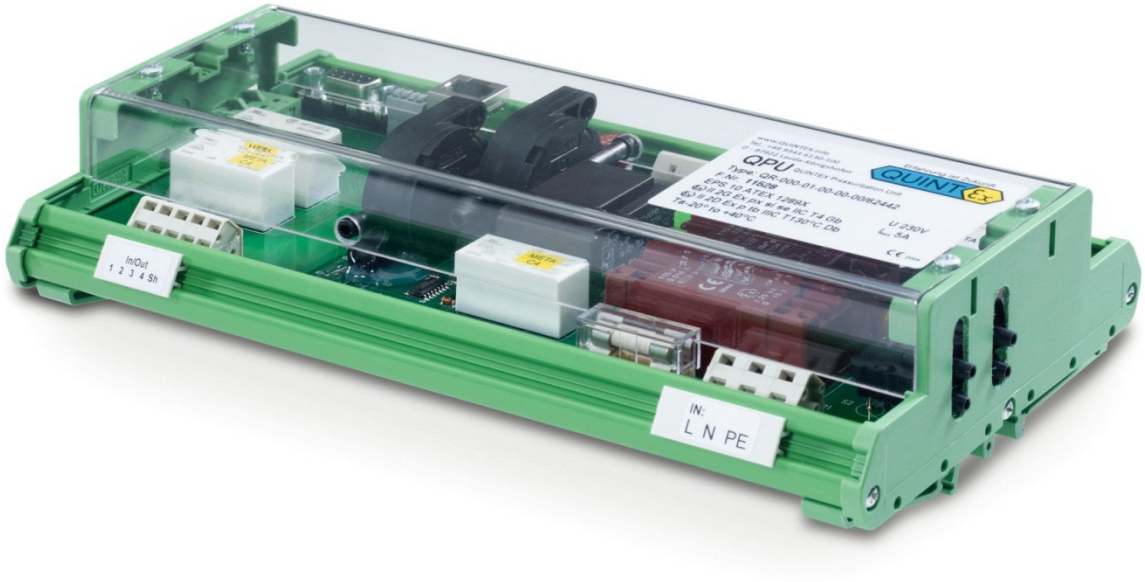
Betriebsanleitung / Operation manual

Druckwächtereinheit QUINGUARD® / Pressurization Controller QUINGUARD®



Manufacturer

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Description

Installation of the QUINGUARD® unit

The pressure switch unit QUINGUARD® can be used in hazardous areas for gas applications within zone 1 and 2 and for dust applications zones 21 and 22

Because the pressure switch unit QUINGUARD® is ATEX approved, there is no need for an additional housing. The pressure switch unit can be installed directly into an approved Ex p housing. For this purpose, it can be installed directly on a DIN rail available.
The respective max. allowable pressure of the approved Ex p housing shall not be exceeded, this is ensured by a safety device.
The maximum temperature of the internal components must be determined by a suitable measurement.
The minimum operating pressure in Ex p-housing is set to ≥ 500 Pa (5 mbar).
The medium of pressurization must be purified instrument air or inert gas.

Following procedure for commissioning is mandatory:

1. **Release by gas detection**
2. **Pressurization**

The specific conditions in the certificate must also be observed!

Description of the function of QUINGUARD®

The QUINGUARD® system within an approved enclosure “e” in accordance to EN600079-7:2008 it uses for switched power or interfaces within a hazardous area. It switches connected contactors, relays or other electrical devices on and off.
The Druckwächter QUINGUARD® with integrated pressure switches and relays operates such that the possible presence of an explosive atmosphere no switching operation occurs. The switching operation takes place only after attainment of the desired internal pressure inside the housing, and thus during the protection provided under pressure. If the internal pressure drops below the allowed system pressure (<5 mbar), the built in-pressure monitor SD switch off the coil of the load switch (contactor or relay). All components or electrical devices in the control cabinet or housing are then likewise disconnected.

Two variants of the engagement after the release measurements are available:
Manual switching:
The manual switching is applicable whenever a release measurement is carried out with gas detector with an pump.
Automatic switching:
The automatic switching can be performed in conjunction with a stationary gas detector in the cabinet or enclosure. Here, the two switch-off functions of the Druckwächter QUINGUARD® and the gas detector are linked. If there is not gas detected and the pressure in the cabinet or housing is greater than 5 mbar the system is activated.

