MAYSER®
Polymer Electric

Operating Instructions

Control Unit SG-RST 153

Version 0.3

1004931 SG-RST 153

Original instructions

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Contents

About these operating instructions

These operating instructions are part of the product.
Mayser Polymer Electric accepts no responsibility or warranty claims for damage and consequential damage due to failure to observe the installation instructions.

➔ Read operating instructions carefully before use.

➔ Keep operating instructions for the complete service life of the product.

➔ Pass operating instructions on to every subsequent owner or user of the product.

➔ Add any supplement received from the manufacturer to the operating instructions.

Validity

These operating instructions are only valid for the products specified on the title page.

Target group

The target group of these operating instructions are operators and trained specialist personnel who are familiar with installation and commissioning.

Other applicable documents

➔ In addition to the operating instructions, observe the following documents:
- Drawing of the sensor system (optional)
- Wiring diagram (optional)
- Installation instructions of the sensors used

Symbols used

Symbol	Meaning
➔ ...	Action with one step or with more than one step where the order is not relevant.
1. ... 2. ... 3. ...	Action with more than one step where the order is relevant.
• ... - ...	Bullets first level Bullets second level
(see chapter 1, pg. 3)	Cross-reference

Table 1-1: Other symbols

Danger symbols and information

Symbol	Meaning
DANGER 	Immediate danger leading to death or serious injury.
CAUTION 	Possible danger which may lead to slight injury or damage to property.
	Information on easier or safer working practices.

Table 1-2: Danger symbols and information

Intended use

The Control Unit is designed for signal processing of a pressure-sensitive protective device (PSPD). It evaluates the output signals of sensors with monitoring resistor 8k2. The integrated output signal switching device (OSSD) transmits the evaluated safety signals directly to the downstream machine controls.

The Control Unit complies with ISO 13849-1:2006 Category 2 PL c. So that the safety classification is retained, the forwarding control must be of the same or a higher category. Without a test signal, the Control Unit complies only with category 1.

The Control Unit is only designed for Safety Edges with monitoring resistor 8k2. Safety Mats and Safety Bumpers must not be connected.

The performance level PL depends on the load connected to the output. In some cases, PL d can be achieved. We will be pleased to advise you.

Safety instructions

➔ **Do not modify Control Unit**
Never manipulate or modify the Control Unit.

➔ **Check supply voltage**
Check supply voltage. It must correspond with the connecting voltage U_S on the type plate.

➔ **Maintain distance**
When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm).

➔ **Protect from sunlight**
In the case of surface installation, ensure that the Control Unit is protected from direct sunlight.

➔ **Observe pin assignment**
Observe pin assignment when connecting the supply voltage.

➔ **Insulate contact surfaces**
Ensure that contact surfaces not connected to the protective earth are disconnected from the power pack and the output circuit by double or reinforced insulation.

➔ **Protect relay contacts**
Risk of welding: Protect the relay contacts externally.

➔ **Fit spark absorbers**
When connecting inductive loads, fit spark absorbers (RC modules) to the consumer.

➔ **Do not cross link Control Unit**
Do not cross link the Control Unit with other Control Units. The terminals X1 and X2 are not isolated.

➔ **Do not overload Control Unit**
Ensure that the specified switching current is not exceeded.

➔ **In the event of a fault, put out of operation**
In the event of malfunctions and visible damage, put the Control Unit out of operation.

➔ **Do not use in ATEX zones**
Do not use the Control Unit in potentially explosive environments (ATEX). The Control Unit is not authorised for use in these zones.

Parts supplied

1× Control Unit
Enclosure with electronics module,
1× Cable screw connection PG9 and
2× cable screw connection PG11.
1× Operating Instructions
1× Declaration of Conformity

Check the scope of supply for completeness and the perfect condition of the product immediately after receipt.

Transport and storage

Packaging and transport

The Control Units are packed individually in cardboard boxes. Several Control Units are stacked in one large cardboard box.
The documents are enclosed separately.

