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Geschäftsgebiet Process Instrumentation  
D-76181 Karlsruhe

**Disclaimer of Liability**

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

© Siemens AG 2001  
Technical data subject to change.

## Classification of Safety-Related Notices

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:



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### DANGER

indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.

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### WARNING

indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

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### CAUTION

used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury.

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### CAUTION

used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

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### NOTICE

indicates a potential situation which, if not avoided, may result in an undesirable result or state.

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### NOTE

highlights important information on the product, using the product, or part of the documentation that is of particular importance and that will be of benefit to the user.

---

## General Notes

This device has left the factory in a perfect condition as regards safety. The notes and warnings in these Operating Instructions must be observed by the user if this state is to be maintained and hazard-free operation of the device assured.



---

### NOTE

Dear customer,

These manuals do not claim to cover all details or equipment variations and do not provide for every possible contingency that may arise during installation, operation or maintenance.

Should further information be desired or particular problems arise that are not sufficiently detailed for the customer's purposes, the matter should be brought up with the respective Siemens Sales Office.

The contents of the instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The Sales Contract contains the entire obligations of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

The contents reflect the latest state at the time of going to print. Subject to technical modifications in the course of further development.

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## **WARNING**

The specifications of the examination certificate valid in your country must be observed.

Laws and regulations valid in your country must be observed for the electrical installation in explosions hazardous areas. In Germany these are for example:

- Working reliability regulations
- Regulations for installing electrical equipment in hazardous areas, DIN EN 60079-14 (in the past VDE 0165, T1)

Intrinsically safe devices may only be connected to circuits certified as intrinsically safe, which correspond to the technical data specified on the rating plate or in the certifications and approvals (e.g. EC type-examination certificates). It should be checked whether the available power supply is compliant with the power supply specified on the type plate and specified in the examination certificate valid in your country.

The interconnection of the NCS sensor with the positioner may not be led out of the potentially explosive area, i.e the appropriate regulations must be observed.

Devices with the protection type "intrinsically safe" lose their certification as soon as they are operated with circuits that do not conform to the specifications laid down in the EC type examination certificate valid in your country.

Correct and safe operation of this device is dependent on proper transport, storage and installation as well as careful operation and maintenance.

The device may be used solely for the purposes described in this manual.

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## **Excluded Liability**

The user is responsible for all changes made on the device, provided that these are not explicitly mentioned in the operating instructions.

## Qualified Personnel

are persons familiar with the installation, assembly, commissioning and operation of the product and who have the appropriate qualifications for their activities such as:

- training or instruction or authorization to operate and maintain devices/systems according to the standard of safety technology for electrical circuits, high pressures and corrosive as well as hazardous media.
- for devices with explosion protection: training or instruction or authorization to be allowed to work on electrical circuits for potentially explosive systems.
- training or instruction according to the standards of safety engineering in the care and use of suitable safety equipment.

---

### CAUTION

Modules which are sensitive to electrostatic charge may be destroyed by voltages which are far below the human level of perception. These voltages occur already when you touch a component or electrical connections of a module without first discharging yourself electrostatically. The damage incurred by a module as a result of an overvoltage is not usually immediately perceptible but only becomes noticeable after a long time in operation.

---

## Use for the Intended Purpose

Use for the intended purpose in the sense of this manual means that this product is designed for use only for the applications described in the catalog and in this technical description.

The product described in this manual has been developed, produced, tested and documented under consideration of the pertinent safety standards. There is normally no danger of damage to property or injury to persons when the handling regulations and safety instructions described for configuration, assembly, use for the intended purpose and maintenance are observed. Low voltages which are connected must be generated by safe isolation.

# General information and function of the NCS

# 1

## 1.1 General information and function

The positioning distance sensing system and controller unit can be mounted separately in all housing variants with the SIPART PS2 positioner.

The stroke or rotary angle detection takes place directly on the drive by a non contacting position sensor (Non Contacting Position Sensor). The controller unit can then be mounted at some distance on a mounting tube or similar and is connected to the positioning distance sensing system by an electric cable and with the drive by one or two pneumatic lines.

Such a separate installation is always useful when the ambient conditions at the fitting exceed the specified values for the SIPART PS2 positioner.

The NCS consists of cast sensor to be mounted permanently and a magnet. The magnet is mounted directly on the spindle in linear actuators or on the shaft stump in rotary actuators. The sensor housing is fixed to the console in rotary actuators and to the NAMUR bracket in linear actuators.

The NCS is supplied with power via the EMC filter module C73451-A430-D23 NCS and at the same time guarantees electromagnetic compatibility.

The SIPART PS2 positioner can be ordered with a pre-assembled EMC filter module or a filter module can be retrofitted to existing controllers at any time.

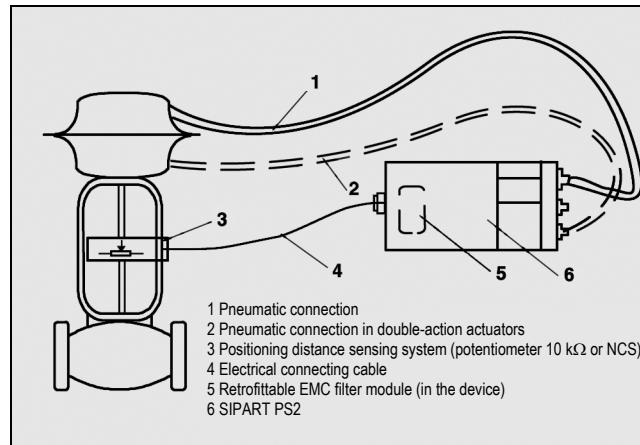


Figure 1 Separate installation of NCS and controller unit

## 1.2 Mode of operation

The NCS contains a magnetic field sensor amongst other things. This sensor has the property that it changes its electrical resistance when approached by a permanent magnet. Due to the measuring method used, it has a large signal-to-noise ratio in relation to external magnetic fields.

