INSTALLATION INSTRUCTION IM 317 E

Device: Thermal Gas flow meter Ecoflow 3
with measuring armature E3555 and flow sensor E3510
for measurement of pressured air, nitrogen, oxygen, carbon dioxide, DN 15 – DN 50

Content: Installation and operation manual

Rev.-no: IM 317 E V0.1-2014-03-18

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Measuring armature
E3555

Sensor E3510

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

User information

- Prior to installing the equipment or before attempting initial start-up, please read this manual thoroughly.
- Please ensure to observe all information and warnings provided in this manual.
- The serial number of the equipment can be found on the identification plate. You will need this information when ordering spare parts. The plate is attached to the outside of the device.
- Installation, start-up and maintenance may only be performed by an electrician. The local guidelines of the place of installation have to be observed.
- Maintenance may only be performed under dead-voltage conditions for personal security reasons.
- In order of guarantee operational safety, only the manufacturer's original spare parts shall be installed.
- Operating the equipment for purposes other than its intended use shall void all warranty claims and product liability. Noncompliance with the intended use refers to but is not limited to improper installation, start-up, operation, maintenance and neglecting the information provided in this manual.
- The device must be integrated into the lightening protection concept of the plant.

Please ensure to operate this device only in accordance with this manual. Departure from these instructions will void and nullify all warranty claims and jeopardizes the operating safety of the device.

We reserve the right to engineering changes, which may necessitate deviations from the current data provided in this manual. Should you require additional information or questions arise that are not sufficiently covered in this manual, please contact us at the following address:

Imprint

Esters Elektronik GmbH
Görresstr. 17
D-63793 Aschaffenburg
Tel.: +49 (0) 6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
eMail: esters@esters.de
Internet: www.esters.de

Copyright

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Table of content

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

1 Introduction

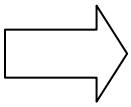
1.1 Operating instructions, general information

These operating instructions are intended for the use of the device and meant to provide support during the installation, operation, and maintenance.

The structure of the document shall make this easy. Important text is highlighted.

Symbols

The following symbols are used in these operating instructions in order to highlight text that requires special attention.



Notes
This arrow points to features that require your special attention.

Caution
This symbol points to important text.
Noncompliance or disregard may cause damage to components or destruction to parts of the system.

Warning!
This symbol points to important text. Noncompliance will place the life and health of persons at risk.

Reference
This symbol refers to additional information available in other manuals, chapters, or sections.

1.2 Goods receipt inspection, transportation, storage

- Ensure the packaging is not damaged!
- Any damaged packaging must be reported to the supplier.
- Retain any damaged packaging until the matter has been resolved.
- Ensure the package's content is not damaged!
- Any damaged part received must be reported to the supplier.
- Retain any damaged goods until the matter has been resolved.
- Use the delivery documents to check the received goods and compare the goods with your order to ensure completeness. For storage and transport purposes, the equipment must be packed with care to prevent damage caused by impact or humidity. Only the original packaging can ensure optimal protection. Furthermore, compliance with all allowable ambient conditions is mandatory (section 4 Mounting and **Fehler! Verweisquelle konnte nicht gefunden werden.**. **Fehler! Verweisquelle konnte nicht gefunden werden.**).

If you have any questions, please contact your supplier or the respective distribution centre.

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

2 Scope of delivery

- 1 x measuring armature E3555 (material: brass) with blank plug, o-ring and union nut
- 2 x measurement pipes (material: stainless steel)
- 1 x flow sensor E3510

2.1 Target groups and qualifications

Only properly trained personnel authorised by the owner of the system shall be permitted to install, start up, and maintain the product. The respective technical personnel must have read and understood the instructions and must follow the directions. Before using corrosive or abrasive test fluids, it is the owner's responsibility to verify the resistance of those parts that contact the measuring medium. The owner must comply with the national rules and regulations governed by the country with respect to installation, function testing, repair, and maintenance of electrical products.

Safety instructions

- Prior to installing the device read the product description.
- Only properly trained personnel shall be permitted to work on/with systems containing gases and shall be authorized to install, execute settings, and perform the initial operation of the equipment. In doing so, compliance with all commonly accepted engineering standards and adherence to regulations to the occupational health and safety act is mandatory.
- Prior to installing and/or removing components of gas-carrying systems, ensure the system is shut down and depressurized.
- Before the initial start-up and/or restart of the system, ensure that all personnel and objects are out of reach of moving parts.
- Noncompliance with these instructions or technical advice may lead to personal injuries and/or damage to property.

