

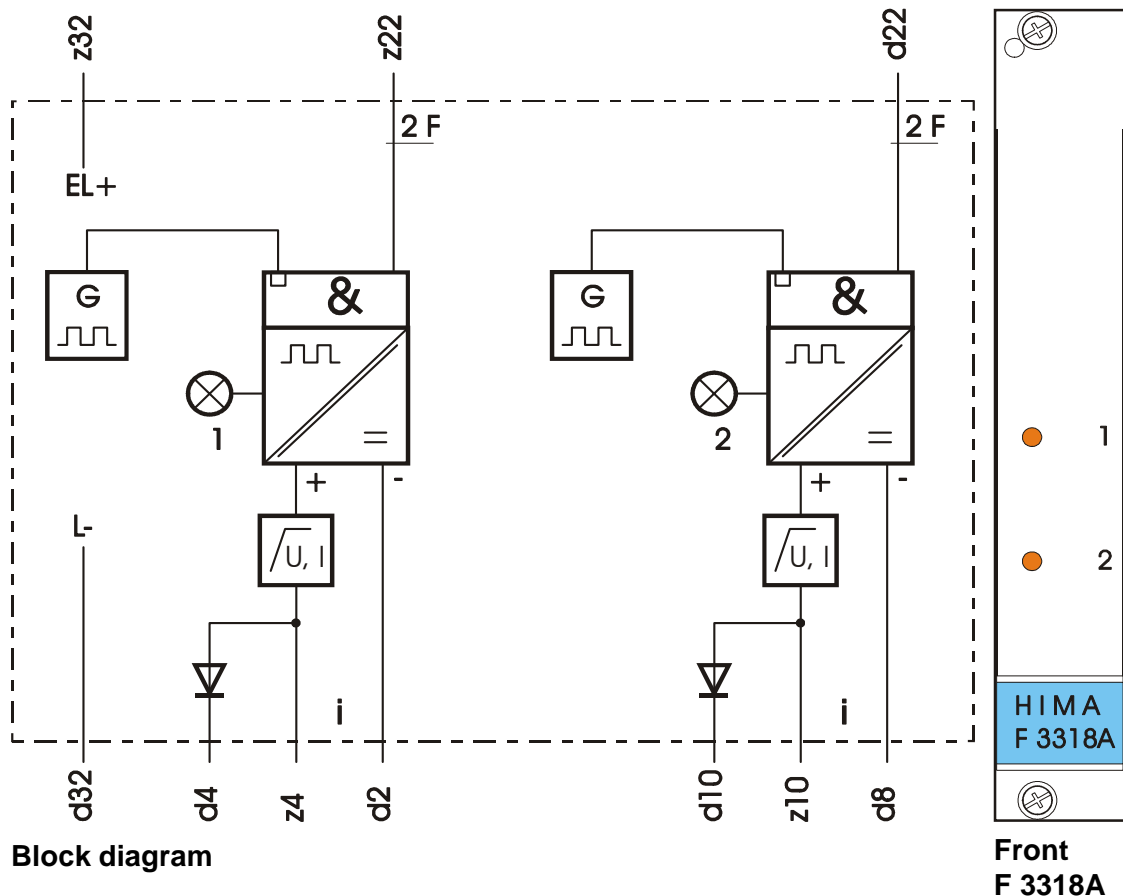
Electronic System **Planar-System F**

Data Sheet/Operating Instructions
for Module
F 3318A



**F 3318A****F 3318A: 2-channel safety related (Ex)i switching amplifier**

- For exciting intrinsically safe valves
- For applications of functional safety, the module is
 - TÜV certified according to IEC 61508 up to SIL 3,
 - acc. to DIN V 19250 and DIN V 19251 up to AK 6,
 - acc. to IEC 954-1 to categorie 4,
 - acc. to DIN VDE 0116,
 - and acc. to EN 298
- EC Type Examination Certificate: TPS 04 ATEX 1 043
- EC Certificate of Conformity: TPS 04 ATEX 1 044 X
(zone 2 and zone 22)

