

Counterweight Safety Gear

WCWSG01, WCWSG02, WCWSG03, WCWSG05

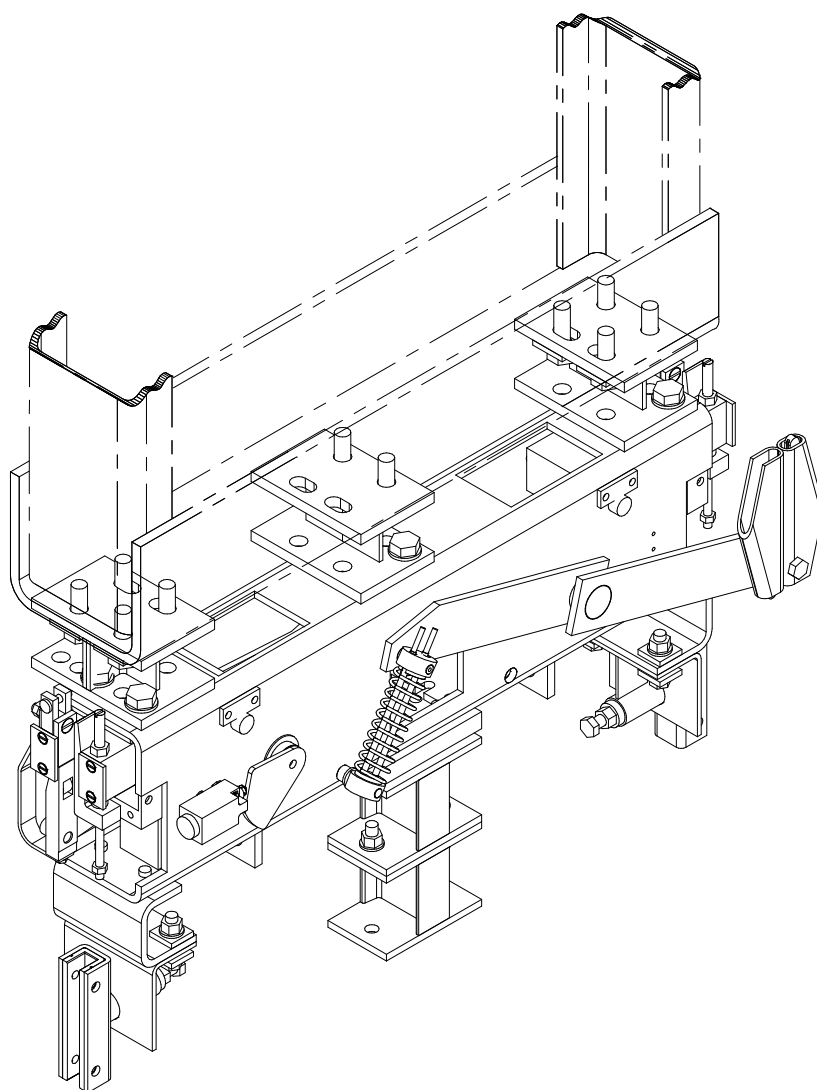
Operating instructions

Blatt/sheet D7AGMGB.000
Datum/date 18.03.2002
Stand/version D-07.04.2016
Geprüft/approved WAT/MZE



Counterweight Progressive Type Safety Gear

WCWSG01, WCWSG02, WCWSG03, WCWSG05



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Product manufacturer reference can be found on the product type label.
For any support or further questions please contact your trading office.



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Änderungen vorbehalten!

Subject to change without notice!



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1 General information prior to installation

1.1 Description and functions

The counterweight safety gears WCWSG01, WCWSG02, WCWSG03 and WCWSG05 are equipped with progressive type safety gears SGB01, SGB02, SGB03 and SGB05 which are combined c-type springs, frame and friction elements, which are activated by a movable activating wedge. The braking force is variable by means of an adjustable counter wedge (refer also to operating instruction of this safety gear type).

The WCWSG series are designed for the use with counterweight frames series WCW, but could also be used with other counterweight frame types as well.

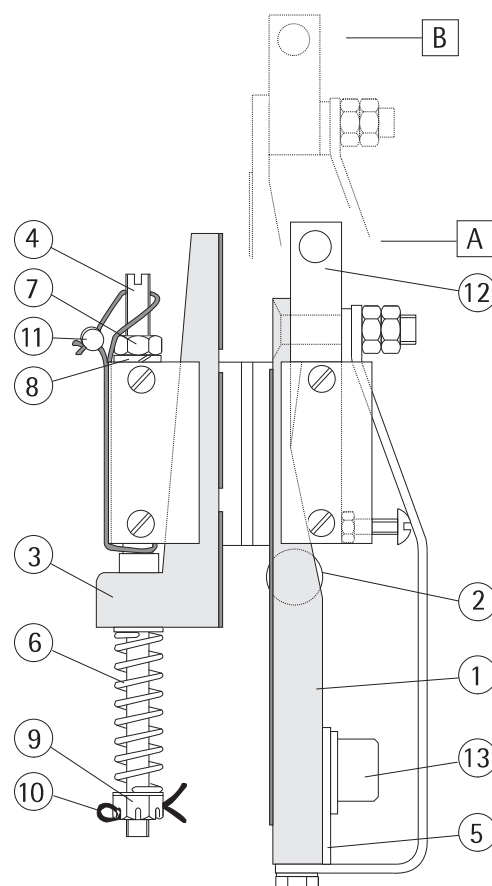
The basic functions of the counterweight safety gear is, if the counterweight exceeds its rated speed upon descent, the overspeed governor cuts in when its tripping speed is reached and triggers the safety gear on the counterweight via the governor rope. The counterweight frame is brought to a standstill and clamps onto the guide rails.

The setting is carried out in the factory (according to the load and rail conditions) and sealed. Later adjustments will not be necessary and are in any case prohibited for safety reasons.

The progressive safety gear is released by lifting the counterweight frame. This returns the clamped brake wedge to its initial positions.

The operating range is defined as follows:

- max. elevator speed 2,50 / 3,5 m/s
- width of guide rail head 8 - 31,75 mm
- max. mass to be gripped
 - $F_{max} = 9200 \text{ kg (EN81)}$
 - $F_{max} = 8160 \text{ kg (ASME)}$
- tripping force of the governor
 - 500 - 1100 N



1. Gripping wedge
2. Transport roller
3. Counter wedge
4. Adjustment screw
5. Fixing for lifting lever
6. Resetting spring
7. Locking nut
8. Spring washer
9. Hexagonal castle nut
10. Split pin
11. Lead seal
12. Fixing for lifting lever
13. Stopper

A Normal position
 B Gripping position

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1.2 Liability and guarantee

This instruction handbook is written for people who are familiar with lift servicing and installation. Sufficient knowledge of lifts is essential.

WITTUR accept no responsibility for damage caused by improper handling, or for damage caused as a result of actions other than those stated in these operating instructions.

The WITTUR guarantee may be voided if parts other than those described in these instructions are installed.

Unless stated otherwise, the following are not permissible due to technical safety reasons:

- The use of components other than those installed
- Carrying out modifications, of any kind on the safety gear
- Installing two different brake heads with different index numbers together
- Destruction of the lead seal
- Combining different component types
- Installing progressive safety gears intended for other employment than that stipulated
- Carrying out faulty or improper maintenance or inspection checks
- Using unsuitable accessories, spare parts or operating material which has neither been released by the WITTUR Company nor consists of original WITTUR spare parts

1.3 Safety precautions

WITTUR machine installation or repair engineers are chiefly responsible for the safe operation of machinery.

It is essential to comply with and keep abreast of all safety rules and legal obligations in order to avoid personal / product damage during installation, maintenance and repair work.

Important safety advice and danger warnings are emphasized with the following symbols:



General danger warning



High danger risk warning (i.e. crushing edge, cutting edge etc.).



