

OPERATING MANUAL



***Thermo Switch
Type TS
Types row L / RL / B / BL / EL***



IM2 EEx ia I

SIL II proofed

General Information

Dear Customer,

The flow control device purchased, is a product of **Grünewald GmbH, 59069 Hamm** and is manufactured as a thermo switch for the use for surveillance of rising or falling temperatures.

To ensure long term and safe operation of the control device, read the operating manual attentively.

If further information is required please do not hesitate to contact our technical support via Grünewald GmbH, Oberallener Weg 7, 59069 Hamm, Tel. +49 (0)2385 922670,

Fax +49 (0)2385 922672.

Internet: www.gruenewald.eu

E-Mail: info@gruenewald.eu

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1. Introduction

This operating manual will assist to operate the thermo switch TS in a safe, proper and economical manner.

Observing the instructions of this manual will:

- Increase reliability and lifespan of the control facility.
- Prevent possible danger.
- Avoid down times caused by failures and repairs.

This manual must:

- be present whilst any installation, maintenance and repair work is performed.
- be read, acknowledged and applied by any person performing tasks to and at the thermo switch TS

Grünewald control and measuring devices operate mainly on electric-mechanical principles. The general installation and operating manuals as well as the product information's do therefore refer to the mechanical and electrical data of the individual device or assembly.

The thermo switch TS is manufactured to latest technical and safety relevant standards, rules and regulations. However, abuse and operation of the device within incorrect applications may result in serious injury or death of the user and/or a third party, as well as it may endanger equipment and other property.



2. General

2.1 General information to the operating manual

This operating manual contains all necessary information required, to ensure correct and safe installation as well as operation of the device. The manufacturer or distributor must be contacted for further information and assistance, if arising difficulties and problems can not be solved within the operating manual provided information. Changes to specification and design as well as improvements to the device are subject to change with out notice and are fully to the discretion of the manufacturer. Users of this operating manual must fulfil required qualification standards. Operating personnel must be trained in accordance to the operating manual.

2.2 General safety instructions

Read the operating manual of the thermo switch TS prior commencement of any work and acknowledge instructions during execution and operation.



The correct condition and operation of the device as well as the compliance with safety rules and regulations is the full responsibility of the operator. The thermo switch TS is manufactured to latest technical and safety relevant standards, rules and regulations. However, abuse and operation of the device within incorrect applications may result in serious injury or death of the user and/or a third party, as well as it may endanger equipment and other property.

Use and operation of the thermo switch TS is only permitted when:

- **the compliance with the intended purpose of use is granted.**
- **the condition of the device complies with safety relevant rules.**

Take note of the technical data of the thermo switch TS and the ambient temperatures. The intended purpose of use of the thermo switch TS is described with in chapter **8** of this Documentation and must be acknowledged. Awareness of the basic safety instructions and rules is the minimal requirement for the safe use and trouble free operation of thermo switch TS. Additionally, all site specific rules and regulations, such as, but not limited to, occupational health and safety rules, rules and standards for erecting and using of electric and mechanical facilities, as well as radio noise suppression rules and standards, must be complied with.

Pay attention and care to tidiness of workspace during performance of repair and maintenance tasks. Do not eat or smoke during work. Unauthorized altering or modifying the equipment will cause loss of any warranty and liability provided by the manufacturer.

Take note of the operating manual and pay special attention to safety symbols and safety instructions on the device and the documentation. Please store the operating manual carefully.

3. Obligations of the Operator

It is the full responsibility of the operator that only persons complying with below out lined regulations are authorized to work on and with the devices.

Persons authorised must,

- be confident and trained with rules of occupational health and safety und the handling and operation of the equipment.
- has read, understood and acknowledged the safety instructions and warnings of this operating manual and all other, with the device associated documentations.
- is examined for compliance and consciousness of work place safety rules on regular bases.

Installation, maintenance and repair work must be performed by trained and qualified personnel only. Faults, which may influence safety, must be rectified immediately.

4. Obligations of User Personnel

Personnel authorized to fulfil tasks at the thermo switch TS must be familiar with the operating manual.