Release by gas detection of the pressurized enclosure

Release with a gas detector with pump

The release measurement with a suitable gas detector with pump is used by small enclosure without a lid to open or where is inside no spare room for a stationary version. For the free measurement a measurement point on the backside of the enclosure will be used. The gas detector is fixed through this point with a tube and is securely mounted on the backside or on the left / right side.
Then, after closing of the enclosure, the air supply will be set manually at the pressure regulator (note: pay attention to max permissible housing pressure!). By using a fixed pressure regulator this eliminated.
Then, after reaching the desired internal pressure, automatically or by an externally mounted switch the Druckwächter QUINGUARD® will be switched on (delivery state is manual switching).
Then the internal Druckwächter QUINGUARD® monitors the overpressure compliance of the internal pressure and on the case of a drop of the pressure switches off all electrical loads safely. For an automatically leakage compensation the valve module can be used as an option.

Release with a stationary gas detector – enclosure series SPZ

Within the enclosure series SPZ we work with a stationary suitable gas detector. This is installed inside the enclosure. The unit should be located depending on the application.
At a fixed gas detector the NO contact of the gas detector is switched in series with the pressure monitor unit QUINGUARD®. Only when both of the switching states are reached, the power supply is switched on.
The fixed gas detection system is of particular use when used in analyser enclosures with containment systems.
There are several manufacturers of fixed gas detectors, here, different manufacturers are coming to use, but is important that all are approved for the intended explosion zone and they have sensors that can sense all explosive gases.
The fixed gas detectors are all working with the power supply DC 24V thus requires a separate power source for those gas detectors.

2.4 Maintenance of portable and stationary gas detectors

To the frequency of maintenance and calibration information of each device manufacturer must be observed.

Our used gas detector has, according to the manufacturer the following intervals:

"..... recommends to test and recalibrate gas detectors at intervals of 12 months or at the site of existing procedures. "

For this purpose the technical manual from manufacture must be considered.

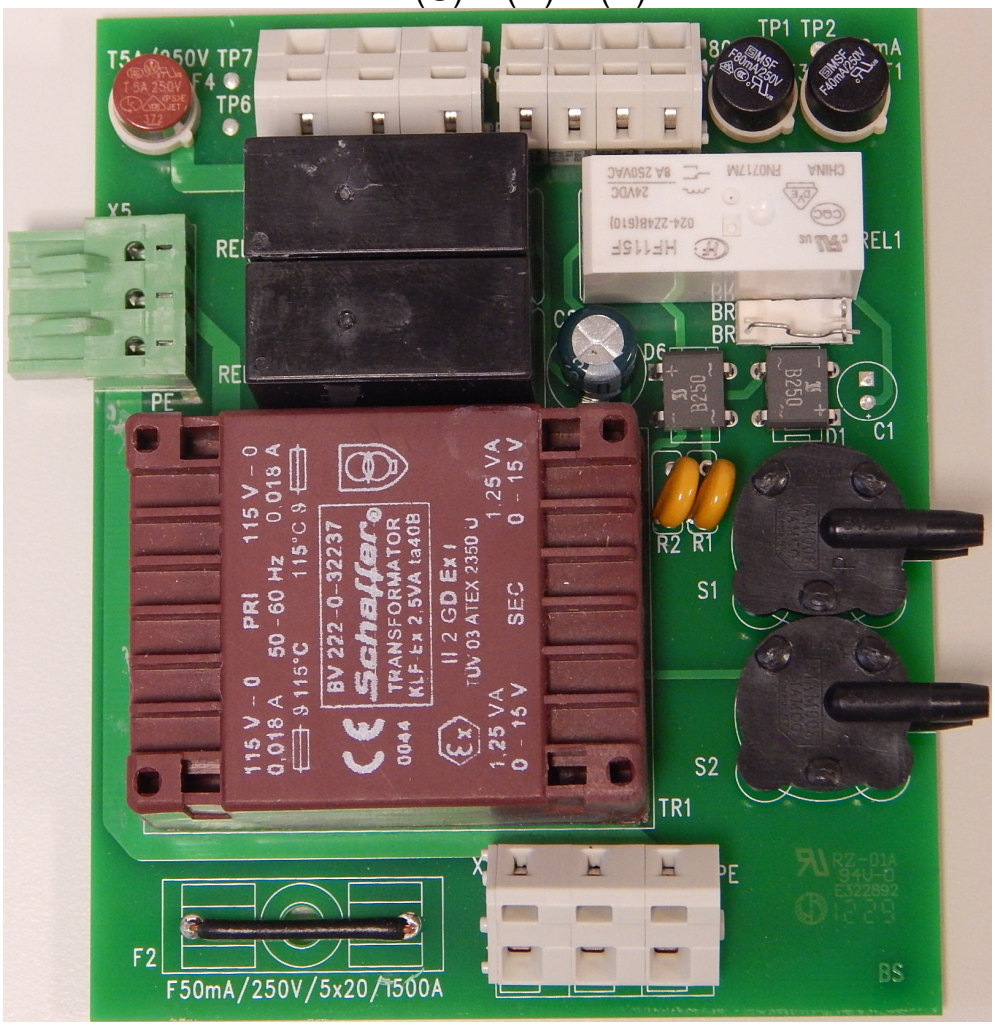
Certification & labelling

Manufacturer:	QUINTEX GmbH
Type:	QSU-….-…./…..
Certification:	EPS 14 ATEX 1751 U
Marking:	II 2G II 2D
Standards:	RL 94/9/EG
CE:	CE 2004