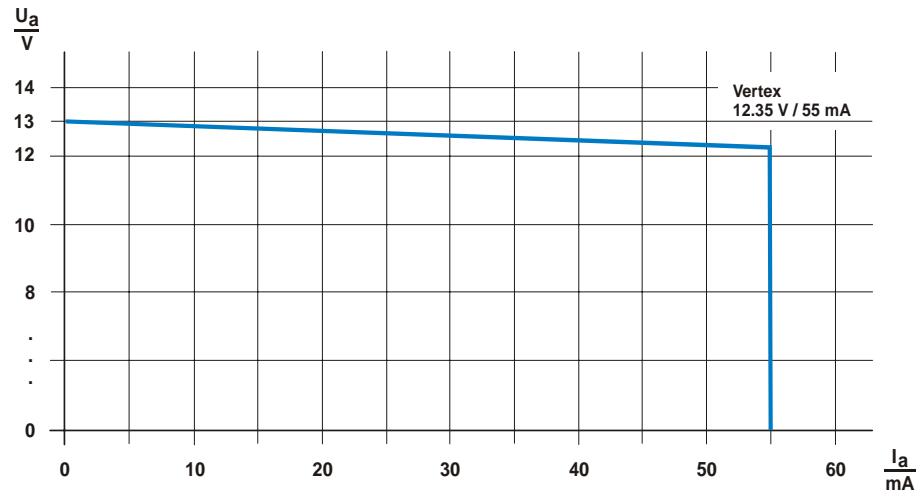


Note: The standard load factor has the designation F (FAN).
 1 F = 2 mA @ 24 V ($R_i = 12 \text{ k}\Omega$) according to DIN 19238.

Technical Data:	
No-load voltage	13 V
Short-circuit current	55 mA (short circuit proof)
Output characteristic	See diagram on page 4.
Switching time	z22 (d22) approx. 4 ms
Reset time (depending on load)	z22 (d22) 5 ... 30 ms
Operating data	24 VDC, -15% / +20%, $w_{ss} < 15\%$ 120 ... 150 mA (depending on load)
Power dissipation	3 ... 2 W (depending on load)
Ambient temperature	-25 ... +70 °C
Ex category	II (2) G D [EEx ib] IIC
Zone 2 / Zone 22	II 3 GD EEx nA II T4
System of protection	IP 20
Space required	4 TE x 3 HE

The safe isolation from the intrinsically safe output circuit to the supply and input circuit is guaranteed for a nominal voltage of up to 375 V peak.

Output characteristic of the F 3318A module



Typical characteristics

The electrical characteristics of valves must be below the output characteristic of the F 3318A module.

Note: The maximum admissible cable length between the output of the amplifier and the actuator must not be exceeded. The cable length is determined by the inductance, capacity and resistance of the cable and actuator used. The lowest of these three calculated values limits the cable length. Detailed information on permissible external inductances and capacities is shown in the schedule of the EC Type Examination Certificate.

Driving the switching amplifier generates electrically isolated voltages of approx. 13 VDC at the outputs. These voltages can be used to excite intrinsically safe valves.

To increase the availability, the use of decoupled outputs connected in parallel is also possible in the protection class [EEx]i. In this case separate modules should be used to achieve continuous operation when replacing one module.


For (Ex)i applications a special female connector (with coding pin on d6) is required: Part no. 99.0000120.

Operating Instructions

Application

The module can be used to control (Ex)i valves. These Valves can be installed in hazardous areas from Zone 1 on.

Caution: Devices, which are installed in the zone 0, must **not** be driven by the F 3318A.

 The F 3318A output channels **must** not be exposed to external voltage. Modules, which were operated in general electrical systems, must **not** be used in Ex-plants **thereafter**.

In addition, **only** the applications described below are admissible.

Electrical specifications concerning intrinsic safety

For these specifications please refer to the schedule of the EC Type Examination Certificate enclosed.

The maximum voltage U_m is 40 V.

Assembly

The module is mounted in a 19" subrack. It must be plugged in vertically. A distance between modules is not required. The design of the subrack must allow heat dissipation.

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.

Note: For further information on assembly and installation, see page 8 to 9 and the HIMA catalogue "Planar-Sytem F".