Installation instructions

Important: Prior to the installation of the measurement module, ensure that all nominal diameters correspond with the actual nominal diameter of the pipe line! Furthermore, ensure the installation direction of the measurement module is correct and corresponds with the information shown on the identification plate.

Remove all packaging residue and follow the instructions as described in section **Fehler! Verweisquelle konnte nicht gefunden werden.**. **Fehler! Verweisquelle konnte nicht gefunden werden.**.

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

3 Warranty

The devices were built in compliance with current directives and have left the factory in technically flawless condition.
In the unlikely event that you still may have reasons for a complaint and the fault can be traced to a factory error, we shall correct any defects at no additional charge. However, in such case, it is your responsibility to report the damage immediately after detection and/or within our permitted warranty period.

Damage caused due to improper use or as a result of noncompliance with these operating instructions, is excluded from this warranty.

The warranty period is 12 months. Unless otherwise agreed upon, the warranty period for spare parts is 12 months as well. The fulfilment of warranty claims shall not extend the warranty period.

The warranty shall become null and void if the measurement module has been opened, unless otherwise expressly stated in the operating instructions or for maintenance purposes only. This shall also apply if serial numbers have been changed, damaged, or removed.

Any repairs, adjustments or similar tasks necessary besides warranty performances shall be without charge. Other services, including transport and packaging shall be invoiced.

Unless liability is mandatory by law, further claims, in particular claims based on damages that do not concern the delivered components, are excluded.

Services provided after the warranty period

Of course, we will be pleased to assist you once the warranty has expired. You can reach us directly by calling.

Contact:

Phone: +49 (6021) 45 807 - 0

Fax: +49 (6021) 45 807 - 20

eMail: service@esters.de

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

4 Mounting

Please follow the rules and regulations for the installation and operation of the gas-carrying system, esp. compressed air system.

Preferred mounting location:

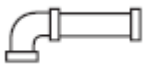
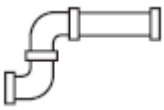
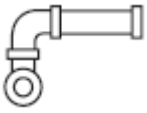
Behind the refrigeration dryer / in the area of the consumer oft he gas. If the gas is feed in the main pipe using a parallel pipe, the device should be installed in the main pipe.
It is possible to install the device after the maintenance unit (use oil for the consumer, if the device must be mounted before the oiler)

In order to reach the specified measurement accuracy, the following conditions of installation must be complied:

- defined inlet-and outlet zone
- defined cross-sectional area of the stream
- fixed immersion depth
- correct position of the measuring elements

The fitting unit must be installed with the arrow shown on the lever in direction of the gas flow.

In case of disturbances in the inlet zone additional **stabilized section (B)** are recommended:

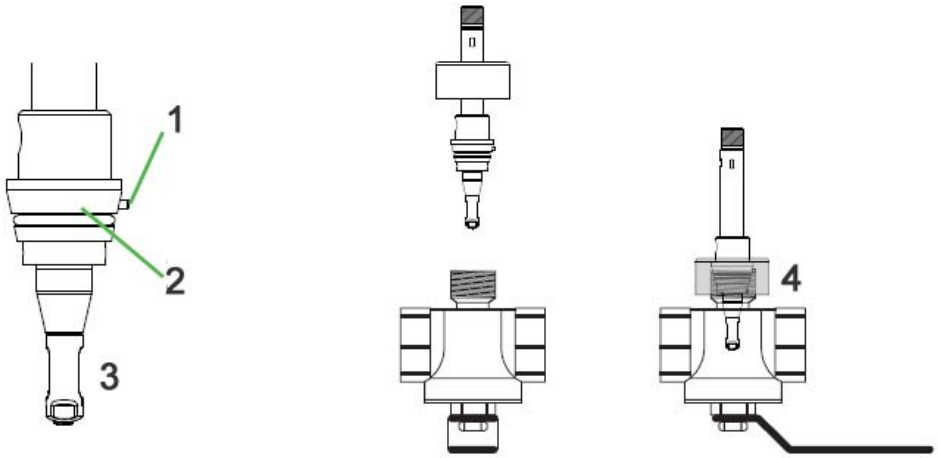
	90° elbow	B = 5 x pipe diameter (D)
	2 x 90° elbow, one level	B = 10 x pipe diameter (D)
	tweo 90° elbow, two levels	B = 15 x pipe diameter (D)
	valve, slide	B = 35 x pipe diameter (D)

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

4.1 Mounting of the measuring armature

The measurement fitting enables for the exact alignment of the sensing head within seconds during installment and removal, with only interrupting the process for a short time.



