



F 3238: 8-channel input module (Ex)i

safety-related, TÜV certified according to IEC 61508 for applications up to SIL 3

- for the connection of safety-related proximity switches (P+F), proximity switches according to EN 60947-5-6 (NAMUR) and contacts with resistor network
 - for intrinsically safe circuits (Ex)i, with sensor supply, with safe isolation
 - monitoring of the lines for short circuit and line break
- EC-Type Examination certificate: PTB 03 ATEX 2031

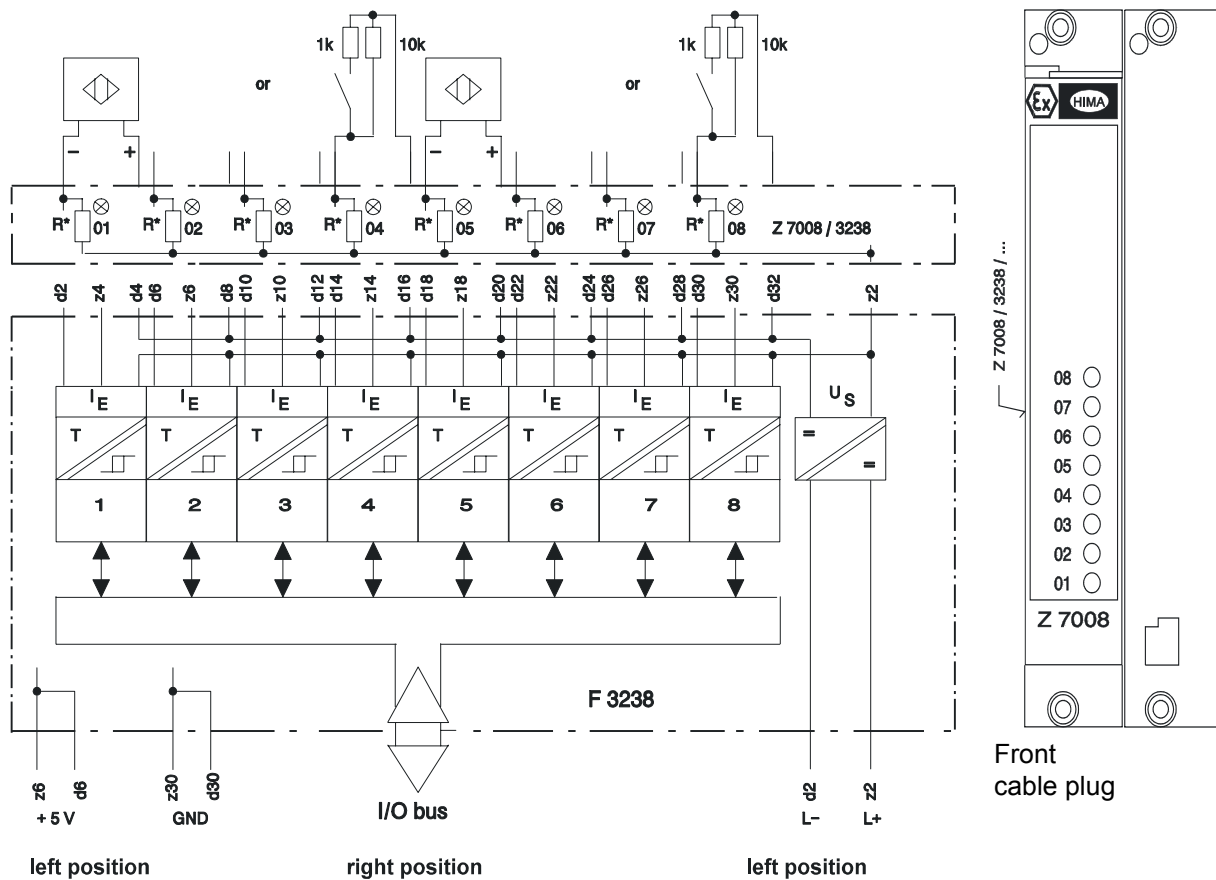


Figure 1: Block diagram and front cable plug

Appertaining function block: HB-RTE-3

Switching time	approx. 10 ms
Switching threshold I _E	0-signal: $0.35 \leq I_E \leq 1.2 \text{ mA}$ 1-signal: $2.1 \leq I_E \leq 6.0 \text{ mA}$
Wire break	$\leq 0.28 \text{ mA}$
Short circuit	$\geq 6.5 \text{ mA}$
Line impedance	$\leq 50 \Omega$ (acc. EN 60947-5-6: 2000)
Line length	$\leq 1000 \text{ m}$ ($\varnothing = 0.5 \text{ mm}^2$)
Supply voltage U _S	approx. 8.2 V
Shunt R*	681 Ω
Space requirement	8 SU
Operating data	5 VDC, 150 mA 24 VDC, 100 mA

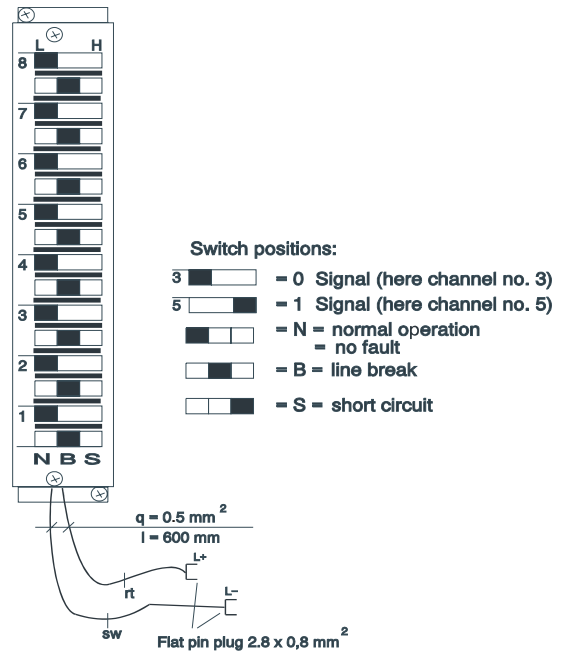
The module is tested completely during operation.
The main test routines are:

- Switch-on and switch-off capability
- Crosstalk on the input circuits by walking-zero
- Functions of the input filters
- Correct function of the module
- Short circuit and wire break of the sensor line

