INSTRUCTION MANUAL IM 110 E

Device: TR 1703

Universal Buffer Stage TR 1703

Content: Installation and operating instructions

Rev. No.: IM 110 E V 1.4-2017-00-16

Rev.-Nr.: IM 110 E V 1.4-2017-00-16

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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.
- In order to 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 refers to but is not limited to improper installation, start-up, operation, maintenance and neglecting the information provided in this manual. Installation, commissioning, operation and maintenance must be performed by a qualified electrician. Guidelines according to the installation site are applicable.
- For personal safety reasons installation and maintenance work may only be carried out when the device is not connected to the power supply.
  The device must be integrated into the lightning protection concept of the plant operator

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:

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Hafenrandstr. 14
D-63741 Aschaffenburg
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1 Introduction

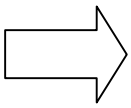
1.1 Operating instructions, general information

These operating instructions are intended for the use of the universal buffer stage TR 1703 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 content of the package 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.
- If you have any questions, please contact your supplier or the respective distribution centre.

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1.3 Scope of delivery

- TR 1703
- Declaration of conformity
- Instruction manual

Mounting instruction

Important: Before installation and configuration it has to be ensured that there is no connection to the power supply.

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2 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.

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

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3 General information

The buffer stage serves as the galvanic separation of incremental impulses (0 - 200 KHz) and their bypass into different installation parts. It is equipped with a programmable digital divider 1 - 500 in order to process high impulse signals in to a measured data acquisition system.

All kinds of signals and divider functions can be adjusted by the customer with jumpers at the front.

- One and multiquadrant operation
- Frequency range 0 - 200 kHz
- Input level TTL - HTL
- Output level 5-15-24 V
- Frequency divider integer (1-500) programmable (option P4)

4 Technical data

INPUT/OUTOUT	
SIGNAL INPUT	Frequency range: 0-200 kHz
	TTL complementary RS 422 level |(S..+) - (S..-)| > 0,5 V; impedance approx. 10 k
	TTL unipolar (S..- = Gnd) Hi level > 1,9 V; Lo level < 1,3 V; impedance approx. 5 k
	HTL complementary * level |(S..+) - (S..-)| > 2 V; impedance approx. 94 k
	HTL unipolar (S..- = Gnd) Hi level > 7,5 V; Lo level < 2,9 V; impedance approx. 47 k
	TTL UCM max = S..+ ... S..- = 30 V; fmax= 200 kHz
	HTL UCM max = S..+...S..- = 100V; fmax= 200 kHz
SIGNAL OUTPUT	Hi level: 24V / 15V / 5V (+-10%)
	Lo level = 0,6 V short-circuit proof, internal resistance about 75 Ohm, current approx. 50 mA

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Option P4	
Impulse scaler for incremental signals	For the acquisition of actual values of speed where high impulse encoder frequencies are unwanted. These can be subdivided by integers in the pulse scaler. The programming is done using jumpers on the front side. The following splitting ratios are possible: mode 1: 1 - 2 - 3 - 4 - 5 - 6 -7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 mode 2: 16 - 20 - 24 - 32 - 40 - 48 - 64 - 100 - 128 - 150 - 200 - 250 - 300 - 400 - 500
Impulse scaler for single component signals	The feeding of the single-component signal is carried out on input S1 exclusively. The 2nd channel for the frequency divider gets simulated, which means the signal input S2 is not available for external signals. The following splitting ratios are possible: mode 1: 1 - 2 - 3 - 4 - 5 - 6 -7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 mode 2: 16 - 20 - 24 - 32 - 40 - 48 - 64 - 100 - 128 - 150 - 200 - 250 - 300 - 400 - 500

Option P5	
Input comparator	Input comparator for complementary sine/ cosines wave; level³ 1 V