1	Locking bolt – for exact alignment
2	Sealing cone - for reproducable immersion depth
3	Sensor – for flow rate measurement
4	Union nut

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

5 Device description

5.1 Technical data flow sensor E3510

MEASUREABLE MEDUM	Pressured air, nitrogen, oxygen, carbon dioxide
MEASURAND	flow in m/s at standard conditions acc. To DIN 1343 P_0 = 1013,25 mbar t_0 = 0°C (273,15 K)
MATERIAL	Sensor tube and conus: Stainless steel 1.4305 Sensor head: Plastic (PBT)
ACCURACY	for 0,5 – 120 Nm/s at 7 bar (abs) and 23°C: ± 2,5 % of measuring value + 0,3% of measuring range
ACCURACY WITH TEMPERATURE COMPENSATION	± (0,1% of measuring value /°C)
LONG-TERM STABILITY	±1,0% v. measuring value per year (pollution excluded)
RESPONSE TIME	t_{90} = 500 ms
SAMPLE RATE	100 ms
RESOLUTION	0,05 Nm/s
OUTPUT	RS485, half duplex connection sensor with Gas Flow Correction Calculator GDR 1403
CABLE LENGTH	Max. 500 m
WIRE CROSS-SECTION	0,5 mm² to 120 m 0,75 mm² to 500 m
POWER SUPPLY	14,5 – 18,5 V, DC, 100 mA
MEDIUM TEMPERATURE	-20 - +100°C
AMBIENTE TEMPERATURE	-20 - +80°C
ELECTROMAGNETIC COMPATIBILITY	EN61326-1, EN1326-2-3
CONNECTION	Plug M12x1
CALIBRATION CERTIFICATE	Test certificate acc. to DIN EN 1024-2.2

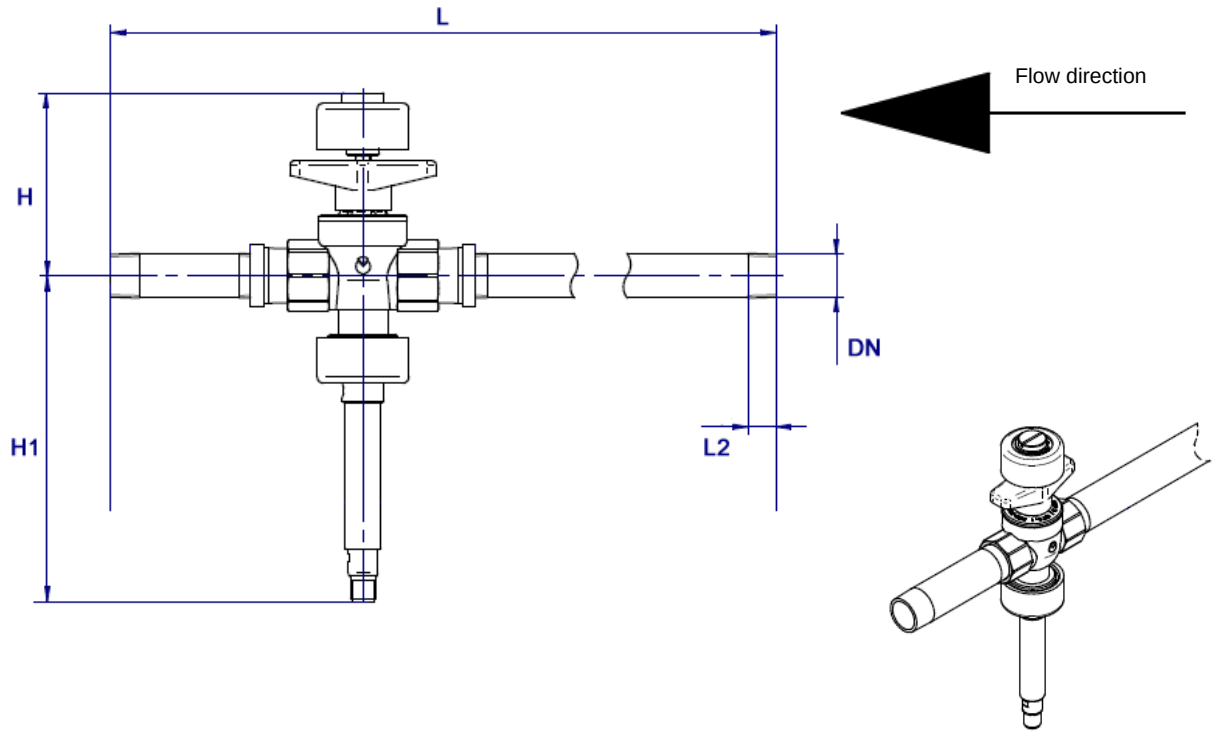
Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

