Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Technical Information/Operating Instructions

Source container QG020/100 US version

Radiometric Measurement
Container with rotary insert for holding source and for manual or pneumatic switch-ON/switch-OFF

Application

The QG020 and QG100 source containers are designed to hold the radioactive source during radiometric level limit measurement, level measurement and density measurement. The radiation is emitted almost unattenuated in one direction only and is damped in all other directions.
QG020 and QG100 differ from each other in terms of size and screening effect.

Features and benefits

- Lightweight device provides best possible screening thanks to almost spherical design
- Safe and easy source replacement
- Highest safety classification for the source supplied (DIN 25426/ISO 2919, classification C 66646)
- Compact device that is easy to mount
- Various angles of emission for optimum adaptation to the application
- Manual or pneumatic switch-ON/switch OFF
- Padlock for fixing the OFF position and to protect against theft
- Switch status easily identified

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Endress+Hauser
People for Process Automation

Table of Contents

Safety Instructions

Radioactive Source

Warning!
This source container contains radioactive material.
For safety instructions see Radiation Safety Manual SD276F/00/en.

Basic Instructions for use and storage

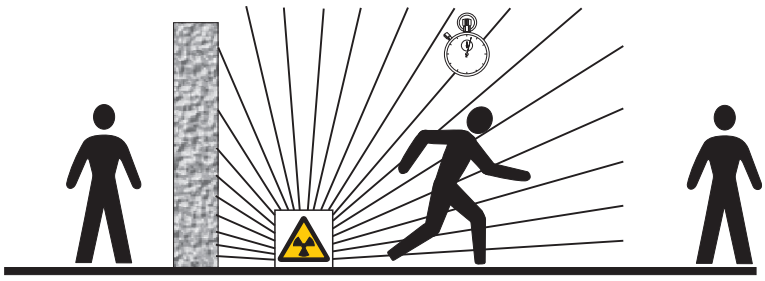
- Observe the applying rules and national regulations.
- Observe the radiation protection regulations in use, storage and for work on the radiometric measuring system.
- Observe warning signs and safety areas.
- Install and operate the device according to the manufacturer's instructions.
- The device shall not be operated or stored outside the designated parameters.
- Protect the device against extreme influences (i.e. chemical products, weather, mechanical impacts, vibrations) when operated or stored.
- Always safe the OFF position of the source insert using the padlock.
- Do not operate or store damaged or corroded devices. Contact the responsible radiation safety officer for appropriate instructions and measures when damage or corrosion occurs.
- Conduct the required leak testing procedure according to the applying regulations and instructions.

Warning!
If the instrument is exposed to vibrations or mechanical impacts, the safety pin can become abraded. This may lead to a loss of the source insert. Stability and tightness of the source insert must be checked in regular intervals (see page 11).

Caution!
In case of doubt about proper condition of the device check the area around the device for leakage radiation and/or contact immediately the responsible radiation safety officer.

General instructions on radiation protection

When working with radioactive sources, any unnecessary exposure to radiation must be avoided. Unavoidable exposure to radiation must be kept to as low a level as possible. Three important measures help you achieve this:



Screening
Ensure the **screening** between the radiation source and you and all other persons is as good as possible. Source containers (e.g. QG020/100) and all high-density materials (lead, iron, concrete etc.), can be used for effective screening purposes.

Time
Time spent in the exposed area should be kept to a minimum.

Distance
Keep at as large a distance as possible from the radiation source.
The local dose rate of the radiation decreases with the square of the distance from the radiation source.

Safety instructions for switching on the radiation

Caution!
Before switching ON the radiation beam it is necessary to ensure that no personnel are within the area of the radiation (or, indeed, inside the vessel). The radiation beam may only be switched ON by specially trained personnel.

Legal requirements for radiation protection

Handling radioactive emitters is legally controlled. The radioactive protection regulations of the state in which your plant is located are to be complied with.

License Requirements
A general or specific license is required for operating a plant which uses gamma radiation. Application for the License must be made to the NRC or the agreement state in which the plant resides.

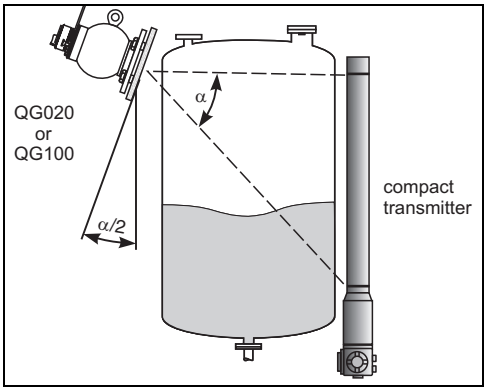
Radiation Safety Officer
The operator of the plant must select an individual to become the Certified Radiation Safety Officer (RSO). The goal of the RSO is to develop and maintain the radiation safety program with procedures to keep the occupational doses to all people as low as possible.
The RSO will administer and or oversee site- specific safety training for al workers.

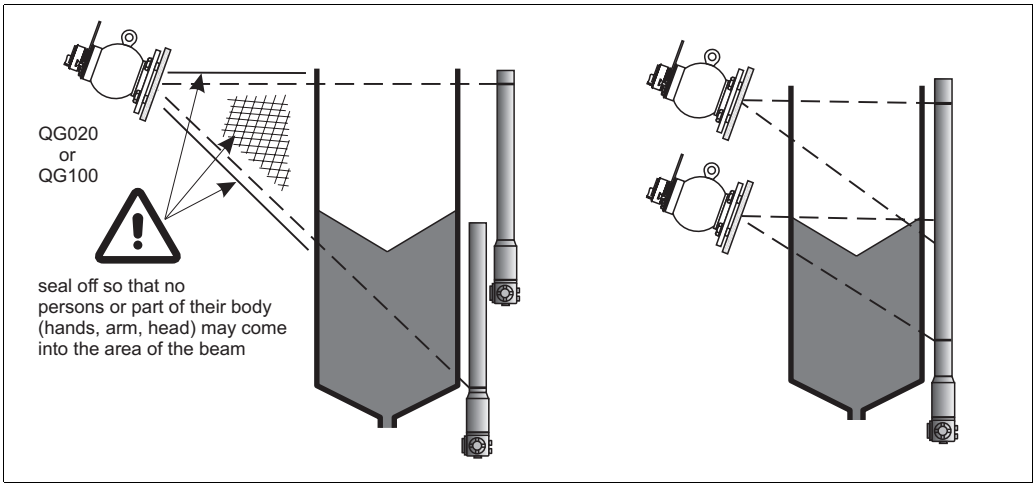
Control Areas
All control areas containing Nuclear gauges are to clearly marked for all people to easily read.
All people entering to do any type of work within the control area should be badge monitored per all safe practices as per NRC / State guideline dose limitations.

Operating Conditions

Level measurement

The source container must be mounted at the height of, or slightly above, the maximum level for continuous level measurement. The radiation must be aligned exactly with the compact transmitter mounted opposite. The source container and compact transmitter should be mounted as close as possible to the product container to avoid control zones.

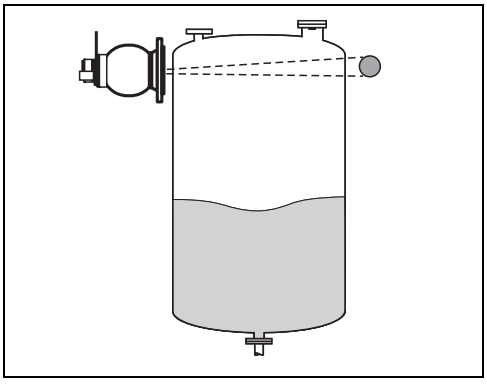




A distance between the source container and the product container often cannot be avoided if the measuring range is large and the container diameter small. This space must then be blocked off and marked.
In general, however, two or more source containers are used for large measuring ranges. The use of several sources can be necessary not only from the aspect of large measuring ranges but also for accuracy reasons.