Druckwächter QUINGUARD®

(C) (D) (E)

(B)



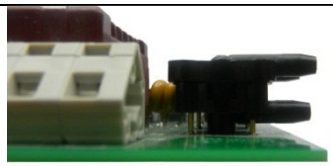
(F)

(G)

Presented without protection

(A)

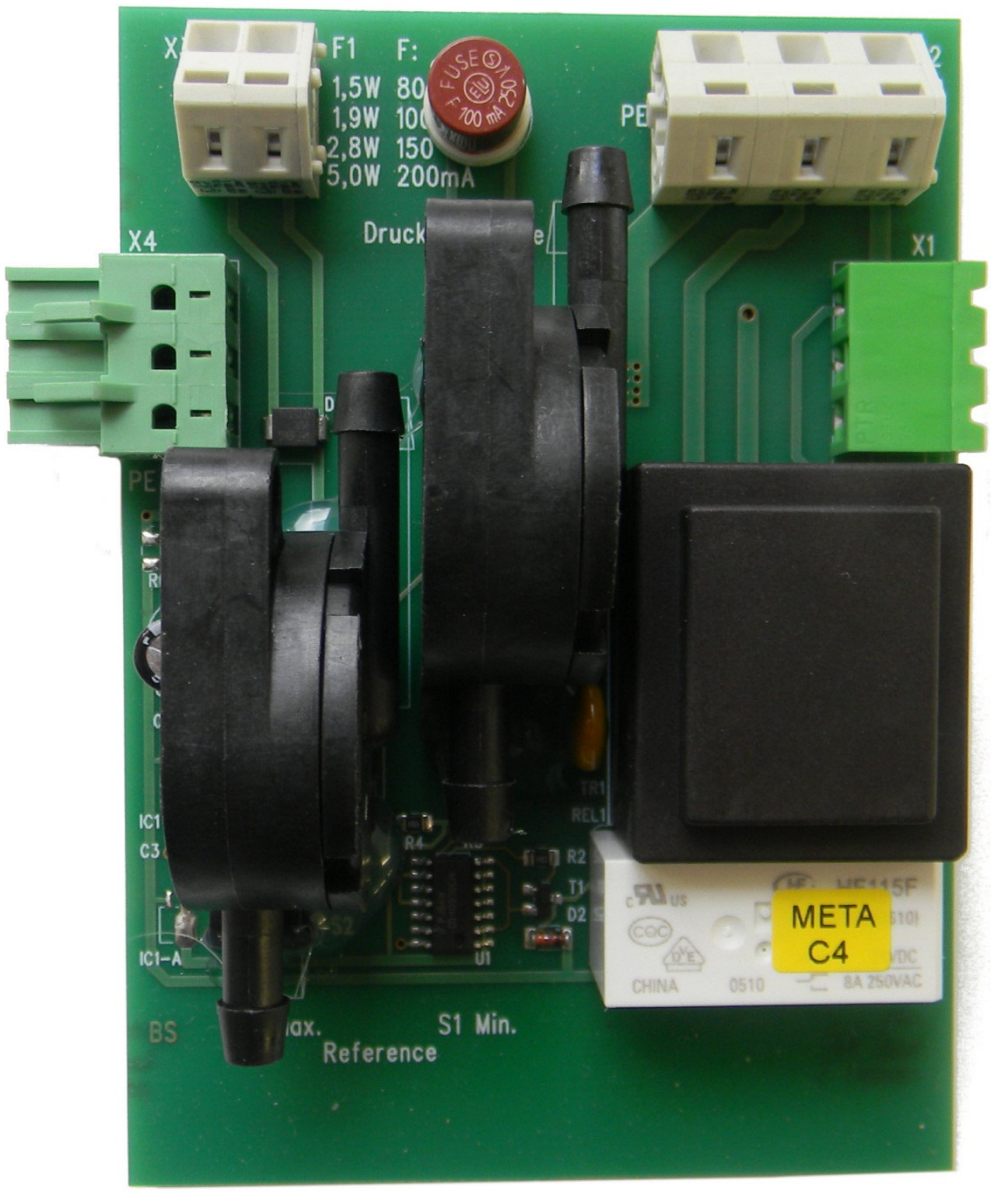
Read from left to right and up / down

A: Input 230V AC (optional DC 24V)	Terminal numbers 3(L)/2(N)/1(PE)
B: Bus- system for the modular built up	N/ L/ PE
C: Output 230V AC (optional DC 24V)	Terminal numbers10(N)/9(L)/8(PE)
D: Maintain switch (free of potential)	Terminal 7/6
E: Restart push button (free of potential)	Terminal 5/4
F: BR1- automatic restart BR2- manual restart	
G: 	Upper pipe is over pressure Lower pipe is atmospheric pressure