5.2 Technical data measuring armature E3555

MATERIAL MEASURING ARMATURE	brass
MATERIAL INLET- AND OUTLET ZONE	Stainless steel

5.3 Dimensions measuring armature E3555 DN15 – DN25

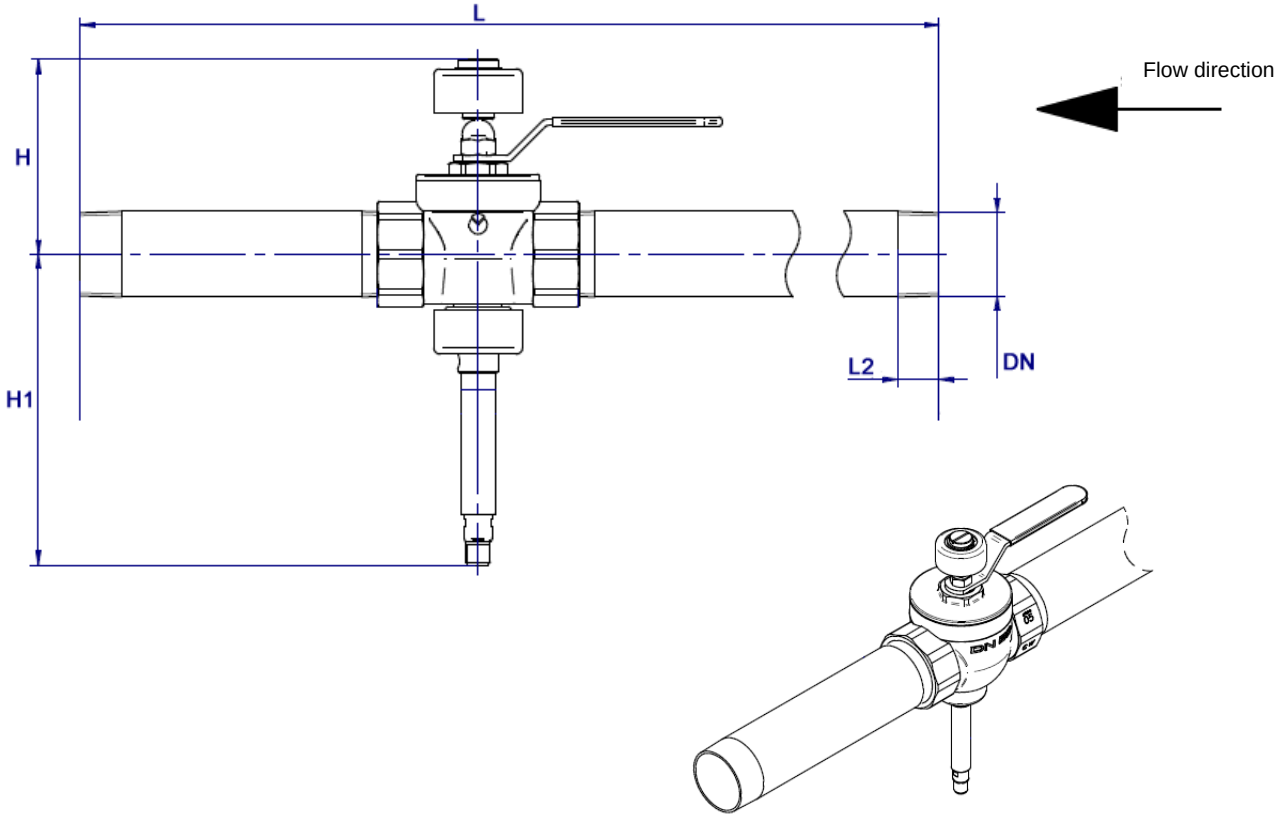


SERIES	DN MM	DN ZOLL	L	L2	H	H1	RANGE NM³/H Q_{MIN}	RANGE NM³/H Q_{MAX}
E3555-15	15	½	392	13,5	87	156	0,32	120
E3555-20	20	¾	454	16,8	99,1	156	0,57	220
E3555-25	25	1	567	17,6	99,1	152,4	0,9	350

Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

5.4 Dimensions measuring armature E3555 DN32 – DN50



Series	DN mm	DN Zoll	L	L2	H	H1	Range Nm³/h Q_{MIN}	Range Nm³/h Q_{MAX}
E3555-32	32	1 ¼	715	20,5	97	154	1,5	550
E3555-40	40	1 ½	885	20,7	106	155,9	2,3	900
E3555-50	50	2	1.100	26,9	111,2	159,1	3,5	1.400

Rev.-Nr.: IM 317 E V0.1-2014-03-18

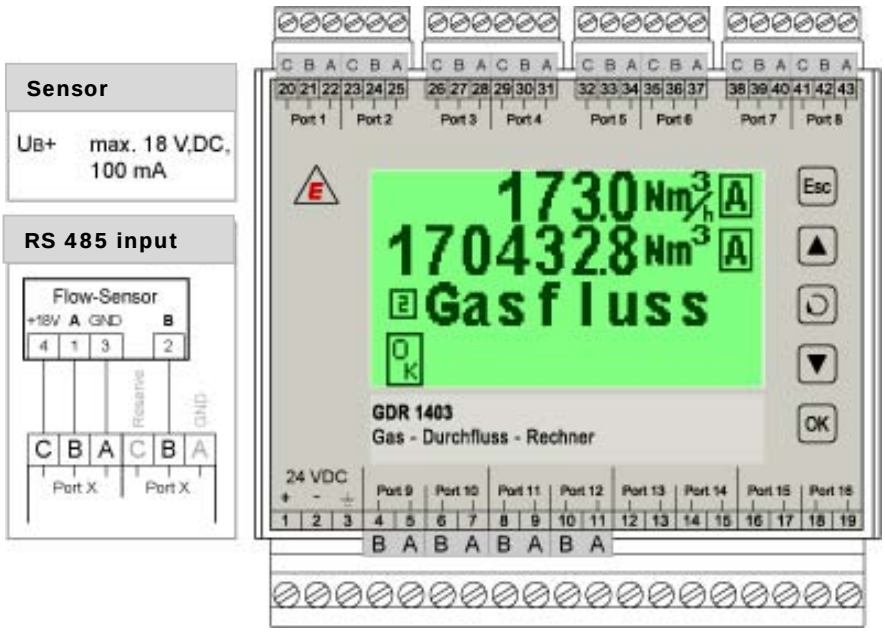
Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

6 Connection assignments

6.1 Flow sensor E3510 with RS 485 interface

FLOW-SENSOR	
1	RS 485 A
2	RS 485 B
3	GND
4	UB+ 14,5 – 18,5 V, DC, 100 mA

6.2 Connection to Esters Gas Correction Calculator GDR 1403



Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

7 Troubleshooting

7.1 Replacing damaged parts

Only authorised personnel shall be permitted to repair damages that may adversely affect the pressure safety or personal safety.
After each repair, the technical data of the specifications must be verified by technical personnel, e.g. by pressure tests.

Replace damaged parts immediately. When ordering spare parts, please use the contact information provided in section 3. Warranty.

7.2 Replacing O-rings and seals

Always keep sealing surfaces clean.

Remove sticky accumulations on a regular basis.

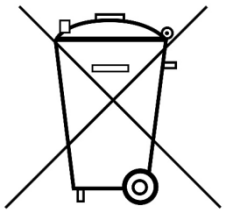
Should a leak occur, please contact your supplier.

Risk of escaping media!
Only authorised personnel shall be permitted to replace sealing material.