Risk of damage to machinery parts (i.e. due to incorrect installation, or such like).



Important information sign

These operating instructions belong with the whole installation and must be kept in a safe place at all times (i.e. machine room).

The proper assembly and installation of WITTUR safety gears requires correspondingly well trained fitting engineers. The responsibility of training lies with the company appointed to carry out the work.

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Before starting installation work:



Only properly trained personnel may carry out work, or be allowed access to the installation site.

- Attach safety devices to guard to protect them against falling (platform or harnesses)
- Cover any floor openings
- Secure installation tools or objects against accidental falling
- Lift shaft openings have to be cordoned off and suitable warning signs should be erected when working in shaft openings
- Work involving electrical equipment must be carried out by an electrical engineer or qualified personnel only.

1.4 Preparation

Before beginning installation work it is in your own interest to ascertain the constructional and spatial conditions. Check where (workshop or on site) and when any installation operation can be or must be carried out. Therefore it is recommended to take into account all the given circumstances, to plan the various operational sequences in advance, rather than carrying them out prematurely and in an unconsidered manner.

On receipt of the delivery, the goods or components should be checked for correctness and completeness with the order sheet.

To be checked:

- factory and order number correspond
- details on the name plate correspond to those on the order
- elevator speed
- width and type of guide rail used
- total load (mass to be gripped)

1.5 Advice for when working on safety components

Safety gears are classified as safety components. It is most important that the standards and guidelines described in this section be complied with as well as those given in the rest of this operating manual.



These instructions, and especially the section on safety precautions, should be read and fully understood before work begins.

Safety devices require special attention. It is compulsory that they function perfectly to ensure danger free installation operation.

Safety devices that can only be adjusted after installation must be adjusted immediately after installation.

Operation of safety devices installed ex-works must be tested immediately.

If it is necessary to disassemble a safety device during servicing or repair, they should be reassembled and comply with the required tests, as soon as the work has been carried out.

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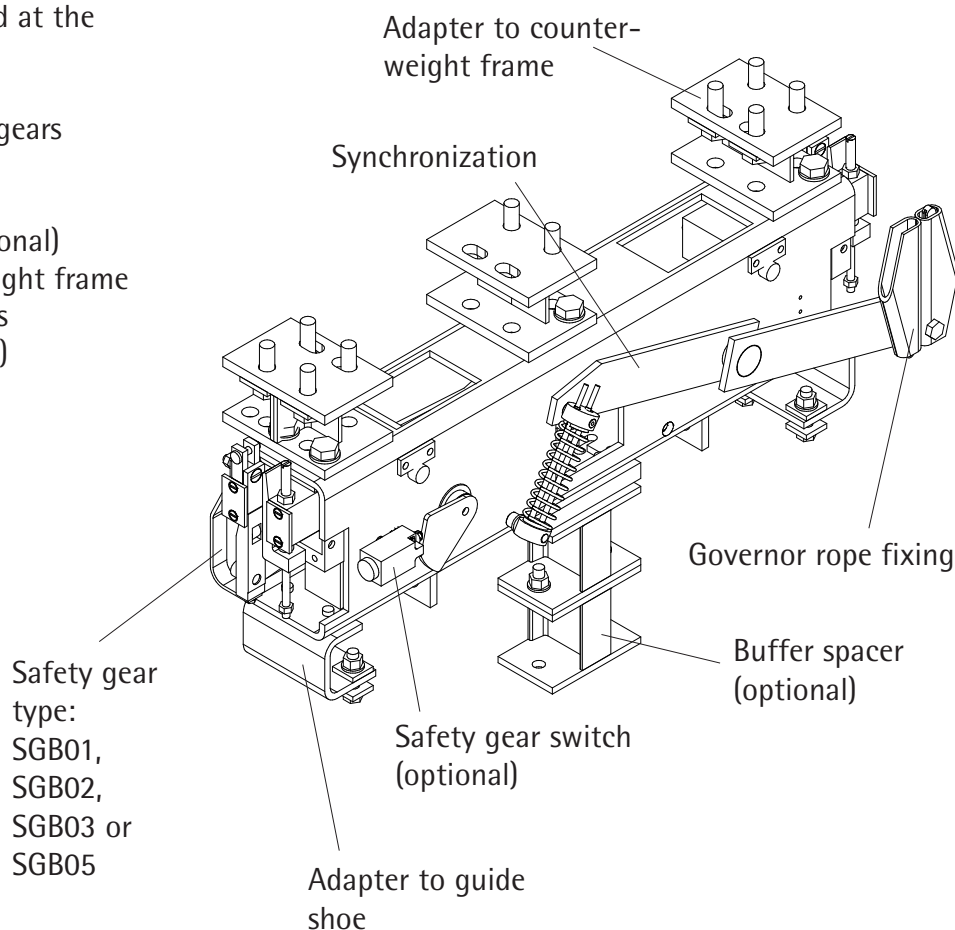
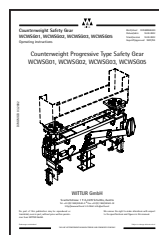
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1.6 Content of supply

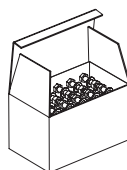
After delivery, check the counterweight safety gear for damage and for full delivery of parts. The content of supply covers:

- Operating instructions manual
- Counterweight safety gear body (pre-adjusted and sealed at the factory) incl.:

progressive type safety gears
 synchronization
 governor rope fixing
 safety gear switch (optional)
 adapters for counterweight frame
 adapters for guide shoes
 Buffer spacers (optional)



- Mounting- and fixing screw-packages



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2 Name plate, designation, identification

The safety gear identification indicators are located on the side of the safety gear body.

These consist of a name plate (acc. to EN81 or ASME) and a identification sticker which gives following data:

- Type term of safety gear
- Serial number
- Elevator number
- Tripping speed
- Mass to be gripped

Type label acc. to EN81, GB7588, GOST R 53780 with type test designation and CE-label

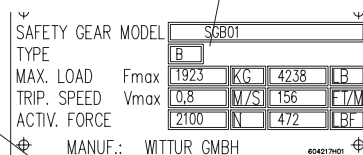
Type term

Serial number

Tripping speed v_{max}



Type label acc. to ASME A17.1



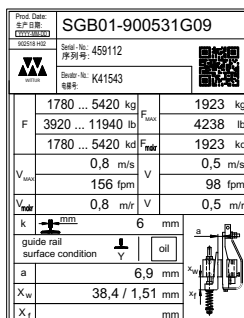
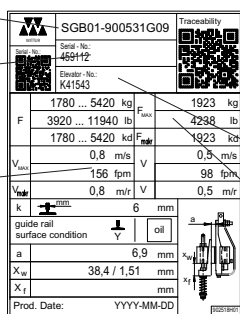
CTP label for GOST R 53780

Date of manufacture

Order number (refer to delivery or order sheet)

Mass to be gripped F_{max}

Type label acc. to GB7588



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3 Installation and adjustment


3.1 Placing the safety gear between the guide rails

Before installation of the counterweight frame, the counterweight safety gear has to be placed between the guide rails.

