

# Gewässer Umwelt Schutz GmbH



# **GGW/AGW glykol protector**

Product brochure GGW/AGW glycol protector GHS valve GlyTron Multi GES glycol protector GEO geoprotector



# Water – our most important resource

Since 2005, GUS Gewässer-Umwelt-Schutz GmbH has been highly regarded as an experienced partner when it comes to catchment systems for securing escaping water-polluting substances so that they can be properly and safely recycled or disposed of. Customers across Germany put their trust in GUS expertise.



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# The GGW/AGW glycol protector

The GGW/AGW glycol protector is a catchment system for refrigeration and air-conditioning systems installed on top of the protector and, in accordance with legal requirements, prevents water-glycol mixtures that have run into the protector (water hazard classes one to three – WGK1-WGK3) from being flushed out during rainfall.

The system has been certified by TÜV Rheinland.

# Further information on the GGW/AGW Glycol Protector:

- Low Voltage Directive:
- CE according to 2006/95/EC
- EMC: CE according to 89/336/EEC
- Maintenance-free drain valves

The GGW/AGW glycol protector is a safety system made of stainless steel 1.4301 or aluminium AlMg<sup>3</sup> with a material thickness of 1.5 mm. To protect against corrosion, the entire surface of all stainless-steel elements is pickled.



# The GGW/AGW glycol protector

The GGW/AGW glycol protector is an extension to the oil protector. In addition to preventing the escape of light liquids (e. g. oils), it also prevents the escape of water-glycol mixtures or other water-soluble substances, in accordance with legal requirements.

The system monitors the water-glycol circuit by means of a digital pressure (or GES) sensor. The information supplied is processed by the control module. System-related pressure fluctuations are distinguished from an emergency scenario (leakage).

In this case, the safety valves used are immediately closed. Escaping water-polluting substances are retained in the glycol protector, and the operator is alerted.



# Function

The water-glycol circuit is constantly monitored by modern sensor technology. The switch box is IP65-protected and UV-resistant, and contains a microprocessor, relays, terminal blocks and the complete internal wiring. The microprocessor evaluates data from the sensors. If the control unit reports a leakage in the liquid circuit, the drain valves are locked and an alarm contact is activated. As such, the leaking water-glycol mixture is safely retained. Special switching technology prevents the valves from opening again without the operator having given spproval. The alarm is shown as plain text on the microprocessor display. Up to two liquid circuits can be monitored with the GES or pressure sensor.

To meet the requirements of safety systems, in the event of a power failure, microprocessor defect, cable break, faulty valve control or sensor defect, the drain valves are automatically closed, locked and the alarm contact activated.

The drain valves are protected from external conditions by a stainless steel or aluminium housing and are equipped with isolated contacts for alarm and operating messages. An additional defrost heater is not required for ye-arround operation of the valves.

The largest possible amounts of precipitation in Germany are safely collected or discharged.

The GGW/AGW glycol protector meets the requirements of Section 62 ff of the German Water Resources Act (WHG) and the German Systems Ordinance (AwSV). The strict guidelines of the German Ordinance on Installations for Handling Water Pollutants (WasgefStAnIV) are also fulfilled. The intelligent pressure monitoring system can also be accessed digitally via the internet at any time.

# GGW/AGW glycol protector



Base pedestals or other special solutions according to requirements

# Note:

When selecting in GGW/AGW glycol protector, a large enough size has to be chosen to ensure that all machine parts carrying water-polluting substances are located in the vicinity of the GGW/AGW glycol protector itself. The separators must not be covered with water-bearing parts.

Ensure that rain can fall unimpeded on the sloping rain collector. In addition, ensure that the stanless-steel material used for the substructure, grade 1.4301 or aluminium AlMg<sup>3</sup>, has a wall thickness of 1.5 mm.

Accordingly, a sufficient substructure must be provided to prevent yielding unter load.