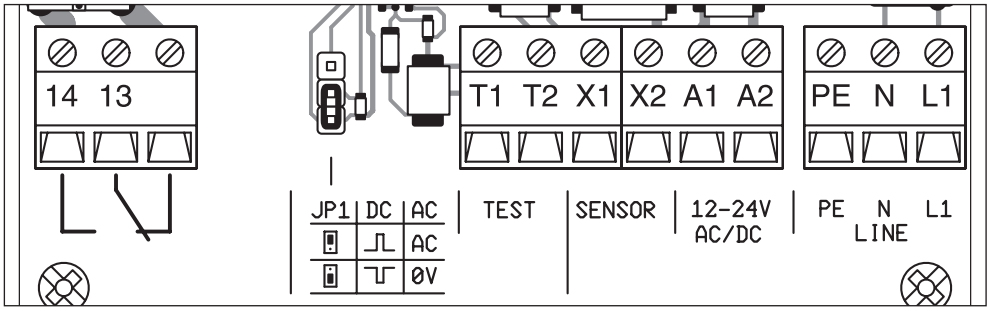
Storage

➔ Store the Control Units in the original packaging in a dry place.

➔ Observe the storage temperatures given in the technical specifications.

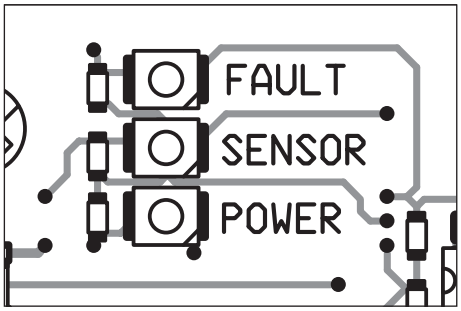
Product overview

Connections



Connections:	**Terminals:**
Switching channel K1	14, 13
Test signal	T1, T2
Sensor	X1, X2
Supply voltage AC/DC 12-24 V	A1, A2
Supply voltage AC 230 V	PE, N, L1

LEDs information



- red LED „FAULT“:
  cable break
- yellow LED „SENSOR“:
  sensor activated or testing
- green LED „POWER“:
  supply voltage connected

Operation, installation and commissioning

Operation

The Control Unit is operated with AC/DC 12 to 24 V or AC 230 V. If the supply voltage is connected, the green LED “POWER” is lit. The Control Unit now monitors the connected sensor, which must be equipped with a monitoring resistor 8k2. If the sensor is not activated, relay K1 is energised. If the sensor is activated, relay K1 is de-energised and the yellow LED “SENSOR” is lit. In the event of cable break on the sensor, relay K1 is de-energised and the red LED “FAULT” is lit. Before every dangerous movement, the safety function of the Control Unit must be monitored by an external test signal from the machine controls.

Without a test signal, the Control Unit only corresponds with category 1.

Installation

DANGER

Danger of injury due to electrocution!

➔ Disconnect all devices and live parts in the immediate environment from the power supply and protect them against being switched on again (see relevant operating instructions)