The LEDs are not tested.

Channel	Connection	Color
1	d2 d4 (x4)*	WH BN
2	d6 d8 (x8)*	GN YE
3	d10 d12 (x12)*	GY PK
4	d14 d16 (x16)*	BU RD
5	d18 d20 (x20)*	BK VT
6	d22 d24 (x24)*	WHBN WHGN
7	d26 d28 (x28)*	WHYE WHGY
8	d30 d32 (x32)*	WHPK WHBU

Cable
LiYY
16 x 0.5 mm²



Lead marking cable plug
Z 7008 / 3238 / C.. gray or
Z 7008 / 3238 / ExC.. blue

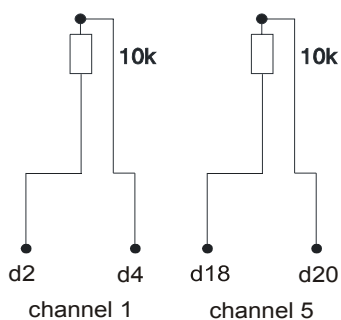
Assembly cable plug Z 7204

Figure 2: Connection wiring

* The connections (X4) to (X32) are only used at special cable connectors.

Termination of not used inputs

Note Not used inputs, which are connected in the HIMA function block HB-RTE-3, must be terminated with a 10 kΩ resistor at the input of the module. Thereby line error messages of the not used input channels are eliminated (see following scheme).



Example:
Channel 1 and channel 5 are not used.

Termination of channel 1 (connections d2-d4) and channel 5 (connections d18-d20) each with 10 kΩ.

Figure 3: Resistor circuit for the inputs

1 Operating Instructions

1.1 Application

The module is used to evaluate proximity switches (according to NAMUR) or contacts with resistor network, in intrinsically safe circuits (Ex)i.

The proximity switches or contacts can be installed in hazardous areas from Zone 0 on, if certified.



The input channels must **not** be exposed to external voltage.

