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Bimetallic and gas pressure instruments for temperature

TH	THERMO-HIT	TK	THERMO-KONTAKT
TM	THERMO-MODUL	T*D	THERMO-DIESEL
TG	THERMO-GAS	TT	THERMO-TEST
TF	THERMO-FLEXIBLE		

Bimetallic thermometers

The temperature as physical unity cannot be measured directly but only upon a phenomenon related to temperature change, like the volume or length expansion of gases, liquids or solid materials.

When a metallic element is submitted to temperature changes, its length varies. This physical property has been used and developed to build temperature measuring devices. The bimetallic sensor is made of two coils, twisted together and welded at their end. Being selected on purpose with very different thermal expansion coefficients, the two materials will generate a torque at their free end when submitted to temperature changes. Thanks to its double helicoid technology, RÜEGER offers the shortest bimetal systems of the world, which guarantees accuracy and short time temperature measurements.

The great success of the bimetal thermometer is due to its outstanding characteristics, such as

- simple and sturdy design
- linear dial scaling with very good legibility
- good precision and nearly no indication hysteresis
- no aging behavior → very long mean time between calibrations
- indication not influenced by ambient temperature or air pressure
- no need of electrical energy
- short sensitive length for spot measurement

All these features make the bimetal thermometer to the best solution for reliable, cost effective, precise and safe temperature measurement. With RÜEGER'S over 60 year's experience as one of the world's leaders in industrial temperature measurement a wide range of thermometers are available covering the highest demands in precision, reliability and ruggedness for applications from laboratory use to marine engine equipment, chemicals, food, pharma.

Gas pressure thermometers

This thermometer uses the volume expansion of gases at temperature changes, in particular the proportional gas expansion of inert gases. These gases can cover temperature changes from -260°C through $+700^{\circ}\text{C}$ and are therefore particularly suitable for high or low temperature measurement. In a closed pressure system the internal pressure change will be proportional to the temperature change, i.e. the pressure will increase when the temperature rises.

The measuring system consists of a bulb with its active volume, a capillary, a bourdon spring and a mechanical gear amplifying the movement of the bourdon tube and transforming it into a rotation. Because the capillary connecting the bulb to the bourdon tube can be bent into any shape and can have a length up to 30m, remote measurement can be executed.

- Main features of the gas pressure thermometers are
- extreme temperature range for mechanical thermometers
 - good precision and very low measuring hysteresis
 - especially when oil filled extremely shock and vibration resistant
 - non-polluting & non-contaminating because of use of inert gases
 - no aging behavior → very long mean time between calibrations

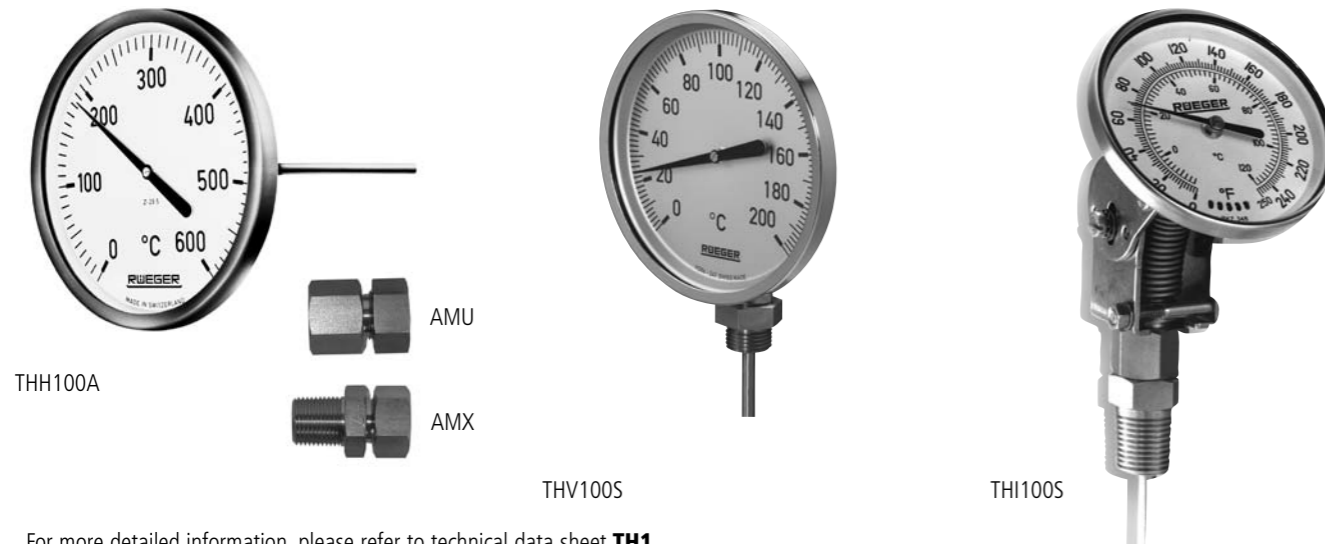
These features allow the use in cleanest and health sensitive environments (pharmaceutical & food industry) as well as for extreme temperatures under highest vibrations.

