F 3335

F 3335: 4-channel output module (Ex)i

safety-related, usable up to SIL 3 according to IEC 61508

- for the control of intrinsically safe valves and for the supply of intrinsically safe transmitters
- Four voltage outputs 24 V with current limiting

EC Type Examination certificate (ATEX): EX5 02 05 19183 037

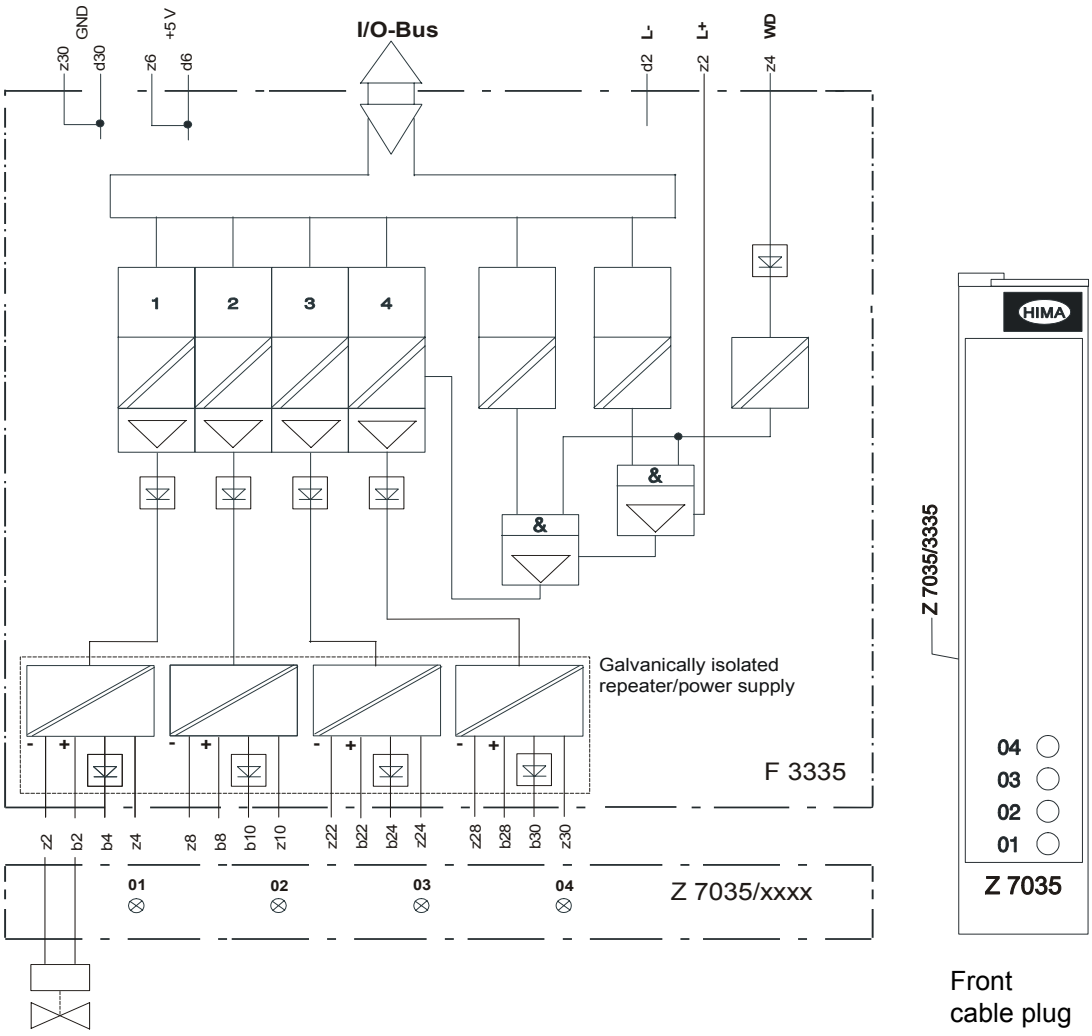


Figure 1: Block diagram and front cable plug

Nominal output voltage	19 V at 20 mA load current
No-load voltage	24 V
Short-circuit current	52 mA (short-circuit proof)
Vertex	24 V / 12 mA
Switching time	approx. 15 ms
Reset time	35 to 270 ms (depending on load)
Ex category	II (2) GD [EEx ib] IIC
Space requirements	4 SU
Operating data	24 V / 270 to 500 mA (depending on load) 5 V / 60 mA