General	
Supply voltage [V]	12 - 28 V DC; max. 8 Watt
Current consumption (mA)	max. 300 mA
Test voltage	3 kV
Ambient temperature:	0…+60 °C
Storage temperature	-20…+85 °C
Electromagnetic load	according to EN61326-1 EN61326-2-3 industrial environment
Humidity class	E = according to DIN 40040
Connection/ clamps	Bopla AK 8191/3 DL/DR, protection class IP 20 according to DIN EN 60529

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HOUSING & WEIGHT	
PROTECTION CLASS	IP 40 according to DIN EN 60529
HOUSING MATERIAL	PA 6.6-FR (UL 94 V0)
MOUNTING	DIN rail according to DIN EN 60715 TH 35
DIMENSION	height: 75 mm width: 22,5 mm depth: 110,8 mm
WEIGHT:	100 gr

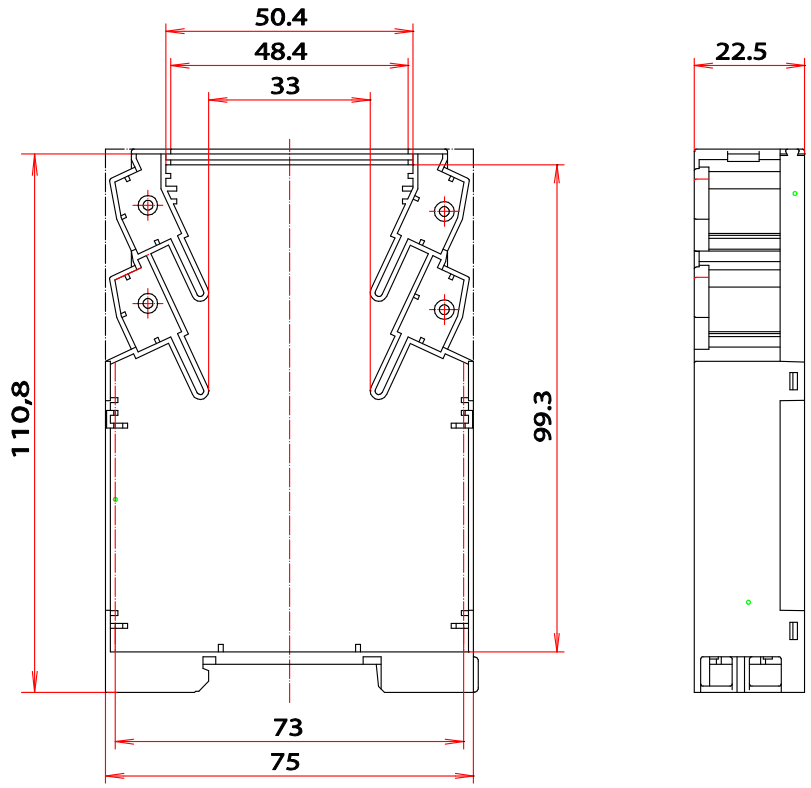

Figure 1: dimension illustration

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5 Installation of TR 1703

Please follow the rules and regulations for the installation and operation of low-voltage switchgear according to DIN 41 488 Part 2.

Preferred mounting location:

The device TR 1703 is designed for DIN rail installation according to DIN EN 60715. The rail guide and fuse clip are on the back side. In order to fasten the TR 1703 on the profile rail, the casting must be mounted to the rail guide and be pressed unto the profile rail. The fuse clip fixes the device automatically.

6 Connection

6.1 Prepare the connection

Note safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltages or voltage peaks are expected, overvoltage arresters should be installed

6.2 Connection procedure

Voltage supply

Make sure that the voltage corresponds to the specifications on the type label.