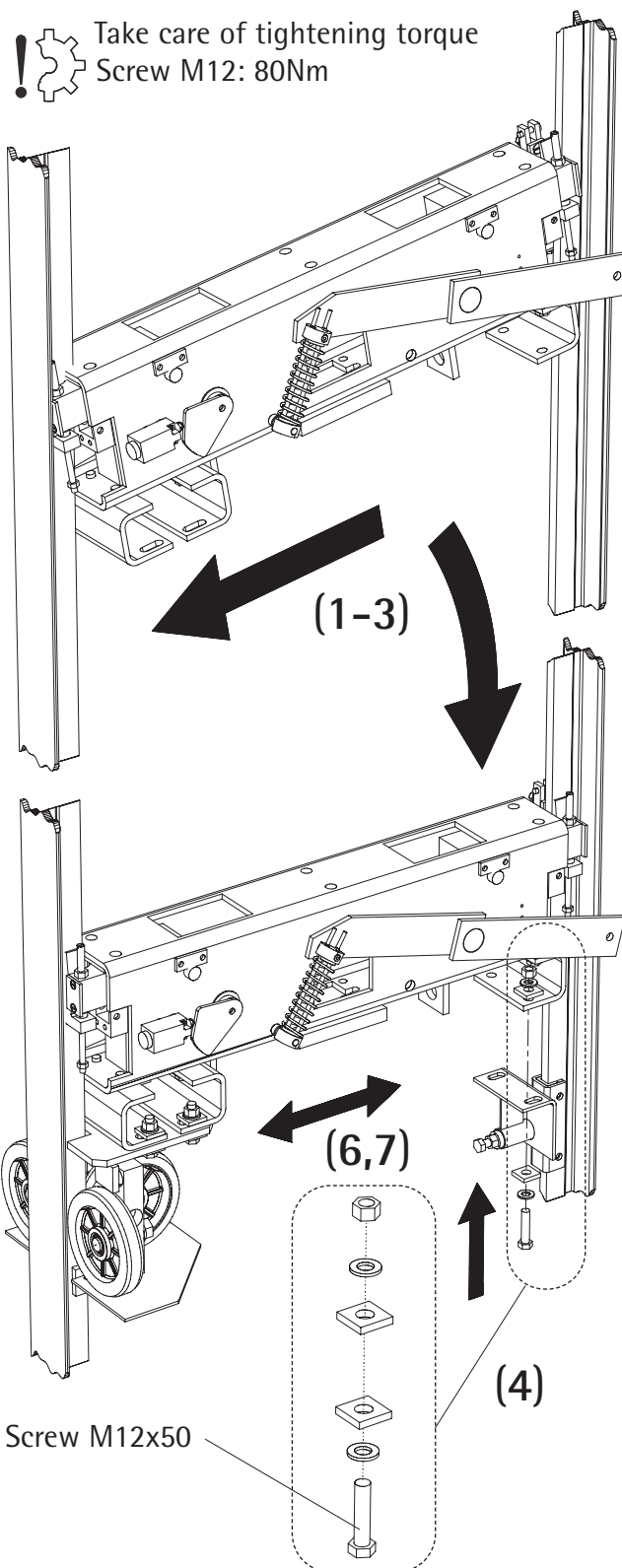
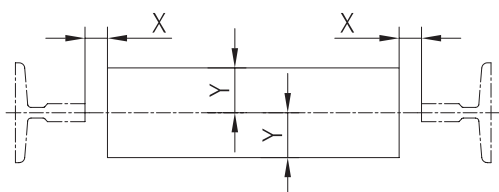
 The guide rails should have been already properly set. The distance between the guide rails should be checked before installing the counterweight safety gear.

 Observe the position of the overspeed governor rope. The position of the lifting lever of the rope at the safety gear cannot be changed if the safety gear is built-in.

- (1) Lift the safety gear between the guide rails by setting safety gear body at an angle (see Fig.)
- (2) Clip one safety gear head onto the rail
- (3) Turn body back into the horizontal position, pushing the second safety gear device onto the rail
- (4) Fix the guide shoes loosely to the safety gear using screws supplied (for setting refer to operating instruction manuals of guide shoes).
- (5) Lower the safety gear on to installation supports or an installation platform.

 Adjust the supports or platform so that the safety gear is horizontal.

- (6) Centre the safety gear between the guide rails (see X-dimension).
- (7) Centre the safety gear in forwards direction (see Y-dimension) - tighten the guide shoe fixing screws.



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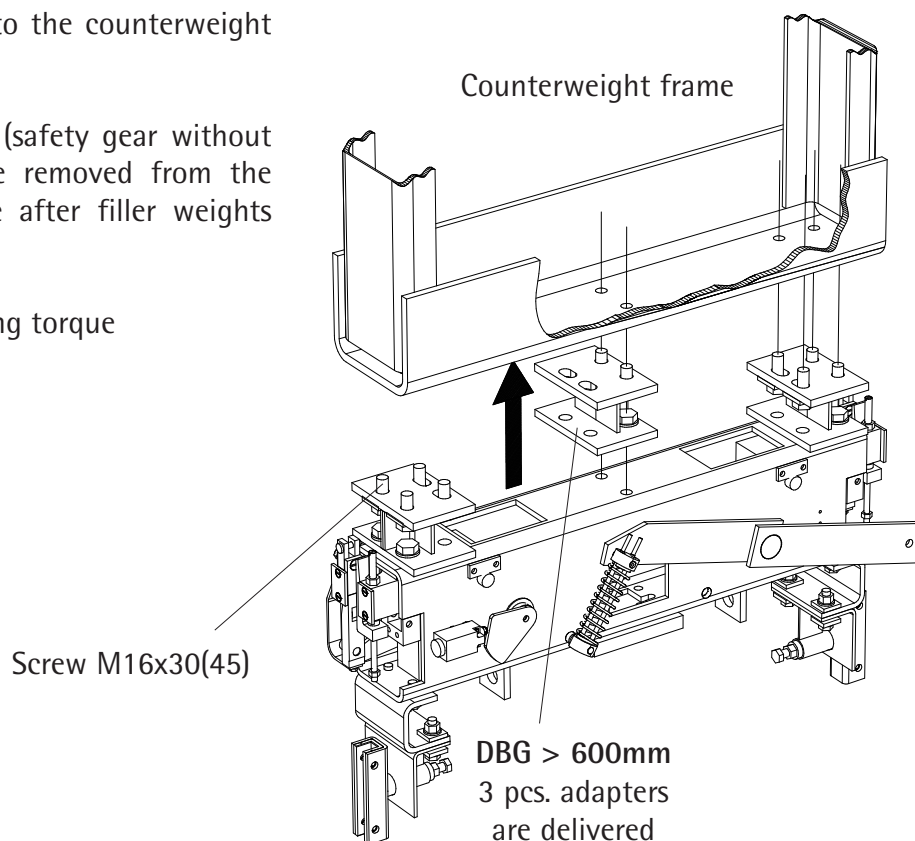
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3.2 Securing the safety gear to the counterweight frame

- (1) Attach the safety gear to the counterweight frame.

 Always use adapters (safety gear without adapters can not be removed from the counterweight frame after filler weights are loaded)!

