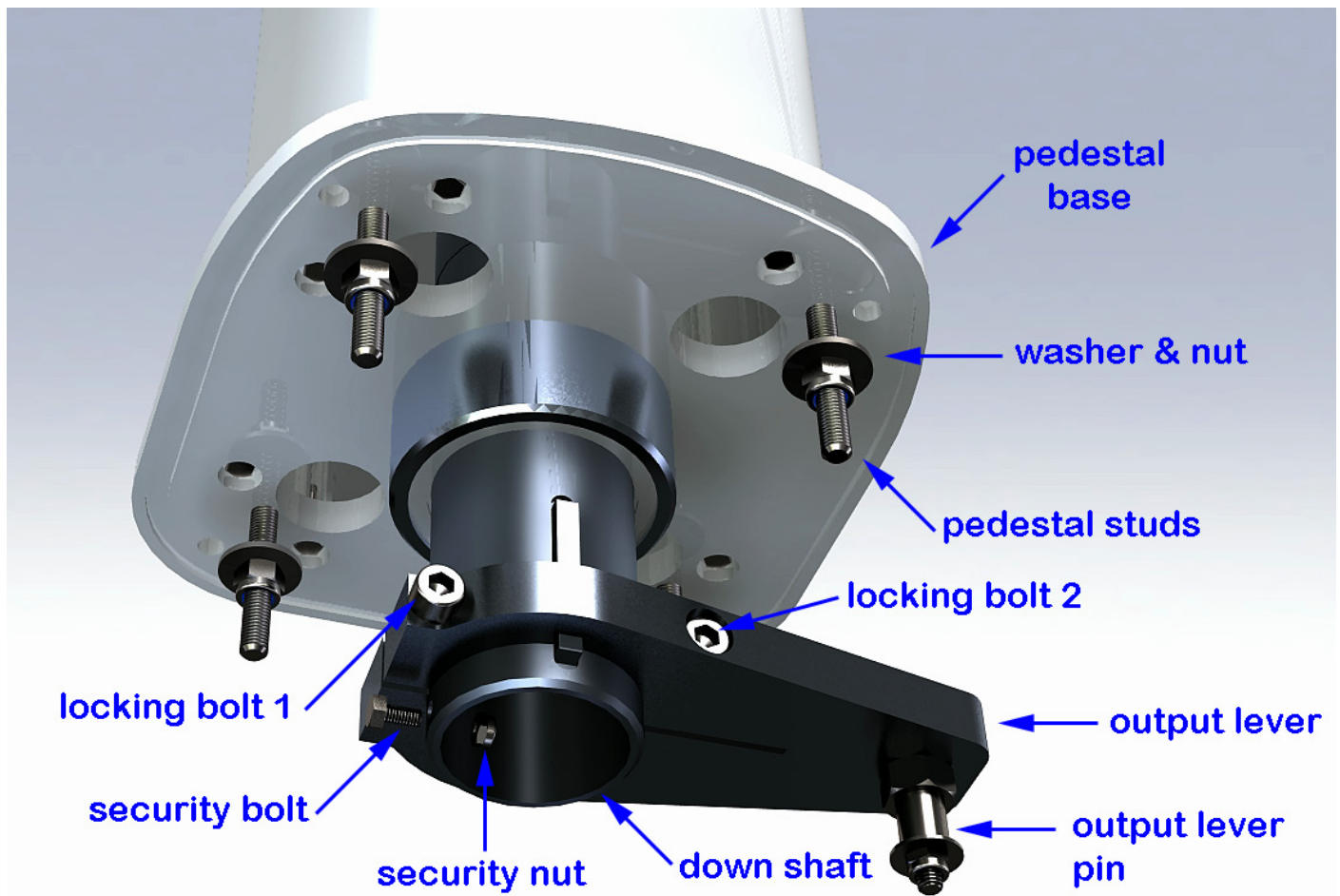


Installation manual JEFA compact autopilot drive unit

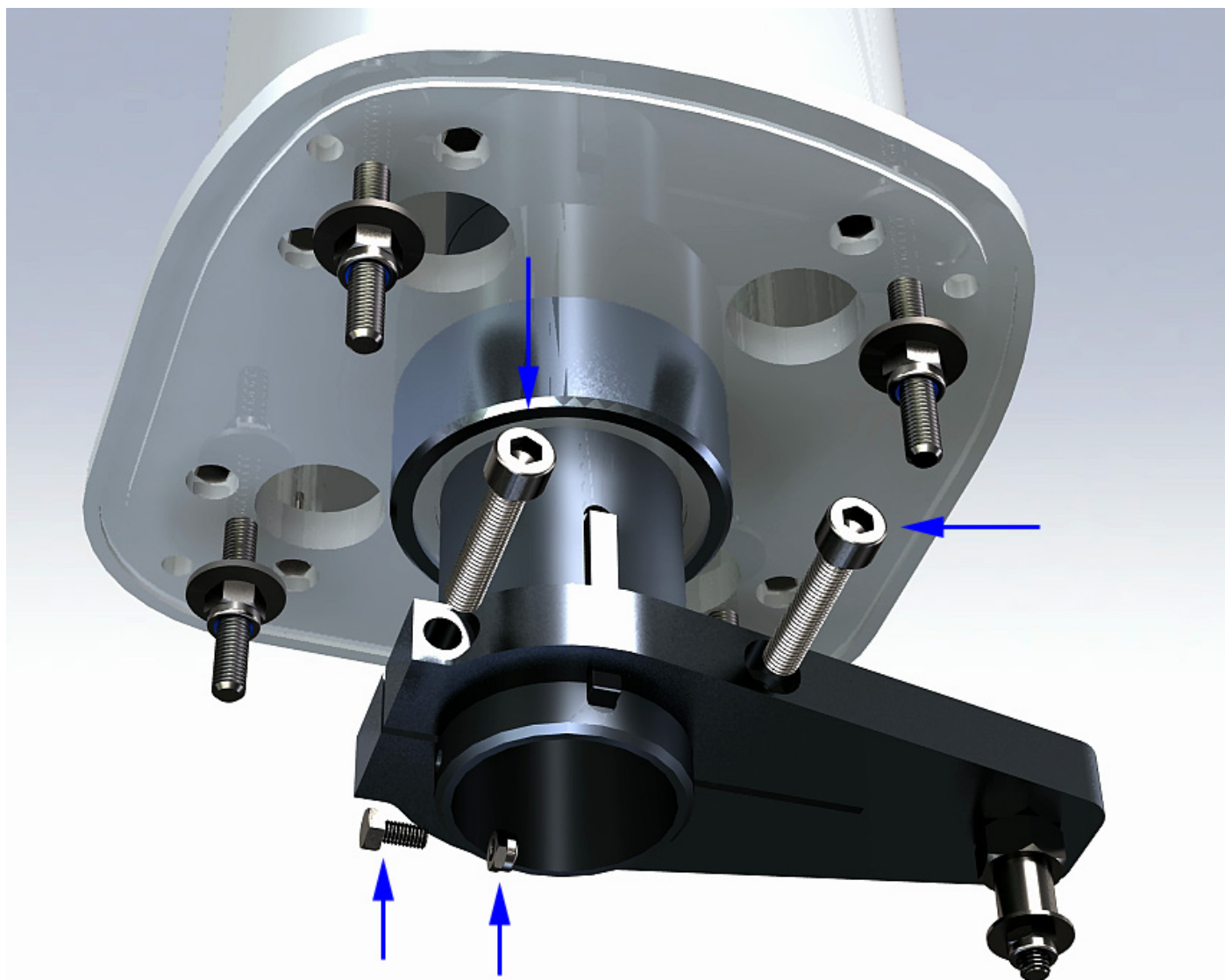
The Jefa compact drive is a strong and compact integrated autopilot drive and much more efficient than existing hydraulic and electro-mechanical linear autopilot drive units (for the why and how, please see our [Q&A page](#)). With a max. rudder torque of 100 KgM (equivalent to 100 Kg force on the end of a 1 meter steering tiller) it's build for 24 hours per day continuous operation with a total weight of only 9,7 Kgs. The combination of the flat wound (pancake) electric motor with the ultra-efficient planetary gearbox results in an extremely efficient drive unit to keep the battery charging time to the minimum. The drive can be used on boats from 20 to 45 foot l.o.a. (or up to 100 Kgm rudder torque) equipped with a Jefa RP100, RP150, RP200, RP300 & RP400 rack and pinion pedestal. The compact drive unit can be installed on a new system or retrofitted to an existing JEFA rack and pinion system. For installation on a new system, please jump to step 4. For the latest autopilot electronics compatibility list, please visit [the product page](#) on our website www.jefa.com.