The module must only be operated with forced ventilation (fan).
The fan (K 9203) must be installed above the subrack where the F 3335 module is plugged in.
If the F 3335 module is operated in an H 41q, the fan (K 9212) must be installed directly under the F 3335 module.

Output characteristic of the F 3335 module

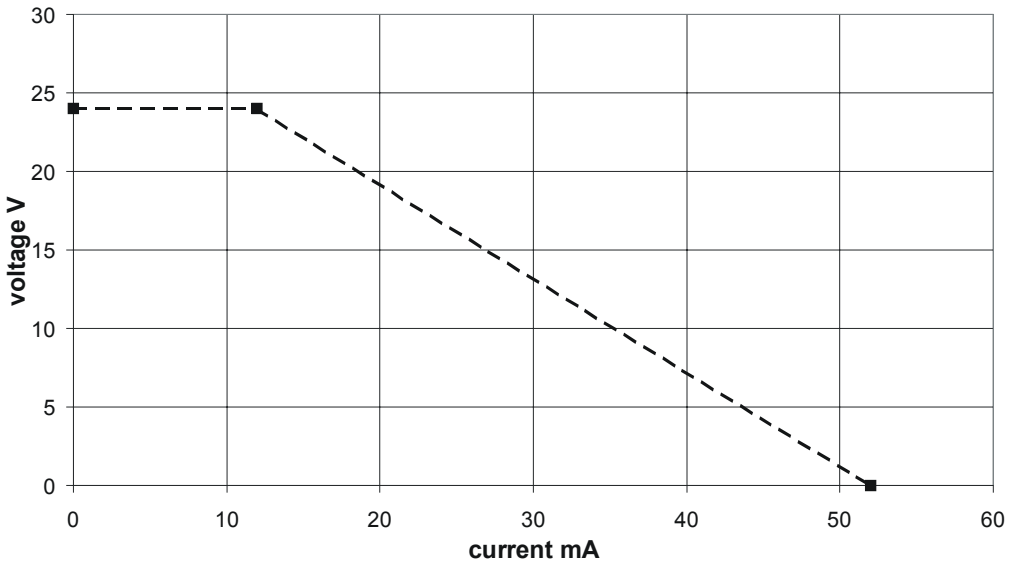
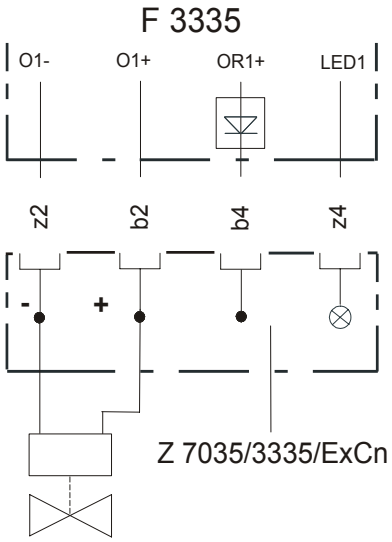


Figure 2: Output characteristic of the F 3335 module

The electrical characteristics of the solenoid valves must be always below the output characteristic of the F 3335 module.