 Take care of tightening torque
Screw M16: 195Nm



Counterweight Safety Gear

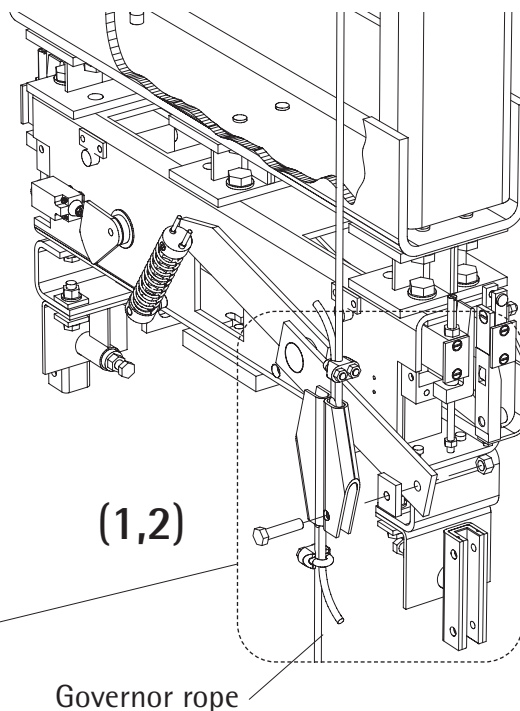
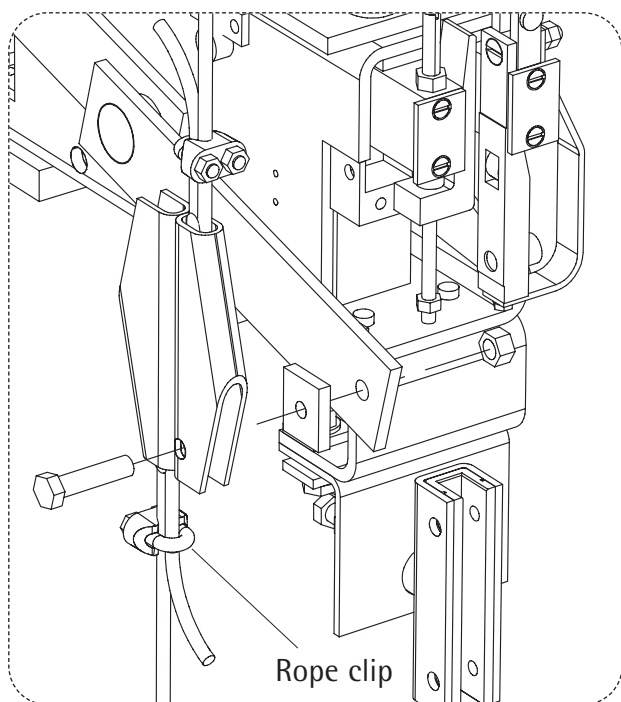
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3.3 Final assembly

- (1) Fix the overspeed governor rope fastener to the safety gear lever
- (2) Install the overspeed governor rope (use delivered rope clips)
- (3) Load the filler weights into the counterweight frame
- (4) Do the counterweight frame roping

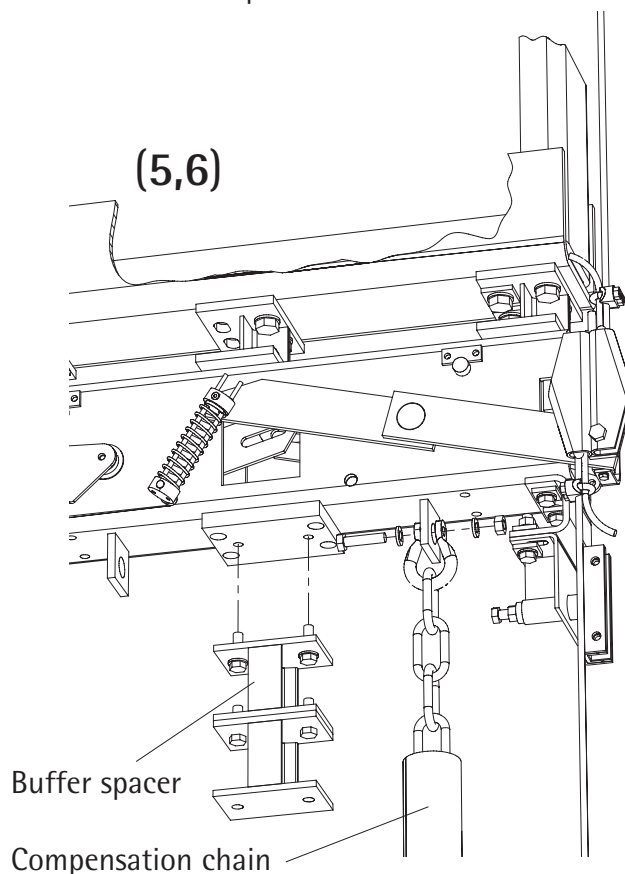


- (5) Mount the buffer spacers (optional) below the safety gear body



Take care of tightening torque
 Screw M12: 80Nm

- (6) Fix the compensation chain (optional) below the safety gear body



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3.4 Gripping wedge adjustment

After installation of the counterweight frame and the guides, the correct centering and adjustment of the safety gear with regard to the rails have to be done.

- (1) Adjust the gap between the counter wedge (3) and the guide rail by using the adjustment screw.

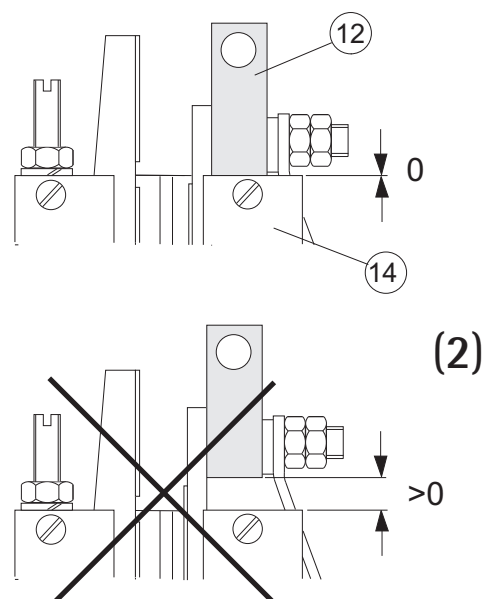
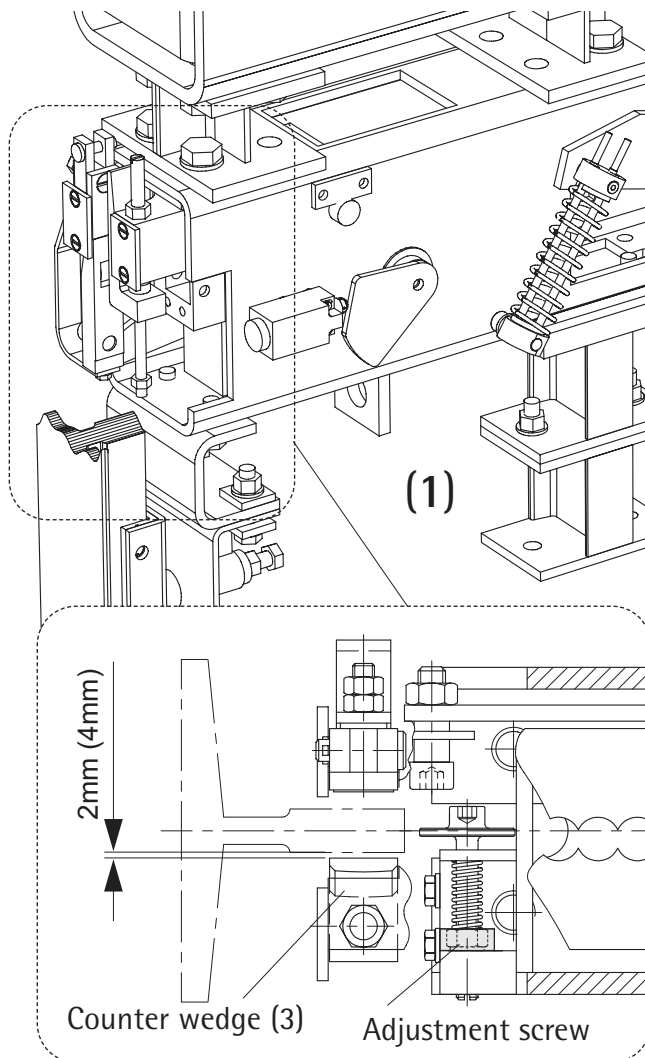
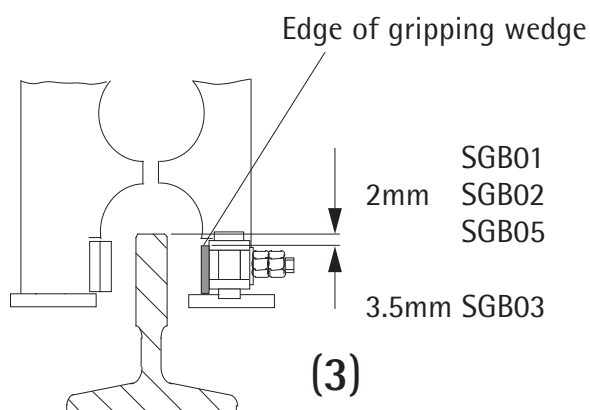


Running clearance:
 2mm ... with sliding guide shoes
 4mm ... with isolated roller guide shoes

- (2) Check that the fixing links (12) of the gripping wedges bear against the spring block (14).
- (3) Check the horizontal adjustment of the gripping wedge.