Thermo-Hit

High performance industrial bimetallic thermometers in stainless steel for petrochemical and industrial applications

RUEGER

A famous trio



THH100A

THV100S

THI100S

For more detailed information, please refer to technical data sheet **TH1**

Application fields

- Chemical, petrochemical, pharmaceutical and food industries
- Process engineering
- Equipment for refrigeration, sterilization and water treatment and offshore installations
- Food processing
- Medical and laboratory apparatus
- Aerospace industry
- Containers

Technical specification

Measuring range
from -70 to +550°C

Head diameters
80, 100, 130, 150 mm

Threads
G1/2A, G3/4A, M18x1.5, M20x1.5, M24x1.5, M27x2, 1/2"NPT, 3/4"NPT

Stems	Lengths
ø 6 mm	60 to 650 mm
ø 8 and 9 mm	60 to 2'000 mm

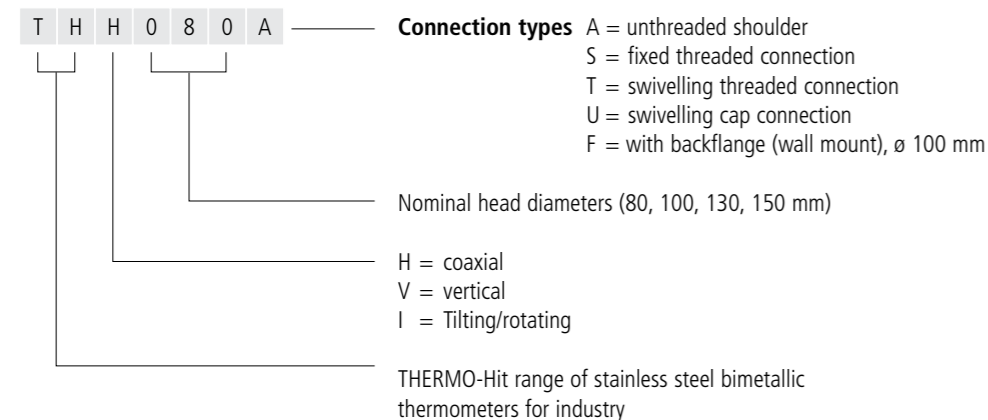
Material
Stainless steel
AISI 304L/1.4306
AISI 316L/1.4404

Advantages

- Fast response
 - Accuracy
class 1 acc. EN 13190 ≤ 400°C
class 2 acc. EN 13190 > 400°C
 - Degree of protection ≥ IP 65
 - Reliability
 - Very good cost/performance relationship
- Options**
- External resetting of thermometers with pierced case
 - Unbreakable acrylic glass
 - Silicone oil filling
 - Index pointer
 - Pierced glass allowing pointer to be reset from outside by means of a special tool
 - Dampened measuring system
 - Head and bezel in stainless steel
AISI 316L/1.4404 (ø 100 & 150 mm)

Ordering code structure

Type



Thermo-Modul

Ultimate top class bimetallic thermometer range in stainless steel with antiparallax dial, for petrochemical and industrial applications

RUEGER

The power system for temperature measurement



TMH100A

TMV100S

TMI100S

For more detailed information, please refer to data sheet **TM1**

Application fields

- Chemical and petro-chemical engineering
- Pharmaceutical industries
- Food industries
- Offshore
- Cryogenics, refrigeration, heating, sterilization
- Industrial plant, e.g. compressors, engines, machines, apparatus, etc

