



OBSERVATOR
instruments BV

OMC-408

User Manual

i

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Safety Instructions:



Note:

This symbol points to an information which contains important instructions concerning the operating. Interferences may result, if these are not followed.



Attention:

This symbol points to an information, the disregard of which may lead to serious material damages. The safety instructions must be strictly observed.

1. Introduction

The intrinsically safe transmitter series HygroClip ID-, IW-, IC-EX is an instrument for the combined measurement of humidity and temperature for operation in hazardous areas, where the classification Exi is required. The transmitter fulfills the European Standard EN 50014 and EN 50020 and has the following designation: **Ex ia II C T6** and **Ex I/II M1 1G/D**

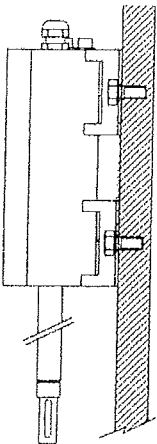


In hazardous areas the transmitter has always to be operated via Zener barriers!

Further copies of these operating instructions can be obtained from either ROTRONIC AG or one of our representatives.

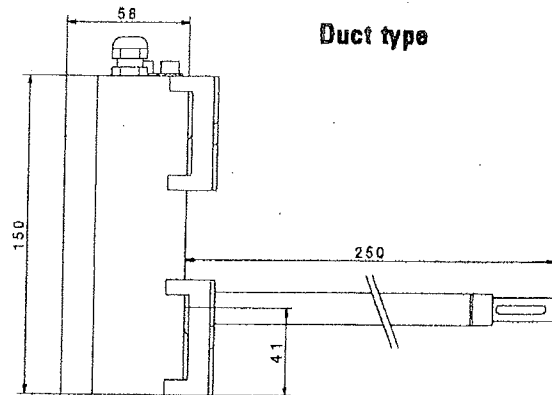
2. Installation

2.1 Mounting



Room type

mounting of the electronic case with 4 screws (not included)

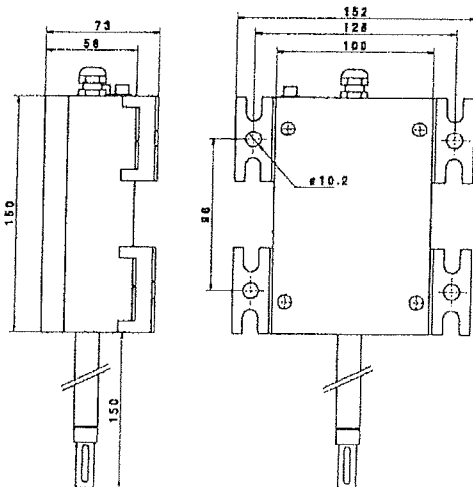


Duct type

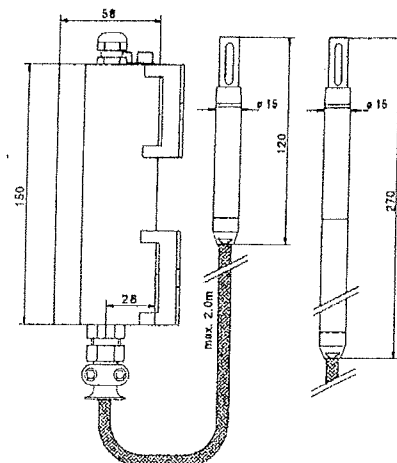
variant A: mounting like room type.

variant B: probe fixing with AGRO-screw fitting and flange.

The flange is only necessary when the screw fitting alone cannot fixed.