Persons authorized to work on the device must permanently commit them self's to:

- Acknowledge the basic occupational health and safety rules at all times.
- Read and acknowledge safety instructions and warnings of this operating manual.

4.1 Qualified personnel

These are persons, familiar with the installation, assembly, commissioning and operation of the product. Furthermore these persons must be qualified and trained for tasks, these persons are authorized to perform. (E.g. training and obligation to maintain required operating conditions in accordance to regional and site-specific rules and regulations).

Education or training for care and use of safety and protective equipment, according relevant standards of safety techniques.

5. Warranty and Liability

Our standard terms and conditions of sale and delivery apply, unless other conditions for warranty and liability were explicitly mutually agreed upon. Claims of warranty or liability leading back to any of the below described causes is not legitimate.

- Using the thermo switch TS not in compliance with the intended purpose of use of this item.
- Incorrect installation, commissioning, operation and maintenance of the thermo switch TS
- Operation of the thermo switch TS in conjunction with defective safety devices or in correctly installed safety and protective devices.
- Neglecting of instructions regarding transportation, storing, installation, commissioning, operation and maintenance of the thermo switch TS.
- Unauthorized modification or adjustments of the thermo switch TS.
- Inappropriate condition monitoring of parts subject to wear.
- Incorrect repairs, inspections and maintenance.
- Catastrophic failures caused by external forces and force majeure.

Any liability for damages caused by in correct operation of the thermo switch TS will be rejected.

6. Warnings and Safety relevant Standards

For references to special hazards and uncommon information's signal the terms **DANGER**, **WARNING**, **ATTENTION** and **REMARK** are used within this operating manual.

DANGER neglecting may cause danger to life and/or serious damage to property.



WARNING neglecting may cause, serious injury and/or damage to property.



ATTENTION neglecting may cause, injury and/or damage to property.



REMARK indicates that special attention to technical correlations is required.



To prevent injury and damage of property due to failure of the device, the acknowledgement of the not specially marked instructions for transportation, installation, product range and maintenance is an absolute necessity.

7. Observing of Environmental Rules and Regulations

Rules and regulations for waste prevention and disposal must be followed at all times when working with or at the thermo switch TS. Materials that may endanger and pollute water such as:

- Grease, oil and Lubricants
- Hydraulic fluids
- Coolants
- Cleaning fluids containing solvents

must not be emitted to surrounding soil, waters and drains. Such materials must be stored, transported and caught, in suitable containers. For safe and environmentally friendly disposal of hydraulic fluids and with such fluids contaminated materials, national and international laws, rules and regulations must be acknowledged.



8. Intended Purpose of Use

The use of the thermo switch is for the monitoring of rising and falling temperatures only. Any adaptation as well as modification or extension of the device, not complying with the intended purpose of use is prohibited and requires the explicit and exclusive approval of the manufacturer.

Acknowledgement of the operating manual and instructions for inspection and maintenance as well as the observance of inspection and maintenance intervals are subject of the intended purpose of use.

Any damage that may arise out of the incorrect use will not be at the responsibility of the manufacturer. The sole risk devolves at the user.

8.1 Range of Application

The use of the thermo switch is for the monitoring of rising and falling temperatures only. It should be mounted mechanically at points where a specified temperature must be monitored. The temperature is conveyed to the measuring device where it is evaluated using the monitoring unit, depending upon the technical equipment this registers the signal and can be sent to the signal wire.

9. Installation / Commissioning / Assembly Instructions

- **DANGER**

- Heed application temperature
- Create a non slip surface
- Use thermal conductance paste
- Avoid mechanical damage



- **ATTENTION**

- Clear mounting points, do not obstruct
- Heed circuit plan when connecting
- Check control plan to avoid overloading



- **NOTE**

- Create firm connection
- The unit must not be used as a mounting point.



10. Description

The thermo switch (which must be used inside an intrinsically safe unit) is used as an accessory and contains only elements that do not affect the intrinsically safe usage of other surrounding equipment.

