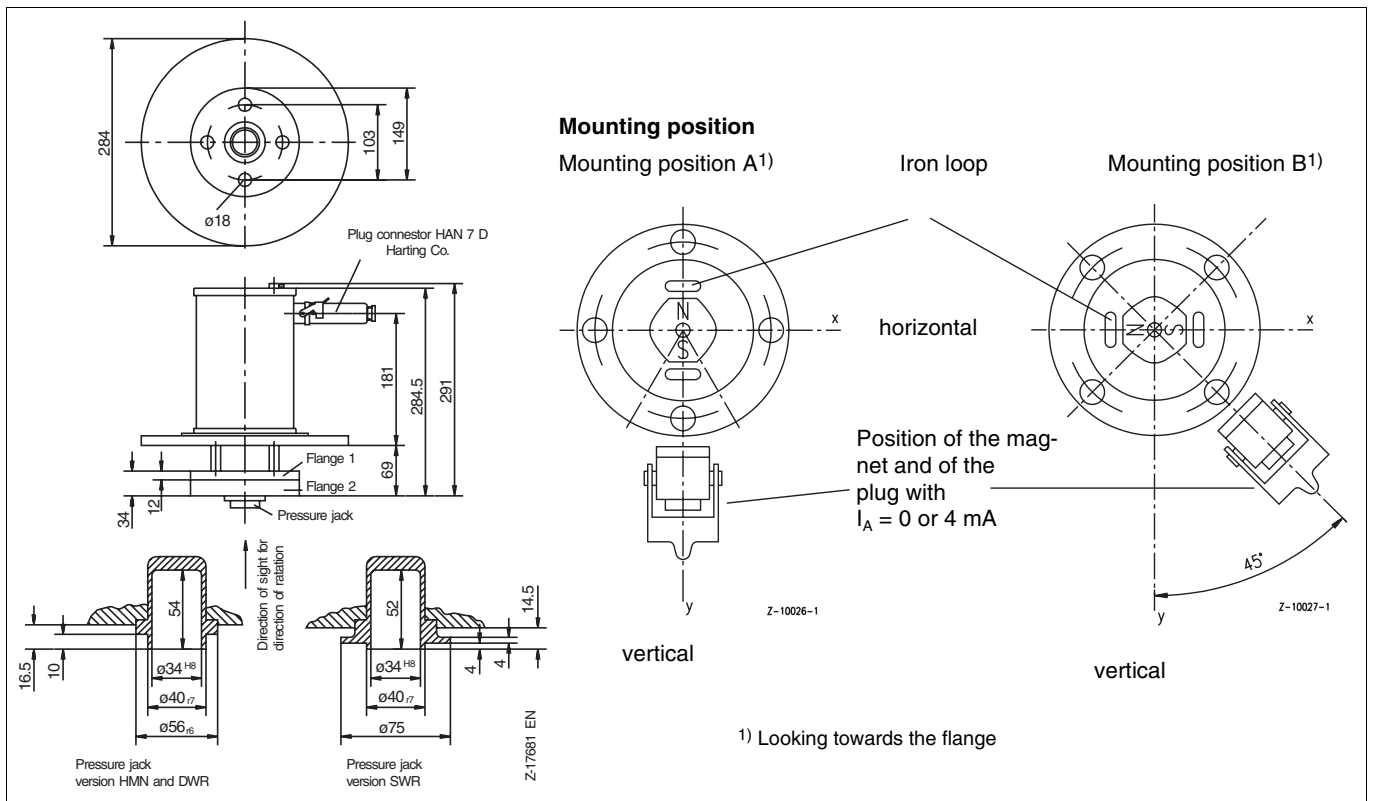


Fig. 2-2 Connection diagram

**2.5 Dimensional drawings (dimensions in mm)**



### 3 Technical data

#### Analog outputs

0 (4) ...20 mA, – 7 Bit/90° ↯

The electro-magnetic sensor system of the encoder is completed by a 9 Bit D/A converter to transform the angular position into an analog signal of either 0 (4) to 20 mA. If not otherwise specified the transducer will be supplied with a measuring range of 0 to 90° ↯ and CW signal sense, i.e. increasing output signal with view on shaft end, when turning clockwise.

#### Electrical data of all outputs

##### Resolution

7 Bits/90° ↯

##### Measuring range

360° ↯, 180° or 90°  
(other ranges upon request)

##### Output signals

A: 0...20 mA  
B: 4...20 mA

##### Linearity

< ± 0.5 % based on 90° ↯

##### Temperature drift

0.02 %/K typ.

##### Code sense

CW\* (CCW at option)

##### Supply voltage ranges

outputs A, B 24...30 V DC

##### Supply current

50 mA typ./70 mA max.

\* Increasing signal when turning clockwise with view on flange side.

#### Current outputs A and B

Tolerances 0 mA ± 150 μA typ./± 250 μA max.  
4 mA ± 150 μA typ./± 250 μA max.  
20 mA ± 150 μA typ./± 250 μA max.

#### Load resistance

0...1000 Ω (U<sub>S</sub> = 24 V DC ...30 V DC)

#### Mechanical data

Series	RAM36
Diameter of shaft	n.a.
Magnetic actuator for shaft diameters	5.1 + 0.05 mm
Operating speed	20.000 rpm
Mass including lead and D-sub plug	100 g approx. + 12 g actuator
Lead exit and lead diameter	radially ∅ 5 mm approx.

#### Environmental data

Series	RAM36
Behavior within magnetic fields	Up to = 0.1 Tesla without influence (all 3axis)
Operating temperature range	- 25 °C...+ 85 °C (+ 125 °C at option)
Storage temperature range	- 20 °C...+70 °C (dependent on packing material)
Resistance against shock	2000 m/s <sup>2</sup> ; 11ms to DIN EN 60068-2-27
Resistance against vibration	10 Hz...2000 Hz; 500 m/s <sup>2</sup> to DIN EN 60068-2-6
Protection grades	Front plate IP 68 Housing IP 64

---

ABB has Sales & Customer Support  
expertise in over 100 countries worldwide.

**[www.abb.com](http://www.abb.com)**

The Company's policy is one of continuous product  
improvement and the right is reserved to modify the  
information contained herein without notice.

Printed in the Fed. Rep. of Germany (05.2006)

© ABB 2006



**ABB Automation Products GmbH**

Borsigstrasse 2  
63755 Alzenau  
Germany  
Tel: +49 551 905-534  
Fax: +49 551 905-555

[CCC-Support.deapr@de.abb.com](mailto:CCC-Support.deapr@de.abb.com)