Printer’s imprint

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Preface

We are pleased that you decided to purchase a quality product from THYSSENKRUPP Aufzugswerke GmbH. This operating manual assists you in getting familiar with the connecting control for brake magnets of lift drives – referred to as brake control below – and with its intended possibilities of use. Important information concerning safety and hazards help you to safely use the brake control as intended. The brake control is subject to technical alterations.
# Table of contents:

**Brake control BSV1**

1. Safety
   - 1.1 Explanation of symbols used
   - 1.2 General safety information

2. Product description BSV1
   - 2.1 Description of BSV1
   - 2.2 Indicators of BSV1
   - 2.3 Technical data of BSV1

3. Transportation and storage

4. Mounting and connecting
   - 4.1 Mounting
   - 4.2 Connection of brake control
   - 4.3 Circuit diagram BSV1
   - 4.4 Layout plan (LEDs; jumpers; terminals)

5. Putting into service

6. Servicing

7. Annex
   - 7.1 Declaration of conformity of brake control
1.1 Explanation of symbols used

The following pictographs and designations are used in this operating manual:

**Danger**
This symbol draws attention to an extreme danger to life or risk of injury to persons. Disregard of warning means danger to life!

**Warning**
This symbol draws attention to an impending danger. Disregard can cause injury to persons or extensive damage to property. Warning notices must always be observed!

**Note**
This symbol draws attention to important information and instructions for operation. Disregard can lead to damages, hazards or failures.

**Inspection**
This symbol draws attention to inspection sequence. These inspection notices must be observed in any case. Disregard can lead to injury to persons or damage to property.
1.2 General safety information

Information about the operating manual
Knowledge of the basic safety requirements is a prerequisite for the safe use and the failure-free operation of this component. This operating manual comprises the most important information how to safely use the component. The operating manual and, in particular, the safety information must be observed by all persons who perform any work on the component. In addition the rules and requirements concerning the regulations for prevention of accidents which apply to the installation location must be observed.

Duties of the owner and / or installer
The owner and / or the installer ensure that only persons are authorized to work at the component, who
• are familiar with the requirements concerning safe working and prevention of accidents and who were trained how to use the component;
• have read the safety information and the warning notices in this operating manual.

Note: Check the compliance of the employees method of working with the safety requirements in regular intervals.

Duties of the employees
Persons who are authorized to perform work at the component are obliged
• to observe the requirements concerning safe working and prevention of accidents;
• to read the safety information and the warning notices in this operating manual prior to start working.

Training of the employees
Only trained and instructed, technically competent persons shall perform work at the component. The competence of the employees must be clearly defined for all tasks concerning putting into service, operation, maintenance and repair work.

Organizational measures
The owner or the installer must provide the necessary personal protective gear. All existing safety devices must be checked regularly in accordance with the maintenance plan.
Informal information about safety measures

- The operating manual must always be available at the location of the installation.
- In addition to the operating manual the general and local regulations for the prevention of accidents and environmental regulations must be made available and observed.
- Clearly and easily visible statutory safety instructions must be made available for the users.
- See to it that all information concerning safety and hazards is always visibly and legibly made available on the machine.

Use as intended

The brake control is designed in accordance with the state of the art and the recognized safety regulations. The brake control shall only
- be used for its intended purpose
- be used only if safe operation is ensured
The brake control shall exclusively be used for connecting magnetic brakes of lift drives. Any other use or any use exceeding the scope of the above definitions is regarded as use outside of the intended purpose. THYSSENKRUPP AUFZUGSWERKE GmbH cannot be hold liable for any damages resulting from this and for any damages which are caused by any errors of procedure.
Use within the scope of its intended purpose also comprises
- observance of all information of the operating manual
- fulfilment of the instructions applying to putting into service, installation description and inspection and repair work.

Guarantee and liability

The „General Conditions and Terms of Sale“ of THYSSENKRUPP AUFZUGSWERKE GmbH apply generally.
Any claims for guarantee and liability are excluded in the case of injury to persons or damage to property resulting from one or several of the causes below:
- use of the brake control outside the scope of its intended purpose
- inexpert mounting, putting into service, operating and maintaining of the brake control
- operating the brake control with defective and/or non-operative safety and protective devices
- disregard of instructions of operating manual that apply to transportation, storage, mounting, putting into service, operating and maintaining of the brake control
- unauthorized constructional modifications of the brake control
- change of ratings or overrating
• unsatisfactory supervision of parts which are subject to wear
• inexpert repair work
• catastrophes caused by outside influence and Act of God.