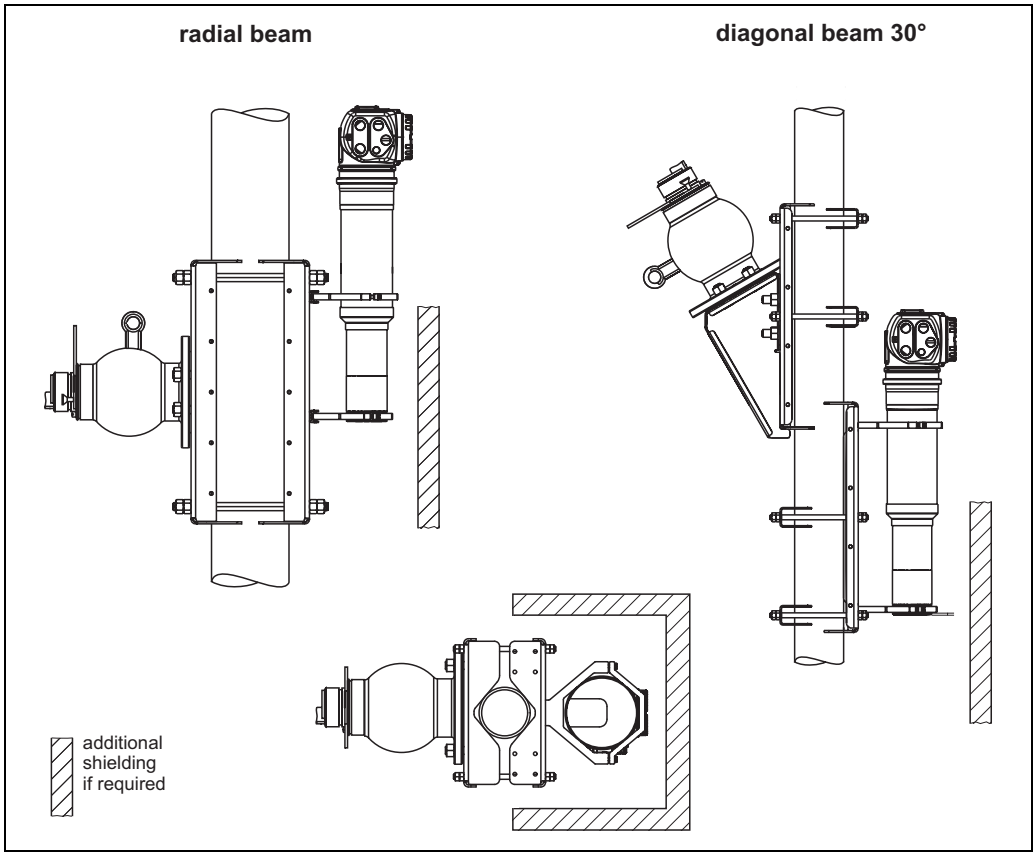
Level limit detection

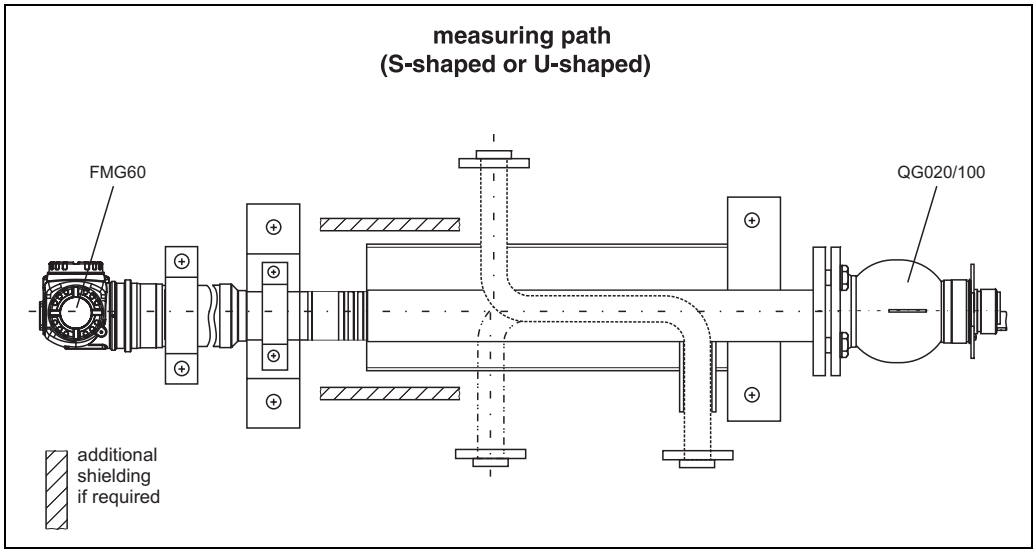
The version of QG020/100 with the angle of emission $\alpha = 5°$ is recommended for level limit detection. If larger angles of emission (20° or 40°) are used, ensure that the ray is horizontal. For this purpose, mount QG020/100 in such a way that the eyelet is positioned horizontally.



Density measurement

The most constant conditions for density measurement in pipes are achieved if the unit is mounted on vertical pipe lines and the feed direction is from bottom to top. If only horizontal pipes are accessible, the path of the ray should also be arranged horizontally to reduce the influence of air bubbles and build-up.
The following clamping devices are available for mounting the source container together with the compact transmitter FMG60:



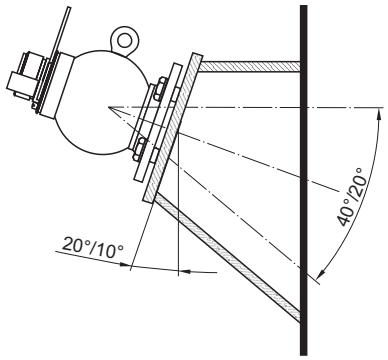


Mounting

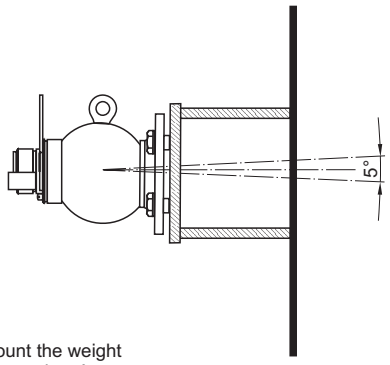
Note!
The radiation source containers QG020 and QG100 may not be mounted at a height greater than 27 feet.

Note!
All maintenance such as mounting, removal or replacement of the radioactive source may only be carried out by supervised personnel who have been specially trained in radiation procedures according to local regulations or handling approval. Ensure that the contents of the handling approval are valid. Local conditions are to be observed.
All work to be carried out may only be done from a safe (shielded!) location. Safety procedures must also be carried out to protect personnel from all possible risk.
Mounting and dismounting is only allowed in the "OFF" position, secured with the padlock.

Level measurement

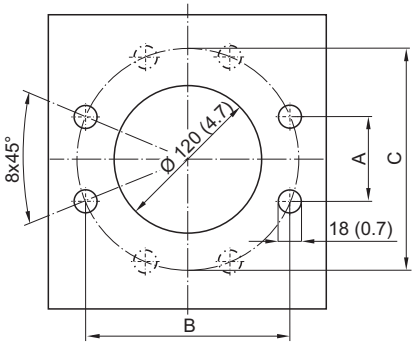


Limit detection

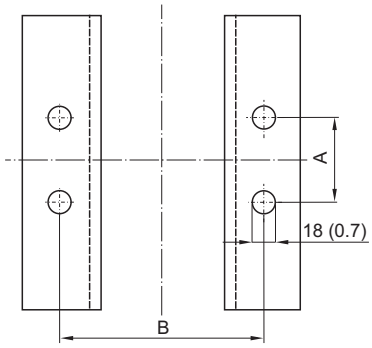


Take into account the weight
of the source container !
QG020: approx. 40-45 kg / 88-99 lb
QG100: approx. 87-92 kg / 192-203 lb

Example: mounting plate (supplied by customer)



or example: L-profile (supplied by customer)



	DIN	ANSI
A	68.9 (2.7)	72.9 (2.9)
B	166.3 (6.5)	176.0 (6.9)
C	180.0 (7.1)	190.5 (7.5)