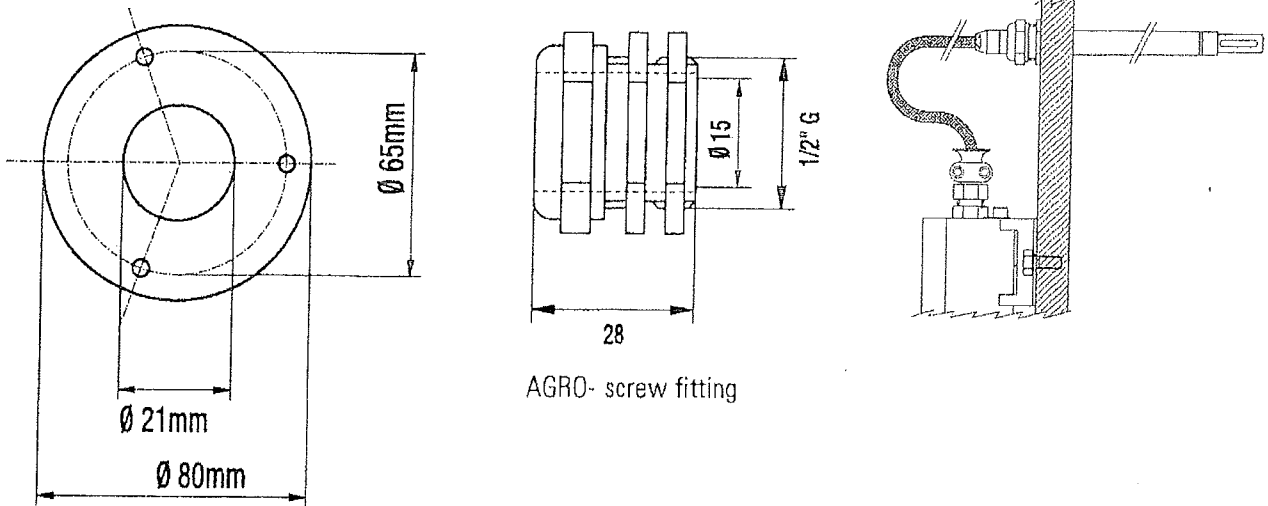


Type with cable probe



Flange mounting for duct and cable probe

Probe mounting as with duct type, variant B



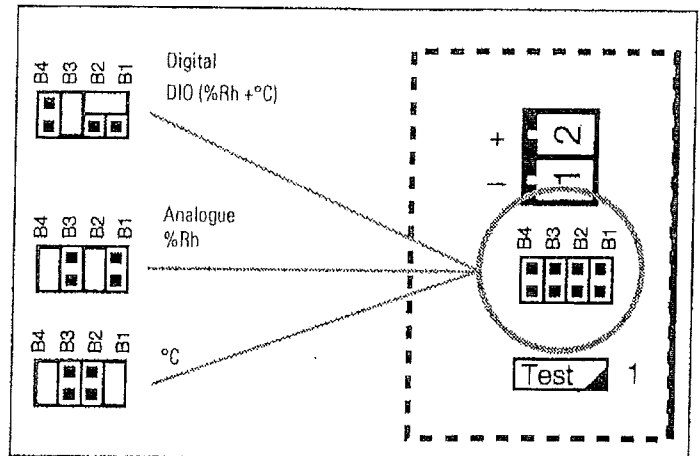
AGRO- screw fitting

3. The possibilities of use and the electric installation

The intrinsically safe transmitter can be configured for the following three applications:

1. Transmitter for the combined measurement of relative humidity and temperature.
Signal working up by the transmitter type HgroFlex.
2. Transmitter for the measurement of relative humidity.
Two wire system, 4...20mA
3. Transmitter for the measurement of temperature.
Two wire system, 4...20mA

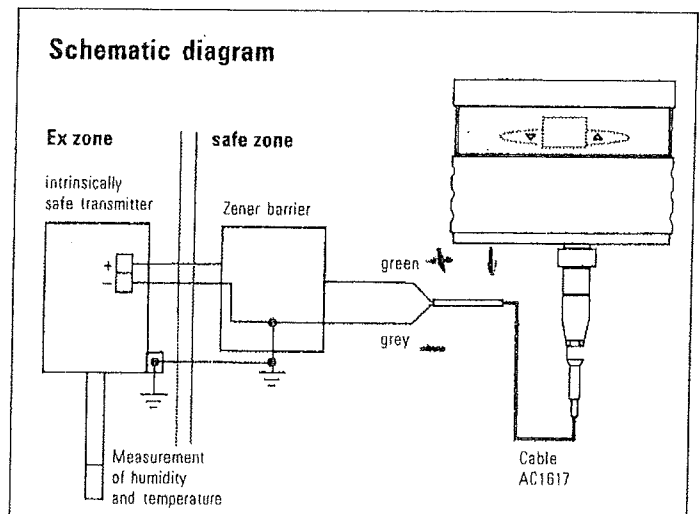
The transmitters are factory programmed for the use as a humidity and temperature transmitter.
The configuration can be changed by jumpers on the printed circuit.
Jumper configuration according to diagram 12.0724.0001.