7.3 Returning goods

If a repair becomes necessary, please return the unit to the supplier. Only use the original packaging when returning the device.

7.4 Waste disposal



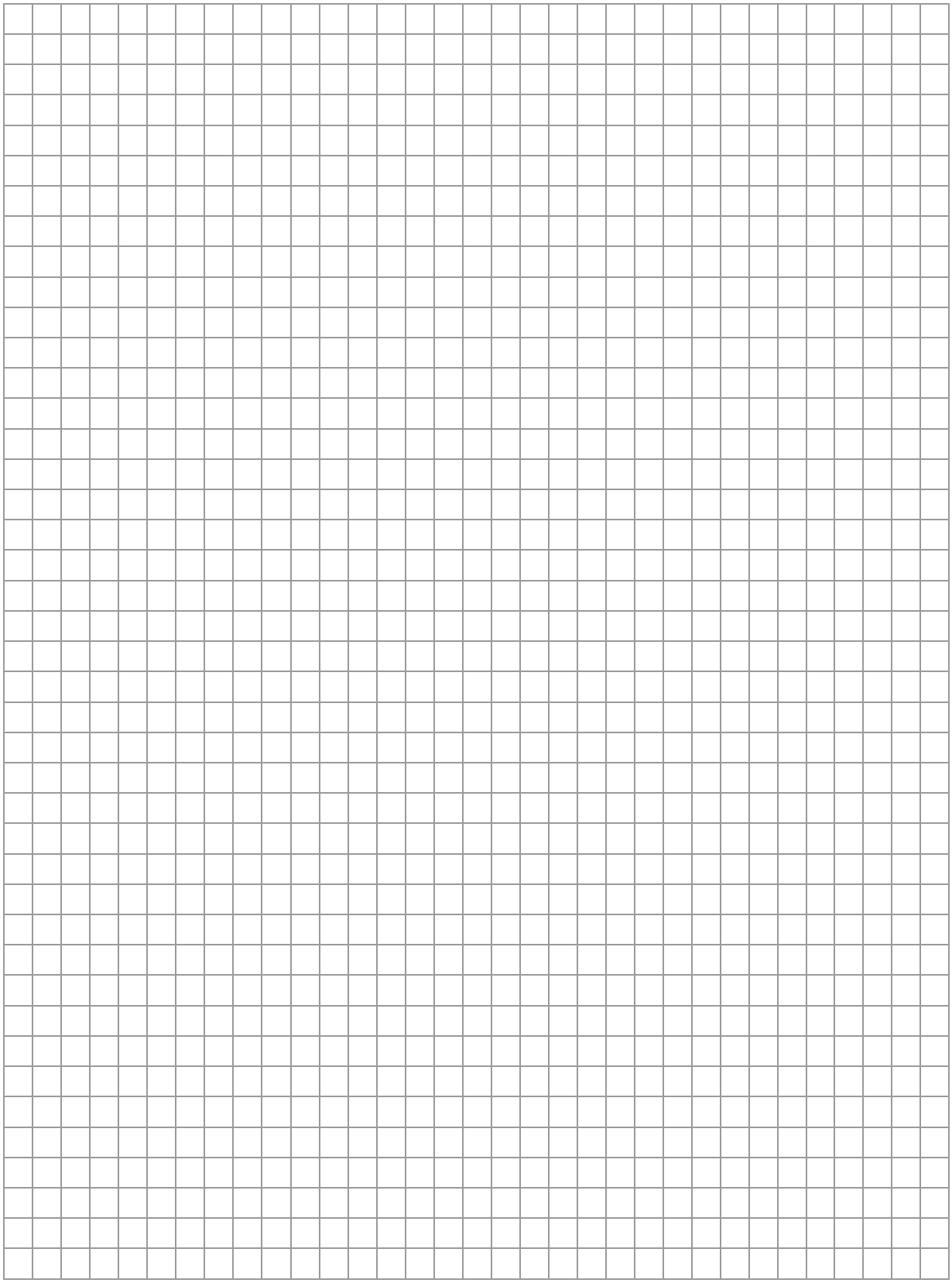
When disposing the device, it must be dismantled and the various materials must be separated. Please comply with your local rules and regulations.

When designing the device, one of the utmost considerations was its environmental compatibility. The measurement units are subject to the European Directive 2002196/EC, which stipulates that electric and electronic equipment must be dismantled and collected separately or may be returned to the supplier for disposal purposes.
Disposing such items as unsorted municipal waste is prohibited.