Max. permissible torque Nm (min. 4 x M 16 screws)

Material	Property class	Coefficient of friction (μ)	Tightness
SS	70	0.14	144 Nm
Steel	8.8	0.14	210 Nm

The container can be mounted:
- by a nozzle directly on the container or pipe, (pay special attention to the weight of the QG)
- on an external construction with low to zero vibration

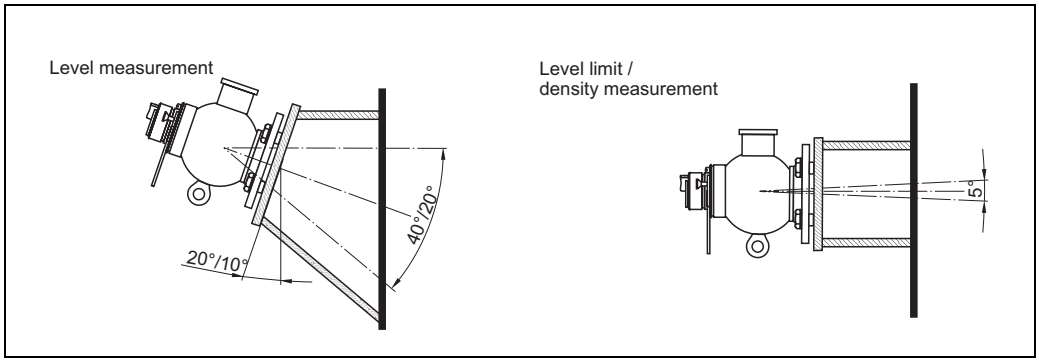
A hole must be provided on the mounting plate for the ray to pass through.

Mounting fireproof version

Advice for installation:
Due to high temperatures in case of fire lead will change the state of aggregation. In case of fire there is a reallocation of the liquified lead.
The mode of reallocation depends on the installation position.

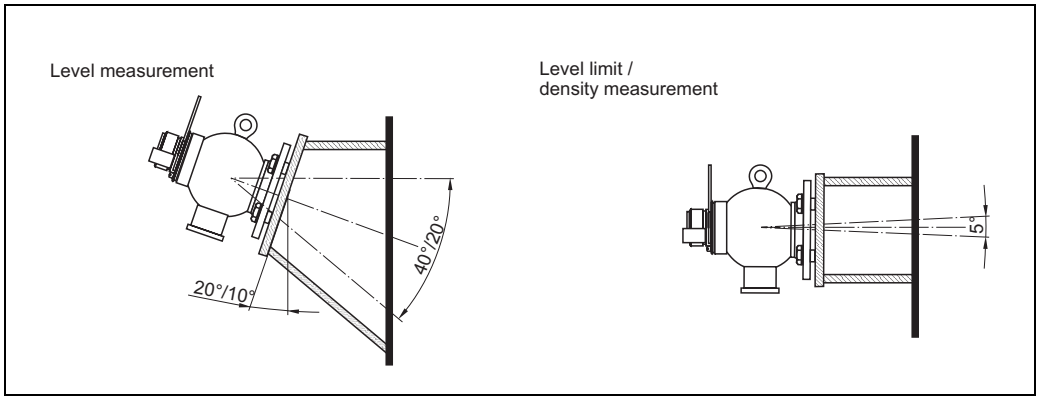
Installation position A (recommended):
The source container is mounted with the compensation compartment on the top. In case of fire only the emission channel will be closed by the liquified lead.

Note! The screening is slightly reduced in the upper area of the container.



Installation position B (not recommended):
The source container is mounted with the compensation compartment at the bottom or in lateral position. In case of fire the emission channel and the compensation compartment will be filled with the liquefied lead.

Note!
The screening will be reduced in the upper area of the source container.



Electrical connection for pneumatic actuator

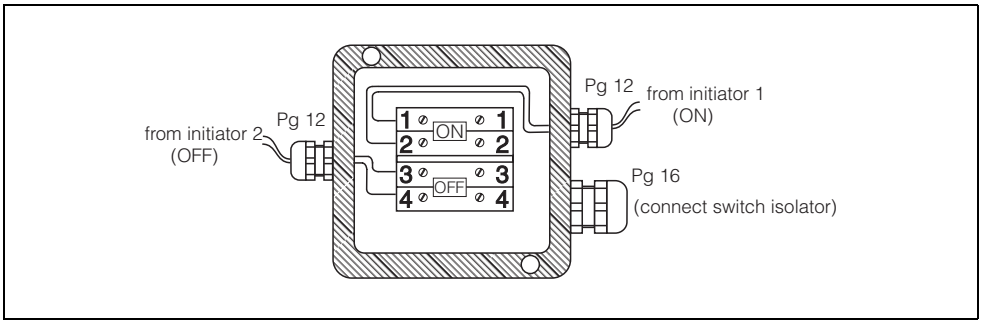
Initiator

The switching status is detected by two proximity switches NJ 4-12 GK-SN (PTB 00 ATEX 2049 X) supplied by Pepperl+Fuchs.

For signal evaluation, the following isolating switch amplifiers can be used:
- Nivotester FTL 325 N
- KFD2-SH-Ex1, 24 V DC (Pepperl+Fuchs)

Connection for the initiators for control monitoring (pneumatic actuator)

Terminal box:



The Pg 12 cable glands on the connecting box are assigned to the initiators on delivery. The Pg 16 cable gland connects the isolating switch amplifier

The table below shows the pin assignment:

Terminals 1,2	Initiator for position "radiation ON"
Terminals 3,4	Initiator for position "radiation OFF"

The connecting diagram is also provided inside the connecting box cover.

Post-installation check

Test for use under general license

Devices intended for use under a general license shall be installed and initially tested for external radiation levels, requried labels and documentation, and leakage-contamination of radioactive material by Endress+Hauser or other persons specifically licensed by the NRC or an Agreement State to perform such activities.

The general licnese allows to perform the initial installation.

Measuring the local dose rate

The local dose rate in the vicinity of the source container must be measured immediately after it has been mounted.

Depending on the installation, radiation can also occur through scattering. In such cases it must be screened by the use of additional lead or iron shielding. Render or mark all control and exclusion areas as prohibited for unauthorized entry.

Behavior on empty vessels / inspection inside the process vessel

After the proper mounting of the source container, the control area around the empty tank has to be measured. Control areas must be blocked off and marked. If there is an entry into the interior space of the tank, it has to be closed and marked with a sign "radioactive".

If any work has to be done inside the vessel during a shutdown situation, the source container has to be switched "OFF". The entry is only allowed after checking all safety regulations by the responsible radiation safety officer.
Control areas have to be measured!

Safety Instructions for Operation

Servicing and Inspection

In designated use, operated under the specified ambient and operation conditions, no inspection or servicing of the device is required.
If nevertheless inspection is considered as necessary – i.e. within the framework of routine inspections of the installation following checks are recommended on demand:

- visual check regarding corrosion of housing, weld seams, outer parts of source insert, lock/padlock
- check of the movability of the source insert (on/off function)
- visual check of the readability of the labels and the condition of the warning symbols
- check of the stability and tightness of the source holder

Country specific regulations may require frequent inspections of the radiation source container.

Maintenance/Cleaning

Note!
Non-routine repair or maintenance must be performed by the gauge manufacturer or distributor or a person specially authorized by NRC or an Agreement State.

Maintenance: Not required when operated within specifications.

Cleaning: Clean from substances which may have impact on safety functions.
Keep labels in legible condition.
Maintain cleaning in appropriate intervalls.

Caution!
If there is any doubt about correct function or proper condition of the device contact immediately the responsible radiation safety officer for advice.

Exchange of source

It is not allowed to exchange the source on site!

Dismounting

Caution!
All maintenance such as removal or replacement of the source container may only be carried out by supervised personnel, who have been specially trained in radiation procedures according to local regulations or handling approval. Ensure that the contents of the handling approval is valid. Local conditions are to be observed.
All work to be carried out may only be done from a safe (shielded!) location.
Safety procedures must also be carried out to protect personnel from all possible risks.
The disassembly of the source container can only be executed during OFF position.
Make sure, the OFF position is secured with a padlock.

