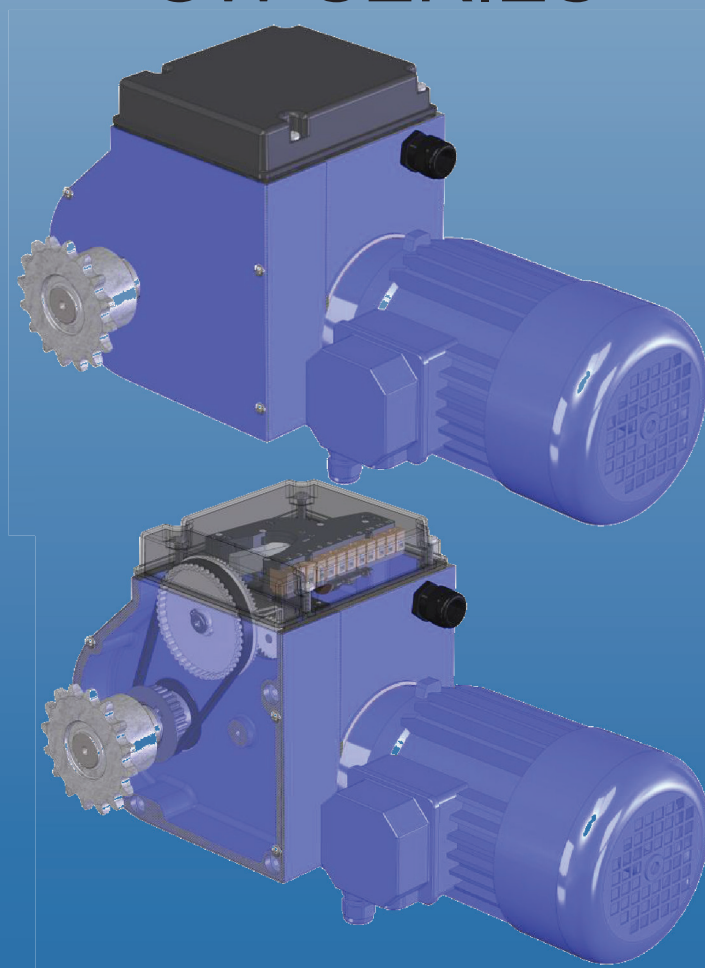




LIMIT SWITCH SYSTEM GW-SERIES



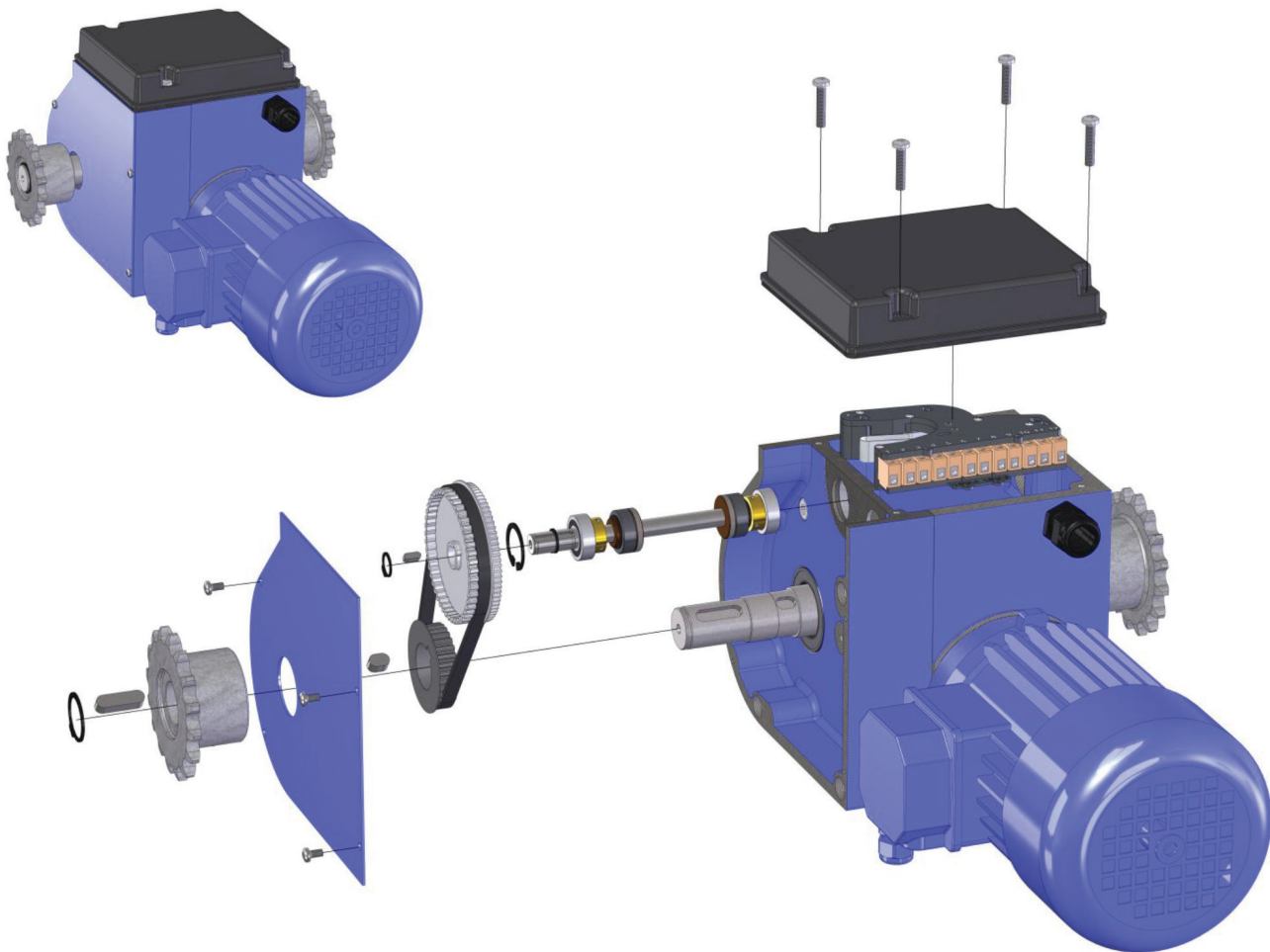
LIMIT SWITCH SYSTEM GW-SERIES

The linear limit switch system is specially designed for use in GW motor gearboxes of de Gier Drive Systems. This document covers the GW10 up to GW150 with an output speed of 1.3 up to 5.2 revolutions per minute (1.6 up to 6.3 at 60 Hz). The shaft of the motor gearbox has a maximum number of 34 or 88 revolutions, depending on the type of motor gearbox. Operating temperature may vary between -15°C and $+60^{\circ}\text{C}$.