3.1 Combined transmitter for humidity and temperature measurement (Factory setting)

Signal working up and supply via Zener barrier by the transmitter HygroFlex.
Digital DIO signal

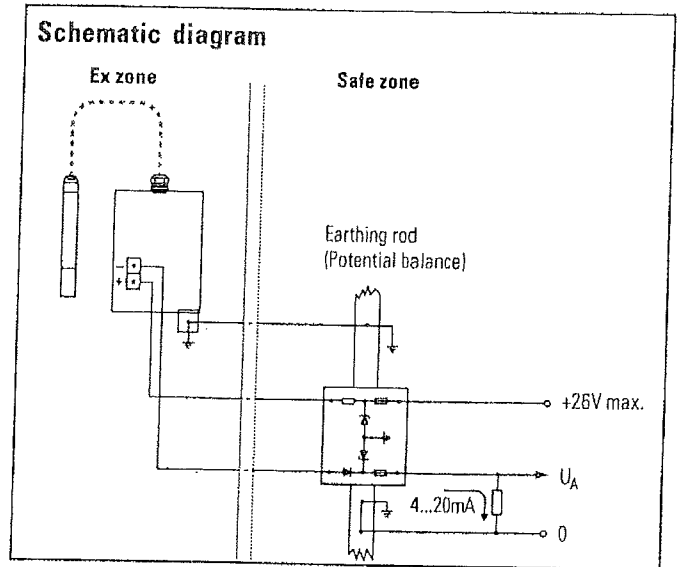
- Max. cable length between intrinsically safe transmitter and HygroFlex = 200m
- Cable for the connection of the intrinsically safe transmitter with the Zener barrier: E-7018
- Cable for the connection of the Zener barrier with the HygroFlex: Type AC1617/ZBXXX
- Connection and type of Zener barrier to be used according to wiring diagram 12.0724.0001



3.2 Humidity transmitter

Two wire system
 4...20mA = 0...100%rh
 Connection via Zener barrier

- Max. cable length between intrinsically safe transmitter and signal working up = 200m
- Cable for the connection of the intrinsically safe transmitter with the Zener barrier: ET-7018
- Connection and type of the Zener barrier to be used according to wiring diagram 12.0724.0001



3.3 Temperature transmitter

Two wire system
 4...20mA = 0...100°C
 Connection via Zener barrier

Schematic diagram, wiring diagram and Zener barrier same as for humidity transmitter.

4. Start up

All ROTRONIC industrial transmitters are adjusted in the factory. Therefore a check of the equipment after mounting is not needed.

4.1. Sensor protection

For the reliable use under more difficult conditions (pollution, higher airspeed), different filters are available.

Allowed airspeed with:

slotted cap	up to 3 m/s		
wire mesh filter	up to 20 m/s	Wirefilter element	Order No. SP-M15
teflon or polyethylene filter	up to 20 m/s	Steelsinter filter element	SP-S15
steel sinter filter	up to 40 m/s	Teflonfilter element	SP-T15

5. Sources of errors

Humidity measuring values can be affected by the following influences :

-Temperature errors

due to too short adapting, cold outer wall, airdraft (e.g. ventilators) sunrays etc.

- Humidity errors

due to steam, water splashes, dripping water or condensation on the sensor etc., but reproducibility and long-term stability are not impaired by this, even if the probe has been exposed for a lengthy period to high humidity or saturation with water vapour.

- Contamination

due to dust in the air. This can be largely avoided by using a corresponding filter (see 4.1). Clean or replace the filters periodically depending upon the degree of contamination of the measuring site.



The sensor is insensitive to chemicals as far as they occur in usual concentrations (MAK values). At higher concentrations or possible contact with liquid chemicals, in any case the manufacturer must be consulted (MAK values = maximum work place exposure).