Take care of different adjustments for certain SGB types.



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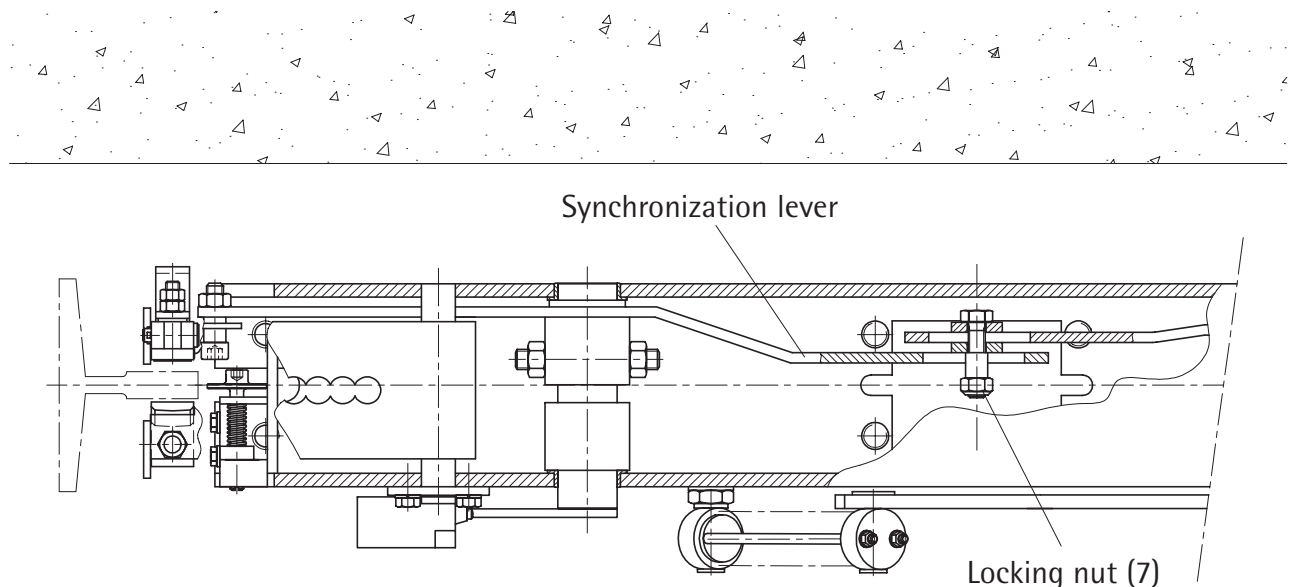
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3.5 Synchronization adjustment

- 1) Raise the safety gear lever by hand and check that both safety gears begin gripping at the same time ... If not, adjust the synchronization:
- (2) **Adjustment of the synchronization:**
 Loosen self locking nut (7) and adjust the screw connection. Remove the plate below the safety gear body if the nut cannot be accessed from the front.

(1-3)



- (3) Check the horizontal movement of the safety gear to be sure that the counter wedge (3) is able to access the guide rail when the safety gear is activated.

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3.6 Electrical installation of the safety gear contact



Work involving electrical equipment should only be carried out by an electrical fitter or qualified personnel.



Before carrying out work, switch off all voltage to installation equipment.



Take note of the following when laying the connection cable:

- that the single polarity cables have double insulation
- the use and laying of cables is governed by the EMC



The safety gear contact opens the lift installation's remotely controlled safety circuit.



The safety gear could be equipped/ordered with or without safety gear switch (referring to the country regulations)

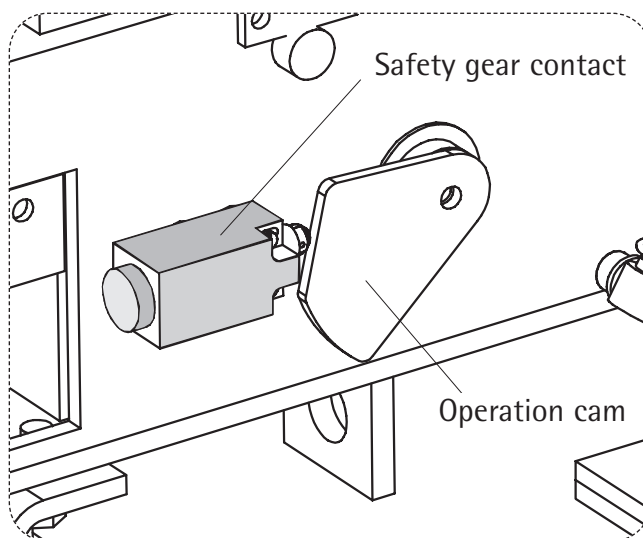
- (1) Connect the contact
- (2) Test the safety gear contact function - adjust if necessary
- (3) Adjust the switch horizontally on its fixing bracket.



Adjusting dimension: 3-5 mm from the guard peak



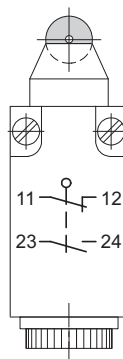
The contact must brake just before safety gear gripping!



(1-3)

3.6.1 Safety gear contact

- use category: AC 15, A300, U_e/I_e 240V (3A)
- thermal current: $I_{the} = 10A$
- insulation voltage: $U_i = 250V$ AC (EN81)
300V AC (ASME)
- protection type: IP 43
- approved in accordance: VDE 0470
IEC/EN 60947-5-1



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4 Function testing

Operational reliability of the installation is assured. The quality and function of individual components are subject to thorough inspection and is checked before dispatch from our works. The safety gear system should undergo an operational test before commissioning or before possible inspection from a technical institute.

First test run after installation



Before the first test run:

The protective coating of grease is to be carefully removed from the guide rails! Clean the guide rails!



The cleaning of the guide rail must be done with a disc brake cleaner or a similar fluid. It is not allowed to do mechanical cleaning like grinding. If the surface cannot be cleaned properly contact the manufacturer.



Clear all people and objects from the lift shaft before commencing the test run
Risk of crushing injuries!

The entire lift travel path should be slowly travelled (in inspection mode) before the functions tests. Attention should be paid to the clearance of all fastened parts, especially with regards to the guide brackets/safety gear devices. Find and remove any protruding bolts or other dangerous restrictions well in advance.

Preparations before tests:



When sliding guides shoes are used, a thin coating of the guide rail oil is to be applied to the guide rails.

When roller guide shoes are used the guide rail may not be lubricated at all.



The lubrication oil may not include high pressure additives.

- Check the activating force of the safety gear synchronization (it should be between 200 and 250 N). This value can be higher if the travel is over 75m. Calculate the minimum required force F_1 as follows:

$$F_1 = \text{mass of overspeed governor rope} \times \text{downwards acceleration} \times \text{safety factor (2)}$$

$$\text{e.g.: } F_{1 \min} = 100\text{kg} \times 1,5\text{m/s}^2 \times 2 = 300\text{N}$$



This is the minimum force which should be measured on the safety gear synchronization to prevent unintended gripping. If the force is less than the retaining spring of the safety gear synchronization must be adjusted.

- Check the tripping force of the overspeed governor F_2 :

This force must be at least twice as high as the force measured on the safety gear synchronization.

$$\text{e.g.: } F_1 = 300\text{N} \Rightarrow F_{2 \min} = 2 \times F_1 = 2 \times 300 = 600\text{N}$$



The maximum tripping force $F_{2 \max}$ of the overspeed governor is 1100N.

