
**User´s
Manual**

**Inductive Ring Sensor
RI20-10 / RI20-17
Option /GR1 – /GR8
for Glass ROTAMETER**

IM 01R01B14-00E-E

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1. Introduction

Before use, read this manual thoroughly and familiarize yourself fully with the features, operations and handling of RI20 to have the instrument deliver its full capabilities and to ensure its efficient and correct use.

Notices Regarding This Manual

- This manual should be passed to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without the written permission of Rota Yokogawa (hereinafter simply referred to as Yokogawa).
- This manual neither does warrant the marketability of this instrument nor it does warrant that the instrument will suit a particular purpose of the user.
- Every effort has been made to ensure accuracy in the contents of this manual. However, should any questions arise or errors come to your attention, please contact your nearest Yokogawa sales office that appears on the back of this manual or the sales representative from which you purchased the product.
- This manual is not intended for models with custom specifications.
- Revisions may not always be made in this manual in conjunction with changes in specifications, constructions and/or components if such changes are not deemed to interfere with the instrument's functionality or performance.

Notices Regarding Safety and Modification

- For the protection and safety of personnel, the instrument and the system comprising the instrument, be sure to follow the instructions on safety described in this manual when handling the product. If you handle the instrument in a manner contrary to these instructions, Yokogawa does not guarantee safety.
- If this instrument is used in a manner not specified in this manual, the protection provided by this instrument may be impaired.
- As for explosion proof model, if you yourself repair or modify the instrument and then fail to return it to its original form, the explosion protected construction of the instrument will be impaired, creating a hazardous condition. Be sure to consult Yokogawa for repairs and modifications.

The following safety symbols and cautionary notes are used on the product and in this manual:



WARNING

This symbol is used to indicate that a hazardous condition will result which, if not avoided, may lead to loss of life or serious injury. This manual describes how the operator should exercise care to avoid such a risk..



CAUTION

This symbol is used to indicate that a hazardous condition will result which, if not avoided, may lead to minor injury or material damage. This manual describes how the operator should exercise care to avoid a risk of bodily injury or damage to the instrument.



IMPORTANT

This symbol is used to call your attention to a condition that must be observed in order to avoid the risk of damage to the instrument or system problems.



NOTE

This symbol is used to call your attention to information that should be referred to in order to know the operations and functions of the instrument.

For Safe Use of RI20:



WARNING

- If the process fluid is harmful to personnel, handle Rotameter carefully even after it has been removed from the process line for maintenance or other purposes. Exercise extreme care to prevent the fluid from coming into contact with human flesh and to avoid inhaling any residual gas.
 - In case of Explosion proof type instrument, further requirements and differences are described in Chapter 4 "EXPLOSION PROTECTED TYPE INSTRUMENTS". The description in Chapter 4 is prior to other descriptions in this instruction manual.
-

1. INTRODUCTION

Warranty

- The warranty of this instrument shall cover the period noted on the quotation presented to the Purchaser at the time of purchase. The Seller shall repair the instrument free of charge when the failure occurred during the warranty period.
- All inquiries on instrument failure should be directed to the Seller's sales representative from whom you purchased the instrument or your nearest sales office of the Seller.
- Should the instrument fail, contact the Seller specifying the model and instrument number of the product in question. Be specific in describing details on the failure and the process in which the failure occurred. It will be helpful if schematic diagrams and/or records of data are attached to the failed instrument.
- Whether or not the failed instrument should be repaired free of charge shall be left solely to the discretion of the Seller as a result of an inspection by the Seller.

The Purchaser shall not be entitled to receive repair services from the Seller free of charge, even during the warranty period, if the malfunction or damage is due to:

- improper and/or inadequate maintenance of the instrument in question by the Purchaser.
- handling, use or storage of the instrument in question beyond the design and/or specifications requirements.
- use of the instrument in question in a location not conforming to the conditions specified in the Seller's General Specification or Instruction Manual.
- retrofitting and/or repair by an other party than the Seller or a party to whom the Seller has entrusted repair services.
- improper relocation of the instrument in question after delivery.
- reason of force measure such as fires, earthquakes, storms/ floods, thunder/lightning, or other reasons not attributable to the instrument in question.