1 switch box (control module), IP65-protected and UV-resistant



Catchment tray, multi-piece - depending on requirements



Safety valve with actuator depending on requirements

1 weather protection cover



GES sensor

(including 5 m cable)

1 pressure sensor <sup>1</sup>/<sub>2</sub>" in refrigeration circuit (5 m cable included)

# Description

The German Water Resources Act and the German Systems Ordinance regulate the handling of water-polluting substances. The stainless steel/aluminium AIMg<sup>3</sup> GGW/AGW glycol protector help meet these legal requirements.

In the event of leaks, it prevents water-pollutant oil and glycol from class one to three from contaminating the environment,

as per legal requirements. The GGW/AGW Glycol Protector with integrated oil separator removes the highest amount of precipitation measured in Germany, without causing the tray to overflow.





**TÜV report** 





# Expert opinion on a leak detection and Collection system for refrigeration and air conditioning systems - glycol protector -

Contracting party:

GUS Gewässer-Umwelt-Schutz GmbH Bentheimer Straße 300 48531 Nordhorn

Processed by:

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# 1. Starting point

The enginieering office UAP, Grimmstraße 9, D-36381 Schlüchtern, was commissioned by the company GUS Gewässer-Umwelt-Schutz GmbH, Bentheimer Str. 300, D-48529 Nordhorn to prepare an expert opinion on the effectiveness of a leak detection and collection system for refrigeration and air conditioning systems (glycol protector).

The glycol protector is used to monitor the glycol circuit in refrigeration and air conditioning systems which are to be used in particular for ventilated, outdoor installation.

This results in the requirement during normal operation to drain off rainwater, detect and indicate a fault in the event of a leak and reatain the leak and the rainwater that accumulates.

The basic layout and function of the glycol protector is described in Annexes 1 to 3. The glycol protector can be assembled in modular form to create complex systems. It can therefore be used in systems of various sizes.

In refrigeration and air conditioning systems, water-polluting substances are used as coolants. To ensure safe operation, the requirements of the Federal Water Act (WHG) /1/ and the Facilities Ordinance (AwSV) /2/ therefore need to be complied with.

The effectiveness of the detection and retention of leaks in the event of a defect in the glycol circuit are to be considered in the expert opinion.

#### 2. Legal Basis

The system was assessed taking the following regulations into account in particular:

- Federal Water Act (WHG)- Act for regulating the water economy dated July 31, 2009 (last amended on January 28, 2019).
- Ordinance on facilities for handling substances hazardous to water (AwSV) dated April 18, 2017.
- Worksheet DWA-A 785 Technical Rule for Substances Harmful to Water (TRwS)
  Determination of the retention capacity until appropriate safeguards become effective - R1 - dated July 2009<sup>1)</sup>
- Worksheet DWA-A 786 Technical Rule for Substances Harmful to Water (TRwS)
  "Designing sealing surfaces", October 2005<sup>1)</sup>
- , Directive on the requirements for steel collection trays with a volume of up to 1000 litres (StawaR)" in the version from April September 2011, Deutsches Institut für Bautechnik, Kolonnenstr. 30B, D-10789 Berlin





The assessment of the electrical part of the safety system is based on the expert opinion "Expert opinion on the function of a pressure monitoring system with switch-off for glycol retention" TÜV mark 296-le-10470438 from TÜV Rheinland Industrie Service GmbH dated 17/09/2010 (Annex 4).

Fire and explosion protection requirements were not part of this assessment.

# 3. System Description

According to Sec. 62 WHG /1/ the system under consideration is a system for using substances hazardous to water.

The glycol protector consists of a steel collection tray under the cooling unit,

a pressure sensor and a quick-action fitting which is electrically controlled over a switch box. If the pressure in the cooling circuit falls below the set pressure by 0.2 bar, the controller integrated into the switch box should activate the locking mechanism on the collection tray for longer than one second and lock the system until the fault is eliminated.

The leak (coolant) should be retained in the collection tray. A separator for oils is integrated into the collection tray.

The separator is designed to retain oils used to lubricate the compressor.

The manufacturer's design of the collection tray is based on the maximum leakage amount escaping.

The glycol circuit is completely filled with liquid in the system to be evaluated.