6. Maintenance and service

6.1 General

The following comments and charts of this chapter refer to the combined humidity and temperature transmitter. They are also applicable on measuring transmitters, which measure only one of the parameters.

6.2 Service plug

For **the display of humidity and temperature during service works**, all transmitters of the series HygroClip ID, IW, IC-EX contain a 5-pin service plug-socket on the print. This print socket is accessible after removing the cover plate. Together with the service cable obtainable as spare parts, the signals can be led onto a display instrument (Art.No. AC 1628).



Attention!

The necessary accessories for the calibration adjustment are not proved for hazardous areas.

In case the transmitter is faulty, it has to be sent to ROTRONIC Switzerland for repair because a special test is required. This is not necessary for the exchange of a humidity or a temperature sensor.

6.3 Check of the humidity transmitter

We recommend to subject the humidity transmitter periodically to a check. (Calibration and/or adjustment). Under normal conditions a check every 1 to 2 years is sufficient.

Definition: Calibration = Check measurement with a reference value (e.g. ROTRONIC Humidity - Standard)
Adjustment = New-adjustment to a reference value.

6.3.1. Comparison Measurement on site with ROTRONIC reference probe

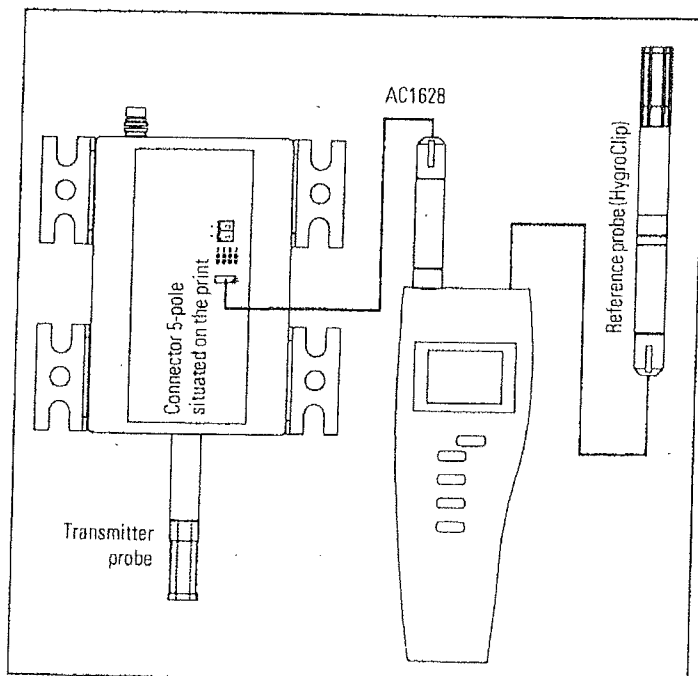
Material required:

- reference probe
- service cable (Art. no. AC1628)
- handheld instrument HygroPalm2 or 3



We recommend that you check the reference probe beforehand with our humidity standards and adjust it, if necessary. For the proceeding, please consult the operating instructions of the HygroPalm

Arrangement



Operation of the HygroPalm according to HygroPalm Operating instructions Menu ADJ REF, section 7

Calibration -/adjustment steps:



The relative humidity of the measured air should be within the range of 25 to 70 % rh during the controlling procedure.

1. Loosen the screws and remove the cover plate.
2. Put the service cable into 5-pole socket and connect with the HygroPalm.
3. Hold the reference probe next to the probe of the transmitter as close as possible to the sensor.
4. Wait for the display to become stable.
5. Reference transfer according to operating instructions of HygroPalm.
6. Remove the service cable and replace the cover plate.

6.3.2. Check with ROTRONIC humidity standards in the workshop



Attention: The ROTRONIC humidity standard (CH-poison class 3) is normally not harmful for people, however can evoke irritations on sensitive skin. If contact with the skin or the eyes occurs, the solution has to be washed out with lots of water. The ROTRONIC humidity standards may not be taken in!