Step 1: Identification of different parts of rack and pinion system:



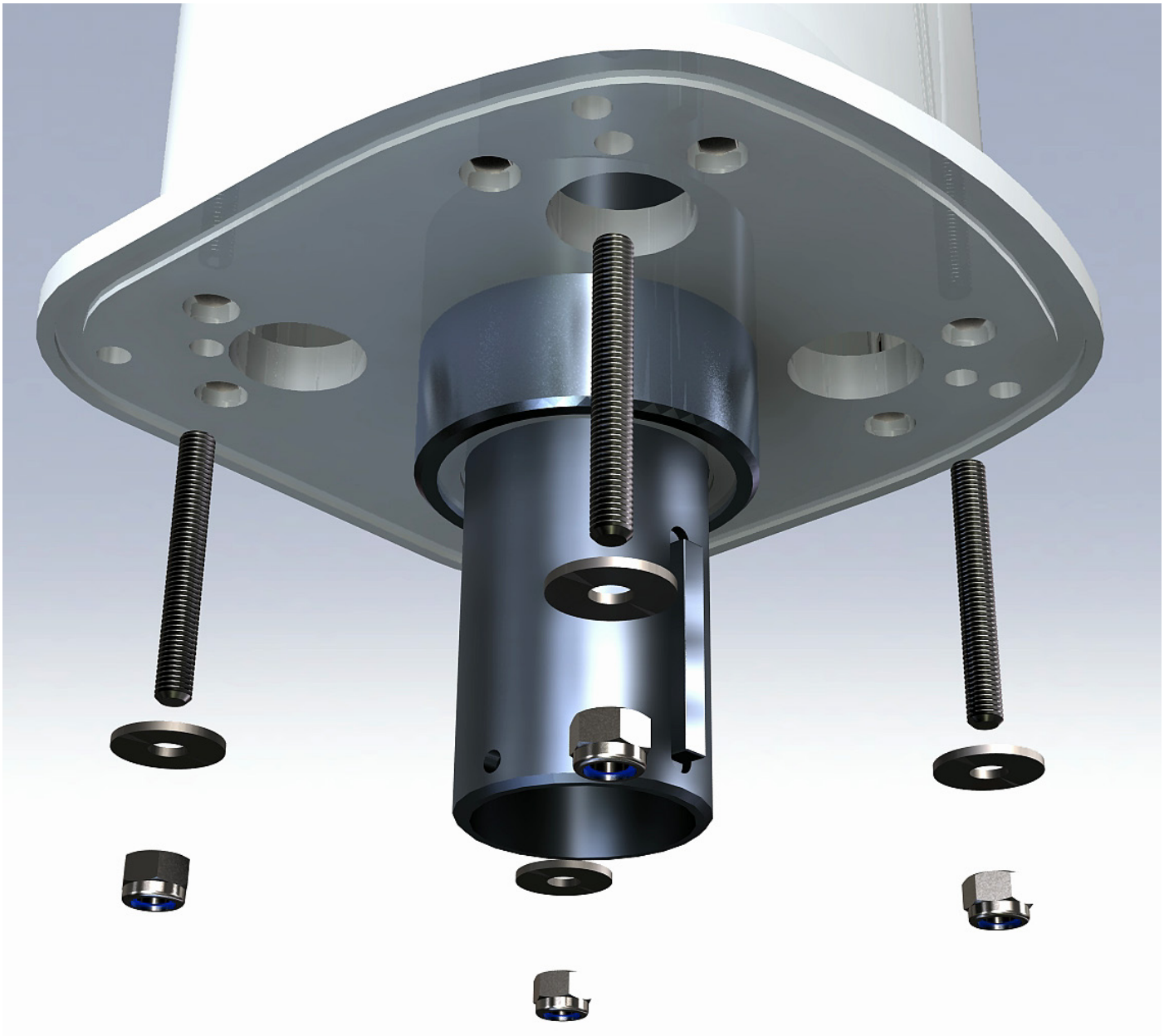
The above illustration shows the under deck parts of a typical Jefa rack and pinion system.