Technical Data

Operation Voltage:	**AC 230V or DC 24V**
Frequency:	**50 – 60 Hz**
Switching capacity:	**max. 5 A – fused internally**
Back-up Fuse:	**5A T / 250V – done on customer side**
Hedging:	**Backup must fan the 1.7 factor be less than the maximum current of the switching device (seal)**
Min. Overpressure:	> **500 Pa (5 mbar)**
Ambient temperature:	**-25°C up to +60 °C**
Dimension:	**107 x 100 x 29mm**
Marking:	**II 2G** **II 2D**
Mounting**:**	**snapped onto DIN rail TS35**
Conformity:	**ATEX/ GOST**

Valve module



Presented without protection

Read from left to right and up down

A: Bus- system for the modular built up	N/ L/ PE
B: Valve 24V DC	15(-)/14(+)
C: Valve 230V AC	13(PE)/12(L)/11(N)
D: Bus- system for the modular built up	N/ L/ PE

Technical data

Dimension	**107 x 85 x 35mm (L x W x H)**
Switching capacity	**5A**
Valve open	**7mbar (700 Pascal) (adjustable)**
Valve close	**10mbar (1000 Pascal) (adjustable)**
Valve voltage	**AC 230V 50- 60Hz** **DC 24V**
Temperature range	**-25°C up to +60°C**

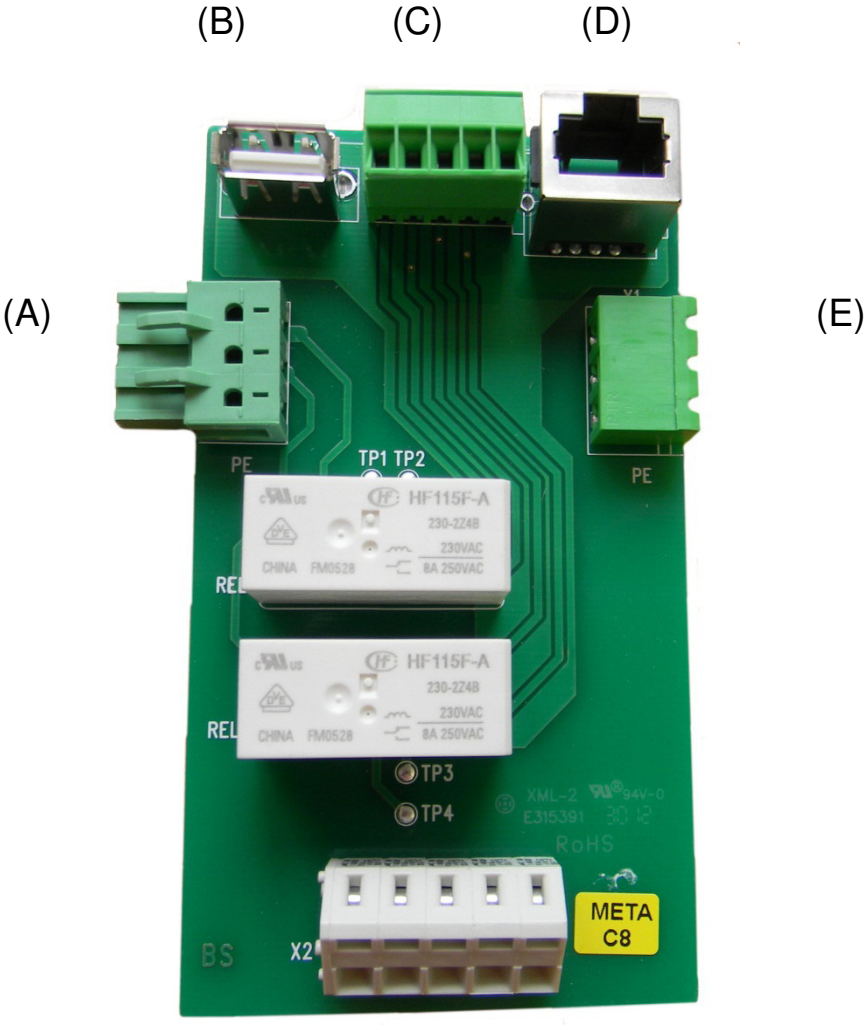
Description

The Valve module has two pressure switches that operate at different pressures. The pressure switches are working with the same measurement principle as the pressure switch unit with the differential pressure measurement. This means they must be connected to the same pressure as the reference pressure monitor unit. Is an adjustable internal pressure in the housing reaches the switch, a digital valve is opened. This increases the internal pressure. The second pressure switch is used to switch off the digital valve, also via an adjustable value. Through this connection and disconnection of the digital valve is a leakage compensation which operates independently of changing leakage.