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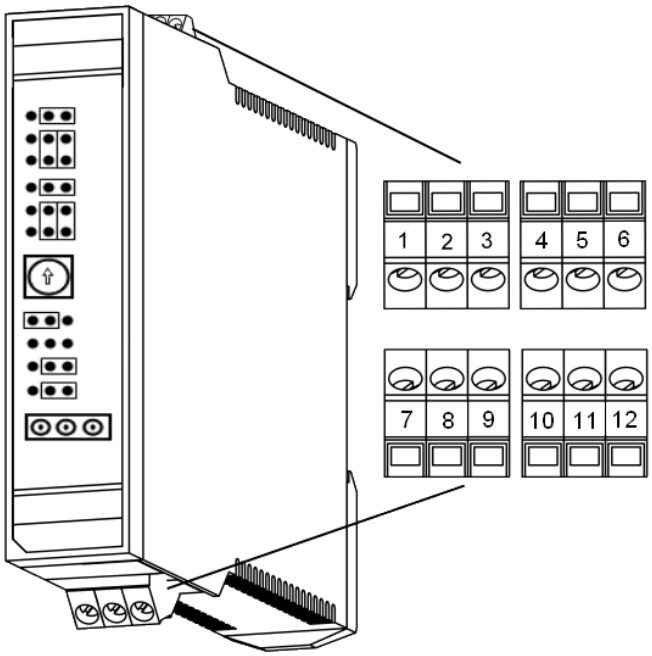
6.3 Connection diagram



DESIGNATION	TERMINAL ASSIGNMENT
1	+24V/DC (UB+)
2	GND (UB-)
3	Input signal 1 (S1)
4	Input signal 1 (S1 GND)
5	Input signal 2 (S2)
6	Input signal 2 (S2 GND)
7	GND
8	Output signal $\overline{\text{S2A-}}$
9	Output signal S2A+
10	GND
11	Output signal $\overline{\text{S1A-}}$
12	Output signal S1A+

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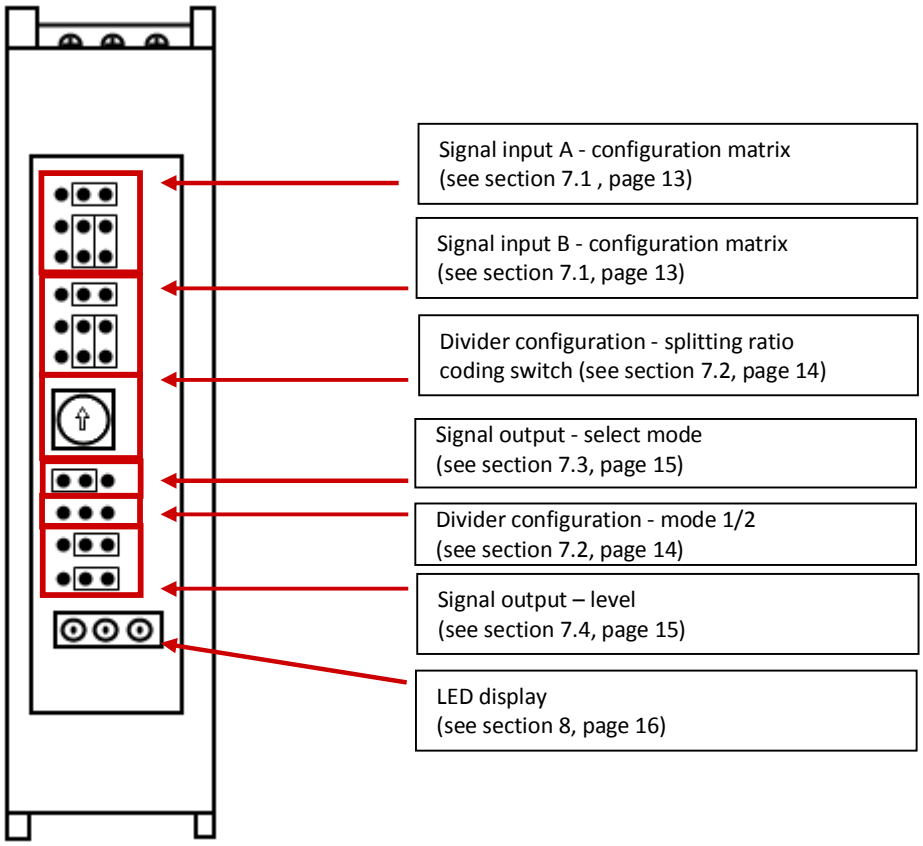
7 Parameter configuration