➔ Check whether all devices and parts are disconnected from the power supply

CAUTION

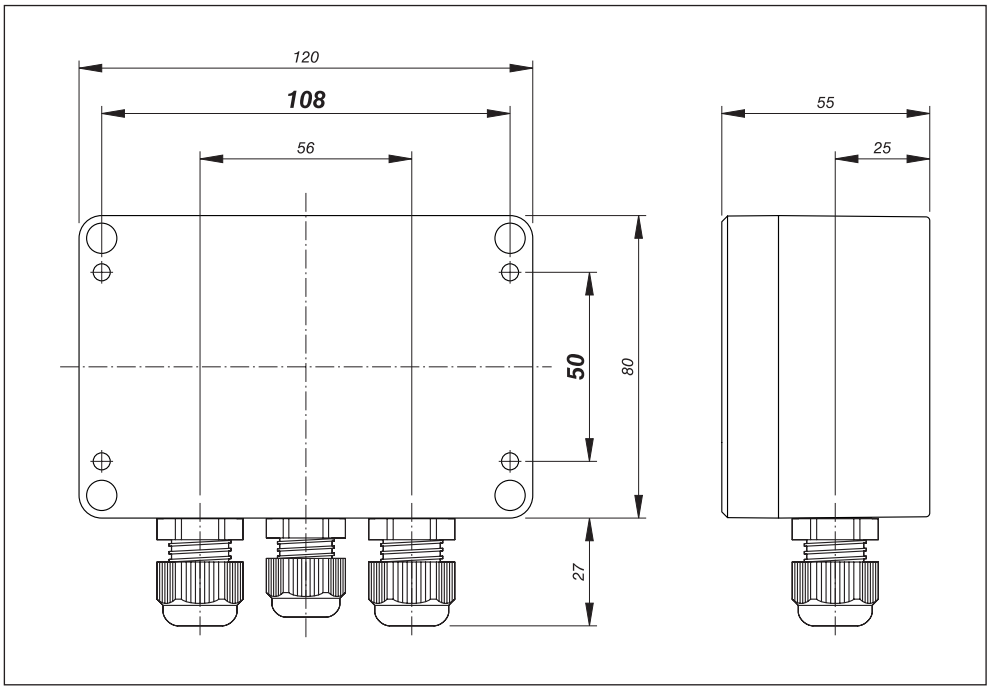
Impaired operation due to overheating

The operation of the protective device may be impaired due to overheating of the Control Unit.

➔ When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm)

➔ In the case of surface installation, ensure that the Control Unit is protected from direct sunlight.

1. Mount the Control Unit in any position with screws Ø 4 mm. For this, remove the enclosure cover.



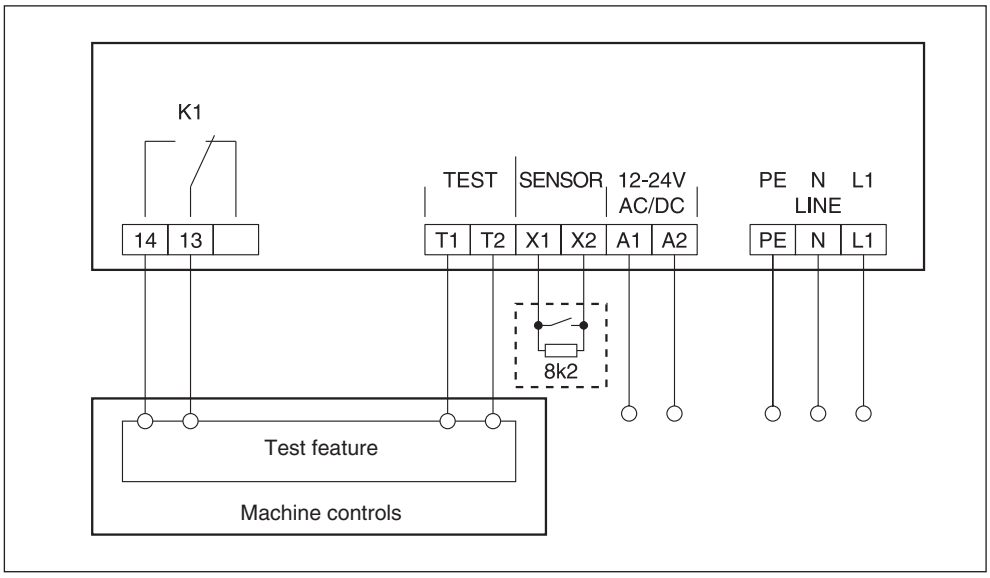
CAUTION

Overall safety endangered

The quality and reliability of the interface between the protective device and the machine influences the overall safety.

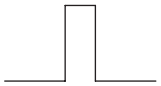
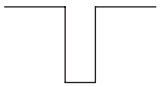
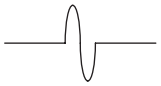
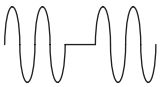
➔ Install the interface very carefully

2. Wire the sensors, test signal, relay contacts and supply voltage to the terminals.



Testing

➔ Set jumper JP1 according to the existing test signal.

Voltage Test signal	Type Test signal	Position jumper JP1	Reaction Switching channel K1
DC			
			