Single channel operation (valve control)
for channels 1 to 4
Cable type: Z 7035/3335/ExCn, part number 93 3335100



Module 1, channel 1

Figure 3: Single channel operation (valve control)

Pin allocation for single channel operation

Channel	Pin	Color
O1- O1+	z2 b2	WH BN
O2- O2+	z8 b8	GN YE
O3- O3+	z22 b22	GY PK
O4- O4+	z28 b28	BU RD

Cable
LiYY
8 x 0.5 mm^2
blue

Figure 4: Pin allocation for single channel operation

Redundant operation (valve control)
for channels 1 to 4
Cable type: Z 7035/3335/ExCn, part number 93 3335101

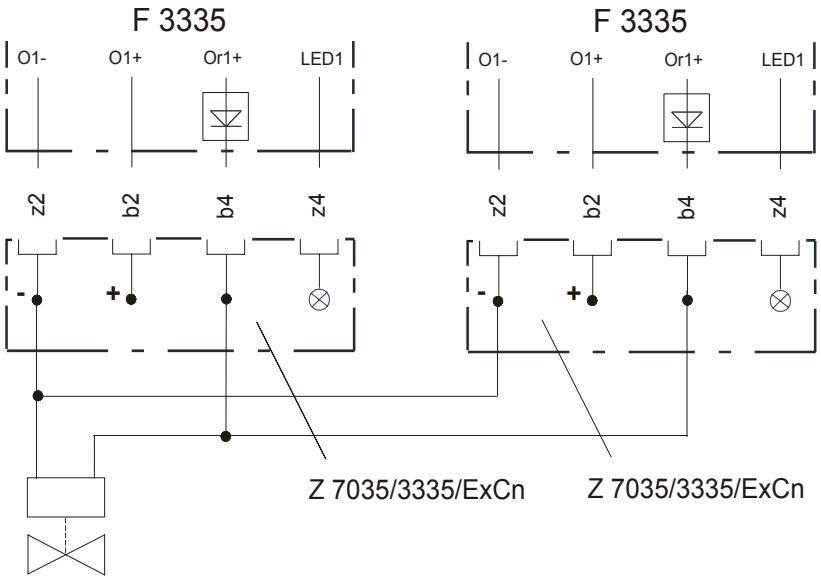


Figure 5: Redundant operation (valve control)

Pin allocation for redundant operation

Channel	Pin	Color
O1- OR1+	z2 b4	WH BN
O2- OR2+	z8 b10	GN YE
O3- OR3+	z22 b24	GY PK
O4- OR4+	z28 b30	BU RD

Cable
LiYY
8 x 0.5 mm^2
blue

Figure 6: Pin allocation for redundant operation

1 List of suitable (Ex)i solenoid valves

This list is not intended to be complete. All data listed are without guarantee. The manufacturers' data sheets are authoritative.

1.1 Safety-related (Ex)i solenoid valves (up to SIL 4 according to IEC 61508)

Manufacturer	Type	Minimum pick-up values	
		U_{an}	I_{an}
Eugen Seitz (Pilot valves)	11 G 52 121.11.01 121.11.02 121.11.03 121.113.23 PV 12F73 Ci oH 133.288.00 PV 12F73 Xi oH 127.991.00 PV 12F73 Xi oH-2 128.319.00	 13 V 15 V 14 V 14 V 14 V 6.4 V 7 V	 16 mA 12 mA 16 mA 16 mA 2.2 mA 1.5 mA 4.4 mA
Norgren Herion (directly controlled valves)	2001, 2002	22 V 5 V [1)]	 40 mA [1)]

[1)] Hold values

1.2 (Ex)i solenoid valves

Manufacturer	Type	Minimum pick-up values	
		U_{an}	I_{an}
ASCO Joucomatic (directly controlled valves)	IMXX (ISSC, WPIS)	 21.6 V 11 V [1)]	 28 mA [1)]
Bürkert (Pilot valves)	0590 5470 6516/6517 6518/6519 8640 6106	10.4 V 10.8 V	29 mA 30 mA
Norgren Herion (Pilot valves)	2032 2033 2034 2035 2036 2037 2038	8.2 V 9.0 V 10.0 V 11.5 V 13.0 V 14.4 V 15.9 V	34 mA 30 mA 27 mA 25 mA 23 mA 21 mA 19 mA