The following materials are used in the system:

Material	Physical state	WGK
Glycol-water mixture	Liquid	1
R407c refrigerant	Gaseous	1 <sup>2)</sup>
Motor oil / ester oil	Liquid	1 <sup>2)</sup>

Installation: Above ground, inside and outside buildings

Risk level according to the Facilities Ordinance (AwSV): The hazard level is to be determined for each system depending on the quantities of water hazardous substances present.







Main components of the system:

- Steel collection trays
- Pressure sensor
- Control box
- Cut-off valve
- Oil separator.

In the cooling systems, a heat exchanger separates the cooling circuit filled with a glycol-water mixture and the refrigerant circuit filled with the refrigerant.

According to the product information available, the glycol-water mixture is released in liquid form in the event of damage.

The coolant is miscible with water and should be retained in the collection trays under the cooling units.

It is assumed that the compressor refrigerant that is liquefied under pressure evaporates when released.

The refrigerant is mixed with ester oils to lubricate the compressor. According to WHG and Sec. 17 AwSV the following basic requirements need to be complied with:

- Planning of the system by expert planners
- Selection of suitable materials
- Detectability of leaks
- Retention of leaks

- Systems must be leak-proof, stable and demonstrate sufficient resistance to the mechanical, thermal and chemical influences expected.

These requirements are implemented for the system type presented by way of:

- Planning by qualified planners

- Installation by trained and specialist companies according to WHG

- Use of materials that are proven to be suitable

(Proof in the form of durability lists and operational experience with the materials used)

- Leak is detected over the pressure monitoring in the system

Leak is prevented by installing stainless steel collection trays acc. to / 5 /

demonstrating sufficient retention volume taking into account / 3 / and /2/.

(Specific reference is made to Sec 18 in / 2 /)

- The stability of each system is verified within the context of the planning.

Further specification of the requirements for refrigeration systems with liquid water-polluting substances can in particular result from /2/ Sec. 35 (3).





# 4. Test setup to evaluate the functional principle and the retention capacity

To evaluate the effectiveness of the system, the following test setup was installed on the company premises at GUS Gewässer Umwelt-Schutz GmbH:

A Type-SIAL HS cooling unit from the company Frost was placed over a 1.4301 steel collection tray with a wall thickness of 1.5 mm.

The collection tray has a capacity of 168 litres and the height of the side walls is 150 mm. The collection tray is equipped with a separation system for light liquids (oil protector).

The electrical part of the monitoring system consists of a pressure transmitter, a digital display instrument and a rotary actuator with emergency control function.

To evaluate the functional principle, leaks according to /3/ Section 4.3.3 were simulated and the actual leakage quantity flowing out and the reaction times by the pressure monitoring system and shut-off mechanism were determined.

It was assumed that the leak took place in a pipe section made of a metallic material.

Since a leak in the system cannot be excluded in the event of a simultaneous precipitation event, a precipitation quantity of 50 l/m2 was considered in the evaluation for the retention volume available.

During normal operation during or after a rainfall event, the oil protector installed in the collection tray drains the collection tray to a filling level of 15 mm.

It is assumed that this volume cannot be taken into account when assessing the retention volume.

In the cooling unit under consideration, the heat exchanger glycol-water mixture/R407c refrigerant is located at the front of the fan compartment separated by a metal wall. It was assumed that the glycol-water mixture released condenses on the housing walls and drips into the collection tray.

If necessary, a suitable splash guard needs to be fitted if other units are used.

The alarm and retention function was tested at a system pressure of 2 bar and 3 bar.







# 5. Remarks

The system under consideration here detected and indicated leaks that occur outside the collection tray. This may make further retention options necessary when designing the safety concept for the entire system.

If applicable, systems needs to be secured against siphoning off.

Switching off feed pumps at the time the leak is reported limits the overrun quantity.

The requirements of water law need to be complied with depending on the classification into the hazard levels according to Sec. 39 AwSV.

Please refer to the specifications in /5/ for winter operation. The procedures and equipment described there did not form part of this test.