AC			
			

Commissioning

1. Reinstall the enclosure cover.

2. Connect the supply voltage.

Check operation

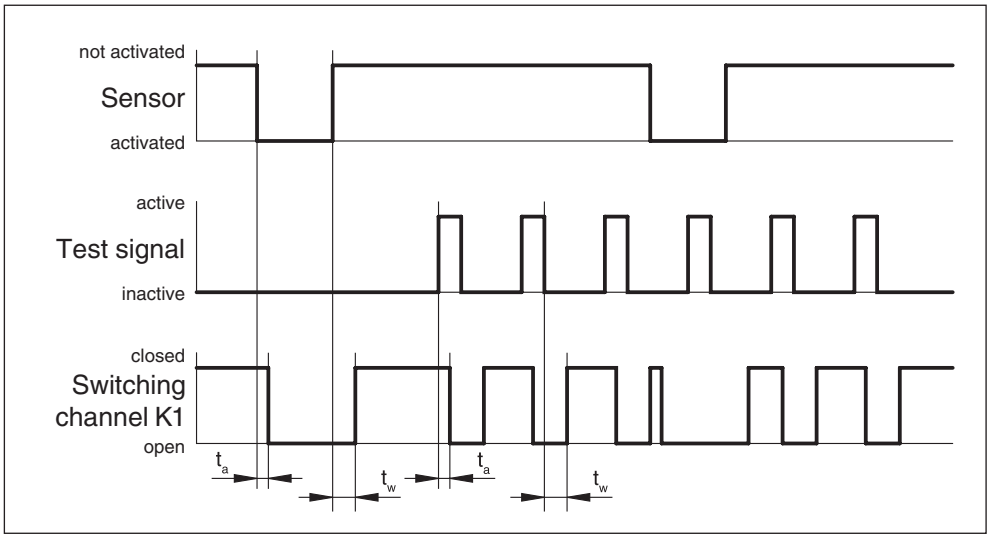
1. Ensure that no sensor is activated
   - only green LED “POWER” is lit
   - switching channel K1 is closed

2. Activate the sensor
   - yellow LED “SENSOR” is lit
   - switching channel K1 is open

3. Initiate a test signal from the machine controls
   - yellow LED “SENSOR” is lit
   - switching channel K1 is open

4. Detach the connection to the sensor
   - red LED “FAULT“ is lit
   - switching channel K1 is open

Flowchart



Recommissioning

DANGER

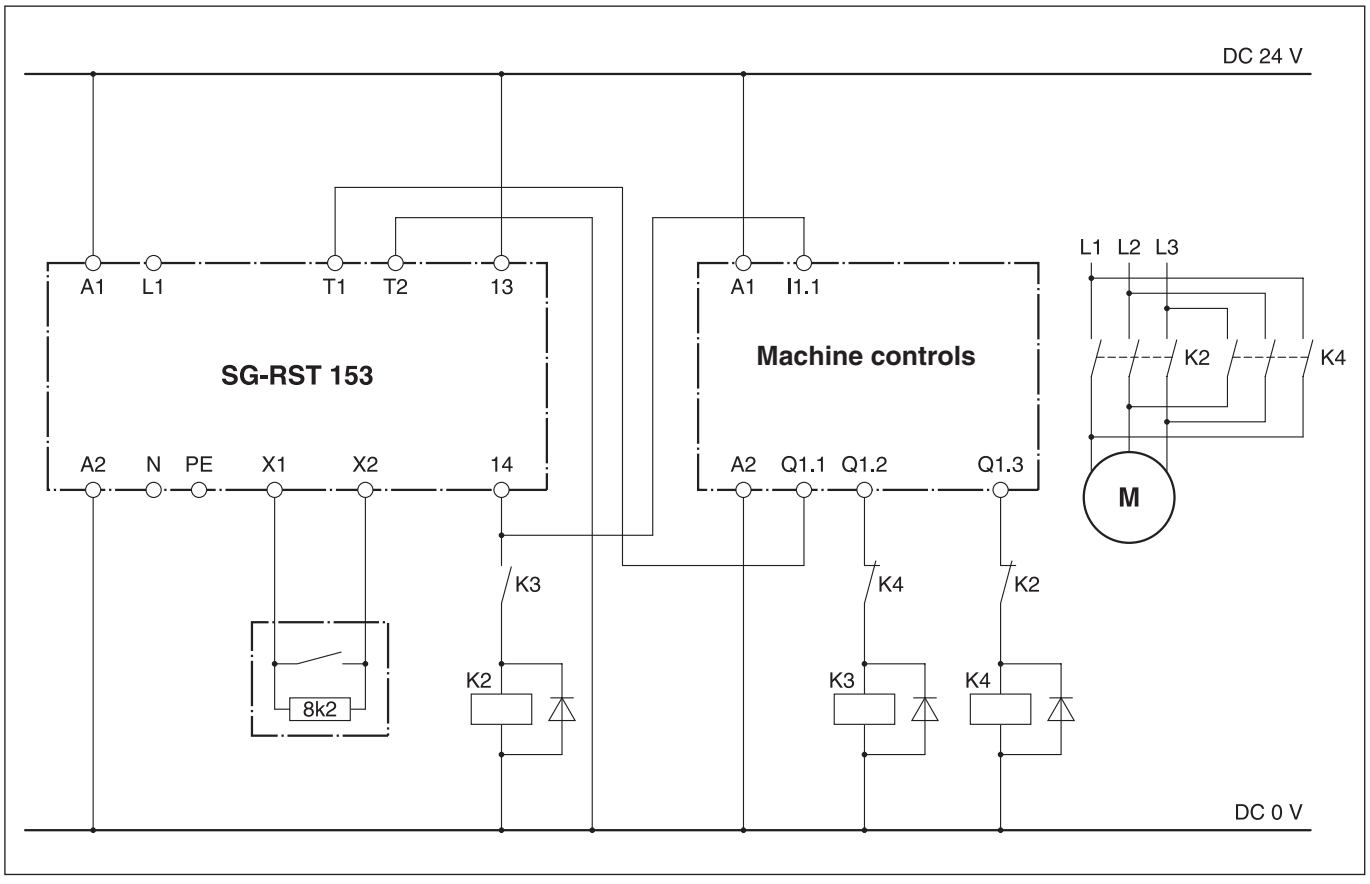
Danger of injury!