The following figure illustrates the functional principle with a rotating magnet.

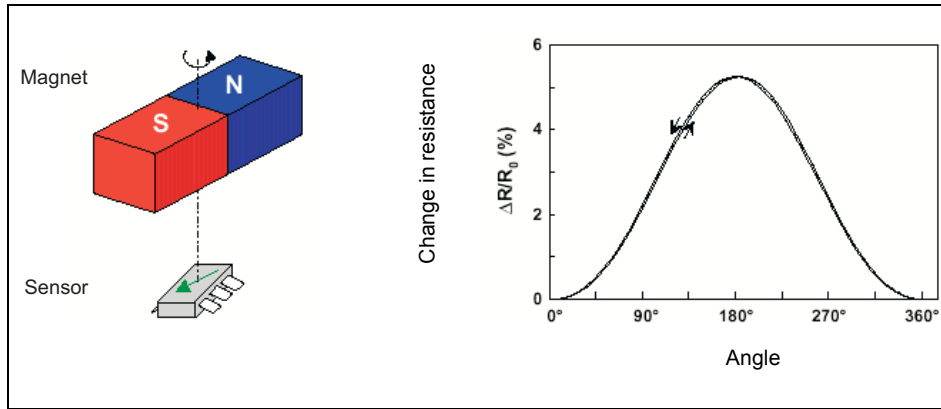


Figure 2 Relative change in resistance depending on the angle of the magnet.

As the figure shows, a circular movement of the magnet causes a sinusoidal change in the resistance. The mechanical stops of the fitting ensure that only one part (quadrant) of the sinusoidal curve is used at any one time. The principle-based non-linearity is corrected by a curve stored in the SIPART PS2 positioner.

When the magnet is moved linearly past the sensor, there is also a change in resistance which can be used to determine the position. The following figure explains the principle.

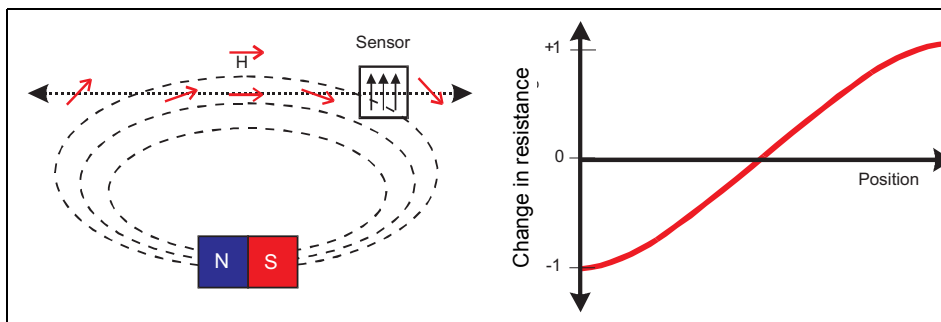


Figure 3 Change in resistance dependent on the position of the magnet.

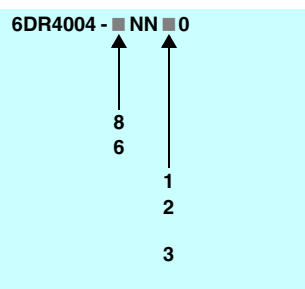
The non-linearity is corrected in the SIPART PS2 positioner by software.

The great advantage of this principle is the freedom from wear. Vibration, moisture and temperature also have only a slight influence on the measuring result.

## 2

The NCS is equally suitable for rotary actuators (according to VDI/VDE 3845) and for linear actuators within its technical specifications (see Chapter 6, page 69 "Technical Data"). The following versions are available:

for part-turn actuators  
for linear actuators up to 14 mm  
(0.55 inch) (on request)  
for linear actuators > 14 mm  
(0.55 inch)



**C73451-A430-D23**

## 2.2 NCS for rotary actuators

The scope of delivery of the NCS for rotary actuators 6DR4004-xNN10 contains (serial no. Figure 4, page 50).

Ser.no.	pieces	Designation	Notes
	1	Operating Instructions	
2	1	Magnet holder	
3	6	Washer	DIN 125 6-200HV-A4
4	2	Hexagon socket head screw	M6x12-A4-70
5	1	Plastic washer	
6	1	Rotary magnet	
7	1	Clamping ring	
8	4	Hexagon nut	EN 24032
9	2	Hexagon socket head screw	M6x25-A2
10	1	NCS sensor	Cable length acc. to order
	1	Screw	SN60088 F3x8-ST
	1	Seal	for screw-type cable gland
	1	Stopper	for closing the seal

## 2.3 NCS for linear actuators

NCS as a linear actuator is available in two different variations:

### Linear actuator up to 14 mm.

This is a direct mount (i.e. without gears or levers) (Figure 5, page 51).

### Linear actuator > 14 mm:

For linear actuators over 14 mm 6DR4004-xNN30, the linear movement is converted into a rotational movement with a lever assembly (Figure 6, page 54).



The following components are included in the delivery for NCS model 6DR4004-xNN30 for linear actuators > 14 mm:

- 1 completed NCS mounting kit
- 1 operating manual (five languages: German, English, French, Spanish and Italian).