Installation of the valve module

The Valve module is together with the QUINGUARD® and all other modules attached to the same DIN rail and are connected by the internal bus system.

Interface module



Presented without protection

Read from left to right and up / down

A: Bus- system for the modular built up	N/ L/ PE
B: USB 2.0 Interface	
C: Universal panel	25/24/23/22/21
D: RJ45 Interface	
E: Bus- System for the modular built up	N/ L/ PE
F: Data input	20/19/18/17/16

Technical data

Dimension	**107 x 73 x 20 (L x W x H)**
Input	**5 pole cage- terminal with PE**
Output	**5 pole pluggable terminal** **USB 2.0 female plug** **RJ45 female plug**

Description

The interface module has 4 NO contacts which are used for switching on or off of 4-wire data line. On the input side of this interface module a 5 pole cage clamp is provided.
To connect the data line at the entrance the line must cut off.
For the output currently there are three connection types are available:

- 1x female USB 2.0,
- 1x RJ45 Ethernet 10/100Mbps female plug
- 1x 5-pin pluggable terminal.

With an interface module, only one interface type can be switched.

Installation of the interface module

The interface module is together with the QUINGUARD® and all other modules attached to the same DIN rail and are connected by the internal bus system.

Safety advices

For electrical systems the relevant installation and operating regulations must be considered (e.g. Directive RL1999/92/EC, RL94/9EG, IEC/EN 60079-14 and the relevant national standards).
The operator of electrical installations in hazardous environment has to maintain the equipment in proper condition, operate properly, monitor and carry out maintenance and repair work.
If the type of protection is concerned, only original parts may be used for exchange (e.g. cover sealing / cable glands).
Assembly / disassembly, operation and maintenance work may only be carried out by trained specialist staff. For junction boxes for use in areas with combustible dusts, the ignition temperature of the dust/air mixture or the glow temperature of the dust must be higher than the safety factor in EN 60079-14 and as the maximum surface temperature of the enclosure.
It must be considered all the generally applicable statutory rules and other binding directives on workplace safety, accident prevention and environmental protection.
Dust deposits >5mm must be removed.

Installation & start up

Assembly / Disassembly:
While installation & operation of electrical plants in hazardous areas the installation & operation instructions has to be considered anytime (e.g. BetrSichV, IEC/EN60079-14, and national regulations).
Please notice the information marked on the label of the product and in EC type-examination certificate. Further information can be found in the QUINTEX product data sheets and is indicated on the product.

Installation:
For enclosures mounted outside there has to be made special preparations to guarantee a safe operation to the demands e.g. usage of devices for protection of the enclosure against rain, “housing” of the enclosure with adequate protection class.

Start-up:
Every electrical device operated in hazardous areas has to be chosen according to the requirements of each single kind of installation.
Operation of electrical devices is only allowed if undamaged and clean.
Before start up and periodically the electrical plant must be checked by qualified & trained staff.

Operation, service & maintenance

The operator of an electrical plant in hazardous areas must guarantee that all devices are in good condition. He has to operate these devices and do the maintenance work within the allowed parameters (please notice EN 60079-17).
Maintenance & Service work must be made by trained staff only.
It´s only allowed to use original spare parts (sealing and cable glands) if replacement is necessary. Damaged parts must be replaced immediately.
The applicable laws and regulations must be considered before restarting. Before maintenance and/or troubleshooting the safety regulations have to be considered.