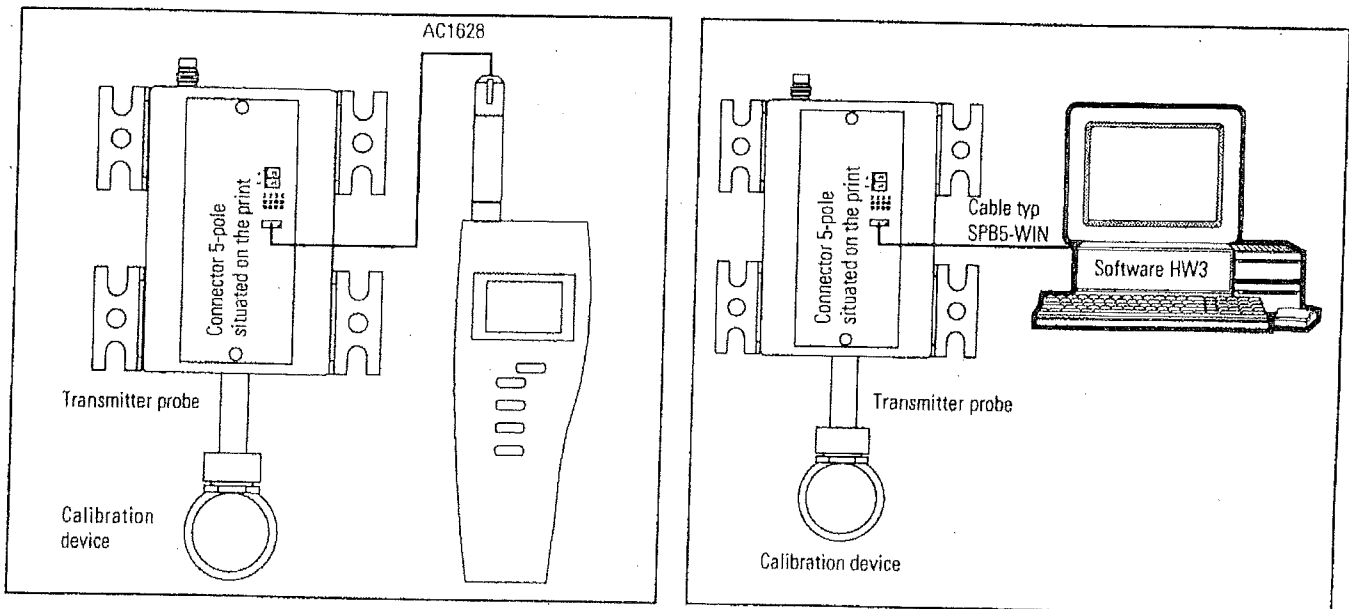
Material required:

- Calibration device type ER-15 or ERV-15 (for probe in vertical position)
- ROTRONIC humidity standards: type EA35 (35 % rh), EA80 (80% rh), EA10 (10% rh), EA05 or EA00 (5% or 0%)
- Service cable (type AC1628)
- HygroPalm2 or 3

Remove the transmitter** and calibrate it in a room with constant temperature.

** Wall mounting types which are installed in a vertical position do not have to be removed from the measuring site, as long as the ambient temperature remains stable during the calibration

Arrangement



Operation of the HygroPalm according to HygroPalm operating instructions
Menu ADJUST 1 PT, section 8.1 or Menu ADJUST M.PT, section 9



Observe the following rules for calibration or adjustment:

- a) Calibrate or adjust at constant temperature and avoid any thermal influence which could influence the measurement: draught, sunshine, heating, fan, etc.!

- b) Place the probe and primarily its calibration device on an insulating base (e.g. the cover of the humidity standard set) so that there can be optimum temperature stabilization.



Attention !

The temperature dependence of the ROTRONIC humidity standards is automatically compensated between 5 and 40°C by the HygroPalm, when the option RHS in the menu 8.1 is selected.

- c) Start with the **35% fh** calibration point and, if necessary, adjust with the HygroPalm; the second, third and fourth calibration step then follows and, if necessary, adjustment with the HygroPalm (80%, 10%, 0%rh).