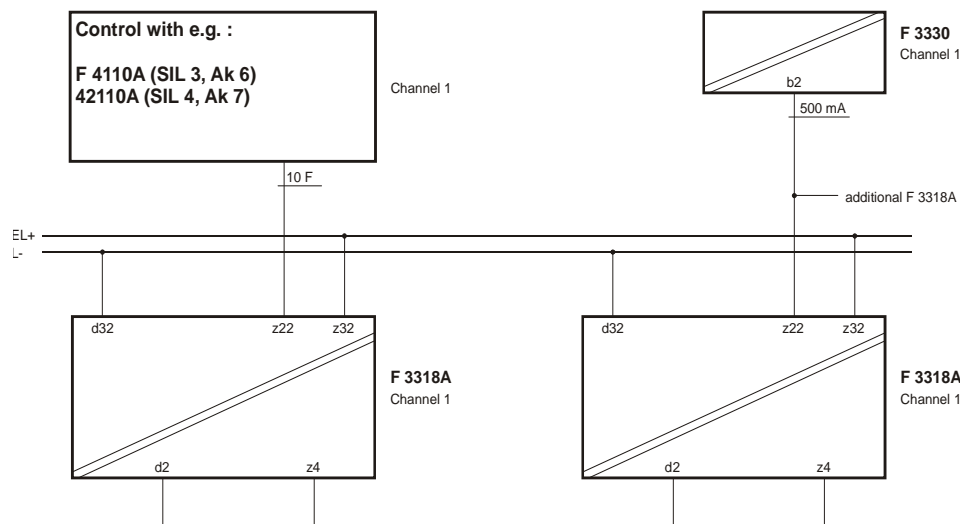
Application examples

Safety-related application up to SIL 3 (AK 6)

The input z22 (d22) of the F 3318A is driven by

- a signal output of a safety related module (e.g. F 42 110), capable of driving a load of ≤ 10 F, or by
- a power output of a testable module (e.g. F 3330).

A testable module (e.g. F 3330) can drive up to twelve channels of the F 3318A. The pins z32 and d32 are connected to the operating voltage.



Note: The proof test intervall is determined to 20 years!

List of usable (Ex)i single solenoid valves

Note: This list does not claim to be complete. All data listed are without guarantee. The manufacturers' data sheets are authoritative.

Caution: In case of parallel connection of two outputs, the following valves must not be driven:



Bürkert:
0590, 5470, 6516, 6517, 6518, 6519, 8640 und 6106

Parker Lucifer
VZ23 (482870.01)

Manufacturer	Type ¹⁾	Minimum operating voltage U_{an}	I_{an}
(Ex)i solenoid valves			
Bürkert	0590 5470 6516/6517 6518/6519 8640	10,4 V	29 mA
	6106	10,8 V	30 mA
Norgren Herion	2030	6,4 V	43 mA
	2031	7,3 V	38 mA
	2032	8,2 V	34 mA
	2033	9,0 V	30 mA
	2034	10,0 V	27 mA
	2035	11,5 V	25 mA
Parker Lucifer	VZ95 (482160.01) VZ23 (482870.01)	10,7	29 mA
Samson	E/P-binary converter 3701, 3962, 3963	9,6 V	1,52 mA
Telektron	V525011L00	12 V	8 mA

1) Occasionally not the valve types themselves, but only the numbers of the solenoid coils are indicated.

Installation

- The module must be installed outside of explosion hazardous areas.
- Considering the special conditions X, the F 3318A may be installed in zone 2 or zone 22.
The special conditions X are to be taken from the schedule of the EC Certificate of Conformity.
- Good knowledge of the relevant standards for the installation in zone 2 and zone 22 is necessary.
- 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.
- The output channels of two F 3318A can be wired in parallel. The reduced maximum values have to be complied with (see the schedule of the EC Type Examination Certificate).
- The separation between intrinsically safe and not intrinsically safe terminals must be ≥ 50 mm.
- 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 colour (RAL 5015) of the insulation.
- Intrinsically safe lines must be marked, 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 lines used must comply with the following insulation test voltages:

- Intrinsically safe lines ≥ 1000 VAC
- Not intrinsically safe lines ≥ 1500 VAC
- For stranded wires, the line ends 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

- EN 50014: 1997 + Corrigendum: 1998 + A1: 1999 + A2: 1999
(VDE 0170/0171, Part 1: 2000, DIN EN 50014: 2000-02)
- EN 50020: 2002
(VDE 0170/0171, Part 7: DIN EN 50020: 2003-08)
- EN 50039: 1980
(VDE 0170/0171, Part 10: 1982, DIN EN 50039: 1982-04)
- EN 50281-1-1: 1998 + EN 50281-1-1/A1: 2002
(VDE 0170/0171 Part 15-1-1, DIN EN 50281-1-1: 1999-10
+VDE 0170/0171 Part 15-1-1/A1, DIN EN 50281-1-1/A1: 2002-11)
- EN 50021: 1999
(VDE 0170/0171 Part 16, DIN EN 50021: 2000-02)
- EN 60079-14: 1997
(VDE 0165 Part 1, DIN EN 60079-14: 1998-08)
- EN 50281-1-2: 1998 + EN 50281-1-2/A1: 2002
(VDE 0165 Part 2, DIN EN 50281-1-2: 1999-11
+ A1, DIN EN 50281-1-2/A1: 2002-11)