Step 2: removal of the output lever:



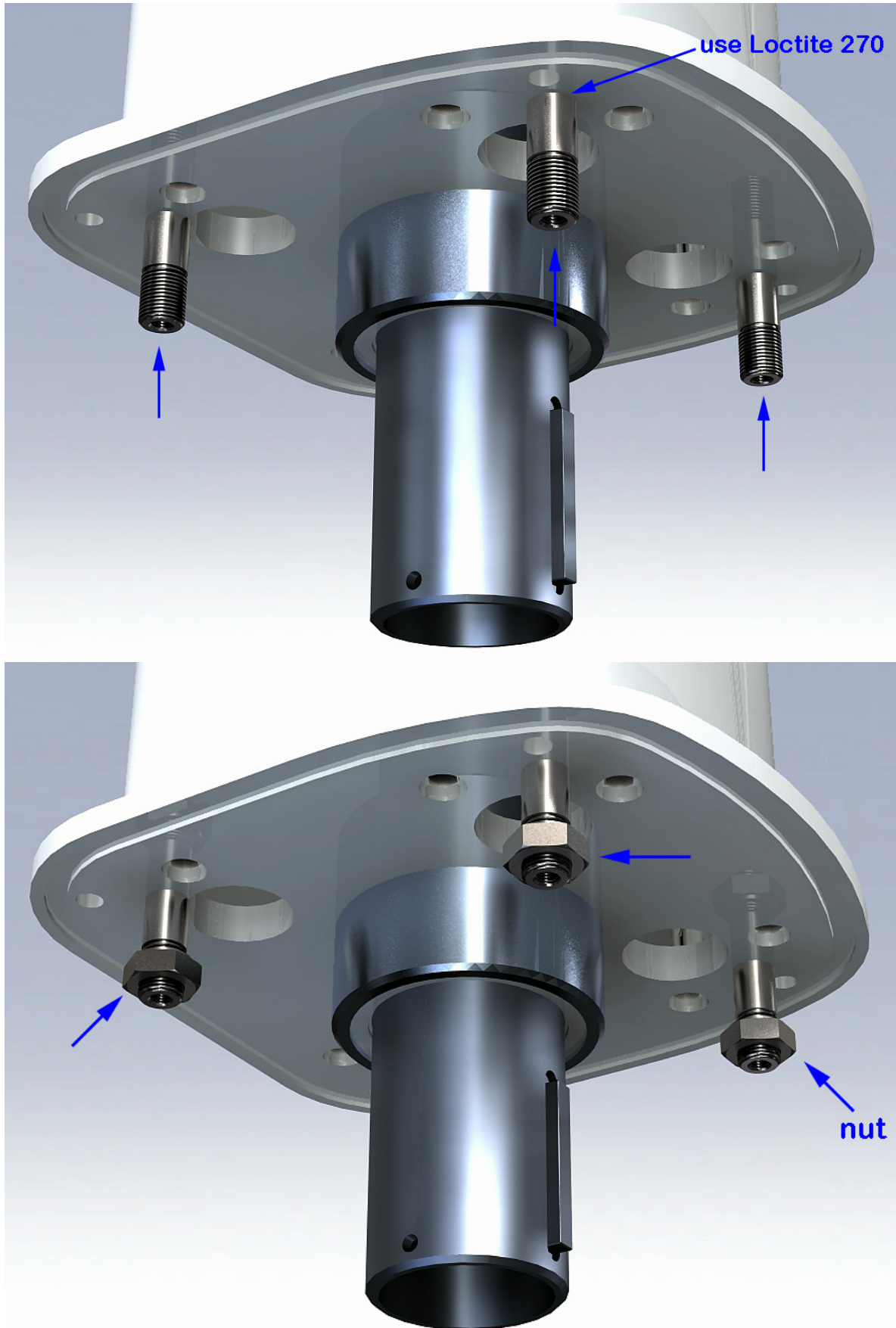
Please remove the draglink connected to the output lever and remove the security bolts and the two locking bolts and pull off the output lever.