➔ Never start your machine as long as the risk remains.

The Control Unit has no reset command, i.e. it is equipped with an automatic reset. If the sensor is released after actuation, relay K1 is energised again with a delay of t_w

➔ After recommissioning, check operation (see above).

Connection examples



Maintenance and cleaning

Maintenance

The Control Unit is maintenance-free.

➔ Repeat the operational test monthly.

Cleaning

DANGER

Danger of injury due to electrocution!

➔ Disconnect the Control Unit as well as all devices and live parts in the immediate environment from the power supply and protect them against being switched on again (see relevant operating instructions).

➔ Check whether all devices and parts are disconnected from the power supply.

➔ Clean the outside of the enclosure with conventional cleaning products.

➔ Allow the enclosure to dry before recommissioning.

Troubleshooting and remedies

Prerequisite: The Control Unit is connected to the supply voltage and sensor. The sensor is not activated.

Fault display	Possible cause	Remedy
green LED “POWER” not lit	No or incorrect supply voltage	1. Check supply voltage, compare with type plate 2. Check terminal assignment 1, 2.
	With correctly connected supply voltage: Control Unit faulty.	➔ Replace Control Unit
yellow LED “SENSOR” permanently lit	Incorrect monitoring resistor on sensor	➔ Connect sensor to monitoring resistor 8k2
	With correct monitoring resistor: sensor faulty	➔ Replace sensor
	Jumper JP1 missing or incorrectly set	1. Check jumper JP1 (see page 9: Testing) 2. Set jumper JP1 correctly
	Test signal constantly active	➔ Check test signal
red LED “FAULT” is lit	No sensor connected	➔ Connect sensor
	Sensor incorrectly connected	➔ Check terminal assignment
	Incorrect monitoring resistor on sensor	➔ Connect sensor to monitoring resistor 8k2
	Cable break	➔ Replace sensor

Fault can still not be detected?

➔ Contact Mayser-Support: Tel. +49 731 2061-0.

Replacement parts

CAUTION

Overall safety endangered

If the sensor and Control Unit are not replaced by original parts from Mayser, operation of the protective device may be impaired.

➔ Only use original parts from Mayser.

Disposal

The Control Units produced by Mayser are professional electronic tools exclusively intended for commercial use (so-called B2B devices). Unlike devices mainly used in private households (B2C), they may not be disposed of at the collection centres of public sector disposal organisations (e.g. municipal recycling depots). At the end of their useful life, the devices may be returned to us for disposal.
WEEE reg. no. DE 39141253

Conformity

CE

The design type of the product complies with the basic requirements of the following directives:

- 2006/42/EC (Safety of Machinery)
- 2004/108/EC (EMC)
- 2006/95/EC (Low voltage)

The Declaration of Conformity is stored in the Downloads section of the website: www.mayser-sicherheitstechnik.de

EC Design Test

The product was tested by an independent institute.
An EC design type test certificate confirms conformity.