Please note:
The following configuration must only be performed in complete absence of line voltage, otherwise the configuration cannot be loaded:

- Divider configuration - splitting ratio coding switch (see section 7.2, page 14)
- Signal output - select mode (see section 7.3, page 15)
- Divider configuration - mode ½ (see section 7.2, page 14)

Configurations for the following signal input and output can be performed with line voltage:

- Signal input A and B - configuration matrix (see section 7.1, page 13)
- Signal output – level (see section 7.4, page 15)

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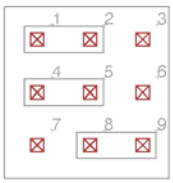
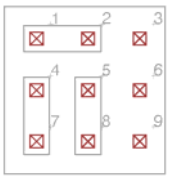
7.1 Signal input A/B – configuration matrix



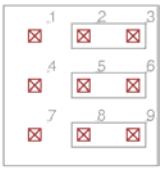
HTL complementary

level |(S..+) - (S..-)| > 2 V; impedance approx. 94 k



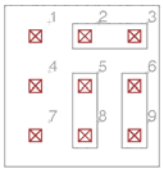
HTL unipolar

Hi level > 7,5 V; Lo level < 2,9 V; impedance approx. 47



TTL complementary RS422

level |(S..+) - (S..-)| > 0,5 V; impedance approx. 10 k



TTL unipolar (S-GND)

Hi level > 1,9 V; Lo level < 1,3 V; impedance approx. 5 k

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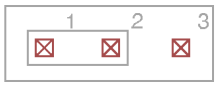
7.2 Configuration of frequency divider – splitting ratio

The configuration of frequency divider – splitting ratio must be performed in complete absence of line voltage, otherwise the configuration cannot be loaded.

CODING SWITCH POSITION	FREQUENCY DIVIDER MODE	
	Mode 1 	Mode 2 
0	Splitting ratio	
	not defined	not defined
1	1	16
2	2	20
3	3	24
4	4	32
5	5	40
6	6	48
7	7	64
8	8	100
9	9	128
A	10	150
B	11	200
C	12	250
D	13	300
E	14	400
F	15	500

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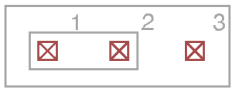
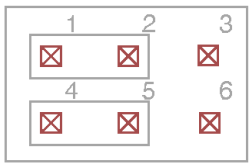
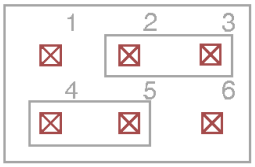
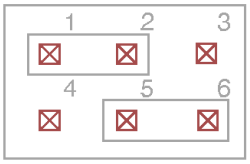
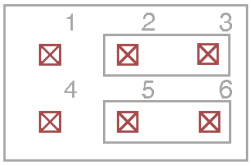
7.3 Signal output – mode selection

The configuration of Signal output – mode selection must be performed in complete absence of line voltage, otherwise the configuration cannot be loaded.

MODE SIGNAL OUTPUT	
Mode P1: **incremental signal** 	**Mode P2:** **single component signal** 
For the acquisition of actual values of speed where high impulse encoder frequencies are unwanted. These can be subdivided by integers in the pulse scaler. A connected signal is required to the signal inputs S1 and S2.	The feeding of the single-component signal is carried out on input S1 exclusively. Via internal wiring the 2nd channel for the frequency divider then gets simulated, which means the signal input S2 is not available for external signals.

Please note: Mode P2 can also be used to convert and divide a single component signal. The output signal just has to be connected.

7.4 Signal output – level

SIGNAL OUTPUT			
		 	
24V +-10%	15V +-10%	5V +-10%	

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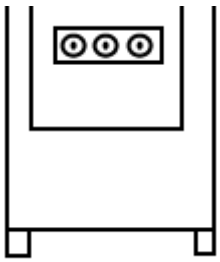
8 Operation



The three-color LED display signals the respective status during operation.