- Secure the source container at the eyebolt.
- Loosen flanged connection, screw off the mounting screws of the flanges.
- Lift the source container by means of a suitable tool.

Procedure after termination of the application

Internal measures
As soon as a radiometric measuring device is no longer required, the radiation source on the source container must be switched off. The source container shall be removed in accordance with all relevant regulations and saved in a lockable room having no through traffic. The responsible authorities shall be informed of these measures. The access to the storage room shall be measured out and signed. The radiation safety officer is responsible for protecting against theft.
The radiation source in the source container must not be scrapped with the other parts of the plant. It should be returned as quickly as possible, see chapter „Safety instruction – Return of radiation source“.

Routine Leak Test Procedure

Note!
Leak tests are not only required as routine checkup but also whenever an incident occurs that may damage the sealed source or the shielding.

In such a case the leak test procedure shall be defined by the responsible radiation safety officer observing the applicable regulations and considering the source container and all involved parts of the process vessel.
The leak test shall be conducted as soon as possible after the incident.

The following leak test procedure is intended to be conducted routinely during continuous operation, during continuous storage or when placing back the source container into operation after storage.
It does not consider incidents that may have damaged the sealed source or shielding.

Frequency for Leak Testing

Leak tests shall be performed every 6 months or according to the intervall specified in the associated sealed source and device registration certificate.

Leak Test Procedure

Leak tests shall be performed by a person or an organization authorized by NRC or an Agreement State to provide leak test services or using a leak test kit supplied by an organization authorized by NRC or an Agreement State to provide leak test kits. Leak test kits shall be used according to its supplier´s instructions. Records of the leak test results shall be maintained.

Testing shall be done at no longer than 6 month intervals, following the procedures stated in this manual.

Perform following procedure unless otherwise instructed:

1. Wipe along the annular gap between the rotatable source insert and the housing (see Fig. 1) or at the join of the actuator adapter cylinder (see Fig. 2). This may be conducted when the source holder is in ON or OFF position at manually operated types. At types with pneumatic actuator secure position OFF with the padlock before conducting the leak test.

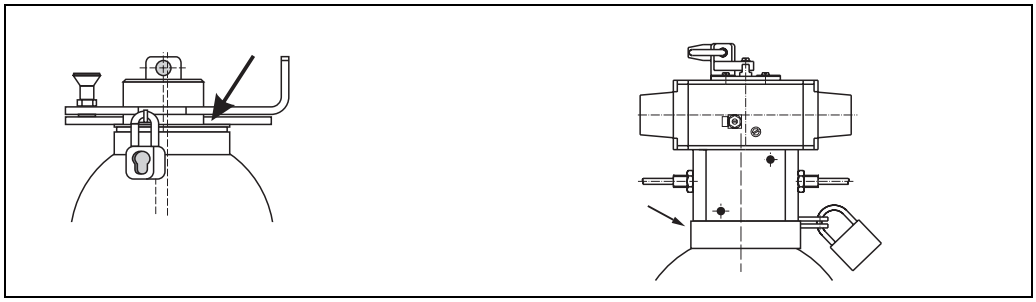


Fig. 1: Manually operated source container

Fig. 2: Source container with pneumatic actuator

2. Analysis of the samples by an organization authorized by NRC or an Agreement State. A source is considered to be leaking if more than 185 Bq (5 nCi) is detected on a leak test sample.

   In case of an indeed leaking source:
   – Immidiately discontinue use of the device.
   – Contact the responsible radiation safety officer for instructions
   – Take appropriate measures to control a potential spread of radioactive contamination from the source. Secure the source.
   – Notify NRC that a leaking source has been detected.

Routine Tests

Visible Check

If considerable corrosion is visible at the housing measure the radiation level around the device. If values occur exceeding the normal operation level, cordon off the area and contact immediately the responsible radiation safety officer for instructions.

In every case corroded devices should be exchanged as soon as possible.
Source containers with corroded interlocks or source holder require immediate exchange.

Routine Test of the Shutter Mechanismuss

Manually Operated Source Containers

Loosen the locking bolt and remove the padlock (when in OFF position) acc. to the operation manual.
Perform the following procedure:

1. Move the source holder several times from ON to OFF or from ON to OFF position acc. to the instruction manual.
   The source holder shall be easily moveable and must not show corrosion at the visible area.
   – If the source holder is not movable from ON to OFF position follow the instruction in section "Emergency Procedure".
   – If the source holder is rough-running or indicating potentially malfunction secure the source holder in OFF position and contact the responsible radiation safety officer for further instructions.
   – In case of corrosion follow the instructions in section "Routine tests".

2. When found the shutter mechanism in acceptable condition follow the instruction manual for correct positioning in ON or OFF position

Source Containers with Pneumatic Actuator

Remove the padlock when in OFF position acc. to the operation manual.
Perform the following procedure:

1. Switch the source holder from OFF to ON position by pressurization .
   The source holder shall move uninterrupted to ON position

2. Reduce pressure below 2.5 bar.
   The source holder shall move back to OFF position
   – If the source holder is rough-running or indicating potentially malfunction secure the source holder in OFF position and contact the responsible radiation safety officer for further instructions.
   – If the source holder is not movable from ON to OFF position follow the instruction in section "Emergency Procedure".
   – In case of corrosion follow the instructions in section "Routine tests".

3. When found the shutter mechanism in acceptable condition follow the instruction manual for correct positioning in ON or OFF position.

Behaviour in the Event of an Incident

Emergency measures

If the source container or the radiation source is damaged by accident or another unforeseen event or if the radiation source is lost by other means, the following emergency measures shall be initiated immediately:

- Inform the radiation safety officer immediately.
- All employees must leave the danger area immediately. The area around the measuring point must be barred to access and labelled.
- Production must be halted immediately if there is a risk that the radioactive material has got into the material being measured. Possibly contaminated material must be secured and must not be further used before it has been tested.
- All persons involved in cleaning up (fire brigade, works security, etc) must be informed of the hazards of radiation.

Report to the responsible authority

As soon as the emergency measures have been initiated, the authorities responsible for radiation must be informed by the radiation safety officer.

Emergency procedure

Objective and Overview

This emergency procedure shall be put into effect immediately to secure an area in the interests of protecting personnel where an exposed source is known, or suspected, to exist.
Such an emergency exists when a radioisotope is exposed either by it becoming separated from the source container or a source holder cannot be put into OFF position.

This procedure will safeguard an area until an appropriate radiation safety officer can attend site and advise on corrective action.

The custodian of the radioactive source (the customer's designated "authorized person") is responsible for observing this procedure.

Procedure

- Determine the unsafe area by measurement (on site) or by calculation knowing the size and type of source installed from the records.

- Cordon off the area at the boundary where the radiation level exceeds 20 µSv/h (2 mrem/hr) by yellow tape or rope and post international radiation warning signs.

  In case of a shutter that will not close:
  If part of the area is accessible (e.g. a vessel in the event of a level gauge installation where there is a possibility that a person might enter), the source housing should be unbolted from its mounting. Put emission channel towards a very thick wall (e.g. from steel or lead).
  Personnel should at all times be behind the source housing, not in front of the emission channel (flange of QG020 / QG100).
  The lifting eye on the housing should facilitate safe handling.

- If it is not practical to cordon off the entire area or if the source is in immediate danger of moving, it may be necessary to secure the source by relocating it or adding shielding. Here the inverse square law should be observed, i.e. radiation reduces with distance quadratically.
  The source should only be handled via pliers or tongs and held as far away from the body as possible.
  The time taken to fulfill the exercise should be minimized by rehearsal prior to execution.

- Make necessary notifications to local authorities as well as the NRC within 24 h.

  NRC´s Operation Center: 301-816-5100 or 301-951-0550

- After thorough assessment of the damage, the responsible radiation safety officer, in conjunction with NRC and/or local authorities and Endress+Hauser, shall agree a remedy to the specific problem.