## 2.4 Other necessary components

In addition to the above scope of delivery you will need:

- A console according to VDI/VDE 3845 for a rotary actuator.
- For a linear actuator > 14 mm stroke, you will require the 6DR4004-8V linear actuator mounting kit for a stroke range of from 3 mm to 35 mm and the longer lever 6DR4004-8L for a range of >35 mm.
- A SIPART PS2 positioner with built-in EMC filter module (order number 6DR5xxx-xxxx2-xxAx). or the EMC filter module (order number C73451-A430-D23) if you want to retrofit an existing SIPART PS2 positioner.

To avoid influencing of the sensor, the fastening elements should be made of non-ferromagnetic metal, e.g. A4 steel or aluminium.

## 2.5 Mounting kit “linear actuator” 6DR4004-xNN20

On request

## 2.6 Mounting kit "Linear Actuator" 6DR4004-8V and 6DR4004-8L

The following are included in the delivery of the mounting kit "Linear actuator IEC 534 (3 mm to 35 mm)" (see Figure 6, S. 54 for item Nos.):

Item No.	Quantity	Designation	Remarks
1	1	NAMUR mounting bracket IEC 534	Standardized connection for mounting console with ledge, column or plane surface
2	1	Pick-up bracket	Guides the driver pin and rotates the lever arm
3	2	Clamping assembly	Mounting of pick-up bracket on actuator spindle
4	1	Driver pin	Assembly on lever (6)
6	1	NAMUR lever	For stroke range 3 mm to 35 mm For stroke ranges > 35 mm to 130 mm (special delivery), lever 6DR4004-8L is also required
7	2	U bolt	Only for actuators with columns
8	4	Hexagon head screw	M8 x 20 DIN 933-A2
9	2	Hexagon head screw	M8 x 16 DIN 933-A2
10	6	Spring washer	A8 - DIN 127-A2
11	6	U washer	B 5,4 - DIN 125-A2
12	2	U washer	B 6,4 - DIN 125-A2
14	1	Spring washer	A6 - DIN 137A-A2
16	3	Spring washer	A6 - DIN 127-A2
17	3	Socket head screw	M6 x 25 DIN 933-A2
18	1	Hexagon nut	M6 - DIN 934-A4
19	1	Square nut	M6 - DIN 557-A4
21	4	Hexagon nut	M8 - DIN 934-A4

# Preparing for Operation

# 3

## 3.1 Assembly

The NCS can be mounted on all slew and linear actuators with a NAMUR interface.

Individual solutions are recommended for the other actuators.

### 3.1.1 角行程执行机构组装程序

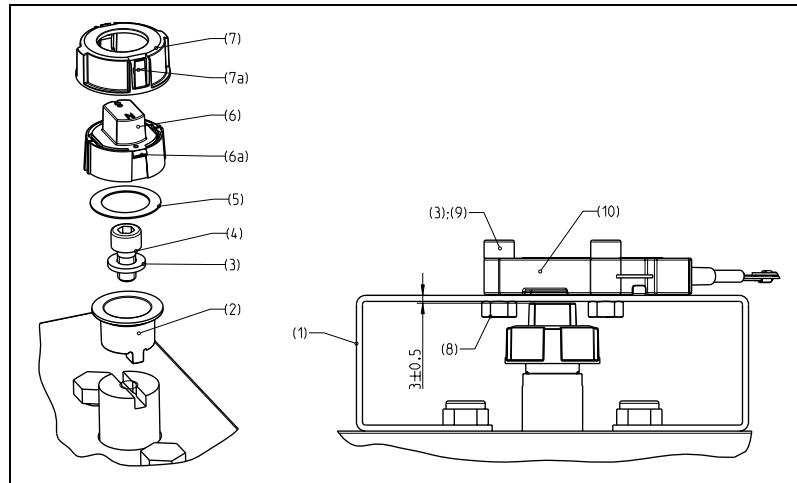


图 4 角行程执行机构组装过程

1. 将磁杯牙头(2)安置到角行程执行机构短轴的凹槽能,用(4)内六角形窝头螺丝和(3)平垫圈固定。
2. 塑胶垫圈(5)嵌入在该旋转磁铁内(6)然而当该旋转磁铁(6)与磁铁杯(2)配装时,相互之间会突然吸合。此时,磁铁便可以在角行程执行机构上,随短轴旋转了。
3. 将紧箍磁铁环(7)旋紧到磁铁(6)上时,弹性元件(7a)的卡箔对应(6a)卡槽,要注意;二个元件相互之间会突然吸合。环夹紧后,该旋转磁铁与短轴就成为整体了。
4. 正确的组装后,控制盘根据VDI/VDE, 3845, 在该旋转磁铁的最高的边缘和该控制盘的最高的边缘之间的间隔,自动地留有3个mm。
5. 如果不使用该标准的控制盘,你必须在"NCS"下面短轴或垫圈之间留有合适的空间。
6. 按本说明,如果要更改SIPARTPS2定位器,安装可参照SIPARTPS2定位器中的EMC滤波器模型图示。