GREEN	YELLOW	RED
OPERATION MODE P1		
periodic flashing: signal input S1 provides a valid signal	periodic flashing: signal input S2 provides a valid signal	constant glow: active power supply
OPERATION MODE P2		
periodic alternating flashing: signal input S1 provides a valid signal		constant glow: active power supply

9 Error description

ERROR	CHECKLIST
NO SIGNAL OUTPUT	- Check, if the signal inputs are correct. - Check, if power supply is on. - Check, if switch code has a valid position. - Check, if the configuration of the input signals is correct.
WRONG SIGNAL AMPLITUDE	- Check, if power supply is on. - Check, if level configuration is correct

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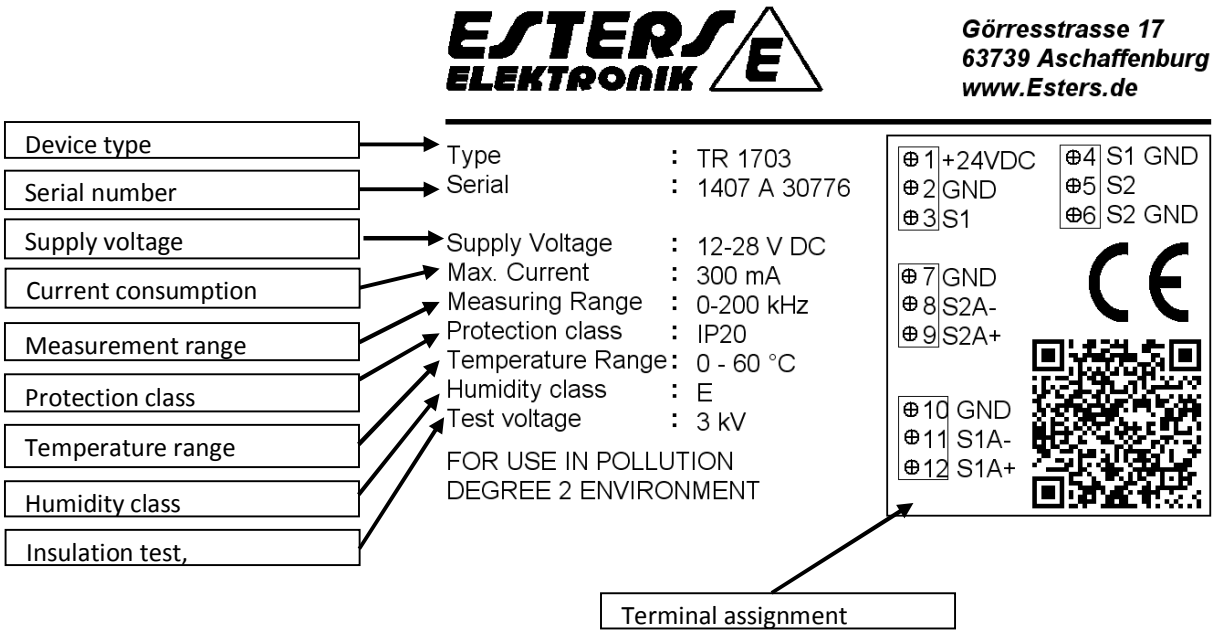
10 Identification plate TR 1703



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11 Troubleshooting

11.1 Replacing damaged parts

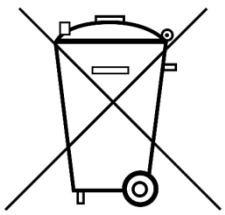
Damages to the device, which affect the safety should only fixed by authorised personal. After each repair the technical data of the specification must be checked by qualified personal.

Exchange all damaged parts immediately. For purchase please use the contact information in section 2, page6.

11.2 Return consignment

In the case of repair, please return the device to your supplier.