Restriction on Use of Radio Transceiver



IMPORTANT

Although the RI20 has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or it external wiring, the transmitter may be affected by high frequency noise pickup. To test for such effects, bring the transceiver in use slowly from a distance of several meters from the transmitter, and observe the measurement loop for noise effects. Thereafter, always use the transceiver outside the area affected by noise.

1.1 General description

This manual describes installation, operation and maintenance of the RI20. Please read it carefully before using this device.

Further, please note that customer features are not described in this manual. When modifying specifications, construction or parts, this manual is not necessarily revised unless it can be assumed that these changes will impair RI20 functions or performance.

All units are thoroughly tested before shipping.

Please check the received units visually to ensure that they have not been damaged during transport. In case of defects or questions please contact your nearest YOKOGAWA service centre or sales office. Please describe any defect precisely and indicate model code as well as serial number. YOKOGAWA refuses any liability for units which have been repaired by the user without prior consent and do not meet the specifications as a consequence.

1.2 ATEX Documentation

This is only applicable to the countries in European Union.

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|--|---|
| <p>GB All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.</p> | <p>SK Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.</p> |
| <p>DK Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.</p> | <p>CZ Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevybušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevybušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.</p> |
| <p>I Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.</p> | <p>LT Visos gaminio ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglų, vokiečių ir prancūzų kalbomis. Norėdami gauti prietaisų Ex dokumentaciją kitomis kalbomis susisiekiate su artimiausiu bendrovės "Yokogawa" biuru arba atstovu.</p> |
| <p>E Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.</p> | <p>LV Visas ATEX Ex kategorijas izstrādājumu Lietošanas instrukcijas tiek piegādātas angļu, vācu un franču valodās. Ja vēlaties saņemt Ex ierīšu dokumentāciju citā valodā, Jums ir jāsazinās ar firmas Jokogava (Yokogawa) tuvāko ofisu vai pārstāvi.</p> |
| <p>NL Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.</p> | <p>EST Kõik ATEX Ex toodete kasutamishendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.</p> |
| <p>SF Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöohjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellänne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.</p> | <p>PL Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym języku, prosimy o kontakt z najbliższym biurem Yokogawy.</p> |
| <p>P Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.</p> | <p>SLO Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angleščini, nemščini ter francoščini. Če so Ex sorodna navodila potrebna v vašem tujejnem jeziku, kontaktirajte vaš najbliži Yokogawa office ili predstavnika.</p> |
| <p>F Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.</p> | <p>H Az ATEX Ex műszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérjük az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviselőt.</p> |
| <p>D Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.</p> | <p>BG Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.</p> |
| <p>S Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.</p> | <p>RO Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.</p> |
| <p>GR Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.</p> | <p>M Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bil-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-egħreb rappreżentant jew uffċju ta' Yokogawa.</p> |

2. Technical Description

The ring sensor RI20 is intended for connection to float flowmeters with a measuring tube of glass or plastic. It indicates whether the float is positioned above or below the sensor.

The float must have ferromagnetic properties (e.g. a plastic float with iron core).

The device is offered into 4 versions:

Type	Option	Diameter of tube	Possible float (Yokogawa Code)
RI20-10 K	/GR1, /GR5	10mm	-MU A□N
RI20-10 G	/GR2, /GR6	10mm	-MU B□N or -PD B□N
RI20-17 K	/GR3, /GR7	17mm	-PD C□N
RI20-17 G	/GR4, /GR8	17mm	-MU C□N or -MU D□N or -PD D□N

The RI20 is bistable, i.e. if the float is below the switch point, current consumption is always < 1 mA and it is > 2.2 mA, if the float is above the switch point. After power on or after power fail the RI20 shows $I < 1$ mA. To find the correct float position the float has to move once through the RI20.