Warning – do not open when energized

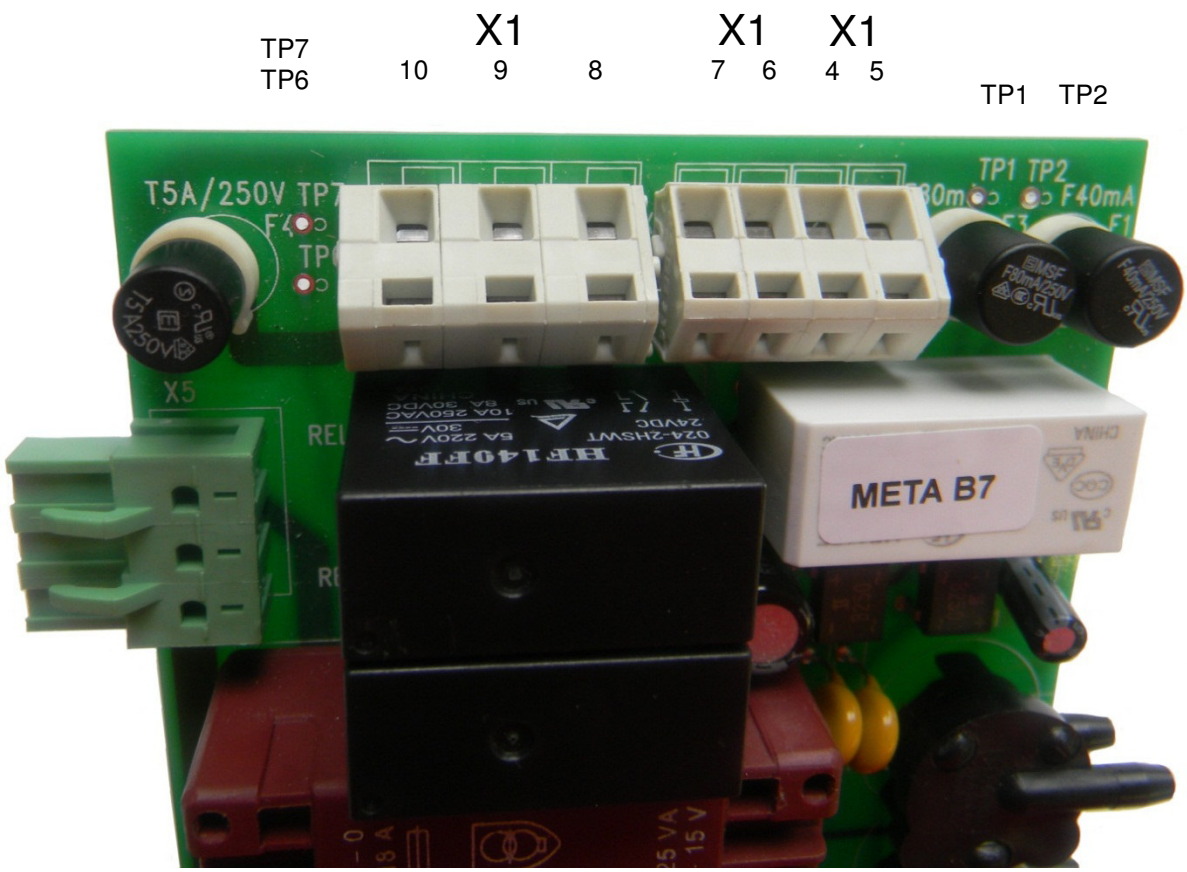
**Warning – Pressure encapsulated enclosure-
Do not open when an explosive Atmosphere is present**

Operation

The operators of electrical installations in hazardous areas must ensure the equipment in proper condition to operate properly, to monitor and carry out regular maintenance and repair work (see also EN 60079-17). Maintenance work and repair of faults in the pressure switch unit QUINGUARD® or on Ex system may only be performed by trained personnel. Prior to the maintenance and / or repair of faults specified safety regulations shall be observed. The warnings on the equipment should be observed.

Maintenance

At the lead-out inspection pins on the circuit board, the pressure switch unit QUINGUARD® is during maintenance once a year checked to switch position "open" at zero pressure of the pressurized enclosure. Relevant contacts are shown in the following image.


TP7
TP6
X1
10
9
8
X1
7
6
X1
4
5
TP1
TP2
T5A/250V
TP1 TP2
F40mA
X5
META B7

Testreport

Test	Result of measurement	
At Relay 1 the voltage between inspection pin TP1 and TP2 should be approx. 23V (TR1).	_____ V	
	Applicable	Not applicable
Relay 2 (first switching contact REL2-B) has to be tested without voltage for status 'open' between pin TP6 and X2-1 (high resistance)	O	O
Relay 2 (first switching contact REL2-C) has to be tested without voltage for status 'open' between pin TP6 and X6-2 (high resistance)	O	O
Relay 3 (first switching contact REL3-C) has to be tested without voltage for status 'open' between pin TP7 and X2-2 (high resistance)	O	O
Relay 3 (first switching contact REL3-B) has to be tested without voltage for status 'open' between pin TP7 and X6-3 (high resistance)	O	O
Pressure switch S1 has to be tested without voltage for status 'open' between pin TP2 and X3-1 (high resistance)	O	O
Pressure switch S2 has to be tested without voltage for status 'open' between pin TP2 and X3-2 (high resistance)	O	O

Is one of the switch contacts in the de-energized state is not open / high resistance or voltage is present (at the transformer TR1) or between TP1 and TP2 of relay 1 is not about to 23V, probably there is a bonding of a switching contact. The pressure switch unit QUINGUARD® shall notbe used anymore and shallbe returned to QUINTEX for inspection.