**Constructional modifications of the brake control**
The brake control components are factory-assembled and assessed. In the case of any modifications of the component THYSENKRUPP AUFZUGSWERKE GmbH cannot be held liable.

**Use of brake control and possible hazards**
The internal electronic circuit of the brake is current-carrying. The component is provided with a transparent cover as a safety precaution against contacting the current-carrying elements. The brake control shall only be operated with the protective cover installed. In the case of settings, such as changing of the jumper settings, disconnect the drive **before** you start working and secure the installation against unintentional connection. Install the protective cover on the brake control **before** the brake control is re-started.

In the case of incorrect adjustment and use there will be danger to life for the user or third parties resp. impairment of the component or material property. Failures which possibly impair the correct functioning are to be eliminated immediately.
2.1 Brake control BSV1

The brake control BSV1 is designed for activating brake magnets at rated currents of 2.0 A to 7.8 A. With BSV 1 the preselected current will always flow independent of line voltage fluctuations. The effective force of the brake magnets and consequently their noise response during activation can be influenced by means of the current to be set through jumpers.

Configuration
The brake control BSV1 consists of the power part, the control board and the filter board. All parts are mounted on a heat sink, including the terminals for the main connections. The heat sink is isolated from the remaining assemblies and is applied to protective earth potential (PE). The heat sink is also used for fastening the assembly in the control cabinet.

Mode of operation
BSV1 is designed as current controller and has PI characteristic. The reference current value is generated on the control board. The desired continuous current (which normally corresponds to the holding current of the brake release magnets) is preselected by means of jumpers J1 and J2 in increments of 0.2 A in the range of 2 A to 7.8 A. Twice the value of the preselected continuous current will flow as pick-up current for one second. The respective reference value settings of the pick-
up current are preset values which **cannot** be changed. Timing and current flow start simultaneously. The rate of the pick-up current rise is limited to 80 A/s.

The power part of the BSV1 can be operated between two phases (400 VAC) or between one phase and N (230 VAC). The current flowing to N is alternating (current flows into both directions). An additional 230 VAC voltage supply is necessary for internal voltage supply. It can, but does not have to be the same as that with which the power part is supplied. Reversing of phases does not result in the destruction of the assembly. Jumper Jf must be set correctly so that the rated frequency of the feeding voltage (50 Hz or 60 Hz) is also applied to the power part. For compliance with the required EMC limit values, a filter is built into BSV1. The filter circuit board also accommodates the suppressor circuits for the power semiconductors. The switching elements which disconnect the brake release magnets must be connected in a certain sequence so that the built-in free-wheeling diode provided before the brake release magnets is able to prevent the current from flowing into reverse direction. See section „connection of brake release magnets“ in chapter 4.2 and example of connection in circuit diagram 4.3. The transformers built into the brake control are short-circuit proof. Therefore, additional fusing is not required.

**Note:** The required operating voltage of the BSV1 power part (230 V AC, 400 V AC or any intermediate voltage value) depends on the necessary pick-up current of the connected brake release magnets which shall be operated at the max. output voltage supplied by BSV1.

The voltage tolerances of the line voltage shall be taken into account here. The max. voltage $U_{	ext{aus-max}}$ output by BSV1 dependent on the input voltage $U_{\text{on}}$ is:

$$U_{\text{off-max}} = 0.78 \cdot U_{\text{on}}$$

**Note:** if LED H1 and LED H3 light up simultaneously during operation of BSV1, that means that at least 90 % of the required pick-up current flows.

**Individual functions**

Please see chapters 4.2 to 4.4.
The different operating states of BSV1 are indicated and controlled by lighting diodes:

**LED H1 lights**  if pick-up current (high-speed excitation) is requested

**LED H2 lights**  if current flow in the power part is not blocked by start/stop signal.

Remark:
The current flow will never be blocked if start/stop signal is not connected, so that H2 always lights.