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4.1 Static functions test

The function of the safety gear is to be checked with loaded car and at service speed before the real safety gear test is performed.

- Activate the safety gear actuating lever (or the overspeed governor rope as well by means of the tripping function if available) manually. At the same time, use the emergency control or inspection run control to gradually lower the counter weight.
- Check if both safety gears work at the same time. (Gripping marks on the guide rails must be on the same height). If the safety gears are not working simultaneously the safety gear synchronization must be readjusted.
- After a few centimeters, the counterweight frame should be caught on the left and right by the safety gear.
- The safety gear contact should respond
- Then release the safety gear by running up the counterweight frame. Check that the actuating mechanism and the safety gear contact have returned to their initial positions.



For rated speed lower 1,5 m/s the dynamic safety gear test can be done when the function test is shown to be ok.



If the rated speed is above 1.5 m/s, another safety gear test must be done with empty car and at a speed of 1,5 m/s. Measure the gripping distance as shown in section 4.2. From the tripping speed v and the gripping distance s the retardation R can be calculated according to the following formula.

$$R = v^2 / (2 \times s)$$

The retardation R should be within 6 m/s² and 8 m/s²



If the retardation is not correct the safety gear must be replaced (please contact WITTUR).



The real safety gear test can be performed when the above mentioned tests are ok.

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4.2 Dynamic functions test



Nobody should be in the lift car or on the car roof when carrying out test runs or functions tests!

Each gripping test has to be documented and a copy of the test report should remain in the elevator book.

In order to ease the releasing of the counterweight from the safety gear do the following:

4.2.1 Testing criteria for counterweight safety gear

- the car must be empty
- load the counterweight frame
- gripping speed = tripping speed of over-speed governor (v_t)

- Lock the car side safety gear before testing the counterweight safety gear to prevent unintended tripping of car safety gear due to jumping of the car.



Remove the locking after the safety gear test has been performed!



After each test or activation of the safety gear check that there are no defects that can impair the normal run of the elevator.



Change the safety gear if there is a damage on it. A visual check is sufficient.



It is recommended to do the test near a door, to unload the weights and make it easier to lift up the elevator after testing the safety gears.

4.2.2 Procedure of dynamic functions test

- Drive the counterweight frame to the level near the mid point of the shaft or higher.
- Drive the counterweight frame about 2 m to up direction from the level, use service drive.
- In geared elevators accelerate the elevator with the motor. In gearless the acceleration can be done just by opening the motor brake.

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- Shut down the power supply; keep the brake manually open.
 The elevator should accelerate to the tripping speed of the Overspeed governor. When the tripping speed is reached the Overspeed governor must activate the safety gear and the safety gear must stop the elevator.



If this does not work correct (the elevator does not stop after 2 - 3 m) release immediately the motor brake so the elevator is stopped by it.

- Drive the elevator car in down direction in order to release the safety gear.
 Force to lift the counterweight after gripping:

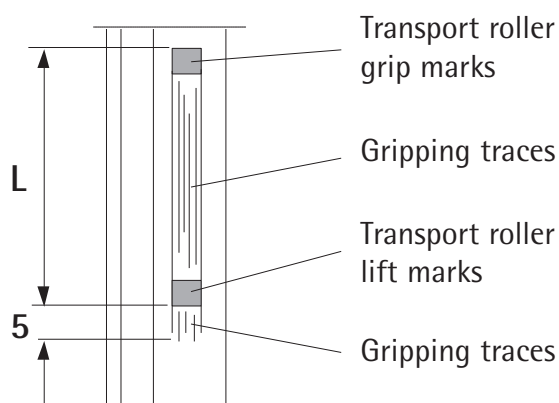
$$F = 1,5 \times F_{\max}$$

- Do the checks described in the following chapters.

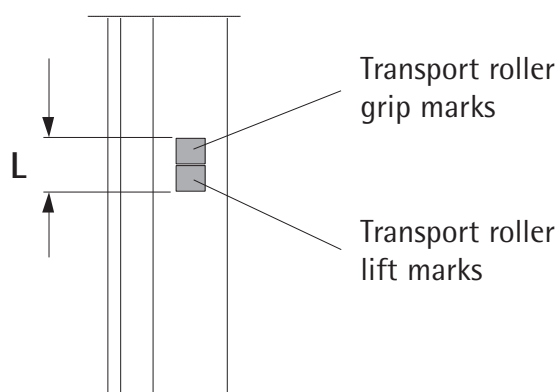
4.3 Gripping distance

4.3.1 Measuring of gripping distance

Measure and calculate the gripping distance "s" as described in one of the following two alternatives:



When the roller leaves separate marks, the gripping distance is $s = L + 5 \text{ (cm)}$



When the roller leaves a continuous mark, the gripping distance is $s = 2 \times L \text{ (cm)}$

Counterweight Safety Gear

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Operating instructions

Blatt/sheet D7AGMGB.017
Datum/date 18.03.2002
Stand/version 18.03.2002
Geprüft/approved WAT/MZE

4.3.2 Permitted gripping distance

Safety gear test with empty car and tripping speed of the overspeed governor:

The gripping distance "s" is to be within the maximum and minimum values which are based on the tripping speed v_t of the overspeed governor.

s = gripping distance [m]
 s_{min} = minimum distance [m]
 s_{max} = maximum distance [m]
 v_t = tripping speed of the governor [m/s]
g = 9.81 m/s²

$$\begin{aligned} s_{min} &= 0.50 \times v_t^2 / g + 0.018 & \dots \text{ if } v_t > 0.6 \text{ m/s} \\ s_{max} &= 0.91 \times v_t^2 / g + 0.034 \\ s_{min} &= \sqrt{0.037 \times 1.00 \times v_t^2 / g} & \dots \text{ if } v_t \leq 0.6 \text{ m/s} \\ s_{max} &= \sqrt{0.068 \times 1.82 \times v_t^2 / g} \end{aligned}$$

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4.3.3 Check of gripping distance "s" against the diagrams 1 - 4

Read from the diagram 1, 2, 3, or 4, (depending on v_t) within which area the gripping distance "s" is plotted.



Note the tripping speed v_t stamped on the rating plate of the overspeed governor.

- If the gripping distance "s" is within the area 1 (shaded), the safety gear is set correctly!
- If the gripping distance "s" is in one of the areas 2 - 5, the safety gear must be replaced (please contact WITTUR)

Example:

Tripping speed of the overspeed governor:

$$v_t = 2.0 \text{ m/s (select diagram 3)}$$

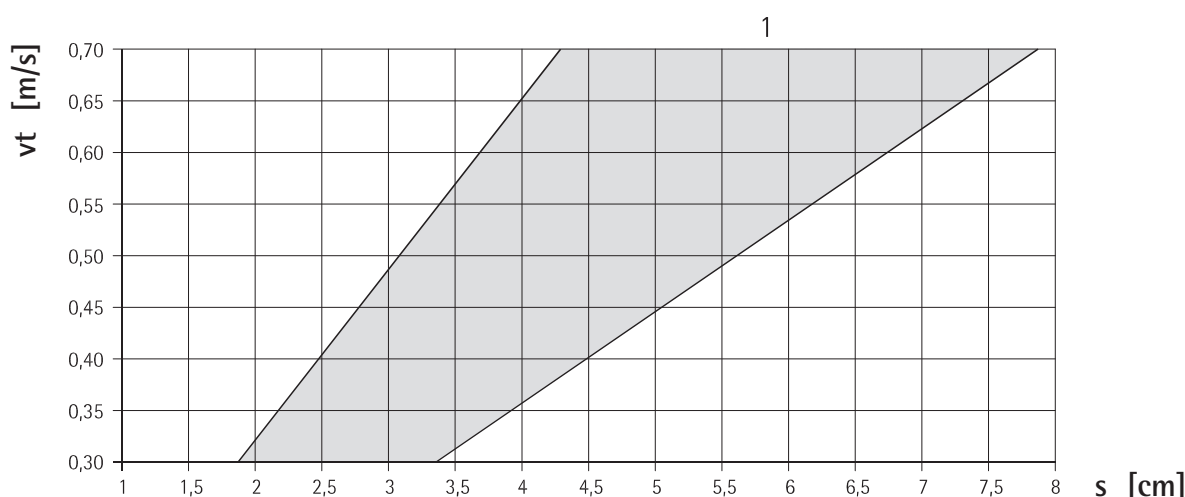
The gripping distance measured:

$$s = 38 \text{ cm}$$

The gripping test has been done with nominal load and tripping speed of the Overspeed governor (v_t)

The diagram shows that the gripping distance "s" is in area 1 - i.e. the gripping distance is OK (max. gripping distance for $v_t = 2.0 \text{ m/s}$ approximately 40 cm).