The system will need to be reassessed if the legal basis or the technical equipment changes.

#### 6. Summary

The glycol protector detects, displays and retains leaks. The size of the collection system is sufficiently dimensioned for the test setup presented here.

Larger amounts of rainfall can also be retained by varying the height of the backsplash.

The suitability of the materials used was proven.

The system presented fulfils the basic requirements according to Sec. 17 AwSV when the manufacturing conditions and the assembly, installation and operating instructions and the notes in this expert opinion are observed and complied with.

Reference is made to the specialist operation and inspection obligations in accordance with /2/.

This expert opinion does not cover changes to the system, particularly with regard to the materials used, the control and monitoring equipment used and the dimensioning of the retention capacity.

Schlüchtern, Germany, November 16, 2018

M. Nacht

M. Neukert (Dipl.-Ing. - Graduate Engineer

# **GlyTron Multi**

The GlyTron Multi is an intelligent monitoring system based on the glycol protector. It can be used to monitor and protect up to four or eight pressure circuits.

The values determined, as well as information on faults, are displayed on the modern touch multifunctional panel.

Customized programming makes it possible to display the machines monitored, and to receive direct information about operating faults. In addition, results from operating status monitoring are stored so that these values can be called up – even after months. This facilitates the analysis of malfunctions in the refrigeration circuit.

The system can also be linked to a network. For example, the operating status of the system can be accessed at any time from anywhere in the world via the internet using the integrated web server, allowing operation to be monitored.

The GlyTron Multi can be integrated into a monitoring centre, or is optionally pre-wired in a separate switch box.

## Technical Data Multifunctional panel:

- TFT-Touchscreen with a resolution of 640 x 480 Pixels and 256 colours
- Robust metal housing, with front IP65
- Three USB-ports
- Two system bus ports
- LAN interface for web server applications
- Two RS 232 serial interfaces

### Central procesing unit:

- Four or eight monitored pressure circuits
- Robust metal housing
- Integrated web server
- Battery-buffered RamRAM für SPS
- frontseitiger Systembusanschluss





# **GES** glycol protector





GES-Sensor – As per requirements Above: mounted on inside wall

Below: plan view

The GES (glycol detection system) is a new type of sensor that detects and differentiates unwanted contaminants such as glycols in draining water. It differentiates between carbon compounds frequently caused by road traffic, organic rotting processes and the glycols to be detected. Three sensors in one housing are used to monitor both the quality of the liquid and the gases it gives off. This sensor automatically detects escaping substances and is not dependent on interaction with pressure sensors to ensure detection. This makes this new glycol recognition system the first of its kind.

The GES detects even the smallest quantities of escaped glycol and thus meets legal requirements under § 62g ff. WHG (Water Resources Act) and under the Facilities Regulations (AwSV). It therefore provides the greatest possible safety for your facilities.



# How it works

CUS Gewässer-Umwelt-Schutz GmbH

the switch box (1-10 %) to an accuracy of one decimal place. The control module evaluates the data and, in the event of a significant measurement, triggers the alarm. The quick-acting shut-off valves downstream in the drain are locked and at the same time an alarm message or SMS is sent via the potential-

free contact. This technology can be combined with a stainless steel drip basin similar to the oil protector or integrated into a roof outlet, the outflow of which is held back in separate drip trays in the event of an alarm.

The glycol content measured by the sensor is displayed on

Schaltkasten (Steuermodul)

# GHS valve (Glycol highspeed valve)

# Compact. Easy to assemble. Universal. Secure.

Electric rotary drive with ball valve Open-close control, 24–240 VAC/DC, 95° rotation angle with 5° preload 8 Nm, 15 Nm with emergency control function: Fast spring return < 1 s



Тур	Torque Value	Supply	Motor run time	Spring Return	Control System	Feedback System
GHS 8	8 Nm	24240 VAC/DC	3/15/30/60/120 s/90°	< 1 s /90°	Auf-Zu	2 x EPU *
GHS 15	15 Nm	24240 VAC/DC	3/15/30/60/120 s/90°	< 1 s /90°	Auf-Zu	2 x EPU *

\* Electrical isolated changeover switched

# Description

The GHS drive generator represents a revolution for control, safety and shut-off valves and other motorized components in technical building equipment.