**LED H3 lights**  if more than 90% of the requested current flows.

**LED H4 lights**  if thyristor Th1 is activated and gate trigger current is flowing.

**LED H5 lights**  if thyristor Th2 is activated and gate trigger current is flowing.

Position and arrangement of LEDs on circuit board see layout plan chapter 4.4 fig. 6.
2.3 Technical data of BSV1

Part No.: 65 000 06 67 0
Supply voltage power part:
230 V AC – 15% to 400 V AC + 10%, 2- phase or phase – N (note operating conditions of connected brake release magnets)
Supply voltage frequency of power part:
50 Hz or 60 Hz
Adjust position of jumper Jf to rated frequency of connected voltage.
Supply voltage for internal power supply:
230V AC + 10% / - 15%, 50/60 Hz
Output current:
Continuous (stabilized) current is equivalent to holding current of brake: 2A to 7.8 A, to be preselected in increments of 0.2 A.
(Stabilized) pick-up current:
Twice the value of the preselected continuous current for one second
Mode of operation: S4
Switch-on duration: 75% ED
Max. operating frequency: 260 circuits / hour
Protection class: IP00
Ambient temperature range: 0°C to 45°C
Relative humidity: max. 70%
Max. site altitude above sea level: 2000 m without derating
derating of 1% per 100m above
2000 m to 3500 m
EMC test: compliance with requirements of
EN 12015 (interference) and
EN 12016 (immunity).
Fitting position:
The cooling fins of the heat sink are arranged in a vertical plane. A clearance of at least 50 mm must be provided above and below the heat sink.
Dimensions L * B * H: 165 x 200 x 93 mm, see drawing fig. 2
Mounting dimensions: Mounting by means of 4 drilled holes
with 5 mm Ø each provided on heat sink.
See drawing fig. 2
Weight: 2.2 kg
Start /stop signal:(terminals X3:1 to X3:3) external control of magnets
Possible voltage level of external signal: 15 V to 50 V DC. Connect range 15 V DC to 30 V DC to terminal X3:2, load resistance 3.6 kOhm.
Connect 30 V DC to (maximum) 50 V DC to terminal X3:1, load resistance 5.8 kOhm.
Signal monitoring the current flow: (terminals X3:4 to X3:6)
Limit values of switching transistor:
Max. voltage 30 V DC + 10%
Max. current 100 mA (limit value)

**Note:** terminals X3:1 to X3:3 provided for external control of magnets and terminals X3:4 to X3:6 provided for the signal monitoring the current flow are optional. ThyssenKrupp Aufzugswerke GmbH cannot be held liable for technical realization of the external connections.
3. Transportation and storage

Packaging of brake control:
The brake control is delivered packed in a carton.

Transportation:
Transportation shall be subject to observation of the safety requirements.

- Mind the risk of damage!
- Do not put any heavy objects onto the packed assembly.
- The assembly is not impact-proof and must also be protected against dropping.

- Remove packing material after transportation.

Note the pictographs fastened on the packing or on other visible places.

<table>
<thead>
<tr>
<th>▲▲</th>
<th>☕</th>
<th>☂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Handle with care</td>
<td>Keep dry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>☀</th>
<th>☢</th>
<th>☒</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not expose to heat</td>
<td>Do not use handheld grippers</td>
<td>Fasten here</td>
</tr>
</tbody>
</table>

Dimensions and weight
Approx. weight of brake control BSV1 2.2 kg, packing not included.
Dimensions: 200 x 165 x 93 mm
See drawing in chapter 4.1

Examination by customer on receipt of goods
Examine the delivered parts for completeness, damage or anything strange.

Report and document shipping damage
After receipt of goods make sure that there is no damage caused during transport.
Information
- Immediately document the damage noticed (drawing, photograph, description of damage).
- Send the respective documents immediately to ThyssenKrupp Aufzugswerke GmbH.

Unpacking
Information
- Dispose packing equipment in accordance with environmental standards or make it available for further use.
- Special transport aids and transport contrivances shall not be sent back to ThyssenKrupp Aufzugswerke GmbH but remain at the customer.

Intermediate storage
- If the assembly is not mounted directly after delivery, carefully store it at a sheltered place and see to it that it is provided with a humidity-proof covering.
- Do not store the assembly in the open air.

Environmental conditions
Information
**Storage:** the ambient temperature during storage is assumed to be maintained between 0 °C to + 50°C.
Maximum relative humidity of air shall not exceed 70 % (no moisture or icing)

**Operation:** the ambient temperature at the final site of the machine shall be maintained between 0 °C to + 45 °C and the relative humidity of air shall not exceed 70 %.
(No moisture, no icing).
### 4.1 Mounting

**Mounting of BSV1**
Fastening of BSV1 by means of the drilled holes provided on the heat sink. Screw the heat sink into the drilled holes provided on the control cabinet. The cooling fins of the heat sink must be in **vertical** plane!
(Heat dissipation !)
Position and dimensions see fig. 2 below.