Diagram 1: $v_t = 0.3 - 0.7 \text{ m/s}$



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Diagram 2: $v_t = 0.7 - 1.4 \text{ m/s}$

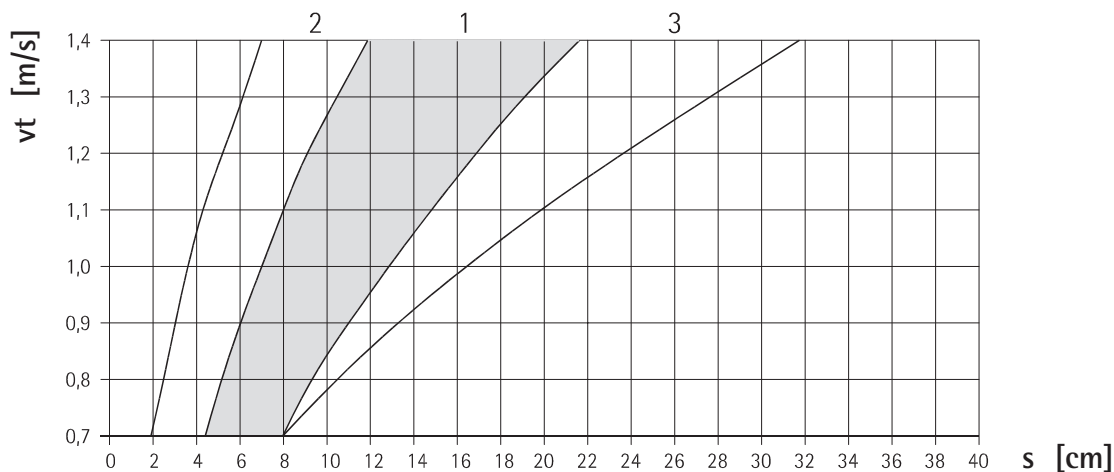


Diagram 3: $v_t = 1.4 - 3.4 \text{ m/s}$

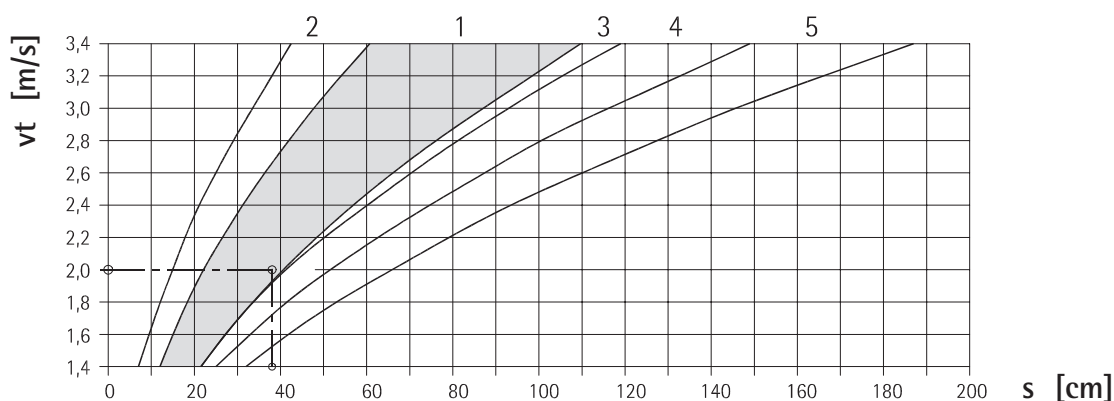
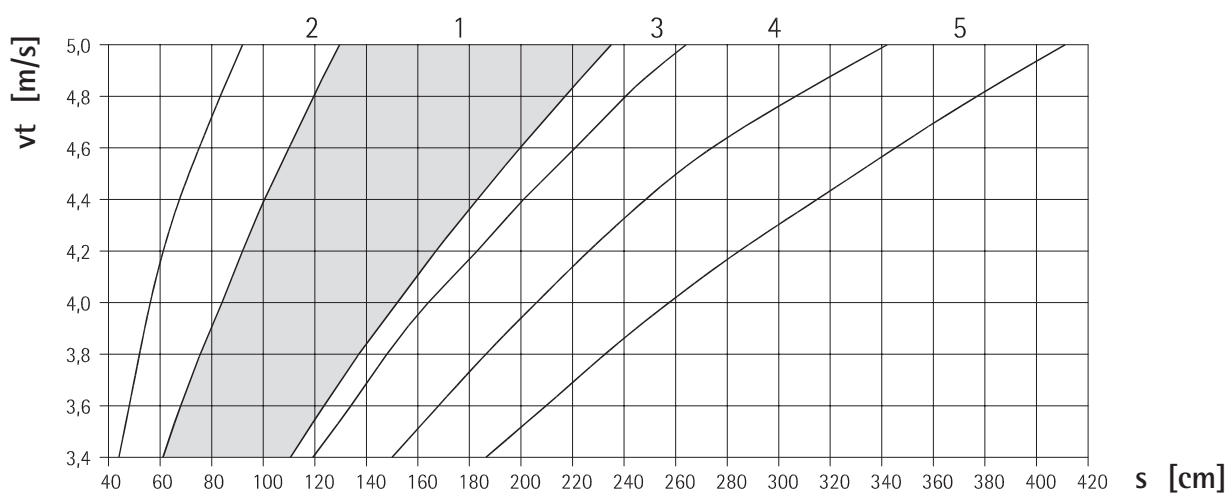


Diagram 4: $v_t = 3.4 - 5.0 \text{ m/s}$



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4.3.4 Visual checks after a safety gear test

- Inclination of the counterweight frame:



During gripping the counterweight may not incline more than 5% towards the normal position.



If there is any defect the safety gear must be replaced!

- Safety gear:

Drive the counterweight frame to the lowest floor and check from the pit following items:

- existence of roller
- existence of brake lining
- visual defects of safety gear parts
- friction marks
- defects on the safety gear housing



After the safety gear test the burrs caused by the safety gear roller must be removed from the guide rails.

5 Maintenance, inspection and repair

5.1 Maintenance and inspection

The progressive type safety gears SGB01, SGB02, SGB03 and SGB05 are basically maintenance free. The whole installation is designed so that no large maintenance operations have to be carried out during damage free operation of the installation.



Please contact us at WITTUR if you have any problems or queries.



Maintenance work should be expertly carried out with utmost care in order to guarantee safe installation operation.

Inspection checks must be carried out at regular intervals (minimum twice a year with each service) to guarantee safe operation. Alterations, damage or other irregularities should be reported, and repaired if possible. Frequent servicing and control checks not only make operation of the installation safer, but also ensure long and reliable service life.

It is recommended that control checks and servicing be carried out before legally prescribed functional tests (e.g. before TÜV tests).



The lift installation must be immediately taken out of use should any damage or irregularities arise which could possibly impair operational safety.

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5.1.1 General



When sliding guides shoes are used, a thin coating of the guide rail oil is to be applied to the guide rails.