11.3 Disposal



The instrument consists of materials which can be recycled by specialised recycling companies.
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.
Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.
If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

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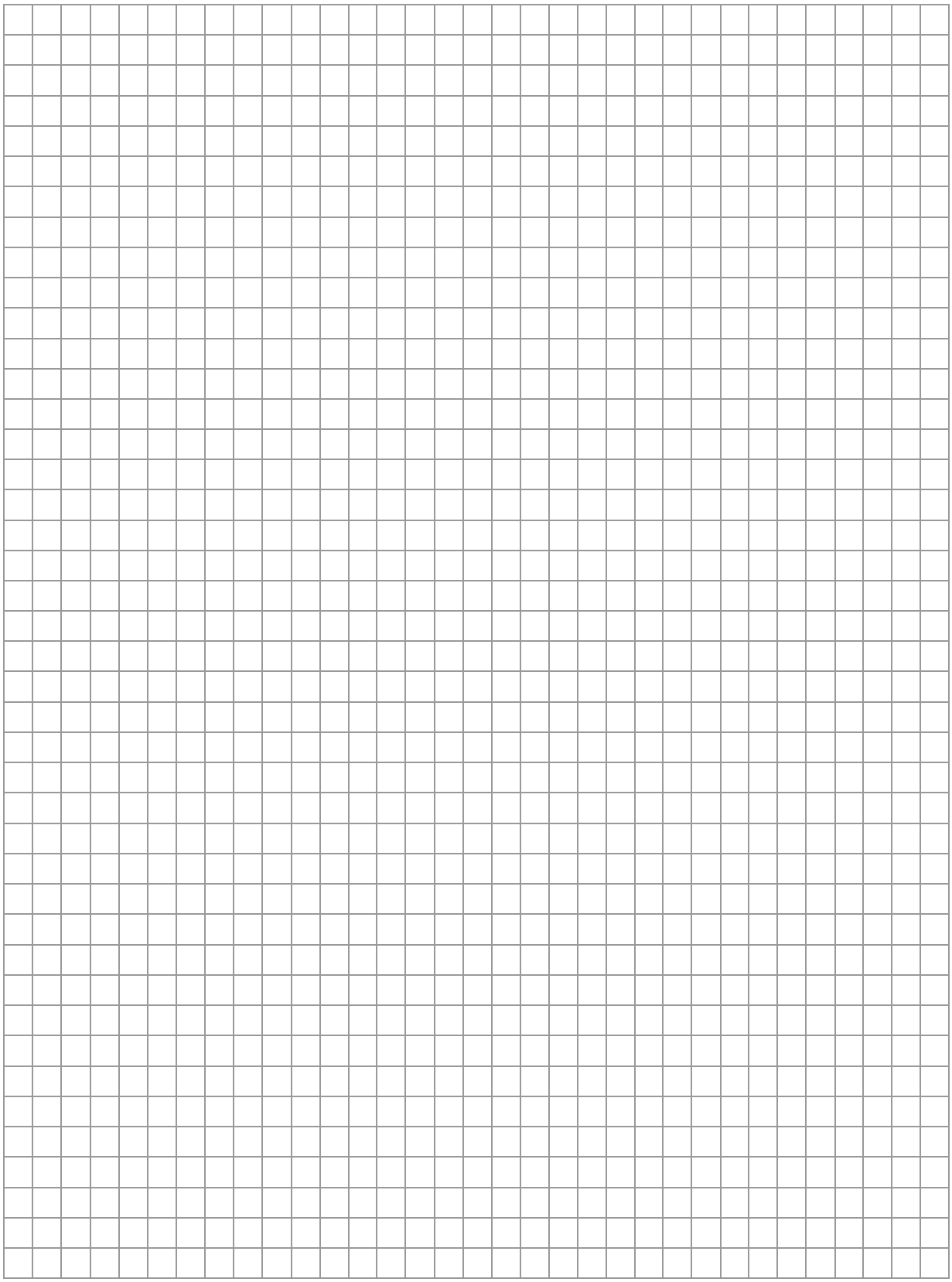