With its protection class IP66, small dimensions, 3.5 kg weight, universal technical characteristics, an integrated heater as well as an optional stainless-steel housing, safe operation – even under difficult environmental conditions – is guaranteed. Brushless motors mean a long service life.

All drives can be programmed and adjusted on site without additional electronic aids. Motor run times can be selected on site. The universal power supply is self-adapting for input voltages from 24 to 240 VAC/DC. The drives are 100 % blockage proof and self-locking.

GHS drives are equipped with an integrated spring return function to achieve safety positions. In addition, the drives each have two integrated, permanently-set, isolated auxiliary contacts with change-over contacts.

The standard axle connection is provided by a positive-locking, double square hollow axle ( $12 \times 12 \text{ mm}$ ). The modular concept allows for the retrofitting of adjustable auxiliary switches and other accessories.

# Highlights

- Industrial application
- Universal power supply 24..240 VAC/DC
- 5 adjustable motor run times 3-15-30-60-120 s/90°
- Open-close control with spring return (spring return < 1 s/90°)</li>
- 2 integrated auxiliary switches, switching at 5° and 85°
- 100 % blocking resistance
- Compact design and small dimensions (L x W x H = 210 x 95 x 80 mm)
- Positive-locking double square hexagon connection (12 x 12 mm)
- 95° rotation angle with 5° preload
- Robust aluminium housing (optional stainless steel design + with C5-M-paint finish)
- Protection class IP66
- Manual emergency adjustment included + pre-setting for comforable manual adjustment
- Gears made of stainless steel and sintered steel weighs only approx. ~ 3,5 kg
- Integrated heating up to -40 °C ambient temperature
- Integrated safety temperature limiter
- Concealed operating elements for parameter adjustment (button, lamp, switch)
- Option to combine with countless accessories

# Approvals

EMC marking 2004/108/EC Electrical safety 2006/95/EC – Low Voltage Directive Protection Class IP66 pursuant to EN 60529

# **Custom Design and Accessories**

- Types with aluminium housing and C5-M coating, parts nickel-plated
- Types with stainless steel housing, parts nickel-plated
- Terminal boxes

Technical Specifications	GHS
Motor torque (min.)	8 bzw. 15 Nm
Torque spring (F)	min. 8 bzw 15 Nm
Dimensioning external load	Blocking torques are specified, which have an external load at max. 80%, but of at least 3 Nm
Power supply/ Frequency	24240 VAC/DC, +/- 10 %, self-adaptive, frequency 5060 Hz +/- 20 %
Power consumption	Maximum starting currents (voltage-dependent, I start-up >> I nominal), approx. 5 W holding power, approx. 16 W heating operation
Protection class	Protection class I (earthed)
Rotation angle and position indicator	95° incl. $\sim$ 5° mechanical preload range, position indicator can be plugged onto hollow actuator shaft
Rotation direction	Selectable by left/right mounting of actuator on valve
Motor run time mods 3 sec	Depending on external load and supply voltage applied, 3 to 4 seconds at 90° rotation angle
Motor	Brushless DC motor
Spring return (F)	< 1 s/90°, Federrücklauffunktion bei Spannungsunterbrechung bzw. Öffnen der Leitung 3
Response time spring return	Up to 1 sec. after voltage interruption
Control system	Open/close
Integrated auxiliary switches	2 integrated auxiliary switches
Output hollow axis	Double square 12 x 12 mm, positive-locking connection, 100 % blockage proof and self-locking up to 15 Nm $$
Electrical connection	Cable tail approx. 1 m, core cross-section 0.5 mm <sup>2</sup> , potential equalisation conductor 4 mm <sup>2</sup> . Finally, a terminal box is required.
Outer diameter Cable tail	2 cable tails for versionSF1
Cable gland	M16 x 1,5 mm standard cable entry
Manual override	Manual override via included hexagon wrench, max. 4 Nm
Heating	Integrated, controlled heating for use of drives down to min40°C ambient temperature
Housing material	Coated die-cast aluminium housing. Available with seawater-resistant C5-M coating or housing in stainless steel DIN EN 1.4581/V4A/UNS-J92900/similar to AISI 316 Cb (VAS)
Dimensions	$L \times W \times H = 210 \times 95 \times 80$ mm, visual display
Weight	Approx. 3,5 kg, stainless steel design approx. 7 kg
Ambient temperature	Storage temperature - 40 +70 °C, ambient temperature during operation -40+60 °C
Humidity	090 % rF non-condensing
Operating mode 3 sec. motor run time	3-second motor run time is only possible 1 minute after connection to the power supply. In open-close mode (opening of the supply voltage and closing it again), the drive moves only at a speed of 15 s/90
= 15 sec. Motor run time</td <td>At 15 / 30 / 60 / 120 100 % ED are permitted (ED = duty cycle)</td>	At 15 / 30 / 60 / 120 100 % ED are permitted (ED = duty cycle)
Maintenance	Maintenance-free functioning, relevant regional maintenance regulations or factory standards must be observed
Scope of delivery	Drive with 1 m cable tail, 4 screws M4 x 100 mm, 4 nuts M4, hexagon key for manual override
Factory settings	8 or 15 Nm; 30 s/90