The limit switch system is driven via a secondary transmission between the outgoing shaft of the motor gearbox and the threaded shaft of the limit switch system itself. This transmission consists of two pulleys and a toothed belt.

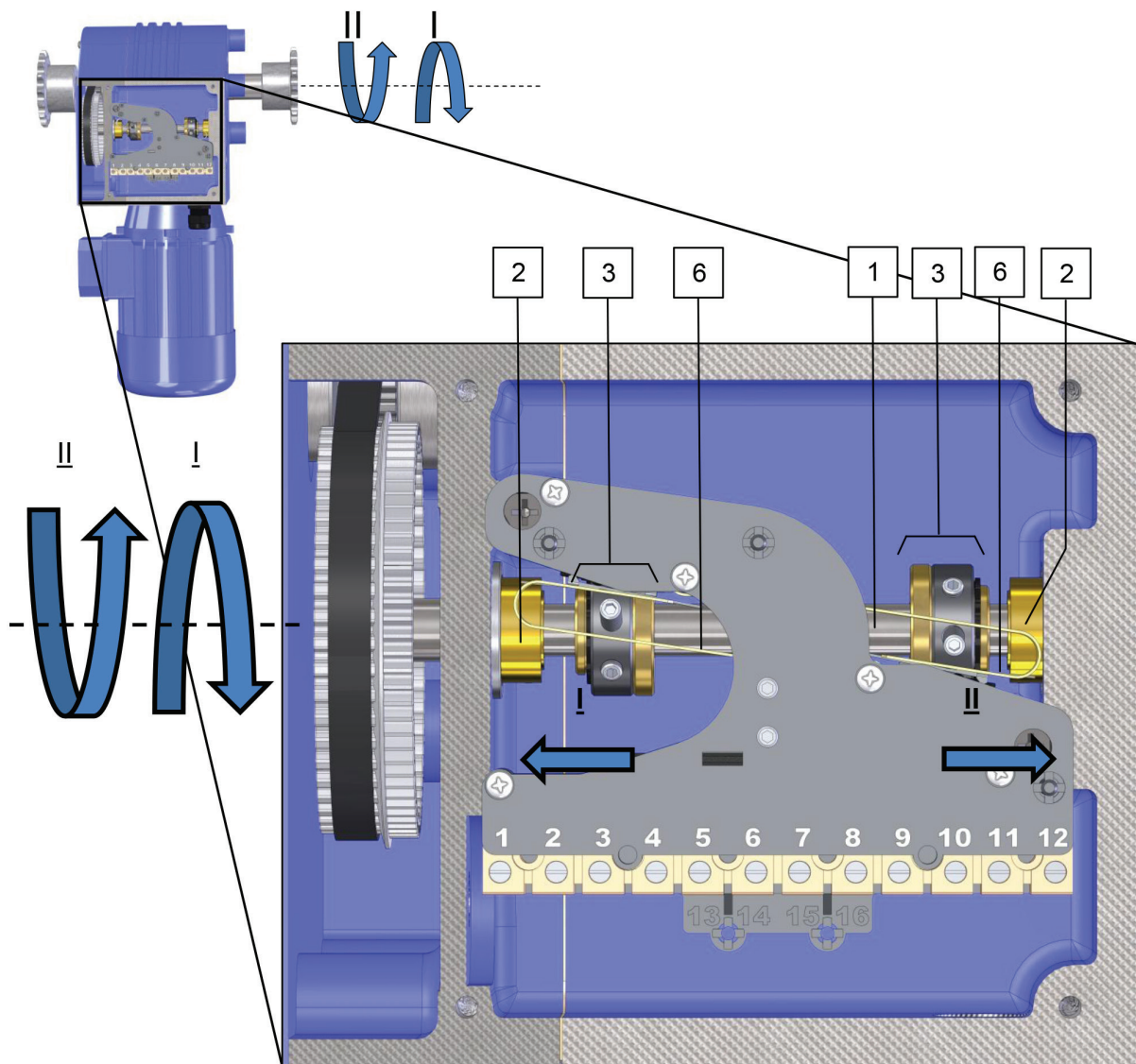
The secondary transmission is accessible by;

- Removing the black plastic cover
- Disassembling the chain sprocket by removing the retaining ring
- Removing the steel cover



FUNCTIONAL DESCRIPTION OF THE LIMIT SWITCH SYSTEM

During normal operation (motor gearbox runs) the switch nuts (3) will move linearly along the threaded shaft (1) in the direction of one of the operating switches (S11 or S12; see next page), depending on the direction of rotation. When the start- or end- position is reached, the switch nut (3) will hit an end stop (2). The switch nut will stop moving linearly and will start to turn with the threaded shaft (1). The long setscrew then pushes the limit switch spring (6) which will activate the operating switch (S11 or S12). These operating switches will send a signal to the relay, which switches off the motor gearbox's electric motor. If the relay or one of the operating switches (S11 or S12) are not functioning properly, the limit switch spring (6) will be pushed further until the emergency switch (S21 or S22; see next page) will be activated. This emergency switch will send a signal to a safety relay, which switches off the control and therefore the electric motor. This prevents any consequential damage occurring to the driven system.



MICROSWITCHES OF THE LIMIT SWITCH SYSTEM

The limit switch system has two sets of micro switches;

- 2 limit switches for start and end position S11 & S12.