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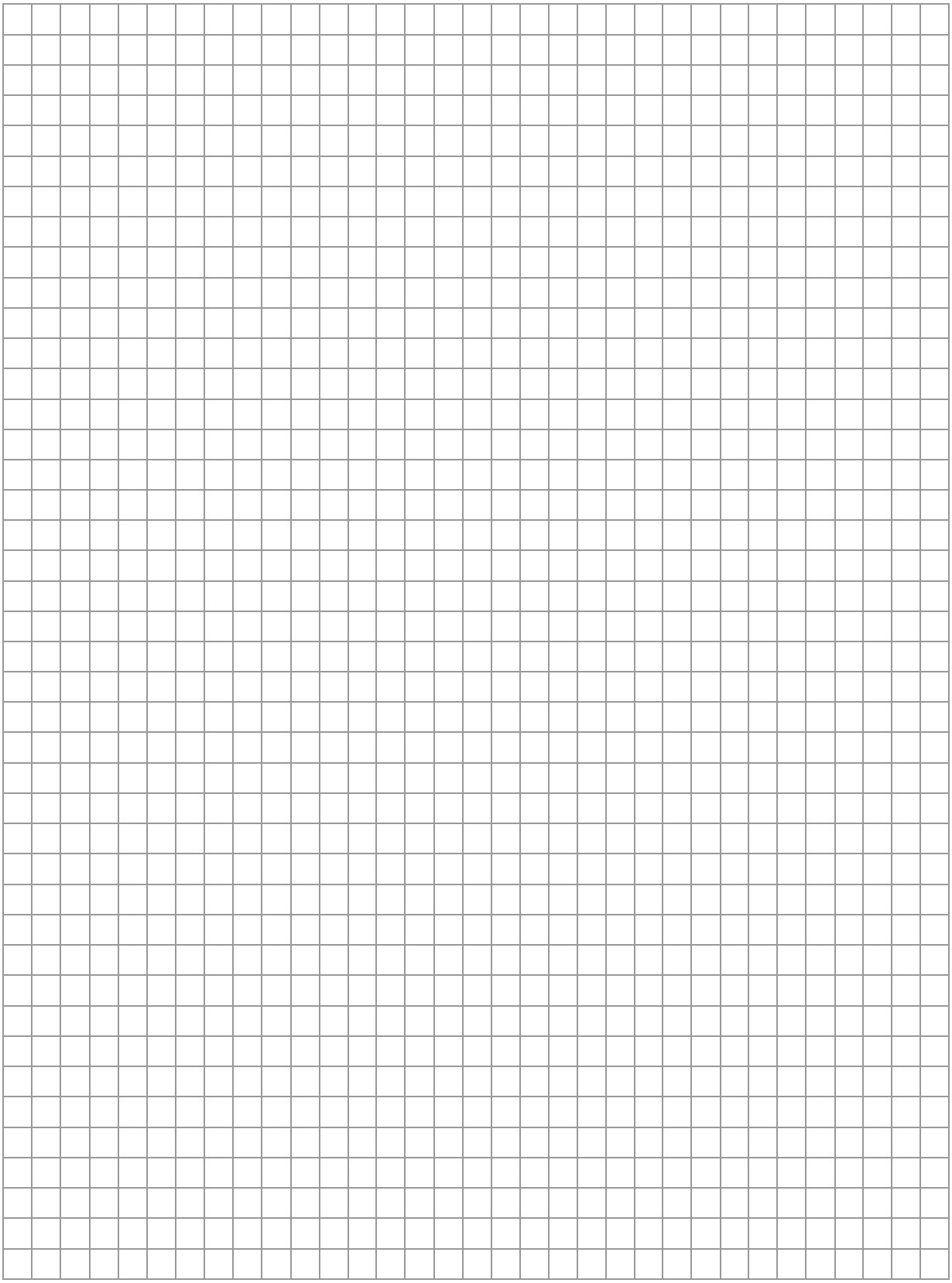

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