# ParParameter Adjustment and Operation/Fault Messages

Switch - push button - lamp For parameter adjustment (on cable side behind blind plug)

10-position switch (S)

Button (T) 3-Fab-LED



## Selectin of Setting Parameters

Runtimes	Switch position S		
3 s/90°	00	05	
15 s/90°	01	06	
30 s/90°	02	07	
60 s/90°	03	08	
120 s/90°	04	09	

Example:

Desired parameters: Motor run time 30 s/90° Result: Switch position **02** 

# Functions, Settings and Parameter Adjustment

#### A) Position angle adjustment

Set switch (S) to position 02, then keep button (T) pressed for at least 3 seconds. The drive moves to both end positions automatically, and adjusts the angle position. The LED will flash GREEN.

The calibration time for this procedure is approx. 30 seconds (30 seconds "open", 1 second "closed") Then set the switch to the desired running/torque position.

#### **B)** Duration selection

Set 10-position switch (S) to desired parameters according to the table above.

The selected parameters are performed during the follo-wing control function. The setting can be made without applying supply voltage. When voltage is applied, the running time must only be selected when the drive is stationary.

# C) Operation of a passive switch in tripping current circuit

If the tripping circuit is interrupted, the drive moves to its end position via the spring return.

# D) Additional information for control

a closed	=	Direction I	
		(drive opens)	
		Divertiend	

a open = Direction I (Spring return function)

The direction of rotation (I and II) depends on the left/right mounting of the drive on the valve.

Installation

\* Electrical connection see wiring diagram





# Important Installation and Operation Information

#### A. Installation, Commissioning, Maintenance

All relevant national and international standards and regulations must be observed. A terminal box must be used for the electrical connection. Warning: safety regulations must be observed when decommissioning. Do not open the cover of the terminal box when it is live! The connecting cables of the drives must be laid firmly and in such a way that they are adequately protected from mechanical and thermal damage. Connect equipotential bonding conductor. Avoid temperature transfer from valve to drive! Close all openings to at least IP66. Drives are maintenance free. An annual inspection is recommended. Equipment may only be opened by the manufacturer.

#### **B. Manual Override**

The drives must be voltage free before manual emergency adjustment is carried out. Turn slowly with the enclosed hexagon wrench (operation can be difficult). Warning: if the hexagon wrench is loosened or released too quickly, there is a risk of injury with the spring return drives!

#### C. Axis Connection, Runtime Selection on Drive

The drives are equipped as standard with a positive-locking axle connection  $12 \times 12$  mm. The housings are axially symmetrical, with direction of rotation selected by left/right mounting. The 10-position switch can be used to set different motor run times and torques on the drive (depending on the type).