Technical specification

Measuring range
from -70 to +550°C

Head diameters
100, 130, 160 mm

Threads
G1/2A, G3/4A, 1/2"NPT, 3/4"NPT, M18x1.5, M20x1.5, M24x1.5, M27x2

Stems	Lengths
ø 6 mm	60 to 650 mm
ø 8 and 9 mm	60 to 2'000 mm

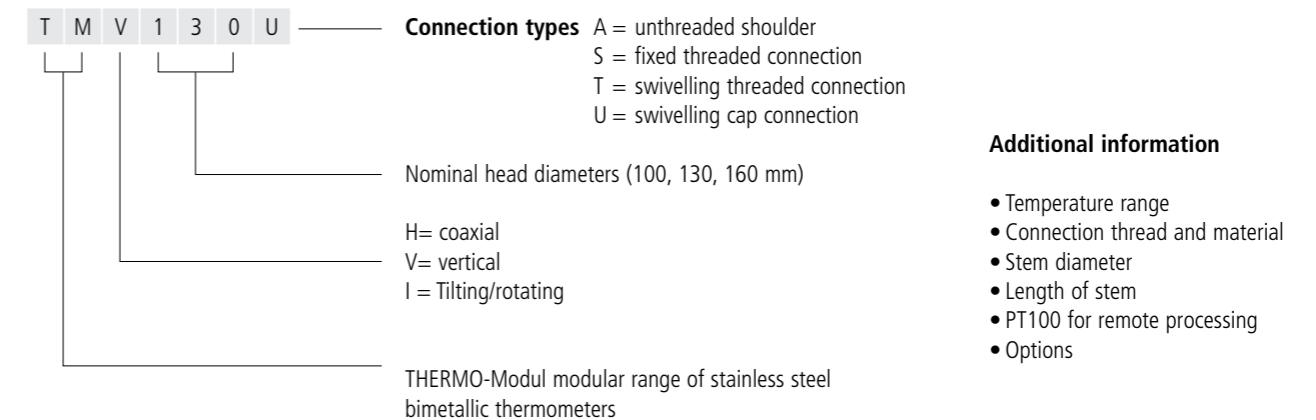
Material
Stainless steel
AISI 304L/1.4306
AISI 316L/1.4404

Advantages

- Parallax free reading
 - High resistance to corrosion
 - Degree of protection IP 65
 - Bayonet bezel
 - Adjustable dial position 360°
 - Most polyvalent thermometer
 - Accuracy
class 1 acc. EN 13190 ≤ 400°C
class 2 acc. EN 13190 > 400°C
- Options**
- Silicone oil filling (100 & 130 mm)
 - Safety glass or unbreakable acrylic glass
 - External adjustment device mounted on glass
 - Bimetallic measuring system damped by silicon grease or oil
 - Index pointer
 - Head and bezel in stainless steel
AISI 316L/1.4404 (ø 100 & 130 mm)
 - Integrated PT100 probe (S90)

Ordering code structure

Type



Thermo-Gas

A modular range of gas pressure thermometers in stainless steel, with rigid stem

RUEGER

A class of its own



TGH100AI



TGV100SI



TGI100AI + AMX

For more detailed information, please refer to data sheet **TG1**

Application fields

- Food industries
- Pharmaceutical industries
- Chemical and petro-chemical engineering
- Offshore
- Cryogenics, refrigeration, heating, sterilization
- Industrial plant, e.g. compressors, engines, machines, apparatus, etc.