It is intended for connection to a non-bistable isolation-switch amplifier complying with EN 60947-5-6 (NAMUR). With its plastic casing and its sealed-in electronic equipment, the RI20 meets the requirements of the system of protection IP67 and can also be operated safely in aggressive atmospheres.

The RI20 is maintenance-free.

See chapter 4 "EXPLOSION PROTECTED TYPE INSTRUMENTS" for devices in ATEX, IECEx and NEPSI version.

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3. Technical Data

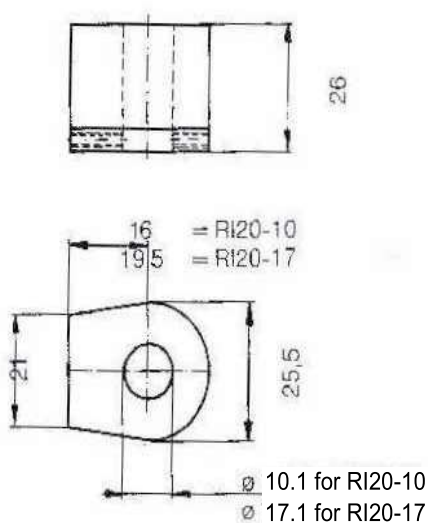
Diameter of measuring tube RI20-10	: 10 mm
Diameter of measuring tube RI20-17	: 17 mm
Power supply	: 4.5...15 V DC (8 V DC NAMUR)
Current consumption (NAMUR)	: float down < 1 mA float up > 2.2 mA
Temperature range	: -25 °C – +65 °C
Materials	
• case	: PBT
• sealing compound	: Polyurethane or Silicone
Protection acc. to DIN 40 050	: IP67
Weight	: 40 g
Supply cable	
• length	: 2 m
• cross section of conductor	: 0.14 mm ²
• cable end with crimp-on component	

EMC-protection:

• DIN EN 61000-4-2	: level 3
• DIN EN 61000-4-3	: level 2
• DIN EN 61000-4-4	: level 3
• DIN EN 61000-4-6	: level 2
• DIN EN 55011	: group 1/class A

In general the RI20 comply with the above given criteria. In rare cases the RI20 may switch from "off" to "on". This should be taken into consideration during operation.

Dimensions (in mm):



4. Explosion-protected Type Instruments

WARNING

- Only trained persons may use the instrument in the industrial area.
- It is forbidden to users to carry out specification changes and other changes at the device. Repairs at the device aren't permitted.
- To ensure explosion protection of the RI20, a suitable explosion-proof transmitter relay must be used.
- The maximum ambient temperature and the maximum temperature of the medium, which flows through the tube, may not exceed 60 °C.
- The connection cable may not be exposed to mechanical loads. The maximum axial strength is 30 N.
- Electrostatic charge on the housing may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the housing.

The RI 20 is an intrinsic safe device. This is certified for hazardous areas of zone 1 (category 2) and zone 2 (category 3).

Temperature range : -25 °C – +60 °C
 EC- Type Examination Certificate number : PTB 03ATEX 2111X
 IECEx Certificate number : IECEx PTB13.0023X
 NEPSI Certificate number : GYJ14.1356

Marking

- Manufacturer : Rota Yokogawa, Rheinstr. 8, D-79664 Wehr
- Type : RI20-10 or RI20-17
- Serial number and year of the production:
 7yymmxxx (yy=year, mm=month, xxx= incremented number (e.g. 70309001))
- Ex-marking : Ex ia IIC T6 Gb
- Entity parameters : $U_i = 12 \text{ V}$, $I_i = 22 \text{ mA}$, $P_i = 66 \text{ mW}$,
 $L_i = 20 \text{ mH}$, $C_i = 200 \text{ nF}$
 or
 see certificate for data