### D. Operation at 3-Second Motor Run Time

The following must be observed during operation:

- 1. The 3-second mode is only possible in switch position 0 and 5, and only if constant voltage is applied to terminals 1 and 2 for at least 1 minute.
- 2. The drive opens when voltage is applied to terminal
- 3. The maximum duty cycle is 10 %, or maximum 1 control cycle per minute. There must be a break of at least 1 minute between two 3-second cycles in the same direction of movement. If an attempt is made to make an adjustment in the same direction of movement in less than the prescribed time, the function is blocked until the end of the break (but is automatically released again afterwards).
- 4. The same applies to spring return drives with respect to spring operation, which is classified as a driving function in 1 direction.
- 5. If an attempt is made to operate a spring return drive in switch position 0 or 5 with 1-wire control, the motor run time is automatically changed over to 15 s/90° in order to avoid an uncontrolled duty cycle, which can cause the drive to overheat.

#### **E. 3-Point Control Operation**

Max drives are ideally suited for 3-point control operation. In order to protect elements such as gears and connecting elements from damaging effects caused by short control pulses, ... Max drives are protected by internal electronics. The electronics ignore pulses of < 0.5 s. pulse length must be min. 0.5 sec. When changing direction, the break is 1 sec.

#### **F. Spring Return Function**

The spring return function is only activated when the supply line to terminals 1 or 2 is interrupted.

In the event of an interruption, the drive always moves to its end position via the spring (even if the power supply then becomes available again during the reset function). Afterwards, the drive/control function is resumed.

#### G. Use at Low Ambient Temperatures Below -20 °C

All drives are equipped with an integrated controlled heater for applications down to -40°C ambient temperature. Heating is automatically supplied when the fixed power supply is applied to terminals 1 and 2.

- 1. The drive must be immediately electronically connected after installation.
- 2. The heater switches on automatically when the drive reaches an internal temperature of -20 °C. It heats the drive up to operating temperature, and then switches off automatically. The drive does not move during heating.
- 3. The drive and control function is only guaranteed after this heating time.

#### **H. Excessive Temperatures**

The drives are protected from overheating. This is achieved via an internal thermostat, which limits and switches off the drive in the event of a fault when the temperature is too high. An upstream temperature sensor ensures that, in the event of faulty operation, the drive switches off before this point. This safety function is reversible, meaning the drive is fully functional again once it has cooled down. However, the fault must be immediately remedied on site.

### I. Synchronous Operation

Multiple drives on one axis connection, or mechanically connected drives, are not permitted.

#### J. Mechanical Protection

The drives must be operated with a minimum external load. After mounting to the valve, the angle position can be adjusted to protect the valve from mechanical stress. During operation, before reaching the end position/blockage speed, the drive briefly reduces speed (motor power) and "smoothly" turns into the blockage.

#### K. Routine Testing of Fire Dampers

When performing routine tests, it must be ensured that voltage isolation (interruption of the power supply to the drive) is carried out. The test button on the InPro TT is only used for local control of the drive function.

# **Electrical connection**

All drives have automatic voltage detection for 24-240 VAC/ DC. The drives detect applied voltage automatically, and do not need to be adjusted! The safety function for spring return drives is activated by interrupting the supply voltage or by opening line 3. Electrical connection must be made via a terminal box. An overcurrent protection device (< 10 A) must be provided on the installation side.

The starting current is approx. 2 A for 1 second.

#### Note:

During commissioning, an adjustment of the adjustment angle must be carried out.

For the motor running times the duty cycle!

Spring actuators must not be operated without an external load.

# Wiring of the integrated auxiliary switches



#### Connecting the GHS valve

Terminal block switch box	Terminal block GHS valve
Terminal 5	PE
Terminal 22	1
Terminal 17	2
Terminal 18	3

#### Auxiliary switch

Terminal block switch box	Terminal block GHS valve
Terminal 13	1
Terminal 14	2
Terminal 11	4
Terminal 12	5



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