Technical specification

Measuring range
from -260 to + 700°C

Head diameters
100, 130, 160 mm

Threads
G1/2A, G3/4A,
1/2"NPT, 3/4"NPT, M18x1.5, M20x1.5,
M24x1.5, M27x2

Stems	Lengths
ø 6 mm	150 to 650 mm
ø 8, 9 and 13 mm	150 to 2'000 mm

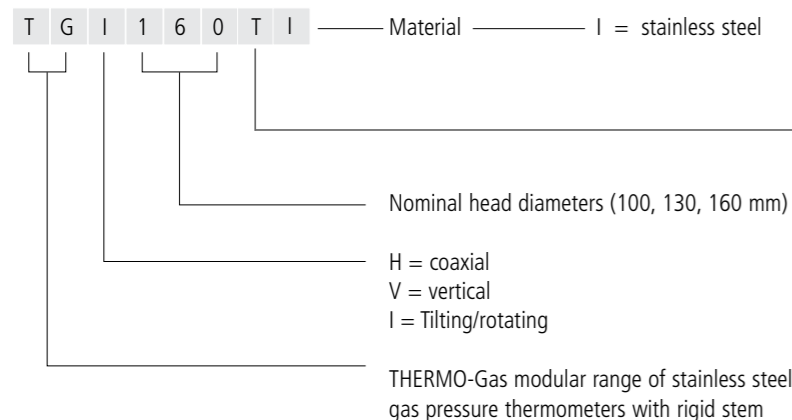
Material
Stainless steel
AISI 316L/1.4404

Advantages

- Wide measuring range
- Fast response
- Non-polluting
- Very resistant to shock and vibration
- Weatherproof \geq IP 65
- Accuracy
class 1 acc. EN 13190 \leq 400°C
class 2 acc. EN 13190 $>$ 400°C
- Options**
 - Safety glass or unbreakable acrylic glass
 - Amplifying movement, stainless steel
 - Ditto, resistant to high vibrations
 - Index pointer
 - Liquid filled
 - Integrates Pt 100 probe (S91)

Ordering code structure

Type



Connection types

- A = unthreaded shoulder
- S = fixed threaded connection
- T = swivelling threaded connection
- U = swivelling cap connection

Additional information

- Temperature range
- Connection thread and material
- Stem diameter and material
- Length of stem
- Pt 100 probe for remote indication
- Options

Thermo-Flexible

A modular range of gas pressure thermometers in stainless steel, with capillary tube

RUEGER

The «high-performance» category



TFH100EI

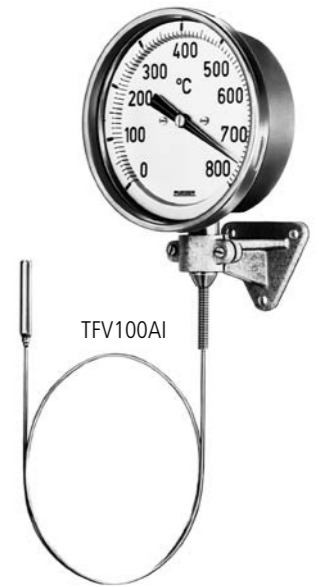


Bulb types:

- type 1
- type 2
- type 3T
- type 4U



TFV100BI



TFV100AI

For more detailed information, please refer to data sheet **TF1**

Application fields

- Food industries
- Pharmaceutical industries
- Chemical and petro-chemical engineering
- Offshore
- Cryogenics, refrigeration, heating, sterilization
- Industrial plant, e.g. compressors, engines, machines, apparatus, etc.

Technical specification

Measuring range
from -260 to + 700°C

Head diameters
100, 130, 160 mm

Threads
G1/2A, G3/4A,
M18x1.5, M20x1.5, M24x1.5, M27x2

Capillary tube
ø 2.5 mm

Capillary lengths
From 0.5 m to 100 m

Temperature bulbs
ø 6, 8, 9 and 13 mm

Sensitive length of bulb
50, 75, 100, 150, and 200 mm

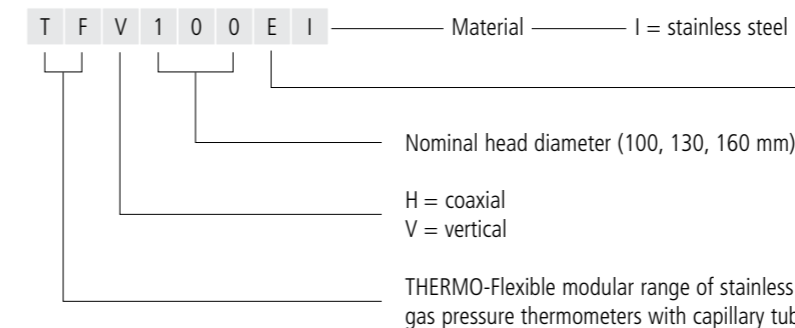
Bulb materials
AISI 316/1.4401

Advantages

- Wide measuring range
- Fast response
- Non-polluting
- Resistant to shock and vibration
- Weatherproof \geq IP 65
- Remote indication
- Accuracy
class 1 acc. EN 13190 \leq 400°C
class 2 acc. EN 13190 $>$ 400°C
- Options**
 - Safety glass or unbreakable acrylic glass
 - Stainless steel gear
 - Ditto, resistant to high vibrations
 - Index pointer
 - Liquid filled
 - Capillary + PVC, PTFE sheathing
 - Integrated Pt 100 probe (S91)