### 3.1.2 直行程执行器行程 14 mm的装配程序

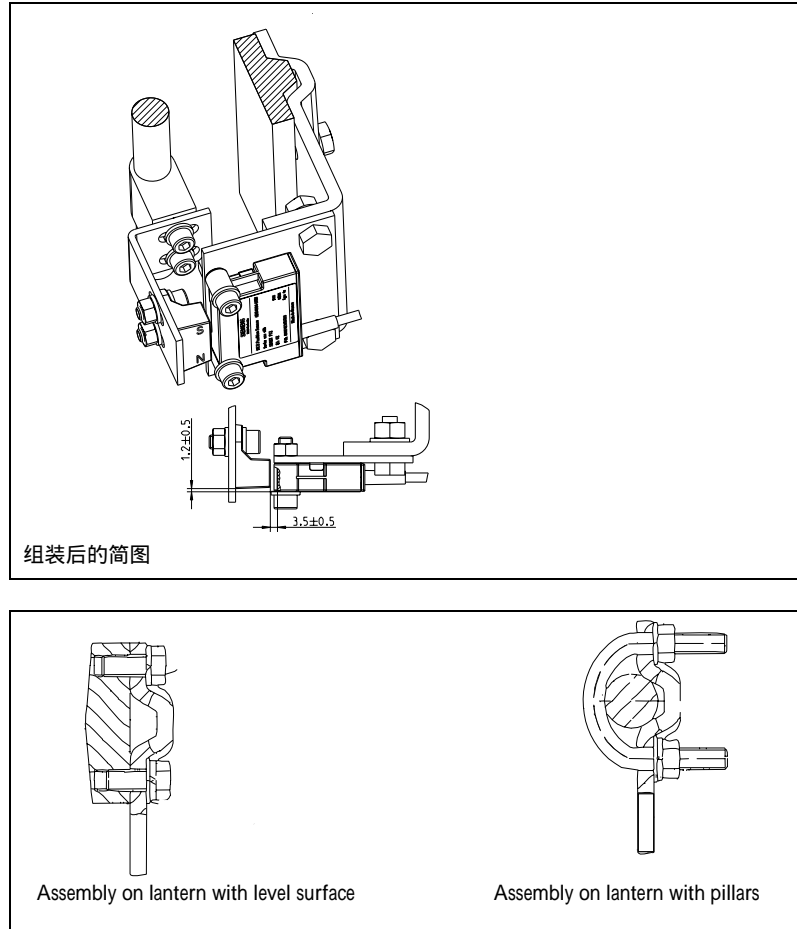


图 5 直行程执行器14mm的组装例子

Set the sensor so that is arranged centrally to the stroke and the dimensions are kept as well as possible according to Figure 5, page 51.

### 3.1.3 Assembly of linear actuator > 14 mm

(see Figure 6, page 54)

1. Mount clamping assembly (3) with socket head screws (17) and lock washers (16) on the actuator spindle.
2. Insert the pick-up bracket (2) into the recesses of the clamping assembly. Set the required length and screw only so tight that the pick-up bracket can still be shifted.
3. The center of the pin (4) is set to the value of the stroke range specified on the actuator or set to the next large scale value. The same value can be set later for 3.YWAY during start-up, to display the travel in mm after initialization.
4. Push the lever onto the positioner shaft as far as possible, and secure with the socket head screw (17).
5. Attach the mounting bracket (1) to the NCS mounting set using the two hexagonal head screws (9), spring washer (10), U washer (11) and hexagon nut (21).
6. Selection of the row of holes depends on the width of the actuator yoke. The driver pin (4) should engage in the pick-up bracket (2) as close to the spindle as possible, but must not touch the clamping assembly.
7. Hold the NCS mounting kit with the mounting bracket (1) on the actuator such that the driver pin (4) is guided within the pick-up bracket (2).
8. Tighten the pick-up bracket.
9. Position the mounting parts according to the type of actuator:
  - Actuator with ledge: hexagonal head screw (8), U washer (11) and spring washer (10).
  - Actuator with plane surface: four hexagonal head screws (8) with U washer (11) and spring washer (10).
  - Actuator with columns: two U bolts (7), four hexagonal nuts (21) with U washer (11) and spring washer (10).
10. Secure NCS mounting kit onto the yoke using the previously positioned mounting parts.



---

**NOTE**

Adjust the height of the NCS mounting kit such that the horizontal lever position is reached as close as possible to the center of the stroke. You can use the lever scale of the actuator for orientation. If a symmetrical assembly is not possible: it must always be guaranteed that the horizontal lever position is passed through within the stroke range.

---

If you want to retrofit a SIPART PS2 positioner, install the EMC filter module in the SIPART PS2 positioner according to the enclosed installation instructions.