Step 3: removal of the pedestal studs:



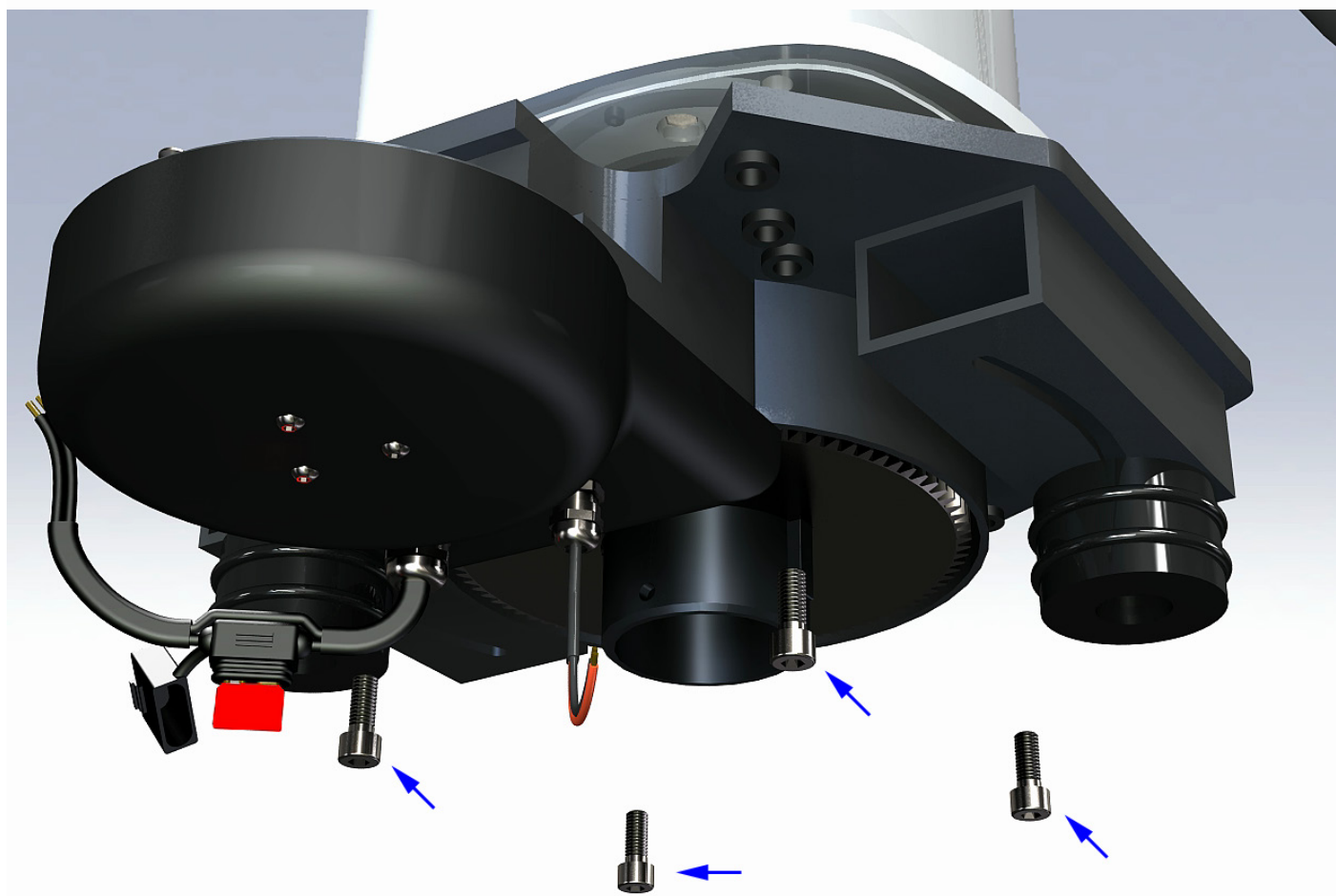
One will have to decide if it is easier to dismount the studs with the pedestal still mounted on the cockpit floor or to take the pedestal off the deck. When the pedestal is left on and you can't get the studs off, you can locally heat them to break the Loctite. Watch for the fire! Carefully drill the deck holes up so the bigger studs will fit.