When roller guide shoes are used the guide rail may not be lubricated at all.



The lubrication oil may not include high pressure additives.

Operation temp. [°C]	Viskosity
-20 ... +5	68 cSt/40°C
-5 ... +35	ISO VG-320
+30 ... +50	ISO VG-460

Tab. 1: Lubricant requirements

5.1.3 Cleaning of guide rails

Any dust or dirt on the guide rails can have influence to the friction between the guide rail and the safety gear. This means that the guide rails must be cleaned carefully whenever the dirt becomes visible on the guide rails or in minimum once per year.



As cleaning fluid a disc brake cleaner or a similar fluid should be used.



Mechanical cleaning like filing, grinding is not permitted.

Only the marks from the safety gear rollers caused during safety gear activation may be removed with a file or a scraper.

5.1.2 Maintenance and inspection check list

- Check that all fixings are tighten and aligned
- Check that the guide shoes are correctly aligned and adjusted
- Check brake shoe/guide rail for free running, and adjust if necessary
- Check brass brake lining for damage or high degree of wear
- Check state of safety gear and neighboring components for damage, deformation or heavy oxidation (rust)
- Check that the gripping wedge can move free
- Check axial play and turning capacity of the safety gear shaft.
- Check even running of left and right safety gear (synchronization)
- Check actuating mechanism and rail/connection for free movement/proper functioning. Check synchronization
- Check safety gear contact for function/clearance and adjust if necessary (see chapter 3.6)
- Clean system if dirt has built up

5.2 Returning tests

The standard levels of returning tests should not be higher than the standards of the tests before installation.

These returning tests are not allowed to cause wear or stresses that impair the operation reliability of the elevator. The tests must be done with empty car and reduced speed.



The reset of the safety gear must be done by an expert person.

Each gripping test has to be documented and a copy of the test report should remain in the elevator book.

For detailed adjustment dimensions and testing procedures refer to chapter 4. Functions testing.

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5.3 Operational life time of the safety gears



After certain times of gripping with full load (mentioned below) change the complete safety gear!



Operation of the system without the safety gear, even for short periods of time, is forbidden.

v_t [m/s]	No. of grippings
< 1,4	15
1,41 3,4	8
3,41 5,0	4

Tab. 2: Operational life time

v_t tripping speed of overspeed governor

Permitted repair work:

Repairs to the safety gear system which do not directly affect the safety gear (e.g. synchronization, safety gear contact, etc.) must be carried out locally. In other words, all procedures involved in initial installation are also included in the repairs and maintenance schedule.

Such repair work in the safety system must, of course, be carried out correctly and with utmost care, in order to guarantee long-term safe operation of the system.

5.4 Carrying out repairs



As a rule, the safety gear should neither be taken apart or altered in any other way (sealants, sealing wax). This also applies to repairs. An exception to this is the synchronization (e.g. due to reconstruction work etc). Condition for this, is that the process is carried out properly and functioning is in no way compromised.



Please contact WITTUR if for any reason something is unclear, or you encounter damage that cannot be repaired with the help of these instructions.



It is forbidden to replace faulty or worn parts of the safety gear yourself.

The reasons are:

- conditions of liability and technical safety
- only original replacement parts may be installed (these are available from manufacturer only).
- repairs are carried out only in pairs and are checked before return.

Counterweight Safety Gear

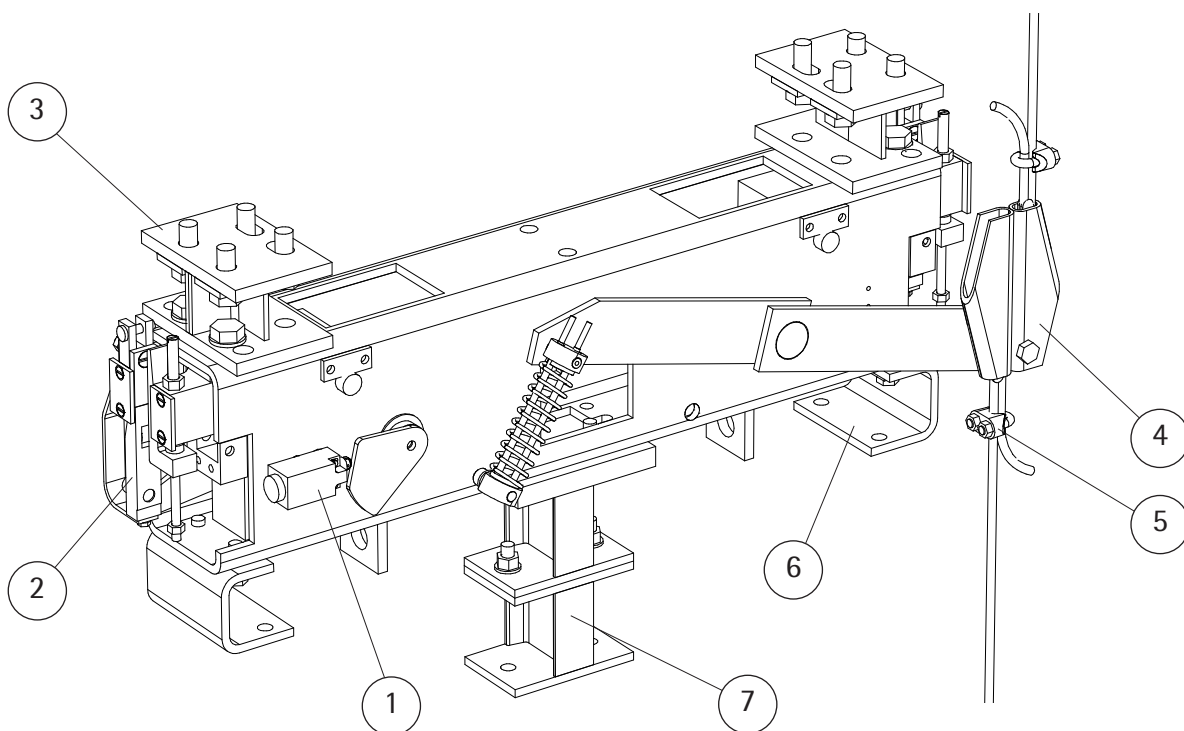
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5.5 Spare parts list

Pos.	Component	Spare part	... used / note	Number...	Art. No.
1	Safety gear contact	Bernstein	I88-U1Z Riwk	1	258453
2	Progressive type Safety gear	SGB05	(a pair of) (safety gear data must be stated in the order)	1	86290G..
		SGB01	(a pair of) (safety gear data must be stated in the order)	1	80065G..
		SGB02	(a pair of) (safety gear data must be stated in the order)	1	80066G..
		SGB03	(a pair of) (safety gear data must be stated in the order)	1	80067G..
3	Adapter (for CWT)	80 mm height	(DBG>600mm ... three pcs. required)	1	602185G01
4	Rope housing (incl. rope clips - 2pcs. and fixing screw M12)		rope diam. 6-7 mm	1	392772G06
			rope diam. 8-9 mm	1	392772G08
			rope diam. 10 mm	1	392772G10
5	Rope clip	S6,5	DIN1142 rope diam. 6-7 mm	1	259316
		S8	DIN1142 rope diam. 8-9 mm	1	256349
		S10	DIN1142 rope diam. 10 mm	1	252042
6	Adapter (... to guides)	incl. fixing screws M12	(guide shoe data must be stated in the order)	1	474681G..
7	Buffer spacer	incl. fixing screws M12	(increment 100mm - must be stated in the order)	1	395954G01





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6 Revision Table

Issue	date	description of change	CR
C	09.04.2013	GB7588 and revision table added	CRW-3391
	09.04.2013	GOST R 53780 added, spare parts list and views updated	CRW-3901
D	07.04.2016	title page and type label updated, add last page	CRW-6014



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Product manufacturer reference can be found on the product type label.

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