Inspection by: First name/last name	
Inspection date: (TT.MM.JJJJ)	
Signature of inspector:	

The position of the measurement points is described in this manual under Operating; Services and maintenance.
This page maybe be copied for inspection

Additional components

Atmospheric pressure

The Druckwächtereinheit QUINGUARD® unit operates with pressure switches. One of the pressures is located inside the housing and is therefore always on the open side(top) of the pressure switch. The second port is the atmospheric pressure; it is connected via the supplied tube system with the pressure switch. To bring both tubes together use the delivered fexible tube.

Pressure reducer (Inline)

To ensure a constant air flow at the entrance a fixed set pressure regulator is used. There are different types available, for example 1 bar.
The incoming pressure can have max. 18 bar the reduction are working automatically.
Also available are adjustable versions.

Saftey outlet

The safety outlet FGO has the task in an unexpectedly high internal pressure in the enclosure to reduce this pressure. A valve plate is mechanically mounted on a spring opens when increased pressure and the internal pressure is reduced. Then the valve plate closes again automatically. We recommend the enclosure with a safety outlet to equip. Depending on the size of the Cabinet is different variants available
The outlet FGO is equipped with particle locks.

Gas detector with pump

The release measurement with a suitable gas detector with pump is used by small enclosure without a lid to open or where is inside no spare room for a stationary version. For the free measurement a measurement point on the backside of the enclosure will be used. The gas detector is fixed through this point with a tube and is securely mounted on the backside or on the left / right side.

Stationary gas detector

To allow automatically switch on of the Ex p system a stationary gas detector can be used. The used gas detector must be calibrated and approved to the ATEX standards.

General information on the fixed gas detectors

Prior to initial operation of gas detection equipment manufacturers documentation is to be observed. Here are the procedures described for the first operation and the calibration cycles.
Following procedure for commissioning is mandatory:

1. **Release by gas detection**
2. **Pressurization**

For stationary gas detectors is the outdoor fairs take place until after the warm-up.
The pressure must be carried out only after the warm-up!

Test report

Technical data QUINTOS QOS

Customer		Project	

QUINTOS Data

Enclosure size (LxWxH) [mm]			
Type		Serialnumber	
Ex-Zone		Order No.	
Ambient temperature	-20°C...+40°C	Temperature class	T3

QUINGUARD Data

QUINGUARD		Valvemodul	
Interfacemo.		Valve	
Gas Detector		Power supply	

Electrical Data

Nominal voltage [V]		Power consumption[A]	
Power dissapation [W]		Power contactor [kW]	

Pneumatic Data

Enclosure volumne		Leakage medium	
Pressure reduced to		Leakage [l/h]	
certified max. pressure			