Step 4: mount the new pedestal studs:

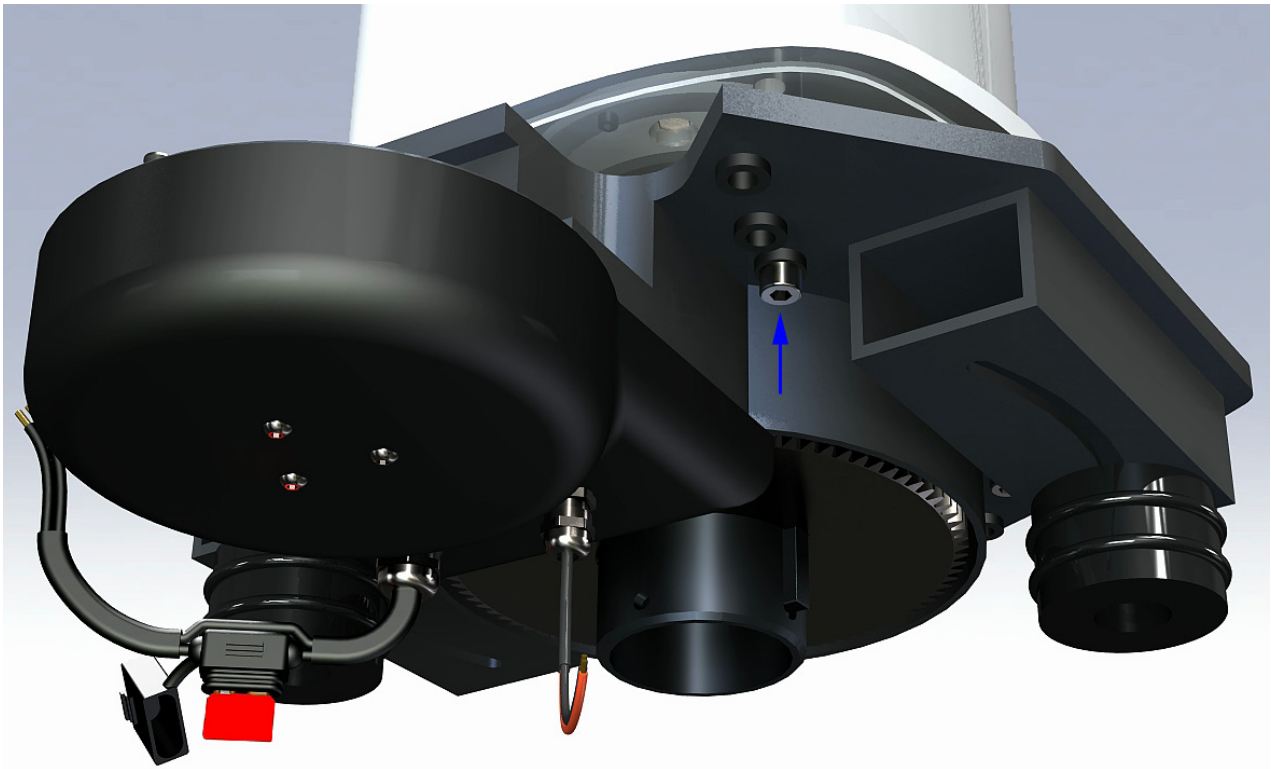


Mount the new pedestal studs using Loctite 270. The Loctite will prevent the studs from coming loose in time due to vibrations. Mount the nuts to clamp the pedestal to the deck.