The motor gearbox will stop at the moment one of the end positions (e.g. system is completely closed or open) is reached and one of the two limit switches (S11, S12) is operated.

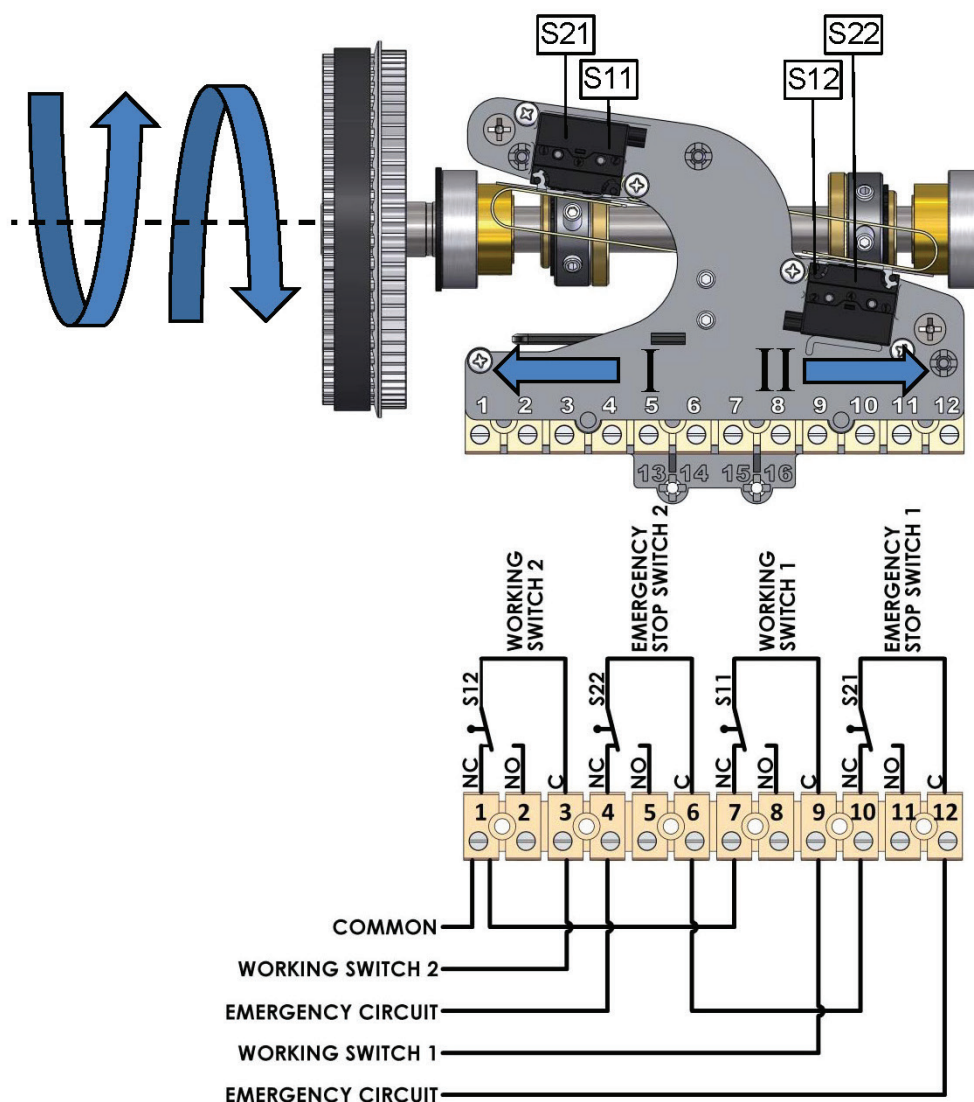
- 2 limit switches for emergency stop S21 & S22

In case one limit switch for the end-position (S11, S12) or relay does not function correctly, there is a second switch (emergency stop switch S21, S22) which will stop the motor gearbox to avoid damage to the driven system.

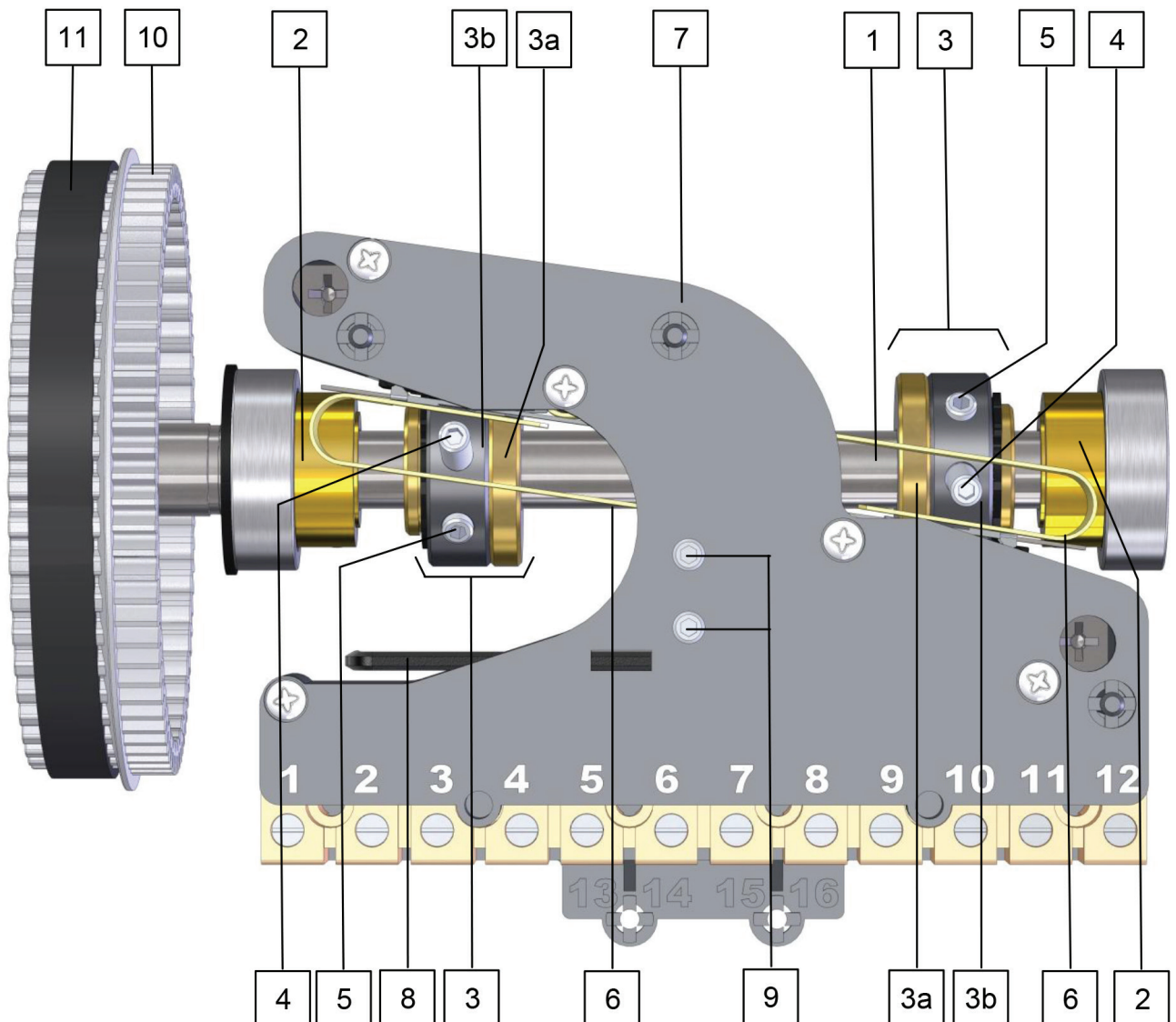
The contacts of the limit switches are suitable of switching the following currents:

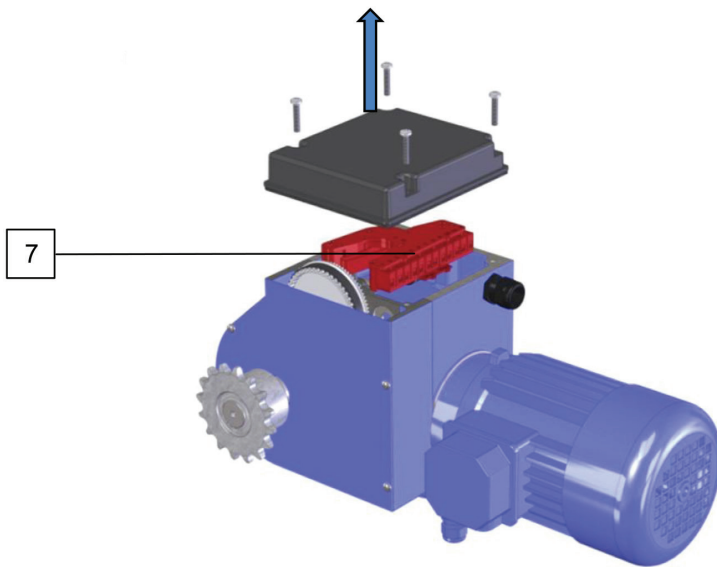
- 24 VAC/VDC; currents from 200 mA up to 500 mA
- 230 VAC; currents from 50 mA up to 1,5 A

Please use the by De Gier provided wiring diagrams when connecting the limit switch system.



No.	Description	Component is included in article no.
1.	Threaded shaft	SP.AS.ENDS.01
2.	End stop	SP.AS.ENDS.01
3.	Switch nut	SP.AS.ENDS.01
3a.	Knurled bronze nut	SP.AS.ENDS.01
3b.	Adjusting ring	SP.AS.ENDS.01
4.	Long set screw	SP.ENDS.03
5.	Short set screw	SP.ENDS.03
6.	Switch spring	SP.ENDS.03
7.	Limit switch assembly	SP.ENDS.03
8.	Hexagonal key	SP.ENDS.03
9.	Spare set screws	SP.ENDS.03
10.	Pulley	SP.TW77.06.XL.KS15GS
11.	Toothed belt	SP.TR156XL037