The thermo switch contains of a housing made of brass. Inside is a temperature dependant switch element which is submerged in a sealing compound.

The electrical connection of the switch element use (depending on the model) a pin and socket connector, or a fixed cable which protrudes out of the sealing compound of the housing.

For use of wire monitoring, to resistors or an end element have been built in optionally.

11. Operation, Maintenance and Repair

Rules and regulations for workplace safety and occupational health and safety apply for the operation of the device.

Modifications, add-ons and / or changes to the thermo switch TS may influence safety and must not be performed unless approved by the manufacturer.

The devices are, apart from periodical cleaning, which is dependent on the degree of pollution of the medium, maintenance free units.

- Appropriate workshop equipment is absolutely necessary for the execution of maintenance measures.
- Regulations for electrical equipment must be observed.
- Incorrect use, operation or repair may result in severe injury or death.
- Prior any repair or maintenance task commences local rules and regulations must be acknowledged.

12. Transportation / Storage

- Transport temperatures shall not exceed the range of -20°C to 60°C within a dry and clean environment.
- Protect against external forces.
- Storage temperatures shall not exceed the range of -20°C to 60°C within a dry and clean environment.
- To prevent any condensation of water when stored in rooms with a high degree of humidity, measures such as heating of the room or application of drying agents is required.

13. Hazards

For specified normal operation, there are no hazards known by the manufacturer.

Hazards due to transportation, storage, fitting, running, maintenance, and servicing are to be observed by the user.

Dangers that arise whilst fitting and connecting the device are to be considered and the corresponding actions are to be taken and a hazard analysis is to be rendered.



14. Technical assistance

For assistance in an event of malfunctioning or failure of the device please contact

Grünewald GmbH, 59069 Hamm

Tel. +49 02385 922670, Fax +49 02385 922672

or *E-Mail:* info@gruenewald.eu

15. Technical details

TS/L.... TS/B... respectively

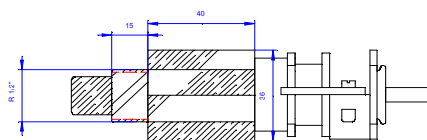
Voltage	Ui	24	V
Current	Ii	2,5	A
Internal capacitance max.	Ci	may be neglected	
Internal inductivity max.	Li	may be neglected	
Switch temperature	°C	40°C / 50°C / 60°C / 80°C	

TS/BL.... TS/RL.... respectively

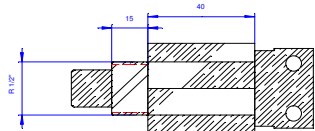
Voltage	Ui	24	V
Internal capacitance max.	Ci	may be neglected	
Internal inductivity max.	Li	may be neglected	
Switch temperature	°C	40°C / 50°C / 60°C / 80°C	

TS/EL...

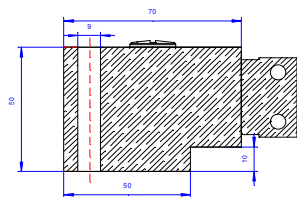
Voltage	Ui	12	V
Current	Ii	15	mA
Capacity	Pi	180	mW
Internal capacitance max.	Ci	may be neglected	
Internal inductivity max.	Li	may be neglected	
Switch temperature	°C	40°C / 50°C / 60°C / 80°C	



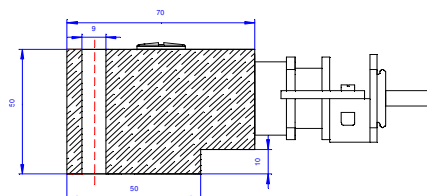
- TS / RL...°C
Version with connection cable (max. 10m)
- TS / REL...°C
Version with wire monitoring end element and connection cable (max. 10m)



- TS / RB...°C
Version with wire monitoring resistors and PROMOS plug connector Type BN 41** **



- TS / B...°C
Version with PROMOS plug connector Type BN 41** **
- TS / BL...°C
Version with wire monitoring resistors and PROMOS plug connector Type BN 41** **



- TS / L...°C
Version with connection cable (max. 10m)
- TS / EL...°C
Version with wire monitoring end element and connection cable (max. 10m)