Calibration -/adjustment steps:

1. Connect the instruments to the power supply.
2. Plug the service cable into the 5-pin service plug socket of the PCB nominated SPB-5 and connect it with the HygroPalm.
3. Unscrew the lower part (bowl) of the calibration device.
4. Unscrew the and remove the filter element. The slotted cap remains on the probe and serves as sensor protection. Introduce the probe into the calibration device as far as it will go and secure by turning the black screw.
5. Place a textile pad in the bowl.
6. Shake the ampoule until the entire liquid is in the thick part of the ampoule.
7. Break off the neck of the ampoule at the predetermined breaking point (white line) and empty the entire contents into the middle of the textile pad (possibly tap a little).
8. Immediately screw in the bowl from below into the calibration device.
9. Let the calibration device on the probe for about 1 hour.
10. Adjustment according to the operating instructions of the HygroPalm
11. Unscrew the bowl from the calibration device.
12. Remove the textile pad and dispose of it with the household refuse.
(The textile pad is designed for one-time use and must not be used again.)
13. Wash out the bowl thoroughly under running water and dry it carefully.
14. Repeat the process (Items 5...13) with the **80% rh**, 10%rh, 5%rh or 0%rh humidity standards.
15. Remove the calibration device, replace the filter element and fasten the screw. Install the transmitter again.

6.4 Check of the temperature transmitter

A temperature adjustment is normally not needed. At doubts about the correct calibration, you may check the transmitter and adjust it, if necessary. As reference, use an accurate temperature probe or an accurate thermometer.

Material required:

- Reference probe
- Service cable (type AC1628)
- HygroPalm2 or 3

Calibration steps:

1. Loosen the screws and remove the cover plate.
2. Put the service cable into the 5-pole socket and connect it with the HygroPalm.
3. Hold the reference probe or thermometer next to the transmitter (wall- or duct type).
4. Wait for the display to become stable.
5. Adjustment according to the operating instructions of HygroPalm.
6. Remove service cable and remount the cover plate.

6.5 Contaminated filters

A polluted filter can cause measurement errors and extend the adapting time. Dependent on the degree of pollution, the filter is to be cleaned periodically or, if necessary, to be replaced.



In order not to damage the sensors, unscrew the filter for cleaning.

Clean the filter with soap water, alcohol or a cleaning agent suitable for removing the contamination and wash it thoroughly at the end with water. Do not screw the filter back on to the probe until it is completely dry.

Replace filters which can no longer be cleaned by new ones.

Should the sensors be severely contaminated despite the protecting filters, then we recommend having these replaced by our service department.

7. Accessories and spare parts

Please use only original accessories as well as spare parts from our actual sales catalogue "HUMIDITY AND TEMPERATURE MEASUREMENT".

Order number :	Option Filter
	Description
SP-S15	Steel sinterfilter element
SP-M15	Wire filter element
SP-T15	Teflon filter element

8. Technical data

Humidity sensor	ROTRONIC-HYGROMER® C-94
Temperature sensor	Pt 100 1/3 DIN
Operating range of electronics	
Temperature	-20...+40°C
Operating range of probe	
Humidity	0...100% rh
Temperature	Cable probe: -50...+200°C Room probe: -20...+40°C Duct probe: Extended temperature range for the probe admissible on condition that the electronics housing remains within the temperature limits of -20...+40°C (Temperature conductivity by the probe)

Accuracy at 23 °C ±2 °C

Humidity	± 1.5 % rh (10...100% rh)
Temperature	± 0.3 K

Repeatability

Humidity	< 0.5 % rh
Temperature	< 0.1 K

Long-term stability humidity

typical at normal conditions	< 1 % rh /year
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Time constant and 1 m/s airdraft

at 23 °C Humidity	< 15 s
Temperature	< 15 s

Adjusting points

Humidity	35 %, 80%, 10%, 0%rh
Temperature	T0., Tmax.