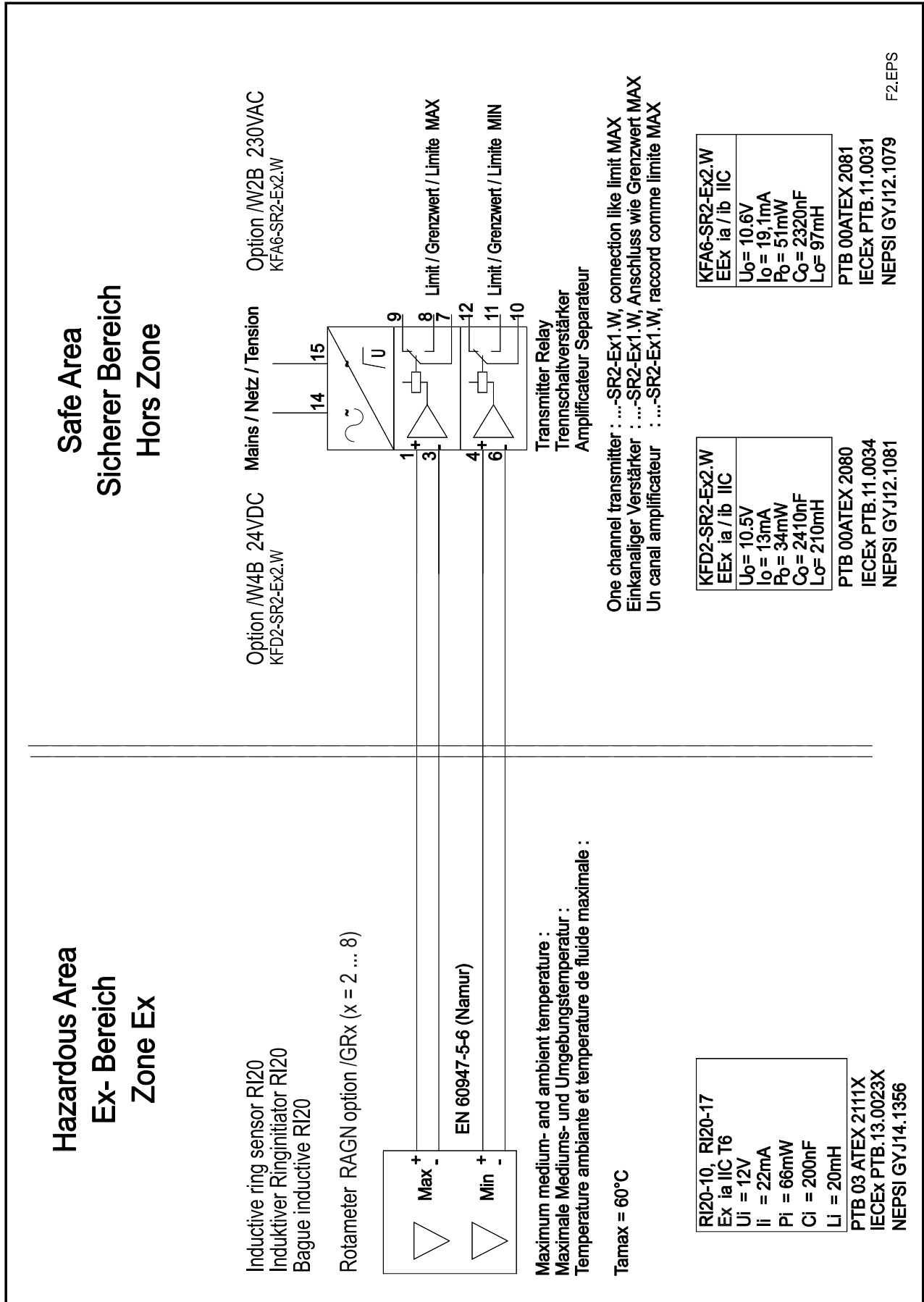
- Marking according to ATEX regulation 94/9/EG:
- Label



WARNING

- The electrical connection of the RI20 is provided with free ends of the cables with cable hulls. Please regard the installation regulations in accordance with IEC 364.
- The shielding of the connection cable is **not** for grounding of the RI20. A RI20 with damaged cable isolation may not be used.