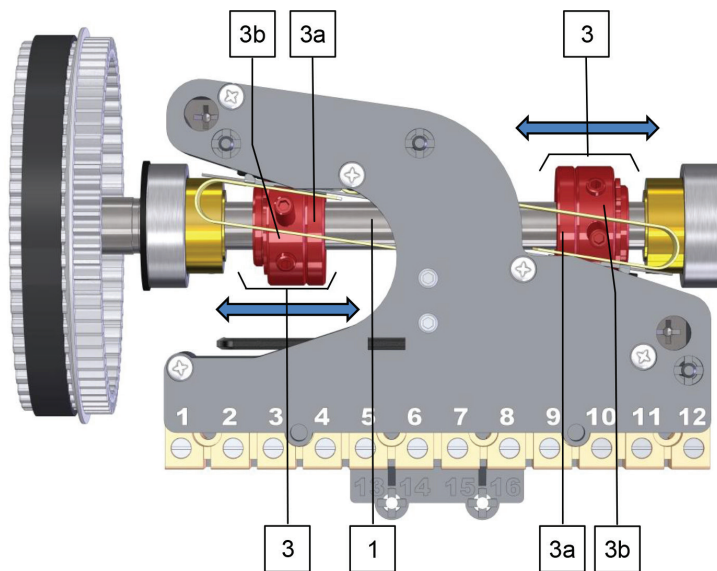




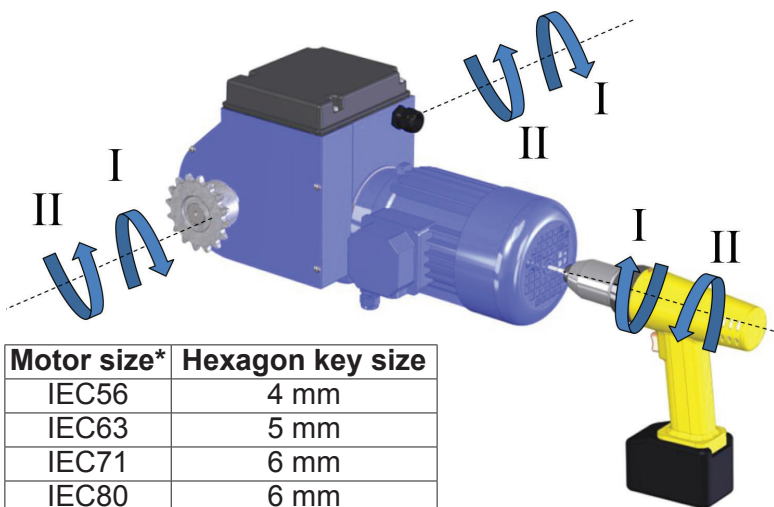
ADJUSTING THE LIMIT SWITCH

In order to adjust the limit switch system it is necessary that the limit switch is electrically connected in accordance with the De Gier wiring diagram. The following steps must be taken to adjust the limit switch system;

1. Remove the black plastic protective cover of the motor gearbox. The limit switch assembly (7, in red) is now visible.
2. Check that the adjusting rings (3b) on the knurled nuts are loose (3a), so that both complete switch nuts (3) can easily be turned by hand on the threaded shaft (1).

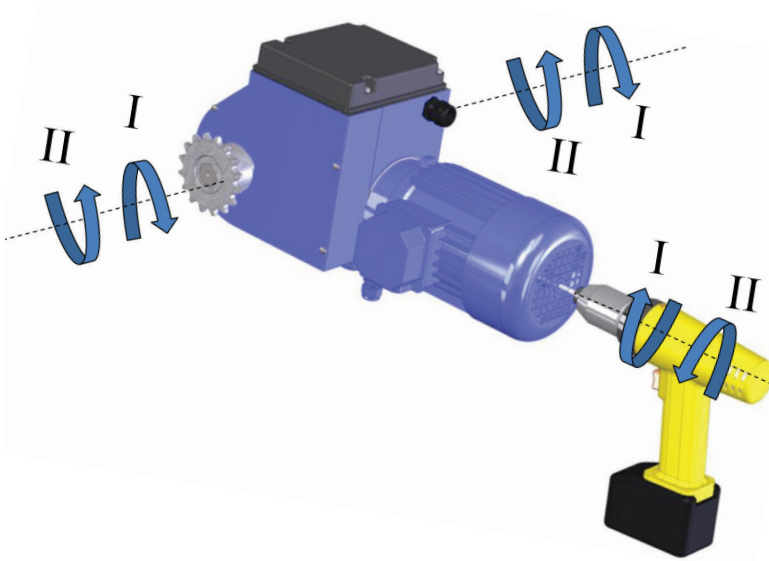


3. Turn the output shaft of the motor gearbox to its start position. This can be done either manually or electrically; Manually; by rotating the shaft of the electric motor with a hexagon key in the shaft of the motor. A drill with a hexagonal key can also be used (maximum 250 rpm). Electrically; by means of a control box. Check if the running direction is correct.



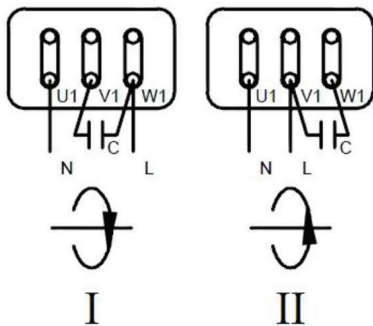
Motor size*	Hexagon key size
IEC56	4 mm
IEC63	5 mm
IEC71	6 mm
IEC80	6 mm
IEC90	6 mm

*You can find the motor size on the type plate which is attached to the electrical motor.

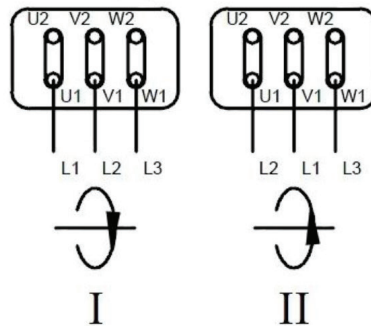


- Determine which operating switch (S11 or S12) should switch in the start and end position. In the following example running direction II is closing the system. Underneath the three wiring options are mentioned including rotation direction of the outgoing shaft.

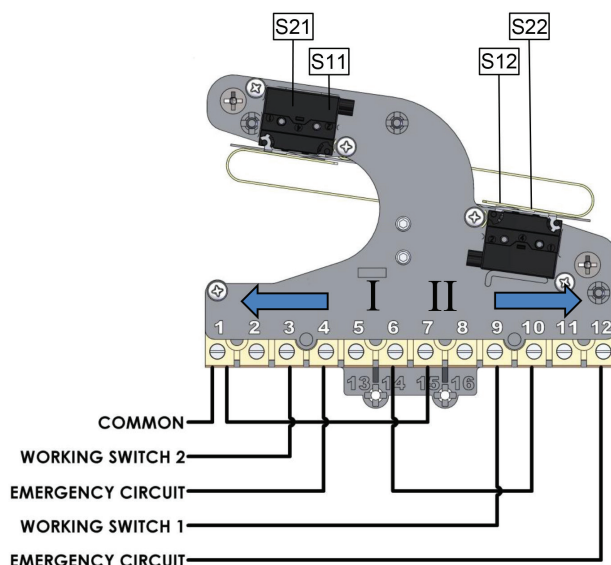
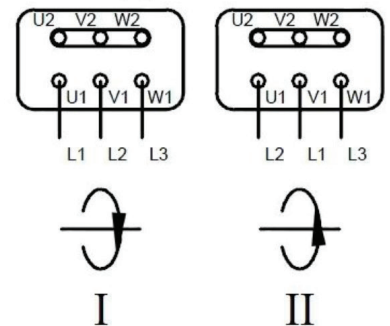
CONNECTION DIAGRAM
230V 1~