Manufacturer	Type	Minimum pick-up values	
		U_{an}	I_{an}
Norgren Herion (Pilot valves)	LPV (E/P-converter) 2080, 2082 2081, 2083 2084	 5 V 10 V 4 V	 1 mA 2.7 mA 1.6 mA
Parker Lucifer (Pilot valves)	482160 482870	10.7 V	29 mA
Parker Lucifer (Directly controlled valves)	492965	13 V 10 V[1)]	20 mA[1)]
Samson (Pilot valves)	E/P-binary converter 3701, 3962, 3963, 3964, 3776, 3766 und 3767	9.4 V 18 V	1.43 mA
Telektron (Pilot valve)	V525011L00	12 V	8 mA

[1)] Hold values

2 Operating Instructions for F 3335

2.1 Application

The module can be used to control Ex valves and Ex measuring transmitters (0/4 to 20 mA). These valves or transmitters can be installed in potentially explosive atmospheres from Zone 1 on.

No external voltage may be applied at the outputs.
Only these applications are permissible, which are described in the data sheet for F 3335.

2.2 Electrical specifications concerning intrinsic safety

For these specifications please refer to the EC prototype test certificate enclosed.

2.3 Assembly and installation

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

Further information for assembly and installation see HIMA main catalog "The H41q and H51q System Families".

Note The module may not be mounted within a potentially explosive atmosphere!

The module is connected to the intrinsically safe field circuits via the cable plug Z 7035.

In addition, the following points should be considered:

- The electronic module including its connections has to be installed in a way that at least the degree of protection IP 20 according to EN 60529: 1991 + A1: 2000 is achieved.
- Two output circuits of one or two modules of the F 3335 type can be wired in parallel. The reduced maximum values have to be complied with (see EC prototype test certificate).
- 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 the light blue color (RAL 5015) of the insulation.
- Modules, which were operated in general electrical system, may not be used thereafter no more in Ex-plants.

The lines used must comply with the following insulation test voltages:

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

Stranded wires must be provided with wire end ferrules. The terminals must be suitable for clamping the wire cross section.

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

- DIN EN 60079-14 (VDE 0165, Part 1)
- EN 50 014 (VDE 0170/0171, Part 1)
- EN 50 020 (VDE 0170/0171, Part 7)

2.4 System start-up

Before the first system start-up, an Ex-expert has to check whether the system has been correctly installed, especially the supply voltage connections and the connections of the intrinsically safe circuits.

2.5 Maintenance

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

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

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

EC Type Examination Certificate

No.: EX5 02 05 19183 037

TÜV PRODUCT SERVICE

in accordance with Annex III of Council Directive No. 94/9/EC for equipment and protective systems intended for use in potentially explosive atmospheres (ATEX) for

HIMA Paul Hildebrandt GmbH + Co KG
Albert-Bassermann-Straße 28

68782 Brühl

Product:	**Electrical apparatus type of protection intrinsically safety i (EX-RL)**
Model:	**Automation device, safety-related** **F 3335**
Parameters:	see appendix (four pages)

The above mentioned product meets the provisions of the Directive.

This certificate is issued on the basis of the product provided for testing and certification and on its technical documentation. The detailed results of the test and the provided technical documentation are listed in

Test report no.: 70013102.3

This certificate pertains only to the sample product submitted to TÜV PRODUCT SERVICE for testing. Therefore this certificate has no specified period of validity.

Released with the above mentioned certificate number by the Certification Body of TÜV PRODUCT SERVICE.

Department: TA-ES/MUC-IQSE / jb
Date: 15.05.2002

TÜV PRODUCT SERVICE GMBH is a Notified Body in accordance with Council Directive 94/9/EC for equipment and protective systems intended for use in potentially explosive atmospheres with the identification number 0123.