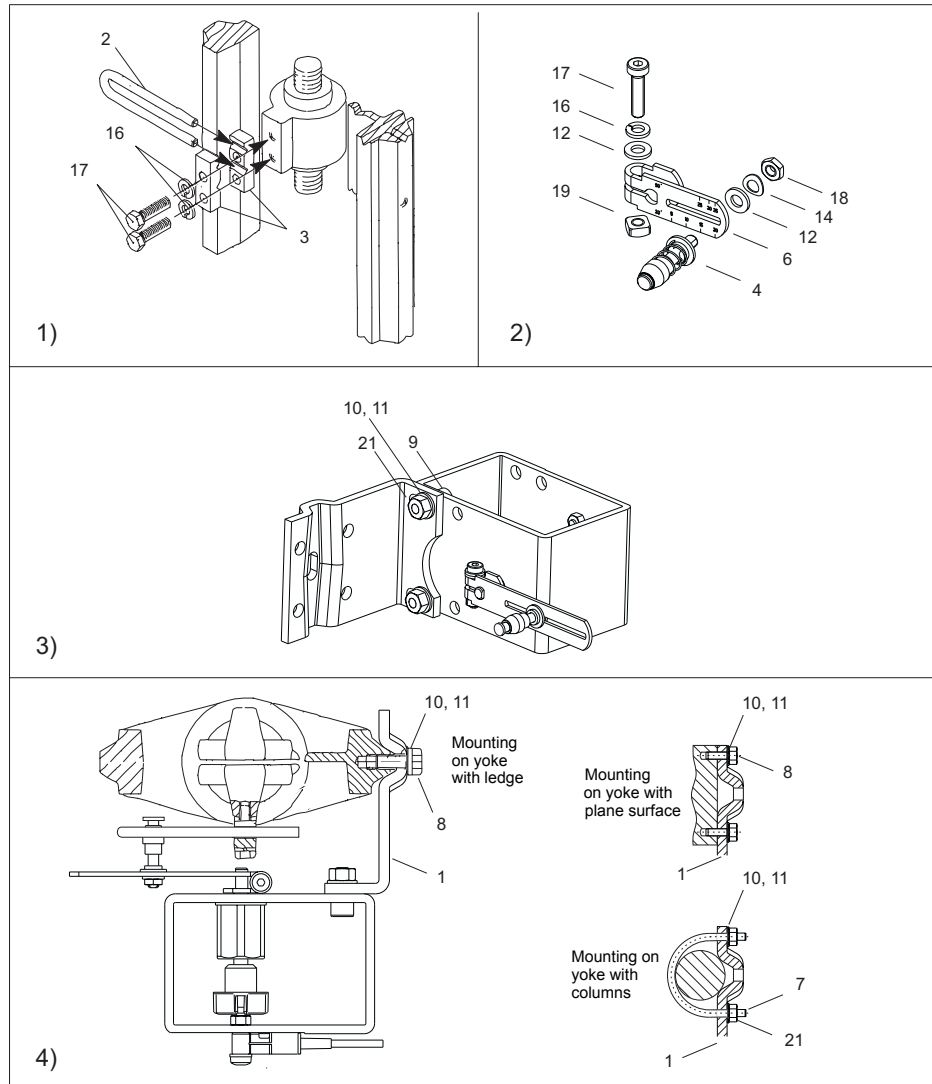


Figure 6 Assembly procedure for rotary actuators > 14 mm



### 3.1.4 Dimensioned drawing

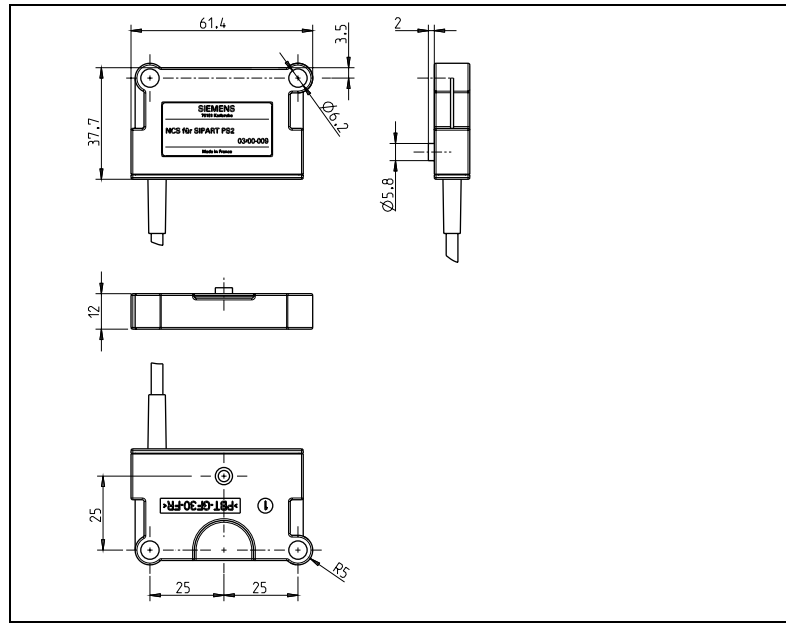


Figure 7 Dimensioned drawing NCS

## 3.2 Electrical Connection

You require the EMC filter module order number C73451-A430-D23 for the electrical connection. The SIPART PS2 positioner supplies power to the NCS via the EMC filter module. Proceed as follows to connect the shielded four-pole cable of the NCS to the SIPART PS2 positioner:

1. Replace the dummy stopper on the SIPART PS2 positioner with the screw-type cable gland supplied with the EMC filter module.



---

### NOTE

Use the blue screw-type cable gland for Ex devices and the gray gland for non-Ex devices.

---

2. Lay the stripped NCS-cable from the outside through the opening in the screw-type cable gland with the two openings into the SIPART PS2 positioner. If you do not need the second opening in the screw-type cable gland, seal this with the enclosed stopper.
3. Screw on the screw-type cable gland tight.
4. Clamp the colored wires of the cable in the following order (see Figure 8, page 57) to the terminal of the EMC filter module:
  - yellow top terminal (Vcc)
  - green terminal below the top terminal (Vref)
  - white or black terminal above the bottom terminal (Vpos)
  - brown bottom terminal (GND)
5. Connect the terminal end of the cable shield with a screw to the grounding point of the positioner.