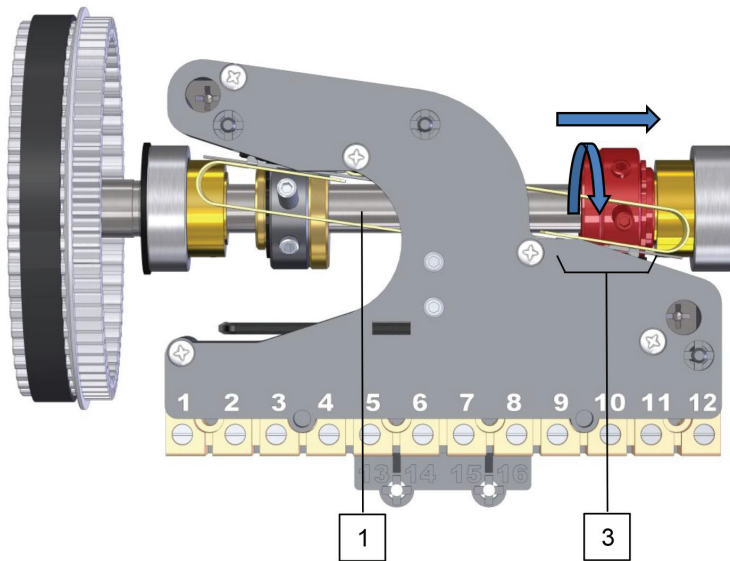
CONNECTION DIAGRAM
 Δ 230V 3~



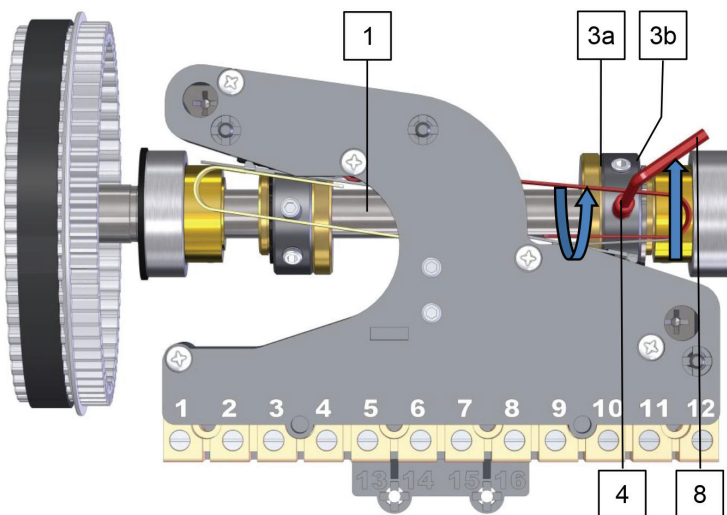
CONNECTION DIAGRAM
 Δ 400V 3~



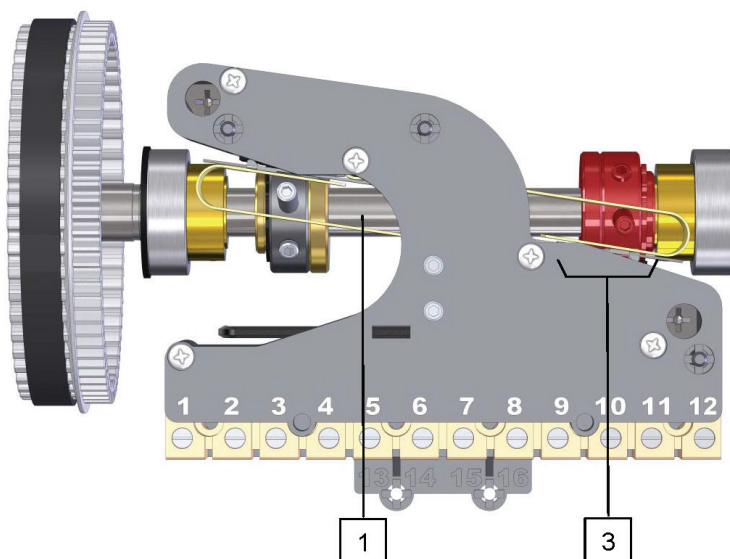
- Rotation in direction II corresponds with limit switch S12. When limit switch S12 is activated, connection 3 and 2 are connected (1 and 3 are disconnected).



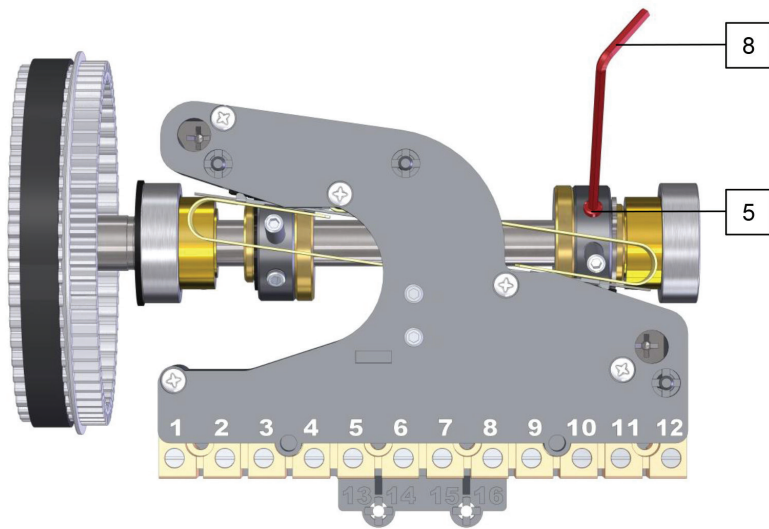
6. When the system is completely closed (start position is reached), turn off the power. Now turn the bronze switch nut (3, in red) to its end position on the threaded shaft (1) by hand.