Procedures after termination of the application

Internal measures

As soon as the radiometric device is no longer needed the shutter should be closed and locked.
The source container should be removed,in accordance with the individuals License and stored in a out of the way dedicated secured room. The RSO is responsible for overseeing this is properly carried out.

Return

To address the disposal sources call your local Endress+Hauser office for assistance and service if needed.
There are no returns to Endress+Hauser from within the United States.

Operation

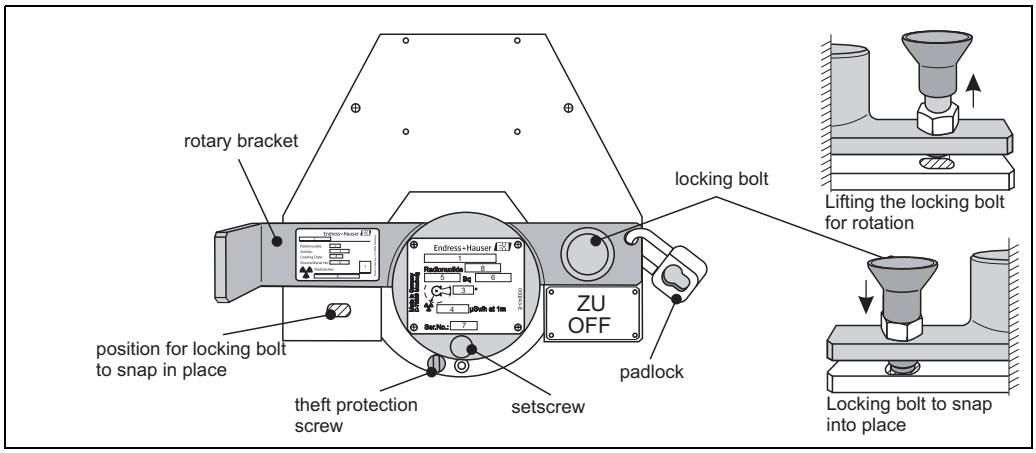
Switching radiation ON manually

Procedure

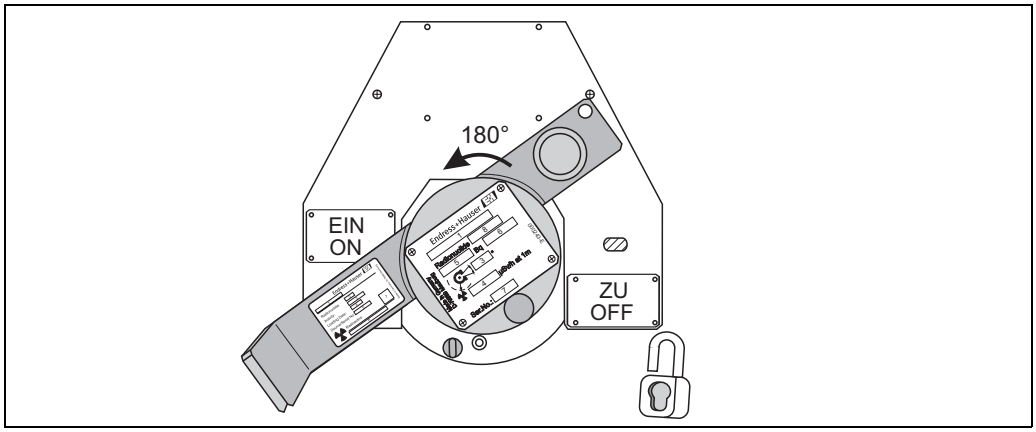
1. Remove padlock and losen setscrew.

2. To switch ON radiation: lifting the locking bolt and turn rotary bracket 180° counterclockwise. Fix the locking bolt in ON position. Make sure that the locking bolt locks in place.
   The visible sign displays the current switch status (from OFF to ON).
   The other sign is covered by the rotary bracket.

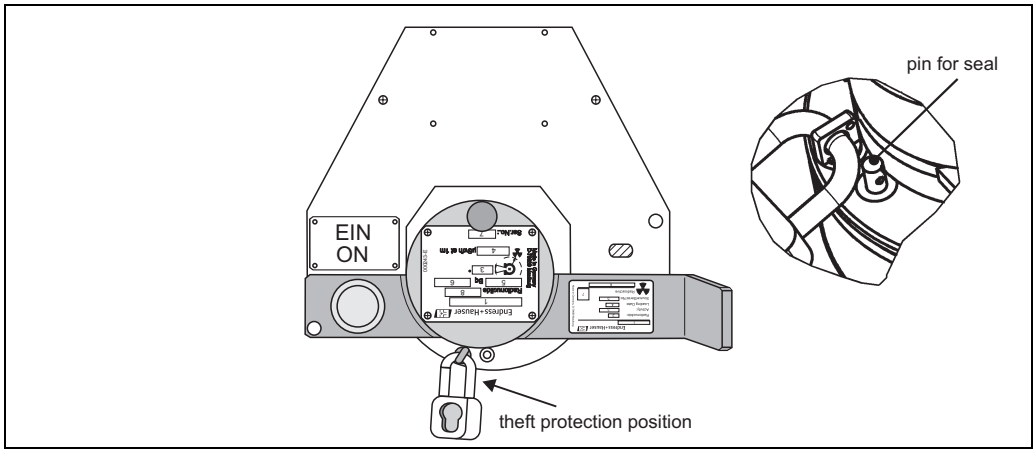
3. IMPORTANT: Insert padlock into the hole of the theft protection screw and lock. Insert and fix setscrew.



Position OFF



Rotation in ON position



Position ON

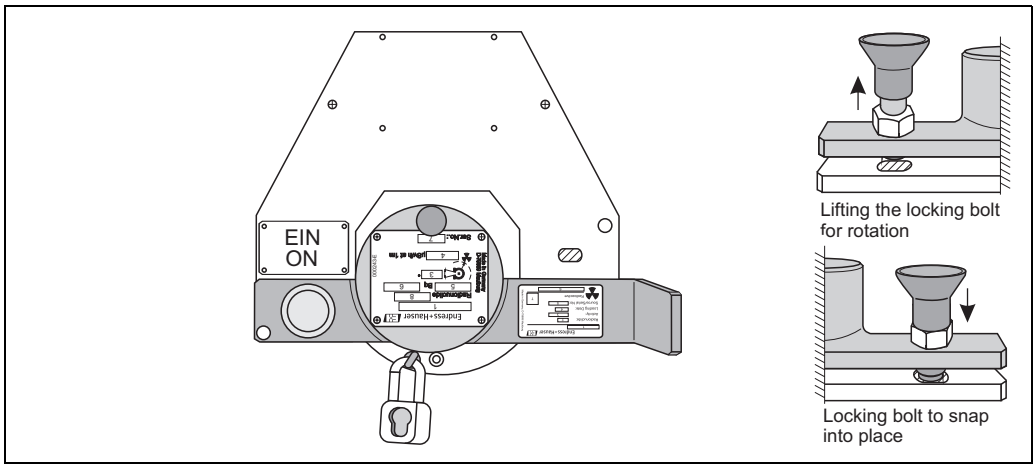
Switching radiation OFF manually

Procedure

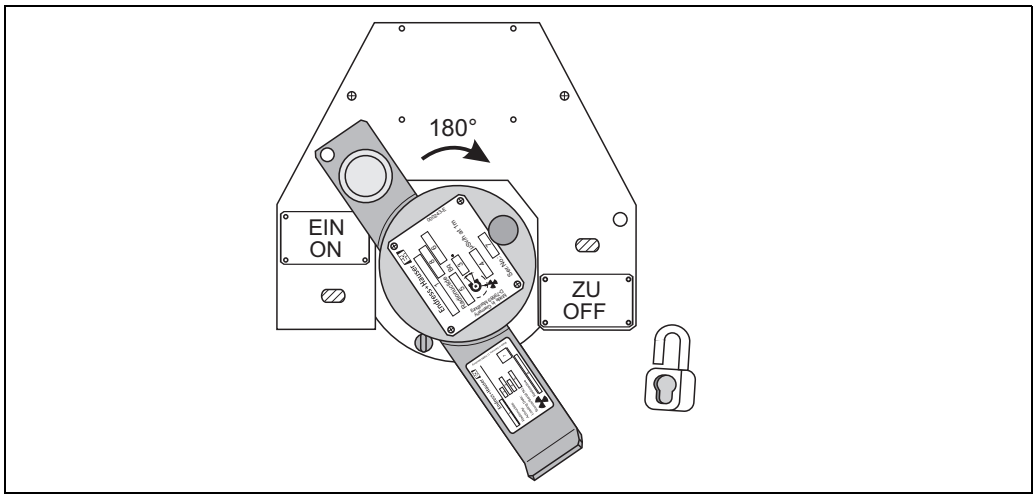
1. Remove padlock from the theft protection position and addition for density modification, losen setscrew.