Output signal

Humidity, temperature	4...20 mA (analogue), 4...10 mA (digital)
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Load

max. 800 Ohm at 26 VDC

Supply volatage

10...28 VDC

Case material

high-grade steel

Indentification

 II 1 G EEx ia IIC T5

II 2 G EEx ia IIC T6



EG-Baumusterprüfbescheinigung

- (1) EG-Baumusterprüfbescheinigungsnummer
- (2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - Richtlinie 94/9/EG



PTB 01 ATEX 2180

- (4) Gerät: Messumformer HygroClip I*-EX
- (5) Hersteller: Rotronic AG
- (6) Anschrift: Grindelstr. 6, 8303 Bassersdorf, Schweiz
- (7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage und den darin aufgeführten Unterlagen zu dieser Baumusterprüfbescheinigung festgelegt.
- (8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 01-21280 festgehalten.

- (9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 + A1 + A2

EN 50020:1994

EN 50284:1999

- (10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.
- (11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.
- (12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 1 G EEx ia IIC T5 bzw. II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Braunschweig, 04. Dezember 2001

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2180

(15) Description of equipment

The measuring transducer, type HygroClip I*-EX is a combined measuring instrument for humidity and temperature and converts the sensor signal into a load-independent current of 4...20 mA.

The apparatus will be manufactured in three variants: Type HygroClip IC-EX with cable sensor 2 m, type HygroClip ID-EX used as channel sensor with 200 mm sensor tube and type HygroClip IW-EX used as room sensor with 150 mm sensor tube.

The apparatus is intended for use in hazardous areas.

Electrical data

Input and supply circuittype of protection Intrinsic Safety EEx ia IIC
for connection to an intrinsically safe circuit only
maximum values:

$$U_i = 28 \text{ V}$$

$$I_i = 195 \text{ mA}$$

$$P_i = 830 \text{ mW}$$

$$C_i = 11 \text{ nF}$$

L_i negligibly low

(16) Test report PTB Ex 01-21280

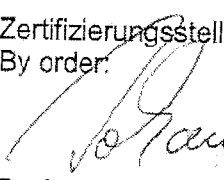
(17) Special conditions for safe use

none

(18) Essential health and safety requirements

will be met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, December 04, 2001


sheet 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

1. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 01 ATEX 2180

Gerät: Messumformer HygroClip I*-EX
Kennzeichnung:  II 1 G EEx ia IIC T5 bzw. II 2 G EEx ia IIC T6
Hersteller: Rotronic AG
Anschrift: Grindelstr. 6
8303 Bassersdorf, Schweiz

Beschreibung der Ergänzungen und Änderungen

Der Messumformer HygroClip I*-EX darf künftig auch entsprechend den im zugehörigen Prüfbericht 03-23016 aufgeführten Prüfungsunterlagen gefertigt werden.

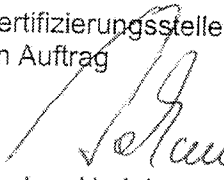
Die Messumformer-Typenreihe wird um den Typ HygroClip IE-EX ergänzt. Der HygroClip IE-EX ist ein Einschraubfühler mit einer Kabellänge von 2 m.

Die elektrischen Daten und alle übrigen Angaben gelten unverändert auch für diese 1. Ergänzung.

Prüfbericht: PTB Ex 03-23016

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Braunschweig, 14. April 2003


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin



Prüfbericht

Test report

PTB Ex 03-23016



Gegenstand:
Object Messumformer HygroClip I*-EX

Antragsteller:
Applicant Rotronic AG

Anschrift:
Address Grindelstr. 6
8303 Bassersdorf, Schweiz

Eingangsdatum:
Date of application 2003-01-15

Prüfspezifikation:
Test specification EN 50014:1997 + A1 + A2
EN 50020:1994
EN 50284:1999

Prüflaboratorium Explosionsschutz
Im Auftrag

Braunschweig, 14. April 2003

H. Bienmüller



1. Erläuterungen zum Prüfgegenstand

Der Messumformer HygroClip I*-EX darf künftig auch entsprechend den unten aufgeführten Prüfungsunterlagen gefertigt werden.

Die Messumformer-Typenreihe wird um den Typ HygroClip IE-EX ergänzt. Der HygroClip IE-EX ist ein Einschraubfühler mit einer Kabellänge von 2 m.

Die elektrischen Daten und alle übrigen Angaben gelten unverändert auch für diese 1. Ergänzung.