Modules, which were operated in general electrical systems, must **not** be used in (Ex)i-applications thereafter.

In addition, only the applications described in this data sheet are admissible.

1.2 Electrical specifications concerning intrinsic safety

For these specifications please refer to the EC-Type-Examination certificate enclosed.

1.3 Assembly

The module must not be mounted in hazardous areas.

The module is mounted in a 19" subrack. It must be plugged in vertically. The design of the subrack must allow heat dissipation.

The module is connected to the intrinsically safe field circuits via the cable plug Z 7008.

1.4 System start-up

Prior to the first system start-up, an Ex-expert has to check the correct installation of the system, especially the supply voltage connections and the connections for the intrinsically safe circuits.

1.5 Notes on project engineering

Appertaining software function block: HB-RTE-3 (for latest version refer to the description of the operating system).

Module in Surface Mounted Device (SMD) technology (AS03) usable with BS41q/51q V7.0-7 or newer.

Note for use in (Ex)i circuits: No restrictions about type of module adjacent to F 3238.

Redundant connection for a safety-related proximity switch

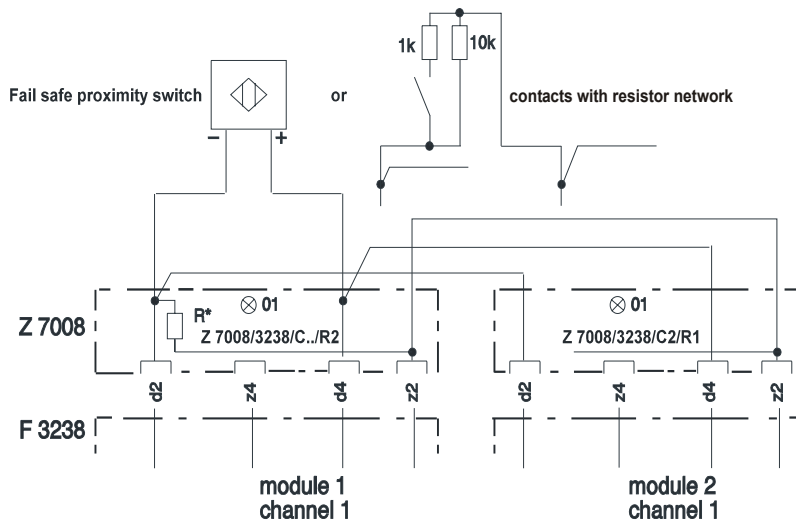
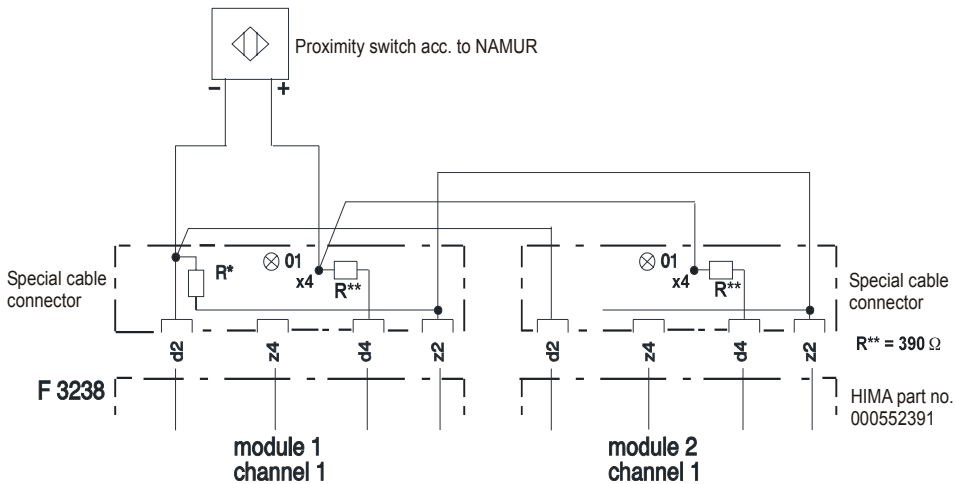


Figure 4: Redundant connection for a safety-related proximity switch

Cable plug: Z7008 / 3238 / Ex / C.. / R
 HIMA order no.: 93 3238 300

**Connection for proximity switches NAMUR
 (according to EN 60947-5-6: 2000)**



R** is also necessary in mono applications!