2. To switch OFF radiation: Lift the locking bolt and turn rotary bracket 180° clockwise. Make sure that the locking bolt locks in place.
   The visible sign displays the current switch status (from ON to OFF).
   The other sign is covered by the rotary bracket.

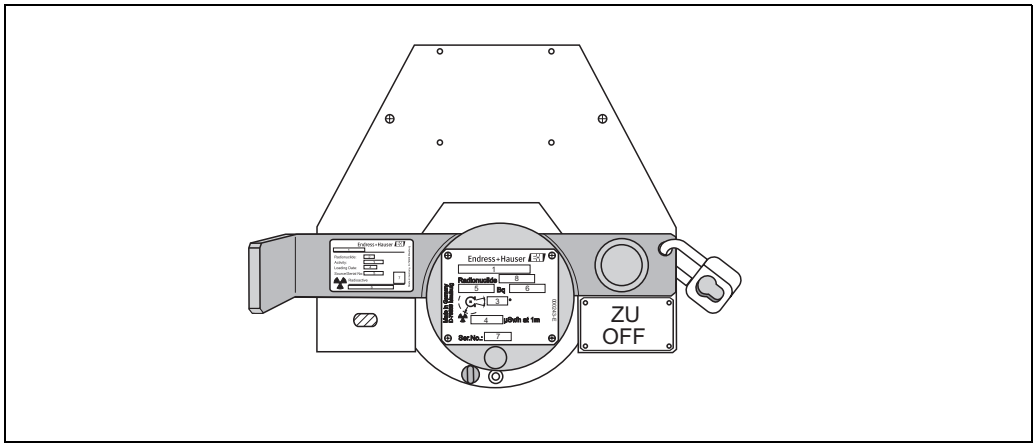
3. IMPORTANT: Insert padlock into the hole provided and lock.



Position ON



Rotation in OFF position



Position OFF

Pneumatic actuator

Pre-commissioning
Pre commissioning is to connect the compressed air supply and remove the upper padlock on the top of the instrument. In case of revisions this padlock must be locked again. In the meantime insert the padlock at the lower padlock or keep it at a place outside the installation.

Depending on the pressure of the compressed air, the actuation cylinder mounted on top of the source container switches the radiation ON or OFF.

Switching radiation ON pneumatically

Actuating pressure is approx. 72 psi (5 bar) / pressure range 51...87 psi (3.5...6 bar)

Note!
Pressure shall not exceed 87 psi (6 bar)
Do not lock or block the actuator in "ON" position!

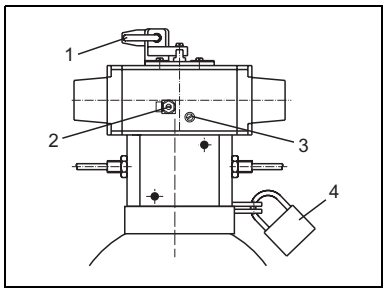
Switching radiation OFF pneumatically

Reset by spring force.

Note!
If pressure falls below 36 psi (2.5 bar) the actuator automatically switches back in "OFF" position.

Warning!
- Do not remove lower padlock!
  The current switching status is displayed and also available as an initiator signal.
- Do not touch the ON/OFF indicator or the top of the actuator when pressurized!

Compressed air connection



Please note!
The throttle check valve is adjusted ex factory and secured with screw lock - leave it unchanged!

1 upper padlock (OFF position)
2 throttle check valve
3 vent
4 lower padlock

Upper Padlock:
When the source container is in ON position keep the padlock in safe custody at the lower padlock.

Fireproof version BAM tested

The source container QG020, QG100 in the fireproof version are increased fire resistant. Both source containers comply with the specification of DIN VDE 0412-1 chapter 6.4 in all installation positions. The value of source container QG020, QG100 is much better than the compulsory limit value of 10 mSv/h at a distance of 1 m (40 inch).
The increased fire resistant version has a compensation compartment, which is welded laterally onto the housing. In case of fire the liquefied lead will be collected in the compensation compartment.

Test report:
A BAM* test report of the fire test is available on request.

* (BAM = German Federal Institute for Materials Research and Testing)

Function and System Design

Function

The gamma rays emitted by the radioactive source radiate equally in all directions.
For shielding reasons, the capsule containing the source is located in the source container.

In the QG020 or QG100 source containers, the radioactive source is surrounded by a lead covering encased in steel which screens off gamma radiation. The radiation is emitted, almost unattenuated, in one direction only through a channel (focussed narrow ray path).
By turning the insert 180°, the radiation source is positioned in the radiation emission channel (radiation is switched on) and removed from the channel (radiation is switched off).
The particular switch position (in OFF) is fixed by a padlock. The position can be easily identified externally.

Warning!
Any existing accesses to the vessel have to be locked and marked. The radiation safety officer must keep the key.

After switching "OFF" the source container the control area has to be measured by the radiation safety officer. If control areas occur inside the vessel, the radiation protection has to take additional measures before he is allowed to enable the access into the vessel. If control areas occur outside the vessel these must be cordoned off (Check by measuring!).

Attenuation factor and half-value layers

Source container	QG020		QG100	
Source	^{60}Co	^{137}Cs	^{60}Co	^{137}Cs
Attenuation factor F_S *	37	294	181	3100
Number of half value layers*	5.2	8.2	7.5	11.6

*approximated values

The QG2000 source container is available for even stronger screening. Please refer to Technical Information TI427F/00/en for more information.

Weight

Source container	Standard	Pneumatic	Fireproof
QG020	approx. 40 kg (88 lb)	approx. 45 kg (99 lb)	+1 kg (2.2 lb)
QG100	approx. 87 kg (192 lb)	approx. 92 kg (203 lb)	+2.4 kg (5.3 lb)

Radiation emission channel

Angle of emission
5°, 20° or 40°

Width of emission channel
6° in all versions
The emission channel is on the same level as the eyebolt of the source container. It is also marked on the outlet opening.

Attenuation of the useful beam
approx. 0.3 HWS (F_S = 1.2) via the cover plate

Materials

	QG Source
Rotary insert and internal components	316 Ti
Housing and flange	Steel or 316 Ti Yellow paint RAL 1004 with black warning symbol

Screening material

Lead

Ambient conditions

Ambient temperature	T= –40...+200 °C (-40...+392 °F) manually operated versions T= –20...+80 °C (-4...+176 °F) versions with pneumatic actuator
Pressure	atmospheric
Vibration	zero to mild
Fire	unlikely (accident conditions only)
Explosion	unlikely (accident conditions only)
Fireproof version, BAM-tested (BAM = German Federal Institute for Materials Research and Testing)	1h at 1000 °C (1832 °F) 945 °C (1733 °F)/1h meets the requirements of ISO7205, IEC60405, ANS N538, AERB/SS/2
Security arrangement	
Padlock	■ to secure the „OFF“ position on installations in case of revisions ■ for anti-theft protection

Pneumatic actuator

- Version with pneumatic switch ON/OFF
- Swivel range: 180 °
- Comp. air connection: G 1/ 8
- Actuating pressure: 51...87 psi (3.5...6 bar)
- Reset by means of spring
- Required air quality: Class 5 acc. to ISO8573-1