**Dimensions, fixing and assembly dimensions of BSV1**

[Diagram showing dimensions and assembly details]
4.2 Connection of brake control BSV1

Safety note:
The internal electronic circuit of the brake control is applied to mains voltage. Therefore the assembly has a plastic cover as safety precaution against contacting current-carrying elements. Before you start any work on the assembly, de-energize the brake control. This even applies to setting or re-setting of jumpers. Re-secure the protective cover before the brake control is started.

How to connect the power part (see circuit diagram in chapter 4.3)
Mains supply
Connect the power part and the mains supply at terminals X1:1 and X1:2. In so doing it is irrelevant whether the power part is operated between two phases (400 V operation) or between one phase and neutral conductor N (230 V operation). The connected phase sequence is also irrelevant. Connect terminal X1:3 to protective conductor (PE).

How to connect the brake release magnets
Connect the brake release magnets in series. Connect the brake release magnets at terminal X1:4 and terminal X1:6. The free-wheeling diode provided between terminals X1:4 and X1:5 is only active as long as the brake release magnets and terminal X1.5 are electrically connected. In ideal circumstances the last contact element does not open until the brake is disconnected and the remaining contact elements are open and the current flowing through the free-wheeling arm has become zero.

Suppressor circuit of brake release magnets
Varistor-type suppressor circuit must be provided. Directly connect the varistors to the terminals of the brake release magnets. This will be most effective.

Never use RC-type suppressor circuit for operation of BSV1.

Attention: the rated voltage of the used varistors and the operating voltage of BSV1 must be compatible.

How to connect the internal power supply
The internal voltage supply is 230 V AC. Connect the power supply at terminals X2:1 and X2:2. Phase sequence is irrelevant. The voltage source used can, but does not have to be the same as that with which the power part is supplied. The voltage shall always be applied and not only be connected during operation.
Adjust line frequency of 50 Hz / 60 Hz
Dependent on the line frequency of the voltage source which supplies the power part, jumper Jf must be set as follows:

Jumper position 1 – 2 applies to 50 Hz
Jumper position 2 – 3 applies to 60 Hz

50 Hz operation applies if the jumper is not set.
You cannot make use of the complete setting range of the current controller if the jumper is set incorrectly.
However, this will not cause destruction of the assembly.
50 Hz operation is the standard setting.

How to adjust the reference current value
Set the rated current of the connected brake release magnets (or the one-tenth current value thereof to be selected next) as reference current value.
Jumpers J1 and J1 are used for setting the reference current value, which can be set from 2 A to 7.8 A in increments of 0.2 A.
Jumper J1 is used for selecting integer current values from 2A to 7 A in increments of 1 A and
jumper J2 for selecting one-tenth current values from 0.0 A in increments of 0.2 A.
The current values determined by the two jumper settings are added.
Example: J1 in position 3A and J2 in position 0.4 A means a preselected reference current value of 3.4 A. The respective maximum current value is applied if the jumper is not set. If neither J1 nor J2 are set, the selected reference current value is equivalent to 7.8 A.

Monitoring signal current flow
BSV1 supplies an output signal as soon as 90 % of the requested current flows. The signal and the remaining BSV1 circuit are isolated via optocoupler. The switch signal is generated via switching transistor and is applied at terminals X3:4 to X3:6.
Mode of functioning:
The switching transistor will be turned on (positive acknowledge), if at least 90 % of the requested current flows.
If the lift is stationary and the brake disconnected the acknowledge received from the monitoring signal will be negative. (The switching transistor is not turned on).
The output circuit design allows for directly controlling a relay.
Limit values of switching transistor:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>max. voltage</td>
<td>30 V DC</td>
</tr>
<tr>
<td>max. current</td>
<td>100 mA</td>
</tr>
</tbody>
</table>

Switching and possible example of connection see fig.5.
Connection of a free-wheeling diode directly on the relay coil and between BSV1 terminals and the controlled relay is recommended with long lines (longer than 1 m).
Attention: the signal output is not short-circuit proof!

Start/stop signal
Starting and stopping of current flow in the power part of BSV1 can optionally be determined by an external signal.
The respective signal input is isolated from the remaining BSV1 circuit via optocoupler.
The external signal the voltage level of which shall be maintained between 15 V DC and 50 V DC is used for switching on the LED of the optocoupler.