The EC design type test certificate is stored in the Downloads section of the website: www.mayser-sicherheitstechnik.de

Technical Data

SG-RST 153	**AC/DC 12 to 24 V**	**AC 230 V**
Test principles	EN 1760-2, EN 12978, ISO 13849-1	
Connecting voltage U_s		
Voltage tolerance	-10% to + 25%	-10% to +10%
Nominal current	35 to 50 mA	12 mA
Nominal frequency	48 to 62 Hz	48 to 62 Hz
External protection	–	250 mA slow-acting
Short-circuit current (max.)	2 A	< 3.0 VA
Power consumption	< 1.5 VA / < 1.5 W	
Times		
Reaction time t_a	< 5 ms	< 5 ms
Re-start time t_w	< 50 ms	< 50 ms

SG-RST 153	AC/DC 12 to 24 V	AC 230 V
Safety classifications		
EN 1760-2: Reset	without	without
ISO 13849-1:2006	Category 2 PL c	Category 2 PL c
$MTTF_d$	33 Years	33 Years
DC_{avg}	90%	90%
B_{10d} (Load: AC 1 A)	18× 10^4	18× 104
n_{op} (actuations)	52560 per year	52560 per year
EN 60664-1: Creep distance and air gap	for soiling degree 2, overvoltage category III / 250 V / basic insulation	for soiling degree 2, overvoltage category III / 250 V / basic insulation
IEC 61140:2001+A1:2004	protection class II	protection class II
Control Unit Inputs		
Sensor	X1, X2	X1, X2
Monitoring resistor	8k2 Ohm	8k2 Ohm
Short-circuit resistance	≤ 400 Ohm	≤ 400 Ohm
Line resistance	≤ 10 Ohm	≤ 10 Ohm
Line length (max.)	100 m	100 m
Switching thresholds		
Sensor activated	< 4 kOhm	< 4 kOhm
Cable break	> 12 kOhm	> 12 kOhm
Test signal	T1, T2	T1, T2
Input voltage (max.)	AC/DC 30 V	AC/DC 30 V
Signal duration	> 30 ms	> 30 ms
Signal pause	> 100 ms	> 100 ms
Switching thresholds	positive negative	positive negative
Test signal active	≥ 9 V ≤ 4 V	≥ 9 V ≤ 4 V
Test signal inactive	≤ 4 V ≥ 9 V	≤ 4 V ≥ 9 V
Control Unit Outputs		
Switching channel K1 (normally closed contact)	14, 13	14, 13
Utilization category	AC-12: 250 V / 2 A	AC-12: 250 V / 2 A
as per EN 60947-5-1	DC-12: 24 V / 2 A	DC-12: 24 V / 2 A
Switching voltage (max.)	AC 250 V DC 24 V	AC 250 V DC 24 V
Switching current (max.)	2 A 2 A	2 A 2 A
Switching capacity (max.)	500 VA 48 W	500 VA 48 W
Switching operations, mechanical	> 4× 10^6	> 4× 10^6
Switching operations, electrical	> 4× 10^5 (AC 250 V / 2 A)	> 4× 10^5 (AC 250 V / 2 A)
Contact fuse protection external	3.15 A quick-acting	3.15 A quick-acting
Mechanical operating conditions		
Cable terminals		
Solid wire	1× 2.5 mm^2 or 2× 1.0 mm^2	1× 2.5 mm^2 or 2× 1.0 mm^2
strand with sheath	1× 1.5 mm^2 or 2× 0.75 mm^2	1× 1.5 mm^2 or 2× 0.75 mm^2
Degree of protection as per IEC 60529	IP65	IP65
max. humidity (23 °C)	95%	95%
Operating temperature	-30 °C to +55 °C	-30 °C to +55 °C
Storage temperature	-30 °C to +55 °C	-30 °C to +55 °C
Impact resistance in operation	2.5 g	2.5 g
Impact resistance transport	10 g	10 g
Dimensions (W × H × D)	120 × 107 × 55 mm	120 × 107 × 55 mm
Weight	315 g	315 g