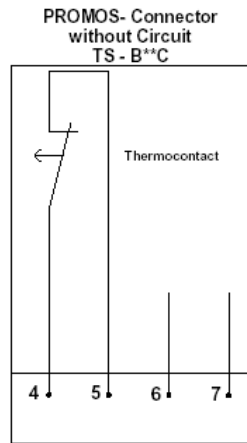
Logic function of the thermo switch with end element „EL“:

Lead „grey“ Voltage	Lead „black“ Voltage	Switch position	operation
negative / 0	positive	switch closed	L (conductive 1)
negative / 0	positive	switch open	0
positive	negative / 0	switch closed	0
positive	negative / 0	switch open	L (conductive 1)

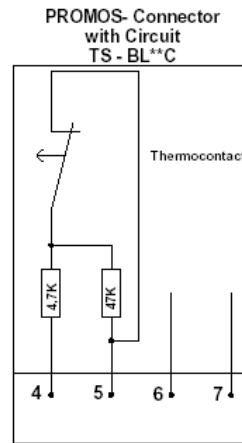
When connecting the thermo switch with the end element „EL“ using the BECKER control system the following allocation applies. (Switch opens when the temperature is reached/Line 3)

Grey: Output of the frequency generator (for example clamp 2, 4, 6,)
Black: Input of the evaluating electronics (for example clamp 1, 3, 5,)

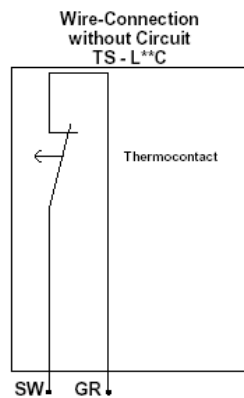
16. Electrical Connection



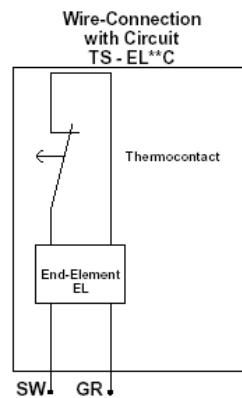
Connection
Type PROMOS



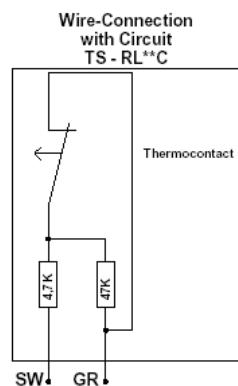
Connection
Type PROMOS



Wire-Connection



Wire-Connection



Wire-Connection

Note:

The marking ** is for the specification of the according switch temperature in degrees celcius of the thermo switch.

17. Environmental protection

ATTENTION!

For safe and environmentally friendly disposal of operating and process materials as well as replacement parts, national and international laws, rules and regulations must be acknowledged. Observe any relevant safety rules and data sheets when handling oils, greases and other chemical substances.