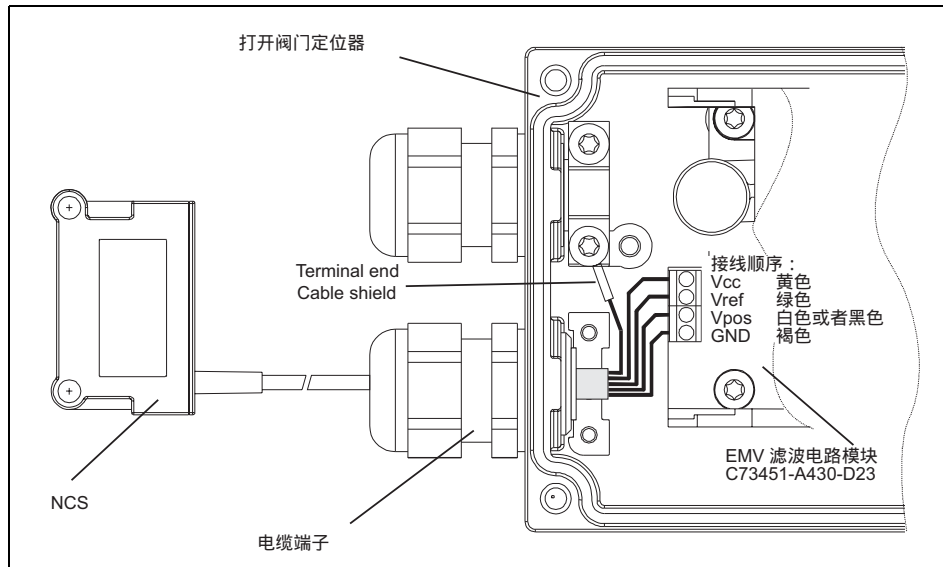


Figure 8 将NCS 连接到EMC 滤波电路模块

6. Ground connection: This is automatically connected to ground potential of the system when fixing to the console by the plate on the back of the NCS. This ground connection only works when the console is connected with system ground with low resistance. Ensure this by measuring the resistance. You may have to ensure grounding by an additional line from the NCS to ground potential.



- Supply the SIPART PS2 positioner with electrical and pneumatic energy. You will see the current sensor voltage (0 to 100 %) in the top line of the display, "NOINI" flashes in the bottom line. The pneumatic drive does not move.
- Presetting for rotary actuator: Adjust the magnet with the valve or flap closed so that the North pole is facing in the direction of the cable.
- Linear actuator setting for > 14 mm: The magnet is permanently attached in the mounting set for linear actuators > 14 mm and is already adjusted. It does not have to be set.
- Observe the display of the SIPART PS2 positioner whilst adjusting the drive to its mechanical end stops with the plus and minus key on the SIPART PS2 positioner. Values within the range from P2.0 to P98.0 must be displayed at all times.



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## NOTE

This condition cannot be satisfied with rotating flaps and linear actuators with too great a mechanical positioning distance.

---

If the display indicates opposite direction of action, set either the parameter "YDir" to "FALL" or turn the magnet 180° (not for version 6DR4004-xNN30).

## 4.1 Initialization of rotary actuators

- Set the 1st parameter ("YFCT") in rotary actuators at normal direction of action of the drive to "ncSt" or at inverse direction of action to "-ncSt".
- Start initialization as usual by "INITA".

## 4.2 Initialization of linear actuators

- Set the 1st parameter ("YFCT") of the positioner to "ncSLL".
- Start initialization as usual by "INITA".



---

### NOTE

The "ncSLL" parameter value only exists with devices in the 6DR5xxx series and only with firmware versions > C4. For devices of series 6DR5xxx and firmware versions < C5 (YAGL) set it to 90°. This is also required for devices of the 6DR4xxx series. The resulting non-linearities can be corrected with the programmable curve by setting the parameter value "SFCT" to "FrEE" and the individual coordinate points respectively.

---



Translation

## EC TYPE-EXAMINATION CERTIFICATE

- (1) **EC TYPE-EXAMINATION CERTIFICATE**
- (2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 94/9/EC**
- (3) EC-Type Examination Certificate Number
- (4) **TÜV 01 ATEX 1784**
- (5) Equipment: Non Contacting Position Sensor (NCS) type 6DR4004-"N"
- (6) Manufacturer: Siemens AG, Automatisierungs- und Antriebstechnik (A&D)  
Address: Ostliche Rheinbrückenstraße 50  
D-76187 Karlsruhe
- (7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) The TÜV Hannover/Sachsen-Anhalt e.V., TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.  
The examination and test results are recorded in the confidential report N° 02 YEX 132667.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50 014: 1997** **EN 50 020: 1994**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-type examination certificate relates only to the design and construction of the specified equipment or protective system according to Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and placing on the market of this equipment or protective system.
- (12) The marking of the equipment or protective system must include the following:



II 2 G EEx ia IIC T6 resp. EEx ib IIC T6

TÜV Hannover/Sachsen-Anhalt e.V.  
TÜV CERT-Zertifizierungsstelle  
Am TÜV 1  
D-30519 Hannover

*K. Kroll*  
Head of the  
Certification Body



Hanover, 2002-01-07

TÜV CERT A4 07/01 10.0001.0

This certificate may only be reproduced without any change, schedule included.  
Excerpts or changes shall be allowed by the TÜV Hannover/Sachsen-Anhalt e.V.

page 1/2



(13)

**SCHEDULE**(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 01 ATEX 1784**

(15) Description of equipment

The Non Contacting Position Sensor (NCS) type 6DR4004-\*N\* is an external sensor for positioners, e.g. for the Electropneumatic positioner SIPART PS2. The sensor is intended for the contactless measurement of the stroke resp. the angle of rotation direct at the actuator.

The permissible ambient temperature range is -40°C to 70°C for T6-T5 and -40°C to 90°C for T4-T1.