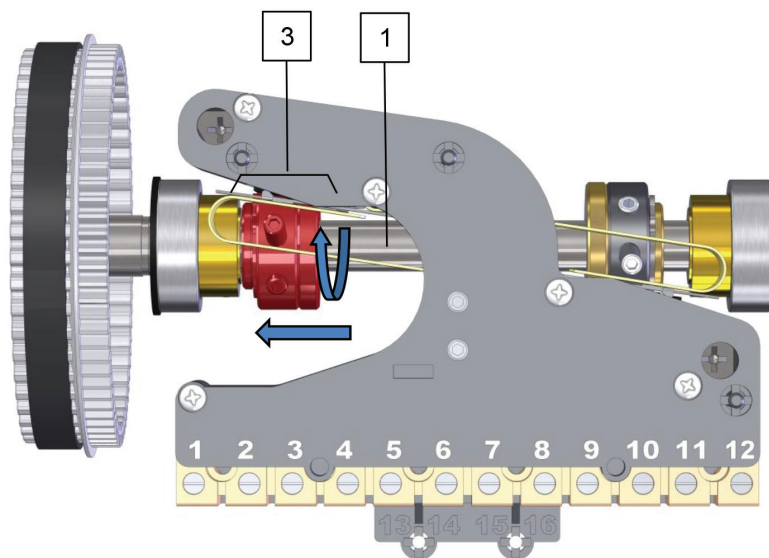
7. Put the hexagonal key (8, in red) in the long set screw (4, in red) and rotate the adjusting ring (3b) around the knurled bronze nut (3a) until limit switch (S12) switches. A single soft click will be audible. Tighten this set screw with a maximum torque of 2,5 Nm.



8. Option; If an electrical control box is used, correct functioning of limit switch S12 can be checked. First shortly reverse the running direction (in this example opening the system). The switch nut (3) then moves from its end position on the threaded shaft (1). During rotation of the shaft only the fixed switch nut (right one in picture) moves linearly over the threaded shaft (1). After the system is opened, close it again carefully. The gearbox should stop when limit switch S12 is activated.

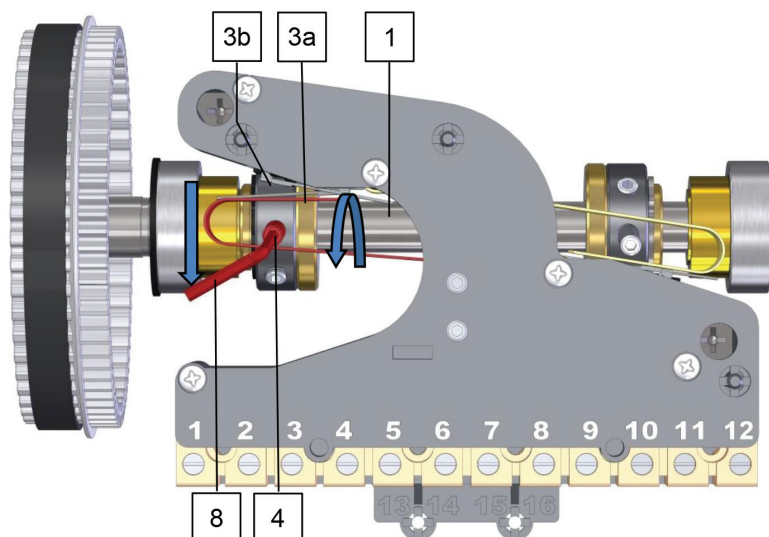


9. When the limit switch functions correctly, the short set screw (5, in red) must be fastened with the hexagonal key (8, in red) with a maximum torque of 2,5 Nm.

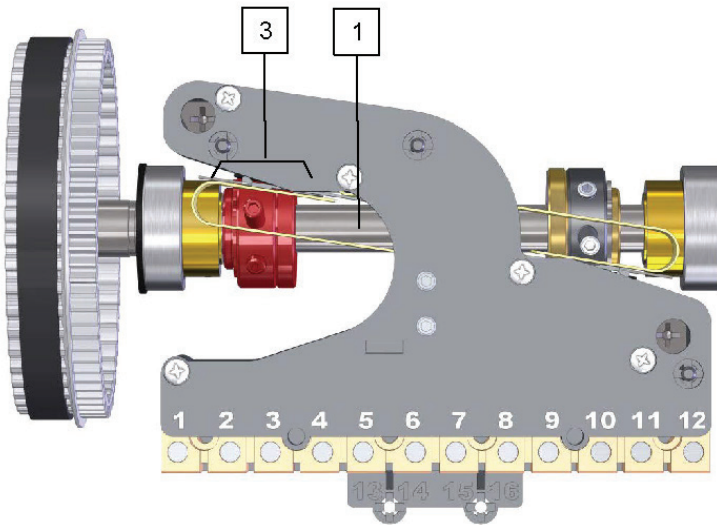


10. Turn the output shaft of the motor gearbox until the system is completely opened. (manually or by control box). In this example this end position corresponds with direction I.

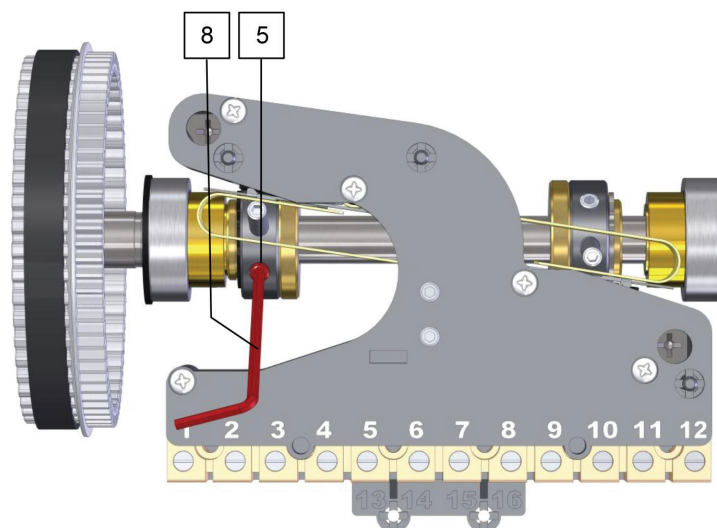
11. When the end position is reached, turn off the power. Now turn the other bronze switch nut (3, in red) to its end position on the threaded shaft (1) by hand.