18. EG-Model test certificate

<p style="text-align: center;">1. Addendum (Addendum to guidelines 94/9/EG annex III number 6)</p> <p style="text-align: center;">for the EG Prototype technical release certificate. DMT 02 ATEX E 256</p> <p>Device: Thermic switch Type TS/**</p> <p>Manufacturer: Grünwald GmbH</p> <p>Address: D – 59069 Hamm</p> <p><u>Description</u></p> <p>The thermic switch can be manufactured according to the test report and receives the following nomenclature:</p> <p>Thermic switch Type TS/**</p> <table style="margin-left: 20px;"> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black; width: 20px;"></td> <td style="border-bottom: 1px solid black;">Switch temperature 40°/50°/60°/80°C</td> </tr> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black;">L</td> <td style="border-bottom: 1px solid black;">= Cable length (max 10m)</td> </tr> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black;">RL</td> <td style="border-bottom: 1px solid black;">= version with cable monitoring resistors and connection cable (max 10m)</td> </tr> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black;">B</td> <td style="border-bottom: 1px solid black;">= Socket connector Type BN 41****</td> </tr> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black;">BL</td> <td style="border-bottom: 1px solid black;">= version with cable monitoring resistors and Socket connector Type BN 41****</td> </tr> <tr> <td style="border-left: 1px solid black; border-bottom: 1px solid black;">EL</td> <td style="border-bottom: 1px solid black;">= version with cable monitoring end element and connection cable (max 10m)</td> </tr> </table> <p>If the thermic switch is supplemented with a cable monitoring end element, it receives the following nomenclature: TS/EL*</p> <p>The basic health and safety regulations as well as environmental regulations regarding the device have been achieved and are according with</p> <p>EN 50014:1997 + A1 – A2 General terms EN 50020:2002 Intrinsically safe "r"</p> <p><u>Characteristics</u></p> <ol style="list-style-type: none"> 1. Version TS/L*, TS/B*, TS/BL*, TS/RL* unchanged 2. Version TS/EL* <table style="margin-left: 20px;"> <tr> <td>Voltage</td> <td>U_i</td> <td>24 V</td> </tr> <tr> <td>Current</td> <td>I_i</td> <td>200 mA</td> </tr> <tr> <td>Power</td> <td>P_i</td> <td>500 mW</td> </tr> <tr> <td>Internal effective capacity</td> <td>C_i</td> <td>negligible</td> </tr> <tr> <td>Internal effective induction</td> <td>L_i</td> <td>negligible</td> </tr> </table> 3. Surrounding temperature area: $-20^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$ <p style="text-align: center; font-size: small;">Side 1 of 2 to DMT 02 ATEX E 256/N1 This certificate may only be distributed in its unchanged form.</p>		Switch temperature 40°/50°/60°/80°C	L	= Cable length (max 10m)	RL	= version with cable monitoring resistors and connection cable (max 10m)	B	= Socket connector Type BN 41****	BL	= version with cable monitoring resistors and Socket connector Type BN 41****	EL	= version with cable monitoring end element and connection cable (max 10m)	Voltage	U _i	24 V	Current	I _i	200 mA	Power	P _i	500 mW	Internal effective capacity	C _i	negligible	Internal effective induction	L _i	negligible	<p style="text-align: center;"><u>Test certificate</u></p> <p style="text-align: center;">BVS PP 02.1146 EG, revision 16.04.2004</p> <p style="text-align: center;">EXAM BBG testing and certification GmbH Bochum, the 16th of April 2004</p> <p style="text-align: center; margin-top: 100px;">Certification centre</p> <p style="text-align: center; margin-top: 100px;">Department</p> <p style="text-align: center; font-size: x-small; margin-top: 100px;">Side 2 of 2 to DMT 02 ATEX E 256/N1 This certificate may only be distributed in its unchanged form.</p>
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Current	I _i	200 mA																										
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Internal effective induction	L _i	negligible																										

19. EU-Declaration of conformity

EU-Konformitätserklärung *EU Declaration of Conformity*

Im Sinne der: *In the legal scene of:*

- EU- Richtlinie Explosionsschutz 2014/34/EU
EU direction 2014/34/EU for equipment and protective systems intended for use in potentially explosive atmospheres explosion prevention
- EU- Richtlinie über die elektromagnetische Verträglichkeit EMV- Richtlinie 2014/30/EU
EU- guidelines over the electromagnetic sociability EMV- guidelines 2014/30/EU