**Electrical data**

Supply- and ..... in type of protection „Intrinsic Safety“ EEx ia/Ib IIC  
 signal circuits resp. EEx ia/Ib IIB  
 (prefabricated cable) only for the connection to certified intrinsically safe circuits with the following maximum values:

$$U_i = 5 \text{ V}$$

effective internal inductance:  $L_i = 240 \text{ } \mu\text{F}$   
 effective internal capacitance:  $C_i = 10 \text{ nF}$

(16) Test documents are listed in the test report No.: 02 YEX 132667.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

16.02.01.00

page 2/2



**SIEMENS**

# EG-Konformitätserklärung

## EC Declaration of Conformity

No. 1282.020- S01

Hersteller: Siemens AG.....  
 Manufacturer: .....  
 Anschrift: Östliche Rheinbrückenstr. 50; 76187 Karlsruhe .....  
 Address: Bundesrepublik Deutschland .....  
 Produkt- Non Contacting Position Sensor für SIPART PS2 NCS.....  
 bezeichnung: 6DR4004-aNxxx a = 6, 8 .....  
 Product .....  
 description .....

Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender  
 Europäischer Richtlinien überein:  
 The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

89/336/EWG Richtlinie des Rates vom 3. Mai 1989 zur Angleichung der Rechtsvorschriften der  
 Mitgliedstaaten über die elektromagnetische Verträglichkeit  
 (geändert durch 91/263/EWG, 92/31/EWG, 93/68/EWG und 93/97/EWG).  
 Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to  
 electromagnetic compatibility (amended by 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC)

94/9/EG Richtlinie des Europäischen Parlaments und des Rates vom 23. März 1994 zur Angleichung  
 der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur  
 bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.  
 Directive of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member  
 States concerning equipment and protective systems intended for use in potentially explosive atmospheres

CE-Kennzeichnung / CE marking : 07102

Karlsruhe, den / the 10.07.2002

Siemens AG

Schradi, Entwicklung.....  
 Name, Funktion .....  
 Name, function .....  
 Unterschrift .....  
 signature .....

Van Dycke, Fertigung.....  
 Name, Funktion .....  
 Name, function .....  
 Unterschrift .....  
 signature .....

Anhang A ist integraler Bestandteil dieser Erklärung  
 Annex A is integral part of this declaration  
 Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.  
 Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.  
 This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be  
 considered in detail.

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SIEMENS

Anhang A zur EG-Konformitätserklärung  
Annex A to the EC Declaration of Conformity

No. 1282.020- S01

Produkt- Non Contacting Position Sensor für SIPART PS2 NCS .....  
bezeichnung: 6DR4004-aNxxx a = 6 , 8 .....  
Product .....  
description .....

Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender  
Normen (variantenabhängig):  
Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):

Richtlinie directive	Norm Standard: Referenznummer Reference number	Ausgabedatum Edition	a =
89/336/EWG	EN 61326/A1 Anh. A	1998	6,8
94/9/EG	EN 50 014	1997	6
94/9/EG	EN 50 020	1994	6

Zertifikate:  
Certificates:

Zertifikat Certificate	Prüfbericht Nr.: Report no.:	a =
TÜV 01 ATEX 1784	02 YEX 132667	6

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.  
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.  
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.



FM Approvals  
1151 Boston-Providence Turnpike  
P.O. Box 9102 Norwood, MA 02062 USA  
T: 781 762 4300 F: 781 762 9375 www.fmglobal.com

## CERTIFICATE OF COMPLIANCE

### HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

**6DR4004-6Na. Non Contacting Position Sensor.**  
IS / I / 1 / ABCD / T6 Ta = 70°C; T4 Ta = 85°C - A5E00078040L; Entity;  
I / 1 / AEx ib IIC / T6 Ta = 70°C; T4 Ta = 85°C - A5E00078040L; Entity;  
NI / I / 2 / ABCD / T6 Ta = 70°C; T4 Ta = 85°C - A5E00078040L;  
NI / I / 2 / IIC / T6 Ta = 70°C; T4 Ta = 85°C - A5E00078040L; Type 4X  
Entity/Nonincendive Field Wiring Parameters:  
Vmax = 5 V, Imax = 200 mA, Pi = 1 W, Ci = 10 nF, Li = 240 µH  
a = Cable length N or A.

#### Equipment Ratings:

Intrinsically Safe for use in Class I, Division 1, Groups A, B, C and D and Class I, Zone 1, Group IIC in accordance with Entity requirements and Control Drawing A5E00078040L; Nonincendive for use in Class I, Division 2, Groups A, B, C and D and Class I, Zone 2, Group IIC in accordance with Nonincendive Field Wiring requirements and Control Drawing A5E00078040L; Indoor and Outdoor, Type 4X Hazardous (Classified) Locations

#### Approved for:

Siemens AG - A&D PI TQ 2  
Oestliche Rheinbrueckenstr. 50  
Postfact 21 12 62  
D-76181 Karlsruhe  
Germany

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NCS  
A5E00097485-06

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This certifies that the equipment described has been found to comply with the following FM Approval Standards and other documents:

Class 3600	1998
Class 3610	1999
Class 3611	1999
Class 3810	1989
NEMA 250	1991

Original Project ID: 3015070

FM Approval Granted: April 1, 2003

Subsequent Revision Reports / Date FM Approval Amended

Report Number	Date	Report Number	Date
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FM Global Technologies LLC

*David W. Styrula*  
David W. Styrula  
Technical Team Manager

4/3/03  
Date

FM Approvals HLC 8/02

3015070  
Page 2 of 2



**DESCRIPTION**

General – The **Non Contacting Position Sensor (NCS)** is a sensor to detect valve and flap positions for the electropneumatic positioner SIPART PS2. The positioning distance sensing system and controller unit can be mounted separately in all housing variants with the SIPART PS2 position controller. The controller unit can then be mounted at some distance on a mounting tube or similar and is connected to the positioning distance sensing system by an electric cable and with the drive by one or two pneumatic lines.