Installation diagram:

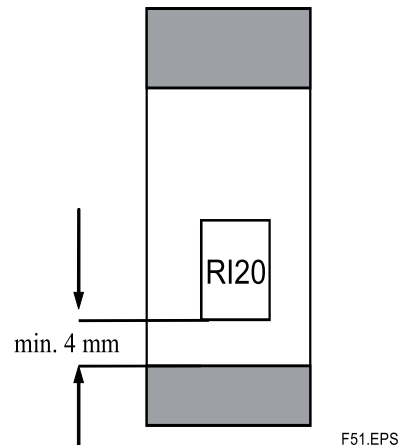
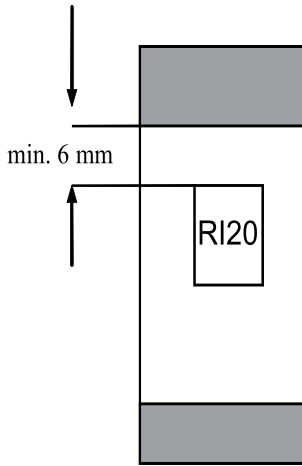


5. Installation Notes

- The RI20 should be connected to a mono stabile transmitter relay.
- Connection to transmitter relay (s. installation diagram in chapter 4 "EXPLOSION PROTECTED TYPE INSTRUMENTS").

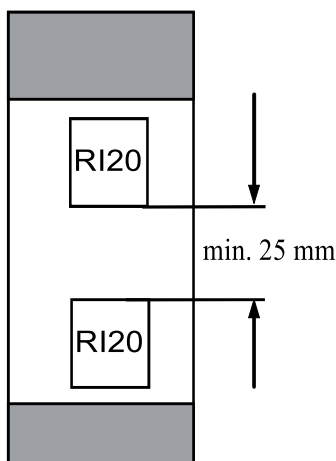
white cable	→ +
shielding	→ -
- The installation regulations in accordance with IEC 364 have to be taken into account.
- The shielding of the connection cable is **not** for earthing of the RI20. A RI20 with a damaged cable insulation may not be used
- The device has to be protected from strong electromagnetic fields.
- Power lines have to be installed separated from the signal lines.
- Switches, power relays and engines can change the switching state of the RI20 (in unfavorable orders).
- Metal parts should have a minimum distance of 50 mm to the RI20.
- If the float is above the RI20 after power on or after power fail, the float has to move once through the RI20 to find the correct float position.

Minimum distance of the digital contact to the metallic parts of the Rotameter-housing:

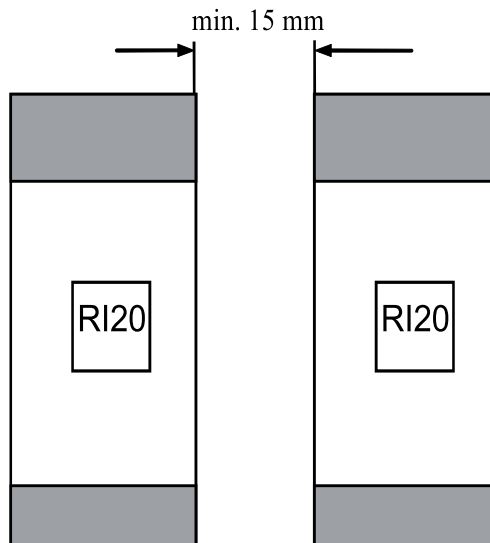


F51.EPS

Minimum distance between 2 digital contacts at the same Rotameter: 25 mm



Minimum distance between 2 Rotameters which are mounted side on side: 15 mm



F52.FI



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Apr. '15