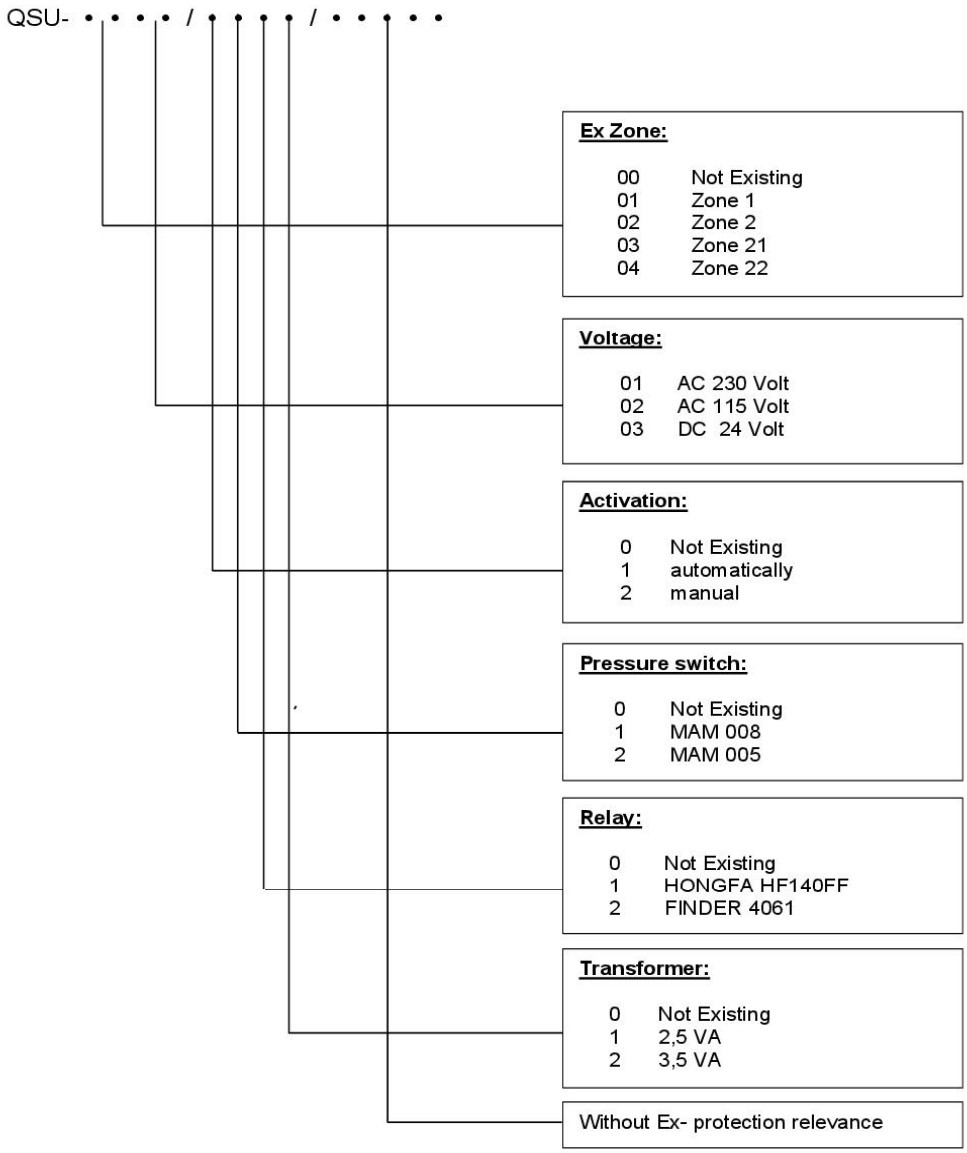
Internals

Capacitor discharge times		Battery	

Important notes	
Warning notes attached	Warning - Pressure Encapsulated Enclosure - Do not open when an explosive atmosphere is present

Marking			
No deficiencies	☐	Deficiencies	☐
Date		Examiner	

Type code


QSU- • • • • / • • • • / • • • • • •
Ex Zone:
00 Not Existing
01 Zone 1
02 Zone 2
03 Zone 21
04 Zone 22
Voltage:
01 AC 230 Volt
02 AC 115 Volt
03 DC 24 Volt
Activation:
0 Not Existing
1 automatically
2 manual
Pressure switch:
0 Not Existing
1 MAM 008
2 MAM 005
Relay:
0 Not Existing
1 HONGFA HF140FF
2 FINDER 4061
Transformer:
0 Not Existing
1 2,5 VA
2 3,5 VA
Without Ex- protection relevance

Disorder table

Breakdown	Possible causes	Remedy
Gas detector switches not free	• Explosive gas was detected and located in the enclosure	• If possible door open and vent
	• Time relay is still running	• Waiting
The electrical appliances are not switched on.	• Power cable not connected • Gas detector switches not free • QUINGUARD switches not free • No pressure inside the enclosure	• Cable connecting • Vent and wait • No pressure inside • Lekage control
Automatic leak compensation does not take place	• No valve module is used	• Valve moudule connecting
	• Leakage is higher than the lekage rate	• For leaks check doors and cable glands
		• Compressed air connection check
Valve switches very fast	• Lekage to high	• Enclosure sealing broken • For leaks check doors and cable glands
		• Amount of leakage of the valve mechanically increase

CE – Declaration

Erfahrung ist Zukunft
QUINT Ex
GmbH

CE-KONFORMITÄTSERKLÄRUNG
DECLARATION OF CE COMPLIANCE
DÉCLARATION DE CONFORMITÉ

Wir/We/Nous

Quintex GmbH
i-Park Tauberfranken 13
D-97922 Lauda-Königshofen
Germany

erklären in alleiniger Verantwortung, daß das Produkt
do herbey declare on our sole responsibility that the product
déclarons sou notre responsabilité que le product

Gerätetyp/type of equipment/type:	**Druckwächter QUINGUARD®**
Typenbezeichnung/type designation/déscription:	**QSU - ….-…./…..**

auf das sich diese Dokument bezieht, mit den folgenden Richtlinien, Normen oder normativen Dokumenten übereinstimmt:
to which this declaration referes, complies with the following driteives, standards or standard documents:
auquel déclaration se reére est en conformité avec les directives, règles ou dcumets normartifes suivants:

	Richtlinie 94/9/EG
	Directive 94/9/EG
	Directive 94/9/CE

Lauda-Königshofen, 22.10.2014

Gisbert Schmahl, GF-Technik

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