How to connect the external signal:
- Connect the lower potential to terminal X3:3
- Connect the higher potential to terminal X3:2 for 15 V DC to 30 V DC or to terminal X3:1 for 30 V DC to 50 V DC.
4.3 Circuit diagram BSV1 (incl. example of connection)

Fig. 4
Output circuit – Example how to connect the signal for monitoring the current flow at terminals X3:4 to 3.6

Fig. 5
4.4 Layout plan

Set jumper 1-2 acc. to current data indicated (e.g. 4.0 A J1 = 4A and J2 = 0.0A)

Fig. 6  
H  Light-emitting diodes
J  Jumpers
X  Terminals
5. Putting into service

Note: the brake control is factory-assessed. However, the customer must check its lift-specific mountings for correct functioning before the lift is put into service.

Inspection instruction for brake control BSV1
The following requirements shall be fulfilled:

• The brake control shall be installed and connected in accordance with the operating manual.
• Varistor-type suppressor circuits are provided at the terminals of the brake release magnets, which are adapted to the rated voltage.
• Jumper Jf is set to existing line frequency.
• Jumpers J1 and J2 are set to holding current value of brake release magnets.
• The protective cover is properly installed.
• If an external start-stop signal is used it shall be checked for correct switching.
• Light-emitting diodes H1 and H3 must light up simultaneously with fast-response brakes (if pick-up current is requested).
• On setting of the drive into operation the light-emitting diodes H4 and H5 light up (if thyristors Th1 and Th2 are activated and gate trigger current is flowing).
6. Servicing

Brake control BSV1 is maintenance-free. However, checking of the switching sequence is recommended by means of LED indicators and brake shoe movements in the course of the annual inspection. See chapter 2.2, explaining, among others, the function of the LED indicators. For position or arrangement of the light-emitting diodes see fig. 6.
Konformitätserklärung
Declaration of Conformity

Hersteller: Thyssen Aufzugswerke GmbH
Manufacturer: Bernhäuser Straße 45
D-73765 Neuhausen / Filder

Produkt: Bremsansteuerung BSV1
Product: (Sach.-Nr. 65 000 06 67 0 / LP: 98 05 05 L / SCHP: 65 000 06 67 0)

Unter Zugrundelegung unserer Sicherheits- und Montagehinweise sowie der Hinweise für die bestimmungsgemässe Verwendung erklären wir, daß dieses Produkt mit der folgenden Europäischen Richtlinie übereinstimmt.

On the basis of our safety and installation instructions as well as the instructions for the appropriate usage we declare that this product complies with the following European Directive:

89 / 336 / EWG EMV-Richtlinie
EMC-Directive

Im Prüflabor der Thyssen Aufzugswerke wurde der Nachweis geführt, daß dieses Produkt mit folgenden Normen übereinstimmt:
The Test Laboratory of Thyssen Aufzugswerke has proved, that this product is in conformity with the following standards:

EN 12015 Elektromagnetische Verträglichkeit - Produktfamilien norm für Aufzüge, Fahrtreppen, und Fahrsteige: - Störaussendung
Angelehnt an EN 50081, Fachgrundnorm für Störaussendung
Electromagnetic Compatibility - Product Family Standard for lifts, escalators, and passenger conveyors: - Emission
Which is based on EN 50081, Generic Standard for Emission

EN 12016 Elektromagnetische Verträglichkeit - Produktfamilien norm für Aufzüge, Fahrtreppen, und Fahrsteige: - Störfestigkeit
Angelehnt an EN 50082, Fachgrundnorm für Störfestigkeit
Electromagnetic Compatibility - Product Family Standard for lifts, escalators, and passenger conveyors: - Immunity
Which is based on EN 50082, Generic Standard for Immunity

BSV1-neu
Konformitätserklärung
Declaration of Conformity


Use: This product is a non independent-operated unit, as defined by the EMC-Directive. Therefore, the compliance with the EMC-Directive is only confirmed for the mentioned unit, under condition that it will be installed by observing the installation instructions according to our user documentation. The distribution of this unit is restricted; it is considered for finishing by competent users.

Neuhausen, den 15.01.2003

[Signatures]
Leiter Forschung & Entwicklung
Managing Director

Leiter EMV-Prüflabor
Manager EMC-Test-Laboratory

BSV1-neu