Rev.-Nr.: IM 317 E V0.1-2014-03-18

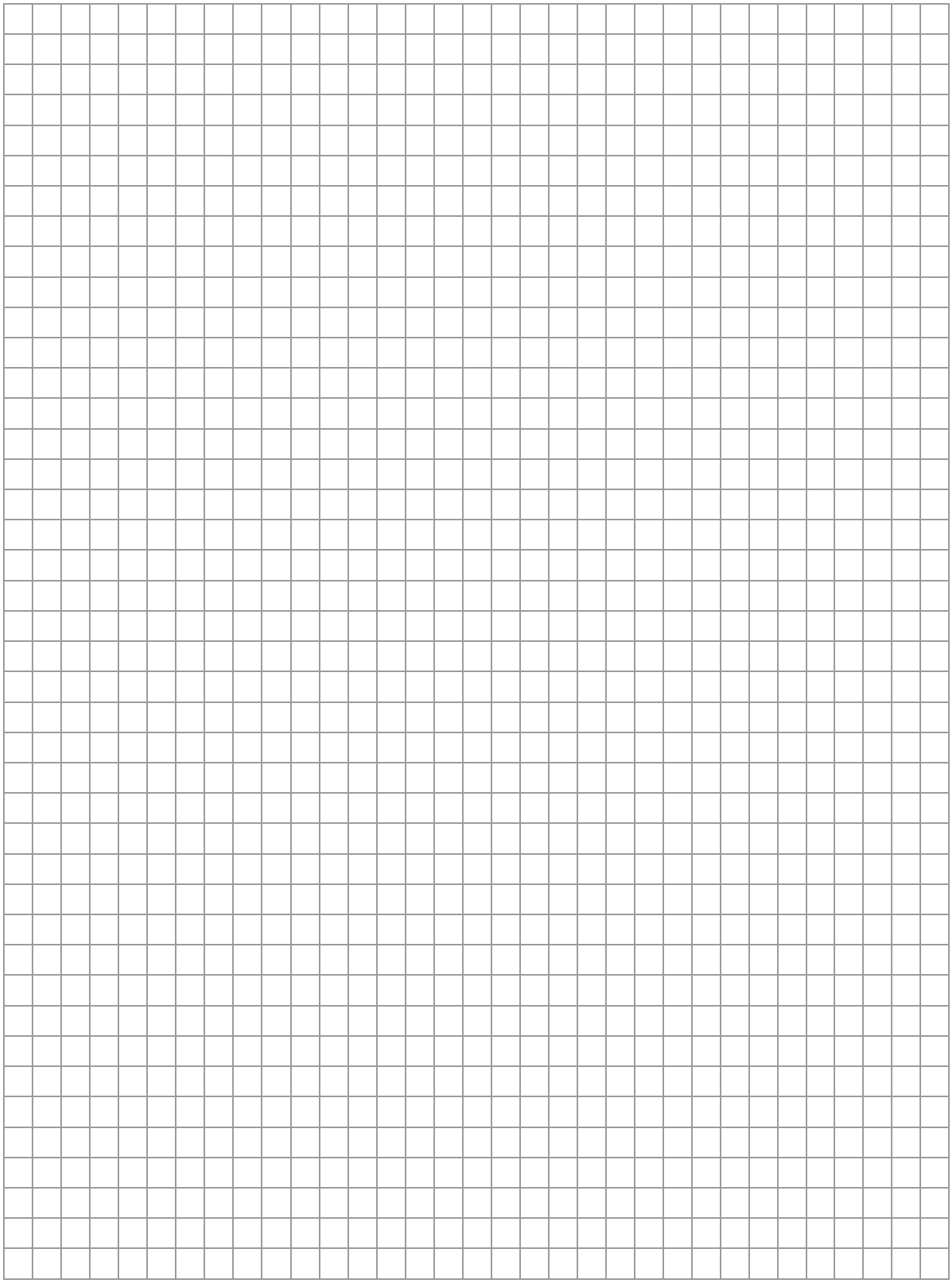
Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

Notes



Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20
Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg
eMail: info@esters.de
Internet: http://www.esters.de