The NCS consists of cast sensor to be mounted permanently and a magnet. The magnet is mounted directly on the spindle in linear actuators or on the shaft stump in rotary actuators

Intrinsically safe for: Class I Div 1 Groups A, B, C, D  
Class I Zone 1 AEx(FM) Ex(CSA) ib IIC  
indoor and outdoor (NEMA 4X)

Nonincendive for: Class I Div 2 Groups A, B, C, D  
Class I Zone 2 Group IIC  
indoor and outdoor (NEMA 4X)

Temperature classes: T6 @ Ta = -40°C ... +70°C  
T4 @ Ta = -40°C ... +85°C

**Notes**

1. Approved associated apparatus or approved barrier must be installed in accordance with manufacturer instructions.
2. Approved associated apparatus or approved barrier must meet the following requirements:  $U_o < U_i \max$  and  $I_o < I_i \max$  and  $P_o < P_i \max$   
 $C_a > C_i + C_{cable}$ ;  $L_a > L_i + L_{cable}$
3. The maximum non-hazardous area voltage must not exceed 250 V.
4. The installation must be in accordance with the National Electrical Code NFPA 70, Article 504, 505, and ANSI/ISA-Rp 12.6.
5. For Division 2 installations without the use of conduit, Associated Nonincendive Field Wiring Apparatus is required for connection to the power supply.
6. No barrier is required for division 2 / zone 2 installation. Equipment must be wired per the NEC division 2 / zone 2 wiring methods.

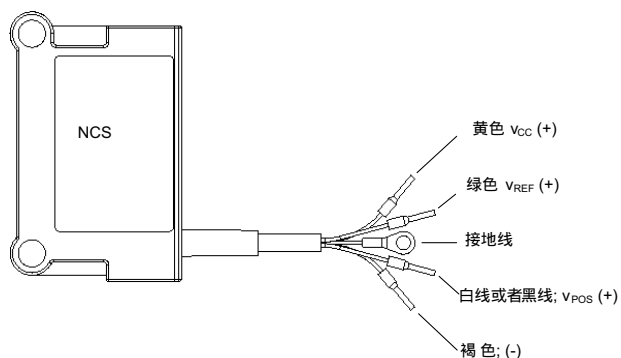
**Unterlage für Zulassungen; Änderungen nur mit vorheriger Genehmigung**  
**Approval document; Change only with prior permission.**

MLFB	6DR4004-8Nxxx	Fabr.-Gr.	831	Produktgruppe	Positioner	Produktfamilie	NCS	Abn.-Kz.	FM / CSA	
DS:	04	Datum	12.07.2001	Benennung	Control Drawing non contacting position sensor					
Änd.-Nr.	79A34355	Urheber	Meinhof	name						
Mod.-No.		author								
Änd.-Datum	04.12.2001	Ableitung	A&D PI13							
Mod.-Date										
Bearbeiter	Meinhof	<b>SIEMENS</b> Automation & Drives			Artikel-Nr.	A5E00078040	Blatt		1/2	
designer					Article No.					
Date					Dokument-Nr.	A5E00078040L				
file	VJ17591.doc				Document-No.					

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NCS  
A5E00097485-06

### NCS 连接线说明



NCS 电气参数：

With type of protection „Intrinsically-safe“, only for connection to certified intrinsically-safe circuits with the following maximum values:  $U_i = 5V$

$U_i = 5V$   
 $I_i = 200mA$   
 $P_i = 1W$   
 $C_i = 10nF$   
 $L_i = 240\mu H$

Effective internal capacitance:  
Effective internal inductance:

for Division 2 application:

Maximum values:  $V_{\max} \leq 5V$

for nonincendive field wiring:

Maximum values:  $V_{\max} \leq 5V$   
 $I_i = 200mA$   
 $P_i = 1W$   
Effective internal capacitance:  $C_i = 10nF$   
Effective internal inductance:  $L_i = 240\mu H$

Effective internal capacitance:  
Effective internal inductance:

**Unterlage für Zulassungen; Änderungen nur mit vorheriger Genehmigung**  
**APPROVAL DOCUMENT; CHANGE ONLY WITH PRIOR PERMISSION.**

MLFB	6DR4004-8Nxxx	Fabr.-Gr.	831	Produktgruppe	Positioner	Produktfamilie	NCS	Abn.-Kz.	FM / CSA	
DS:	04	Datum	date	12.07.2001	<div>Benennung name</div> <div>Control Drawing</div> <div>non contacting position sensor</div>					
Änd-Nr.	79A34355	Urheber	author	Meinhof						
Änd.-Datum	04.12.2001	Abteilung	A&D PI13							
Bearbeiter	Meinhof	SIEMENS Automation & Drives		Artikel-Nr.						
Date	VJ17591.doc			Dokument-Nr.	A5E00078040L	2/2				

NCS sensor (not for EEx d version)

Positioning range

- Linear actuator
- Rotary actuator

Linearity (after correction by SIPART PS2 with firmware > C4)

- Linear actuator
- Rotary actuator

Hysteresis

Continuous operating temperature

Degree of housing protection

3 to 130 mm (0.12 to 5.12 inch), to 200 mm (7.87 inch) on request
30° to 120°
± 1%
± 1%
± 0.2%
-40 °C to +85 °C (-40 °F to +185 °F) extended temperature range on request
IP68/NEMA 4x