**Figure 5: Redundant connection for a proximity switch NAMUR
 (according to EN 60947-5-6: 2000)**

Special cable plug: Z7008 / 3238 / Ex / C../ S101 (mono connection)
 HIMA order no.: 93 3238 101

At redundant connection of proximity switches NAMUR (according to EN 60947-5-6) the following redundant special cable plug must be used:
 Z7008 / 3238 / Ex / W / R1 / S301 with resistors R1..R8=390 Ω for NAMUR proximity switches
 Z7008 / 3238 / Ex / Cx / R2 / S301
 HIMA order no.: 93 3238 301

Between the plug R2 and R1 (see Figure 4) the connections are configured as single cores.

Note If using the special cable plug for Namur proximity switches in the safety loop (module - proximity switch) the SIL level may be reduced to that of the proximity switch.

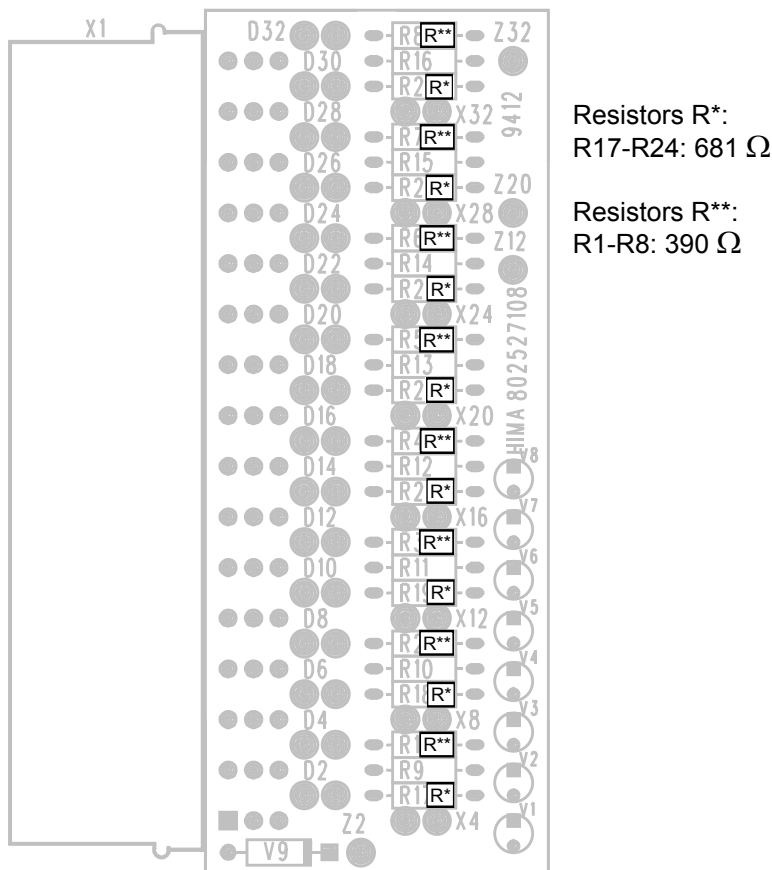


Figure 6: Cable connector Z 7008 (special design for NAMUR)

1.6 Installation

- The electronic module including its connections has to be installed in a way that at least the system of protection IP 20 according to EN 60529: 1991 + A1: 2000 is achieved.
- If two intrinsically safe input circuits of two F 3238 modules are wired in parallel, a special cable provided by HIMA, must be used.
- The separation between intrinsically safe and not intrinsically safe terminals must be ≥ 50 mm, especially between adjacent modules.
- The separation between adjacent intrinsically safe terminals must be ≥ 6 mm.
- Intrinsically safe and not intrinsically safe lines must be installed separately, or the intrinsically safe lines must be provided with additional insulation.
- Intrinsically safe lines must be identifiable, e.g. by a light blue color (RAL 5015) of the insulation.
- The wiring has to be secured mechanically in a way which ensures that in the event of an accidental disconnection, the distance (EN 50 020/ Part 7, Table 4) between the intrinsically safe and not intrinsically safe connections does not fall below the required minimum (e.g. by bundling).