Ordering code structure

Type



Connection types

- A = for bracket mounting
- B = for wall mounting with rear fixing lugs
- E = for panel mounting with rear fixing clamp
- T = with swivelling connection fitted on shoulder
- U = with swivelling cap connection fitted on shoulder
- X = for bracket mounting (A) or for panel mounting (E)

Additional information: refer to technical data sheet **TF1**

Thermo-Kontakt

Bimetallic or gas pressure thermometers with electrical contacts or pneumatic detector

RÜEGER

Safety first



TFV100AIK2.12

TMV100S-K2.22

TGV100SIK2.12

For more detailed information, please refer to data sheet **TK1**

Application fields	Technical specification	Advantages
<ul style="list-style-type: none"> Local or remote reading Alarm or signalling Command or regulation Inherent safety "Ex"-proof models Process control 	<p>Inductive contacts* K2.. High-precision switching, no wear. For explosive atmospheres EEx(i)</p> <p>Pneumatic detector K3.. No electrical supply needed. For explosive atmospheres.</p> <p>Magnetic contacts K4.. For small switching loads, no relay needed.</p> <p>Microswitch contacts K5.. For heavy switching (3A, 250V). Resistant to shock and vibration (TF/TG only).</p> <p>* One switching relay recommended</p>	<p>Compatible with thermometers in modular ranges:</p> <p>THERMO-Modul (page 3)</p> <p>THERMO-Gas (page 4)</p> <p>THERMO-Flexible (page 5)</p>

Thermo-Diesel

Thermometers for diesel engines and compressors: Bimetallic or gas pressure types, Pt 100 probe optional

RÜEGER

Sturdy and easy to read



TSH065AD

TSV065AD

TGV100UD

TFV100BI

S92

For more detailed information, please refer to data sheet **TD3**

Application fields	Types available	Advantages
<p>Thermometers specially designed for mounting on compressors and diesel engines, for measuring the temperature of:</p> <ul style="list-style-type: none"> Inlet air Cooling circuit Exhaust gases Turbocompressors 	<ul style="list-style-type: none"> Bimetallic thermometers with rigid stem Ranges -70 to +550°C Gas pressure thermometers with rigid stem Ranges -260 to +700°C Gas pressure thermometers with capillary tube Ranges -260 to +700°C Pt 100 probes Ranges -220 to +650°C Combined thermometers for local indication (gas filled tube) and remote indication (Pt 100 or T/C type "K") Pockets in stainless steel and other materials, for temperatures up to +1000°C 	<ul style="list-style-type: none"> High reliability under extremes conditions High precision Used by major diesel engine manufactures

Ordering code structure

Type	Configuration
<p>T G I 1 0 0 U I K 2 .12</p> <p>please consult : Thermo-Modul (page 3) Thermo-Gas (page 4) Thermo-Flexible (page 5)</p> <p>Type of THERMO-Kontakt electrical contact or pneumatic detector</p> <p>K2 Inductive sensors (the most precise choice)</p> <p>K3 Pneumatic detector</p> <p>K4 Contacts with magnetic pressure increase</p> <p>K5 Microswitches</p>	<ul style="list-style-type: none"> 1 Contact normally open 2 Contact normally closed 11 2 contacts: 1st "1" type, 2nd "1" type 12 2 contacts: 1st "1" type, 2nd "2" type 21 2 contacts: 1st "2" type, 2nd "1" type 22 2 contacts: 1st "2" type, 2nd "2" type 3 1 changeover contact. Microswitch actioned at switchpoint 33 2 changeover contacts. Microswitch actioned at switchpoint