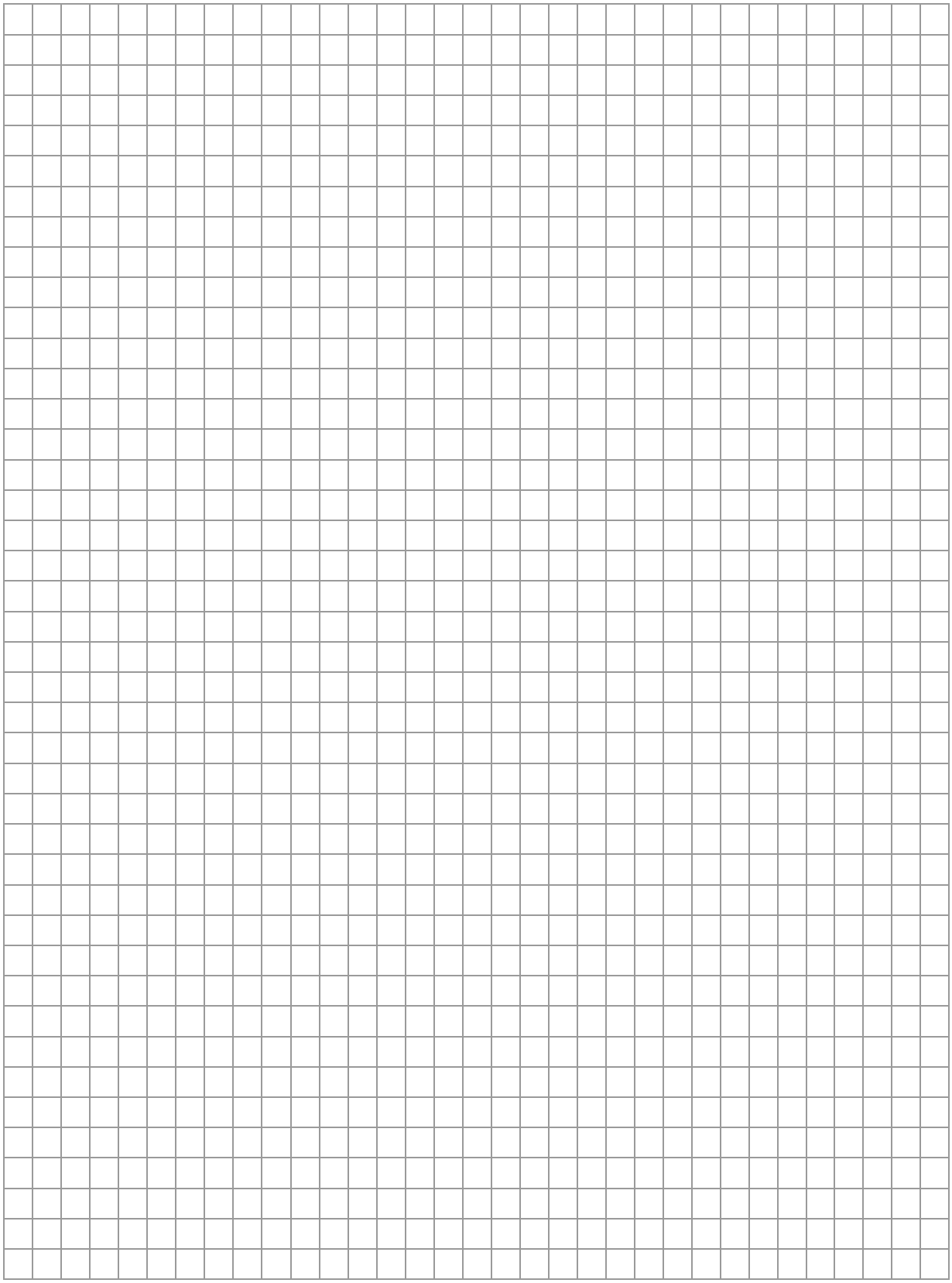


Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20

Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg

eMail: info@esters.de
Internet: http://www.esters.de



Rev.-Nr.: IM 317 E V0.1-2014-03-18

Phone: +49 (0)6021 – 45 807-0
Fax: +49 (0) 6021 – 45 807-20

Esters Elektronik GmbH
Görresstr. 17 • D-63793 Aschaffenburg

eMail: info@esters.de
Internet: http://www.esters.de