TÜV PRODUCT SERVICE GMBH · Zertifizierstelle · Ridlerstrasse 65 · D-80339 München

Appendix to EC Type Examination Certificate

No.: EX5 02 05 19183 037

TÜV PRODUCT SERVICE

1 Description

The module F 3335 is a associated electrical apparatus for installation only outside an atmosphere capable of explosion. This subassembly unit for installation in a subrack consist of one PCB-board. In order to supply (Ex-) transmitters or to switch (Ex-) valves four intrinsically safe Voltage output ports are connectable at the front. The output- and Voltage output ports and the ports for controlling the EA-control bus are connectable at the rear of the module.

The environmental temperature averages $-20°C \leq T_{amb} \leq 60°C$.

From the manual of instruction you will see the general information for secure use.

2 Electrical data

2.1 Intrinsically output circuits, strip X1

Four voltages of 25V for the supply of the (Ex-) transmitters or switching the (Ex-) valves are provided. These are intrinsically safe and safety isolated up to a peak value of 375V against the Voltage output circuit.

Appendix to EC Type Examination Certificate

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TÜV PRODUCT SERVICE

Port	Output	Function
z2	O1-	Voltage output 1 -
b2	O1+	Voltage output 1 +
z4	LED1	Visual display voltage output 1
b4	OR1+	Redundant voltage output 1+
z8	O2-	Voltage output 2 -
b8	O2+	Voltage output 2 +
z10	LED2	Visual display voltage output 2
b10	OR2+	Redundant voltage output 2+
z22	O3-	Voltage output 3 -
b22	O3+	Voltage output 3 +
z24	LED3	Visual display voltage output 3
b24	OR3+	Redundant voltage output 3+
z28	O4-	Voltage output 4 -
b28	O+	Voltage output 4 +
z30	LED4	Visual display voltage output 4
b30	OR4+	Redundant voltage output 4+

2.2 Output circuits

Voltage per output circuit, U_O	crest value DC 25,0 V
Amperage per output circuit, I_O	crest value DC 70,0 mA
Power per output circuit, P_O	crest value 581 mW
Characteristic curve	trapeze
internal capacitor per output circuit, C_i	negligible
internal inductance per output circuit, L_i	negligible

2.3 EEx ib IIC

Max. connectable inductance for one output circuit	L_O = 7 mH
Max. connectable capacitance for one output circuit	C_O = 110 nF
Max. connectable inductance for parallel connection of two output circuits	L_O = 1,6 mH
Max. connectable capacitance for parallel connection of two output circuits	C_O = 110 nF

2.4 EEx ib IIB

Max. connectable inductance for one output circuit	L_O = 25 mH
Max. connectable capacitance per output circuit	C_O = 840 nF
Max. connectable inductance for parallel connection of two output circuits	L_O = 7 mH
Max. connectable capacitance for parallel connection of two output circuits	C_O = 840 nF

Appendix to EC Type Examination Certificate
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2.5 Power supply circuits, strip X2, (non-intrinsically safe)

Power supply circuit 1	Port z2 and d2
Nominal voltage UB1	24 V DC
Voltage $UB1_{max}$	crest value DC 30 V
Power	about 12 W
Power supply circuit 2	Port z2/d6 and z30/d30
Nominal voltage UB2	5V DC
Voltage $UB2_{max}$	crest value DC 6 V
Power	about 1 W

Absolute maximum voltage without affecting the intrinsic safety U_m crest value 40V

3 Identifying marking

The legible and durable marking must include the following option list:

- Name and address of the manufacturer
- Year of construction
- the identifier Ⓔx II (2)GD [EEx ib] IIC

3.1 Production quality assurance

The manufacturer shall operate an approved quality system for production, final equipment inspection and testing according Annex IV directive 94/9/EC.

Munich, May 15th 2002

TÜV AUTOMOTIVE GmbH TA-ES/MUC

Dipl.-Ing. J. Blum