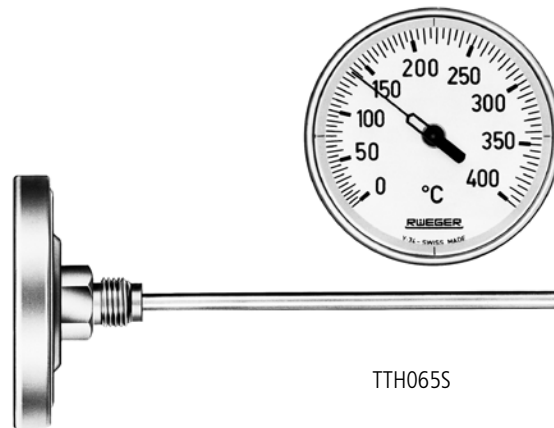
Application background

A complete range of vibration-proof thermometers and probes for diesel engines, compressors and turbochargers

For a diesel engine to run efficiently, the mechanical settings and the combustion conditions must be very precisely regulated. The cooling and lubrication circuits, and the flows of inlet air and exhaust gas, must be held at the correct temperatures, and this is only possible if adequate thermometers are installed which are accurate, reliable, robust and easy to read. Inaccurate temperature readings can lead to inefficient functioning of the engine.

Thermometers for diesel engines and compressors have to work under very tough conditions. They are subject to very severe mechanical forces, and specific measures need to be taken in design to serve for long periods of time without trouble.

As the most important manufacturer of thermometers and temperature sensors, you can benefit of our huge knowledge and experience.

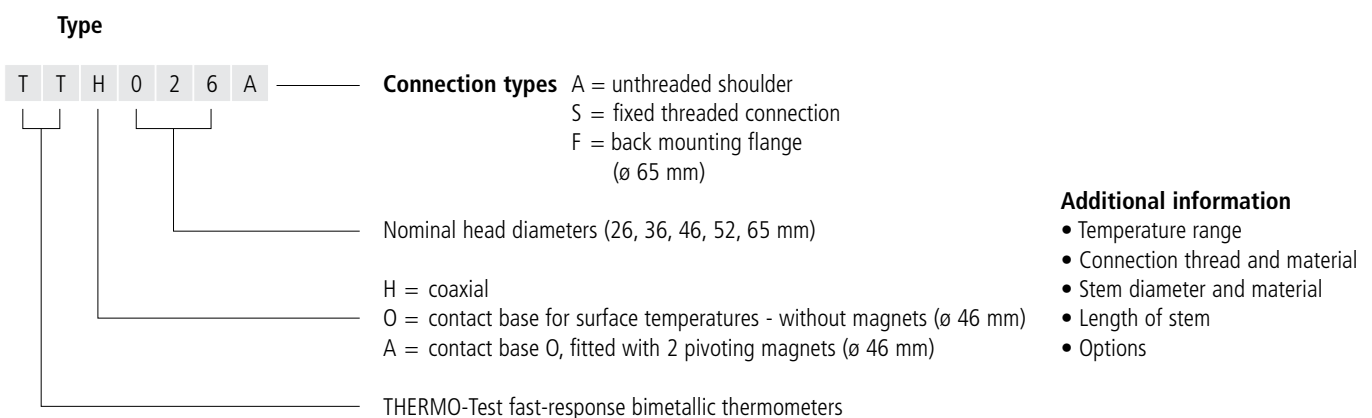


TTH065S

For more detailed information, please refer to data sheet **TT1**

Application fields	Technical specification	Advantages
<ul style="list-style-type: none"> Laboratory Injection moulding, plastic welding Plastics and packaging, general engineering Hydraulic circuits, sterilization, drying plants Fuel preheating circuits Mixer tapes and similar devices Drink dispensers Casting 	<p>Measuring range from -30 to + 400°C</p> <p>Head diameters 26, 36, 46, 52, 65 mm</p> <p>Threads M8, G1/4A, G3/8A, G1/2A, 1/4" NPT, 1/2" NPT</p> <p>Stems ø 4 and 4.5 mm</p> <p>Lengths 60 to 500 mm</p> <p>Material Stainless steel AISI 304L/1.4306</p>	<p>Very fast response 5 sec.</p> <p>Accuracy class 1 acc. EN 13190</p> <p>Degree of protection IP 67 ≤ 200°C IP 54 > 200°C</p> <p>Options</p> <ul style="list-style-type: none"> Unbreakable acrylic glass Movable index marker Bimetallic measuring system dampened by silicon oil Plastic protection sheath Stem with spear point in stainless steel Base fitted with 2 pivoting magnets (TTO)

Ordering code structure



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