Maintenance

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

Caution:

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

CERTIFICATE

No. Z10 04 05 19183 045



Holder of Certificate: HIMA Paul Hildebrandt GmbH + Co KG
Albert-Bassermann-Strasse 28

D-68782 Brühl
Deutschland

Factory(ies): 19183

Certification Mark:



Product: Automation device, safety related

Model(s): F3318A

Parameters: **Power supply:** 24VDC
Structure: 1001 (AK1-6, SIL 1-3)

Tested according to:

- IEC 61508-2:2000; SIL 3
- EN 298:1994
- EN 61000-6-4:2001
- IEC 954-1:1996; Kat. 4
- EN 61131-2/A12:2000
- EN 61000-6-2:2001
- DIN V 19250:1994
- DIN V 19251:1995
- VDE 0116:1989

The listed product was tested on a voluntary basis. The certification mark shown above can be affixed on the product. See also notes overleaf.

The report below and the user documentation in the currently valid revision are mandatory part of this certificate. The product complies with the above listed safety requirements only if the specifications documented in the currently valid revision of this report are met.

Test report No.: HB64021T

Date: 2004-05-03

A handwritten signature in black ink, reading 'Peter G. Weiß'.



TÜV PRODUCT SERVICE GMBH • Zertifizierstelle • Ridlerstrasse 65 • D-80339 München
Gruppe TÜV Süddeutschland

(1) EC Type Examination Certificate

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

(3) EC Type Examination Certificate Number:

TPS 04 ATEX 1 043

(4) Equipment: Safety Related Automation Systems; F3318A

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

(6) Address: Albert-Bassermann-Straße 28; 68782 Brühl; Germany

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

(8) TÜV Product Service, TÜV SÜD Group, notified body No. 0123 in accordance with Article 9 of the Council Directive 94/9/EC of March 23rd 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 of the Directive. The examination and test results are recorded in the confidential report HB63721T

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

DIN EN 50014: 2000**DIN EN 50020: 2003**

(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 and the construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

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

II (2) GD [EEx ib] IIC

Office of certification of explosion protection

Munich, 21.04.2004

J. Blum



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EC Type Examination Certificate 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 TÜV Product Service, TÜV SÜD Group. In case of dispute, the German text shall prevail.

The document is internally administrated under the following number: EX5 04 04 19183 043

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Schedule

(13)

(14) **EC Type Examination Certificate TPS 04 ATEX 1 043**(15) Description of equipment:

The equipment is a 2-fold buffer amplifier used as associated electrical apparatus, which is suitable to open loop control certified consumer loads (e.g. magnetic valves). These valves may be installed within explosive area zone 1 resp. 21 or lower. Because only the output current circuits are intrinsically safe, this building groups must be established outside of the explosive area.

Identification to the explosion protection:

Group:	II
Categorie:	(2) GD
Type of protection:	[EEx ib]
Ambient temperature:	-25°C ≤ Ta ≤ +70°C

Technical data:

The output circuit is safety separated up to a peak value of 375V against the control resp. power supply circuit.

a) Power supply circuit (non-intrinsically safe); connector z32 – d32:

- Nominal voltage, $U_B = 24V$ DC;
- Max. voltage, $U_{B,max} \leq 30V$ DC;
- Power, $P \leq 5W$;
- Absolute maximum supply voltage (safety-relatedly) without affecting the intrinsic safety, $U_m \leq 40V$ DC

b) Control circuits connectors (non-intrinsically safe); connector z22 (d22) – d32:

- Max. control voltage, $U_{S,max} \leq 33V$ DC;
- Control amperage, $I_{S,max} \leq 14mA$ DC;
- Absolute maximum control voltage without affecting the intrinsic safety, $U_m \leq 40V$ DC

c) Output circuit; connector z4(z10), d4(d10) – d2(d8)

Single circuit:

$U_o \leq 14,3V$; $I_o \leq 62mA$; $P_o \leq 887mW$;

$C_o \leq 270nF$; $L_o \leq 1,3mH$ for IIC

$C_o \leq 760nF$; $L_o \leq 10mH$ for IIB

Parallel connection of two outputs:

$U_o \leq 14,3V$; $I_o \leq 124mA$; $P_o \leq 774mW$;

$C_o \leq 580nF$; $L_o \leq 0,028mH$ for IIC

$C_o \leq 1200nF$; $L_o \leq 1,9mH$ for IIB

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- (16) Test report: HB63721T
- (17) Special conditions for safe use: non
- (18) Essential health and safety requirements:
met by standards

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(1) EC Certificate of Conformity

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

(3) EC Certificate of Conformity Number:

TPS 04 ATEX 1 044 X



(4) Equipment: Safety Related Automation Systems; F3318A

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

(6) Address: Albert-Bassermann-Straße 28; 68782 Brühl; Germany

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

(8) TÜV Product Service, TÜV SÜD Group, notified body No. 0123 in accordance with Article 9 of the Council Directive 94/9/EC of March 23rd 1994, certifies, based on a voluntary testing, 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 of the Directive.

The examination and test results are recorded in the confidential report HB63731T.

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

DIN EN 50014:2000

DIN EN 50021:2000

DIN EN 50281-1-2:1999

DIN EN 50281-1-2/A1:2001

(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 Certificate of Conformity relates only to the design and the construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

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



II 3 GD EEx nA II T4

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Schedule

(13)

(14) **EC-Certificate of Conformity TPS 04 ATEX 1 044 x**(15) Description of equipment:

The equipment is a 2-fold buffer amplifier used as electrical apparatus, which is suitable to open loop control certified consumer loads (e.g. magnetic valves). The equipment may be established in explosive area of the zone 2 resp. 22 under adherence to the special conditions.

Identification to the explosion protection:

Group:	II
Categorie:	3 GD
Type of protection:	EEx nA II
Temperature class:	T4
Ambient temperature:	$-25^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$

Technical data:

a) Power supply circuit; connector z32 – d32:

- Nominal voltage, $U_B = 24\text{V DC}$;
- Max. voltage, $U_{B,\text{max}} \leq 30\text{V DC}$;
- Power, $P \leq 5\text{W}$;
- Absolute maximum supply voltage, $U_m \leq 40\text{V DC}$

b) Control circuits connectors; connector z22 (d22) – d32:

- Max. control voltage, $U_{S,\text{max}} \leq 33\text{V DC}$;
- Control amperage, $I_{S,\text{max}} \leq 14\text{mA DC}$;
- Absolute maximum control voltage, $U_m \leq 40\text{V DC}$

c) Output circuit; connector z4(z10), d4(d10) – d2(d8)

Single circuit:

$U \leq 14,3\text{V}$; $I \leq 62\text{mA}$; $P \leq 887\text{mW}$

Parallel connection of two outputs:

$U \leq 14,3\text{V}$; $I \leq 124\text{mA}$; $P \leq 1774\text{mW}$

(16) Test report: HB63731T

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(17) Special conditions for safe use:

a) Type of protection

The module F3318A has to be assembled in a cabinet, which corresponds at least to protection category IP54 after EN 60529. In the case of conductible dust, the protection category IP6X is essential.

b) Adhesive label

This cabinet has to be provided with the adhesive label

„Service only in zero potential state“

Exception:

There exists no explosive atmosphere resp. explosive dust.

c) Power dissipation

The applied cabinet must discharge the arising power dissipation assuredly.

d) Standards

Furthermore, the following norms must be considered:

EN 50281-1-1:1998 + EN 50281-1-1/A1:2002

(VDE 0170/0171 Teil 15-1-1, DIN EN 50281-1-1:1999-10

+ VDE 0170/0171 Teil 15-1-1/A1, DIN EN 50281-1-1/A1:2002-11)

EN 50021:1999

(VDE 0170/0171 Teil 16, DIN EN 50021:2000-02)

EN 60079-14:1997

(VDE 0165 Teil 1, DIN EN 60079-14:1998-08)

EN 50281-1-2:1998 + EN 50281-1-2/A1:2002

(VDE 0165 Teil 2, DIN EN 50281-1-2:1999-11

+ A1, DIN EN 50281-1-2/A1:2002-11)

(18) Essential health and safety requirements:

met by standards

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HIMA Paul Hildebrandt GmbH + Co KG
Industrie-Automatisierung
Postfach 1261 68777 Brühl
Telefon: (06202) 709-0 Telefax (06202) 709-107
e-mail info@hima.com Internet www.hima.com