The cables/ wires used must comply with the following dielectric withstand test:

- Intrinsically safe lines ≥ 1000 VAC
- Not intrinsically safe lines ≥ 1500 VAC

For stranded wires, suitable measures must be applied to prevent spreading at the end of wire. The terminals must be suitable for clamping the wire cross section.

The applicable regulations and standards have to be complied with, especially:

- EN 50014: 1997 + Corrigendum: 1998 + A1: 1999 + A2: 1999
(VDE 0170/0171, Part 1: 2000, DIN EN 50014: 2000-02)
- EN 50020: 1994
(VDE 0170/0171, Part 7: 1996, DIN EN 50020: 1996-04)
- EN 50039: 1980
(VDE 0170/0171, Part 10: 1982, DIN EN 50039: 1982-04)
- EN 60079-14: 1997
(VDE 0165 Part 1, DIN EN 60079-14: 1998-08)
- EN 60947-5-6: 2000
(VDE 0660 Part 212, DIN EN 60947-5-6: 2000-12)

Note	For further information on assembly and installation see the HIMA catalog "The H41q and H51q System Families".
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1.7 Maintenance

In case of a failure, the defective module must be replaced with the same, or with another approved type.



Any repair work must only be carried out by the manufacturer.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin



(1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

PTB 03 ATEX 2031

(4) Equipment: Electronic assembly, type F 3238

(5) Manufacturer: HIMA Paul Hildebrandt GmbH + Co KG

(6) Address: 68782 Brühl bei Mannheim, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 03-22333.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2

EN 50020:1994

EN 50039:1982

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II (1) G D [EEx ia] IIC

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, June 30, 2003

Dr.-Ing. U. Johannmeyer
Regierungsdirektor



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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.

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(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2031

(15) Description of equipment

The electronic assembly, type F 3238 is used for the transmission of signals from up to 8 intrinsically safe input circuits to non-intrinsically safe output circuits. It includes a plug connector with built-in limiting facilities and it is intended for installation in combination with a rack-bound system. For redundant signal detection a combination of two interconnected plug connectors is used with a limitation of the output parameters as such, that two apparatus may be operated in parallel without change of the electrical data given below.

The maximum permissible range of the ambient temperature is $-20\text{ }^{\circ}\text{C}$ up to $+60\text{ }^{\circ}\text{C}$.

Electrical data

Supply circuit 1

$U_n \leq 30\text{ V DC}$, approx. 2.5 W
Maximum voltage $U_m = 40\text{ V}$

Supply circuit 2
and output circuits

$U_n \leq 6\text{ V DC}$, approx. 1 W
Maximum voltage $U_m = 7\text{ V}$

Control circuits

type of protection EEx ia IIB/IIC,
for connection to passive intrinsically safe circuits

Maximum values per circuit:

$U_o = 10\text{ V}$
 $I_o = 15\text{ mA}$
 $P_o = 38\text{ mW}$

linear characteristic

for the maximum permissible values of the external inductance L_o and capacitance C_o reference is made to the table below:

	IIB	IIC
C_o [μF]	4.0	0.76
L_o [mH]	5.0	5.0

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SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2031

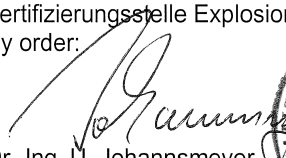
The following values apply if capacitances or inductances or lines occur exclusively in the circuit:

	IIB	IIC
C_o [μ F]	20.2	3.0
L_o [mH]	560	155

The control circuits are interconnected through a common reference conductor and they are safely electrically isolated from all non-intrinsically safe circuits up to a peak value of the voltage of 375 V. The control circuits are safely electrically isolated from ground.

- (16) Test report PTB Ex 03-22333
- (17) Special conditions for safe use
not required
- (18) Essential health and safety requirements
met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:


Dr.-Ing. U. Johannmeyer
Regierungsdirektor



Braunschweig, June 30, 2003

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