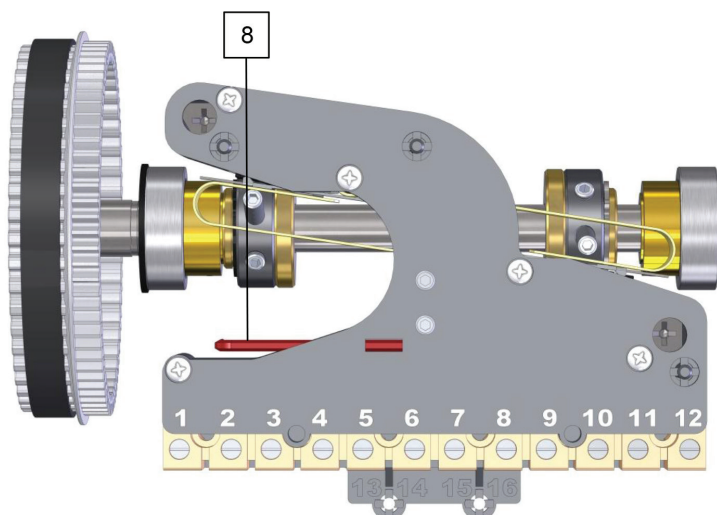
12. Put the hexagonal key (8, in red) in the long set screw (4, in red) and rotate the adjusting ring (3b) around the knurled bronze nut (3a) until the operating switch S11 switches. A single soft click will be audible. Tighten this set screw with a maximum torque of 2,5 Nm.



13. Option; If an electrical control box is used, correct functioning of limit switch S11 can be checked. First shortly reverse the running direction (in this example closing the system). The switch nut (3) then moves from its end position on the threaded shaft (1). During rotation of the shaft ALL switch nuts move linearly over the threaded shaft (1). After the system is closed a little, open it again carefully. The gearbox should stop when limit switch S11 is activated.



14. When the limit switch functions correctly, the short set screw (5, in red) must be fastened with the hexagonal key (8, in red) with a maximum torque of 2,5 Nm.

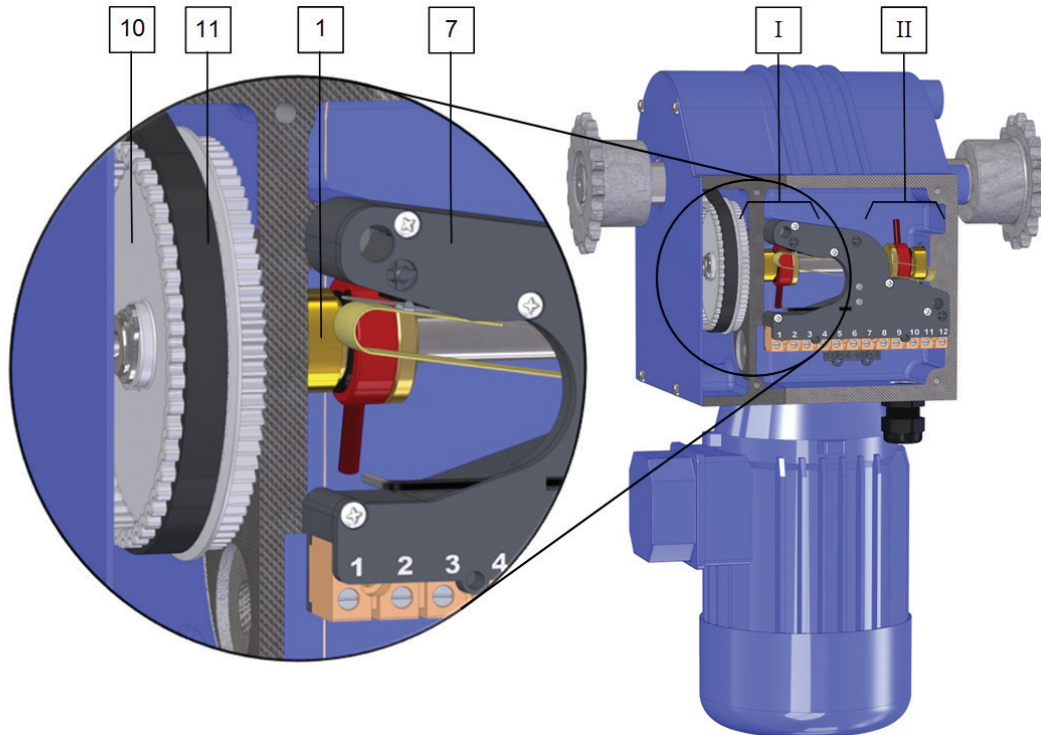


15. Store the hexagonal key (8, in red) in its correct location in the limit switch assembly. Store the bag containing the instructions for adjustment outside the limit switch system. Replace the black plastic protective cover on the motor gearbox.

TROUBLESHOOTING

Situation

The gearbox has run through the emergency switch. Possible in direction I and II.



Possible causes

- Phase change (change of rotation direction)
- Sticking relay contacts
- Faulty connection of the emergency switches (e.g. emergency switch connected parallel to the working switch)
- The load of the gearbox is much too high or too low.

Check

After the fault has been repaired, take the following steps before setting the limit switch system again;

1. Check if the toothed belt isn't damaged.
Article no. SP.TR156XL037 (no. 11 in picture)
2. Exchange grey pulley with a new one (keyway is probably damaged).
Article no. SP.TW77.06.XL.KS15GS (no. 10 in picture)
3. Check for damaged limit switch springs. Exchange assembly if necessary.
Article no. SP.ENDS.03 (no. 7 in picture)
4. Check for damaged parts of the switch nuts. Exchange threaded shaft assembly if necessary.
Article no. SP.AS.ENDS.01 (no. 1 in picture)