Für das: *For:*

Bezeichnung / *description*

TS/**

Kennzeichnung / *marking*

⊕ I M2 EEx ia I

Zulassung / *certification*

DMT 02 ATEX E 256

Seriennummer / *serial number*

Lt. Lieferpapieren / *according to delivery documets*

Notifizierte Stelle / *notified body*



0158 **DEKRA EXAM GmbH,**
Dinnendahlstraße 9, D- 44809 Bochum

EU- Baumusterprüfbescheinigung / *EU- Type Examination Certificate:*

DMT 02 ATEX E 256

Der Hersteller / *the manufacturer*

Grünwald GmbH
Oberallener Weg 7
D- 59069 Hamm

Tel.: +49 (0) 2385 / 922670

Fax: +49 (0) 2385 / 922672

Mail: info@gruenewald.eu

Hiermit bestätigen wir, dass die vorgenannten **TS der Grünwald GmbH, Mess- u. Regeltechnik** den wesentlichen Anforderungen entsprechen, die in den Richtlinien des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (2014/34/EU, 2014/30/EU) in der aktuellen Fassung festgelegt ist. Die Erklärung gilt für alle Exemplare, die nach den beim Hersteller hinterlegten Fertigungsunterlagen - die Bestandteil dieser Erklärung sind - hergestellt wurden.

We herewith declare conformity of the above mentioned TS of Grünwald GmbH, Mess- u. Regeltechnik, with the general directives outlined in the actual edition of the guidelines (2014/34/EU, 2014/30/EU) for equipment and protective systems with the intended purpose of use within explosive environment / atmospheres, of the council for approximation of laws of the member states.

This declaration is valid for all issues produced in accordance to the manufacturing documents of the manufacturer, which also form part of this declaration.

Zur Beurteilung der Erzeugnisse wurden folgende Normen herangezogen:

Following standards were used for the assessment of the products:

EN 60079-0:2015	Explosionsgefährdete Bereiche – Teil 0: Allgemeine Anforderungen <i>Explosive atmospheres - Part 0: Equipment - General requirements</i>
EN 60079-11:2012	Explosionsgefährdete Bereiche – Teil 11: Geräteschutz durch Eigensicherheit „i“ <i>Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"</i>
VDE 0118	Errichten elektrischer Anlagen im Bergbau unter Tage – Teil 1: Allgemeine Anforderungen <i>Installation of electrical equipment – Part 1: General requirements</i>
EN 61508-1	Funktionale Sicherheit sicherheitsbezogener elektrischer/elektronischer/programmierbarer Systeme – Teil 1: Allgemeine Anforderungen <i>Functional safety of electrical/electronic/programmable electronic safety related systems – Part 1: General requirements</i>

- EN 61508-2 Funktionale Sicherheit sicherheitsbezogener elektrischer/elektronischer/programmierbarer Systeme – Teil 2: Anforderungen an sicherheitsbezogene elektrische/elektronische/programmierbare elektronische Systeme
Functional safety of electrical/electronic/programmable electronic safety related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety related systems
- SN 29500 Ausfallraten Bauelemente, Erwartungswerte, Allgemeines; Ausgabestände der einzelnen Teile
Failure rates components, expectation, general; Versions of the individual parts
- EN 61000-6-2 Elektromagnetische Verträglichkeit (EMV) - Teil 6-2: Fachgrundnormen – Störfestigkeit für Industriebereiche
Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments

Im Sinne der EG- Richtlinie Maschinen 2006/42/EG handelt es sich hier um eine auswechselbare Ausrüstung für eine übergeordnete Maschine. Die Gefährdungsanalyse der übergeordneten Maschine muss alle wesentlichen Risiken, die durch den Zusammenbau entstehen oder dem Hersteller nicht bekanntes EMV- Umfeld, überprüfen und in eine Risikokategorie einteilen. Entsprechende Maßnahmen sind durch die Gesamtmaschine zu gewährleisten.

For the purposes of the EC Machinery Directive 2006/42/EG, these are interchangeable equipment for a superordinated machine. The hazard analysis of the superordinated machine has substantially all the risks incurred by the assembly or producer check-known EMC environment, and classified into a risk category. Appropriate measures have to be guaranteed by the entire machine.

Ausgefertigt in / *done at*

Hamm

Am / *on*

March, 08th 2016

Name des Unterzeichners / *name of signatory*

Michael Wolf, Geschäftsführer oder Vertretung /

General manager or representative

Unterschrift / *Signature*



(Maschinelle Unterschrift / *machine- signature*)



Oberallener Weg 7
59069 Hamm / Germany
Phone +49 (0) 23 85 92 26 70
Fax +49 (0) 23 85 92 26 72
info@gruenewald.eu
www.gruenewald.eu