Radioactive Source

The following table identifies the source model, isotope and activity levels that can be used in each of the QG series gauges if specifically licensed:

QG Series	Source Model	Isotope	Maximum Activity
QG020	CKC.P4	Co-60	10 mCi (0.37 GBq)
	CKC.P6	Co-60	10 mCi (0.37 GBq)
	CDC.P4	Cs-137	500 mCi (18.5 GBq)
QG100	CKC.P4	Co-60	50 mCi (1.85 GBq)
	CKC.P6	Co-60	50 mCi (1.85 GBq)
	CDC.P4	Cs-137	500 mCi (18.5 GBq)
	CDC.93	Cs-137	2.5 Ci (92.5 GBq)

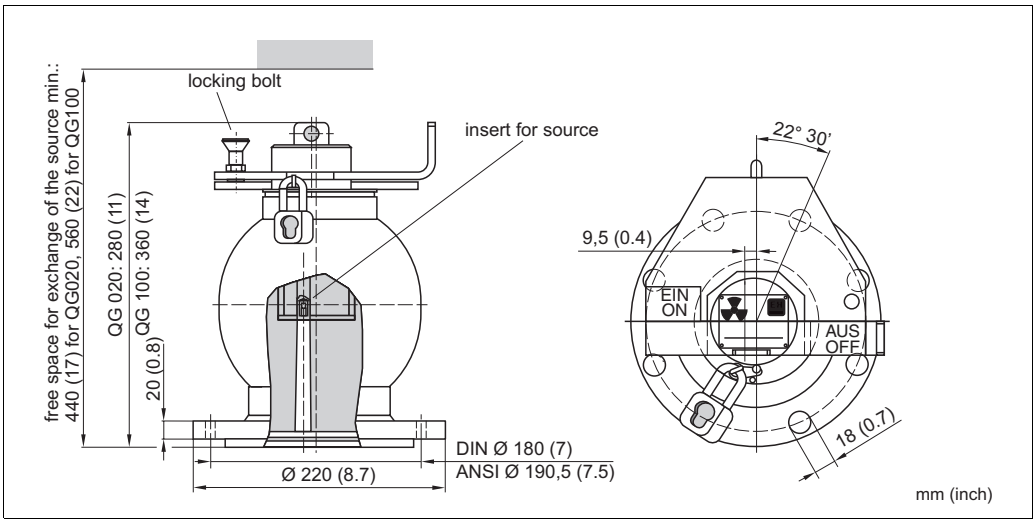
Maximum activity for generally licensed source containers

The following table speifies the maximum activity for genrally licensed radiation source containers:

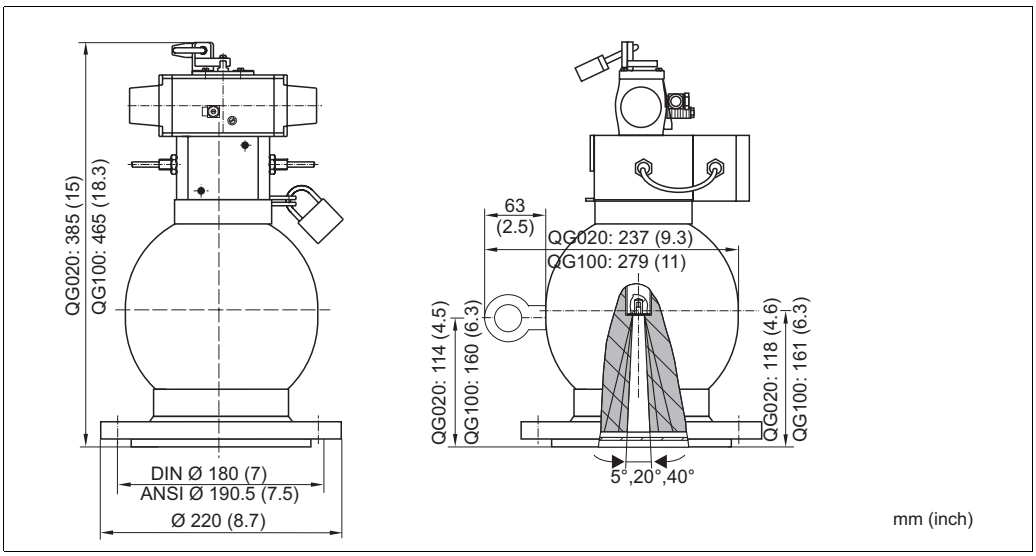
Isotope	Maximum activity
Co-60	81 mCi (3GBq)
Cs-137	270 mCi (10 GBq)

Mechanical Construction

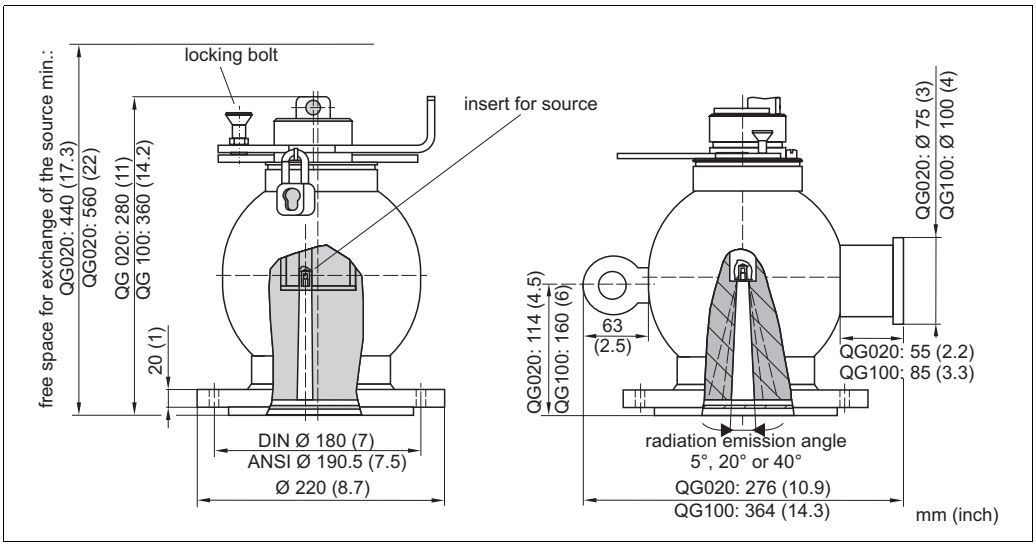
With rotary bracket for switching ON and OFF manually



With pneumatic actuator

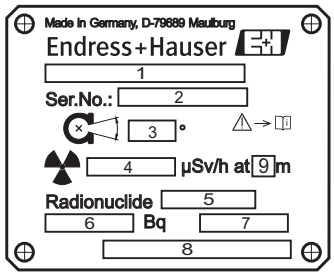


Fireproof version



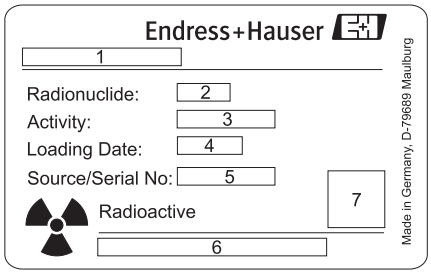
Identification

Nameplate



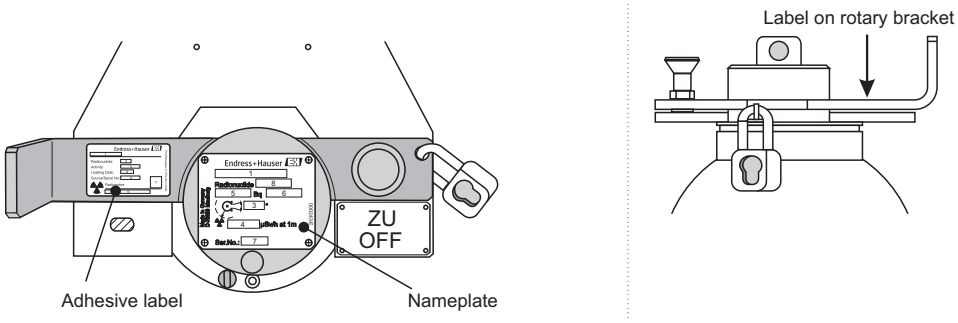
1	Order code (product designation)
2	Serial no
3	radiation emission angle
4	local dose rate in µSv/h
5	isotope (Co60 or Cs137)
6	activity in Bq
7	month/year (completion label)
8	"Caution Radioactive Material"
9	distance in m (default: 1m)