2. Erläuterungen zur Prüfspezifikation

keine

3. Prüfergebnisse

Liste der technischen Unterlagen, Prüfprotokolle, Muster und sonstigen Dokumente

<u>Prüfungsunterlagen</u>	unterschrieben am
a) Beschreibung der Änderung (2 Blatt)	2003-01-17
Beschreibung (2 Blatt)	2003-01-08
Zeichnung Nr. FO_02067	2003-01-08
FO_02088 (9 Blatt)	2003-01-08
b) Stückliste IE-1-EX	
SEV-Prüfprotokoll 01-IK-0018.02	
SVTI-Prüfbericht Nr. 105'084	
Betriebsanleitung	
Produktionsvorschriften	

4. Hinweise für Herstellung und Betrieb

keine

5. Fachliche Beurteilung

5.1 Der Messumformer Typ HygroClip IE-EX besteht aus einem Einschraubfühler im Kabelfühler-Vorderteil. Alle weiteren Bauteile sind identisch. Das "Prüfprotokoll zu Ergänzung, Nachtrag oder Erneuerung am Betriebsmittel bzw. Bauteil" des SEV vom 2003-01-17, Referenz Prüfbericht 01-IK-0018.02, wurde zur Begutachtung mit herangezogen.

5.2 Gemäß den Anforderungen an Betriebsmittel für den Einsatz in Zone 0 ist für den Messumformer Typ HygroClip IE-EX bei der Festlegung der höchstzulässigen Umgebungstemperatur ein Abschlag von 20 % zu berücksichtigen. Bei einer maximalen Temperaturerhöhung von 45 K im Fehlerfall ergibt sich für die Gerätegruppe II, Kategorie 1, eine Einstufung in die Temperaturklasse T5.

5.3 Der Eingangs- und Versorgungsstromkreis wird über eine bescheinigte Zenerbarriere Typ Z 7... der Firma Pepperl + Fuchs gespeist, die vom nichteigensicheren Netz, z. B. durch die Verwendung des Messumformers Typ Hygroflex, galvanisch getrennt ist.

Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit den Europäischen Normen EN 50014:1997 + A1 + A2, EN 50020:1994 und EN 500284:1999.

Es bestehen keine sicherheitstechnischen Bedenken gegen die Durchführung der Änderung.



(1) **Mitteilung**
über die Anerkennung der Qualitätssicherung Produktion

(2) Geräte oder Schutzsysteme oder Komponenten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**



(3) Mitteilungsnummer: **PTB 01 ATEX Q021**

(4) Produktgruppe(n): Feuchte- und Temperaturmessumformer sowie Sensoren in der bestimmenden Zündschutzart "Eigensicherheit"

Die benannte Stelle führt eine Liste der EG-Baumusterprüfbescheinigungen, für die diese Mitteilung gilt.

(5) Antragsteller: **Rotronic AG**
Grindelstrasse 6, 8303 Bassersdorf, Schweiz

(6) Hersteller: **Rotronic AG**
Grindelstrasse 6, 8303 Bassersdorf, Schweiz

(7) Die Physikalisch-Technische Bundesanstalt (PTB), benannte Stelle Nr. 0102 für Anhang IV nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften 94/9/EG vom 23. März 1994, teilt dem Antragsteller mit, daß der Hersteller ein Qualitätssicherungssystem für die Produktion unterhält, das dem Anhang IV dieser Richtlinie genügt.

(8) Diese Mitteilung basiert auf dem vertraulichen Auditbericht Nr. 01QS030, ausgestellt am 2001-11-28. Die Mitteilung ist gültig bis 2004-11-28 und kann zurückgezogen werden, wenn der Hersteller die Anforderungen des Anhangs IV nicht mehr erfüllt.

Die Ergebnisse der regelmäßigen Begutachtung des Qualitätssicherungssystems sind Bestandteil dieser Mitteilung.

(9) Gemäß Artikel 10 (1) der Richtlinie 94/9/EG ist hinter der CE-Kennzeichnung die Kennnummer 0102 der PTB als der benannten Stelle anzugeben, die in der Produktionsüberwachungsphase tätig wird.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, 29. November 2001

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