Adhesive label

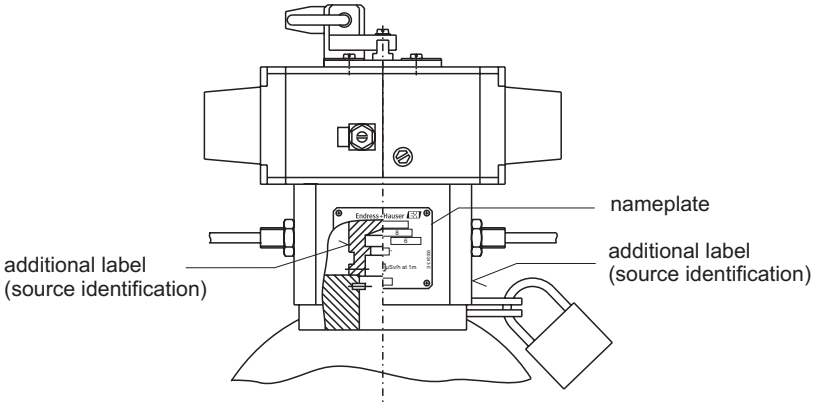


1	Order code
2	Radionuclide (Cs-137 or Co-60)
3	Activity in Bq
4	Month / year
5	Serial no. of source capsule
6	National advice if required
7	Field for bar code or data matrix code

Position of adhesive labels

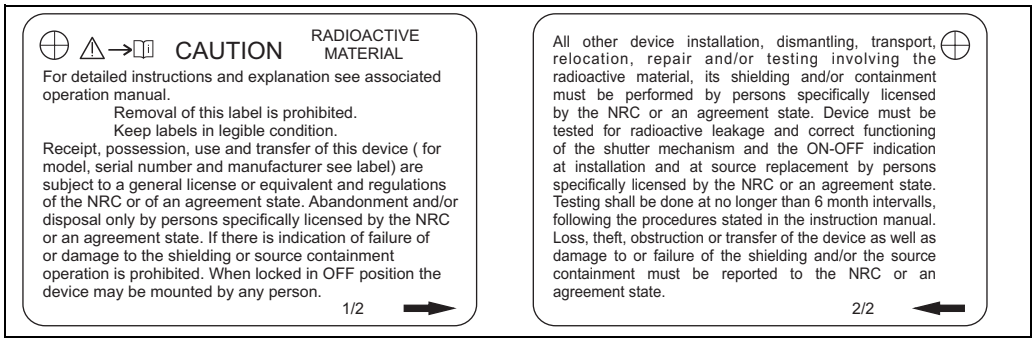


The labels can be found on the rotary bracket.



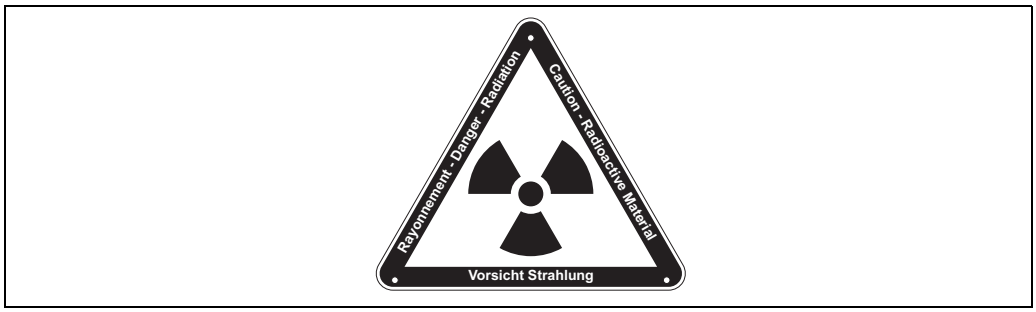
Position of source container with pneumatic actuator.

Label lor General License



This label is attached if the source activity is:
- < 2.9 GBq (81 mCi) for ^{60}Co
- < 9.9 GBq (270 mCi) for ^{137}Cs

Radiation warning sign



This label is attached if the source container is loaded.

Certificates and approvals

Local dose rate

A PTB test report on measurements of the local dose rate (QG020 or QG100 each loaded with a certain source of a certain activity) is available on request.

Fireproof version

A BAM certificate (test over 1h at 1000°C /1832 °F) is available and can be provided on request.
(BAM = German Federal Institute for Materials Research and Testing)

CNSC Certificate

For application in Canada, the following CNSC Certificates are available:
- QG020: No. 094-0104-0-2017
- QG100: No. 094-0115-0-2017

Note!
When using the CNSC Certificates, the additional Safety Instructions SD142F have to be observed.

Ordering Information

Source container QG020/100

	Design				
	J	US (nipple), pneumatic actuator, padlock, labelling (en)			
	K	US (nipple), fire-resistant, density modified, padlock, labelling (en)			
	U	US (nipple), density modified, padlock, labelling (en)			
		Process connection			
		P1	DN100 PN16, flange + container steel		
		P2	DN100 PN 16, flange + container SS316Ti		
		R1	ANSI 4" 150lb, flange + container steel		
		R2	ANSI 4" 150lb, flange + container SS316T		
			Emission angle		
			A	5°	
			B	20°	
			C	40°	
QG020 -					Complete product designation
QG100 -					Complete product designation

Scope of delivery

Scope of delivery includes:
- QG020, QG100
- Radiation source (built in)
- Radiation warning sign
- Operating instruction
- Radiation Safety Manual

Delivery

Germany
We can only ship radioactive sources once we have received a copy of the handling permit. We are more than happy to assist in procuring the necessary documents. Please contact our local sales centre.
For safety reasons and to save costs, we generally supply the source container loaded, i.e. with the radiation source installed. If the user requires the source container be delivered first and if the source must be delivered subsequently, transportation drums are used for shipping.

Other countries
We can only ship radioactive sources once we have received a copy of the import licence.
Endress+Hauser is more than happy to assist in procuring the necessary documents.
Please contact your local sales centre.
Radioactive sources must be installed in the source container for delivery abroad.

The source container is delivered loaded with radioactive source. In any case the source container is delivered in the OFF position, secured with a padlock and a lead seal.
The transport of loaded source containers is conducted by a company commissioned by Endress+Hauser and officially certified for executing this type of job.
Transportation shall take place in a Type "A" package which complies to the regulations of the European Agreement on the International Transportation of Hazardous Substances on Roads (ADR and DGR/IATA).

USA
The source container must be shipped with the radioactive source already installed. The shutter will be secured in the OFF position with a padlock and security seal. The shipment will be a "Type A" package and all marking, labeling and documentation will comply with U. S. Department of Transportation (DOT) regulations. Transport will be by common carrier, or other entity authorized to carry radioactive material.

Shipments to Specific Licensees cannot be made until we have a copy of the Specific License authorizing receipt, possession and use of the radioactive material. Endress+Hauser will be happy to assist with procuring this license if desired.

Shipments to General Licensees (a regulatory license issued for certain inherently safe devices containing sealed sources) cannot be made until we have written authorization from the user which contains the name and telephone number of the person on site who will be responsible for the device.

Contact our local sales center for questions or assistance.

Supplementary Documentation

System Information	**CP017F/00/en** Radiometric measurement technology
Technical Information	**TI213F/00/en** Technical Information on gamma radiation sources **TI427/00/en** Technical Information for the source container QG2000 **TI363/00/en** Technical Information for Gammapilot FMG60
Special documentation	**SD142F/00/en** Supplementary Safety Instructions for Radioactive Sources and Source Containers approved for Use in Canada
Safety Manual	**SD276F/00/en** Radiation Safety Manual

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