Step 5: mount the drive unit:

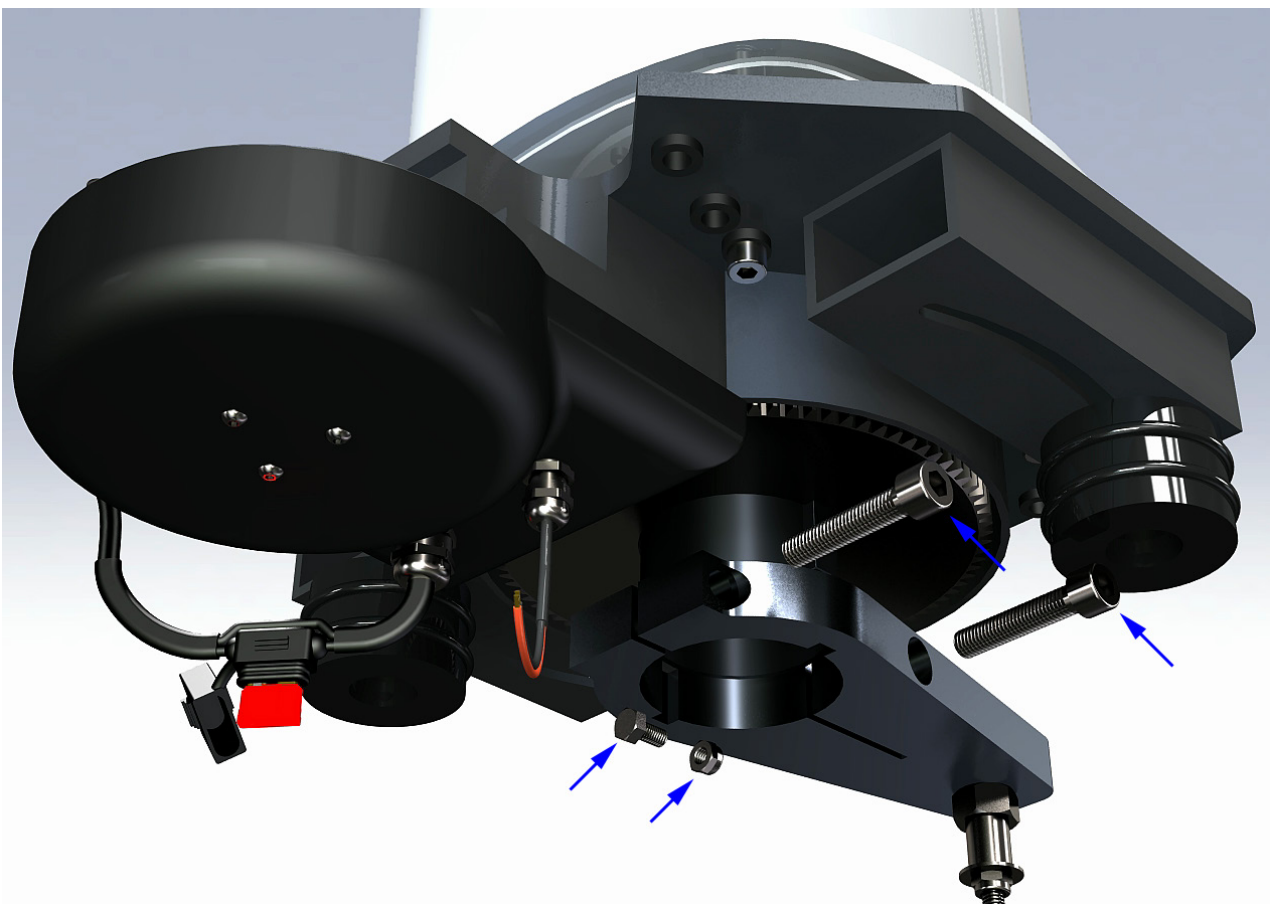


Slide the big gear over the downshaft and mount the four mounting bolts.



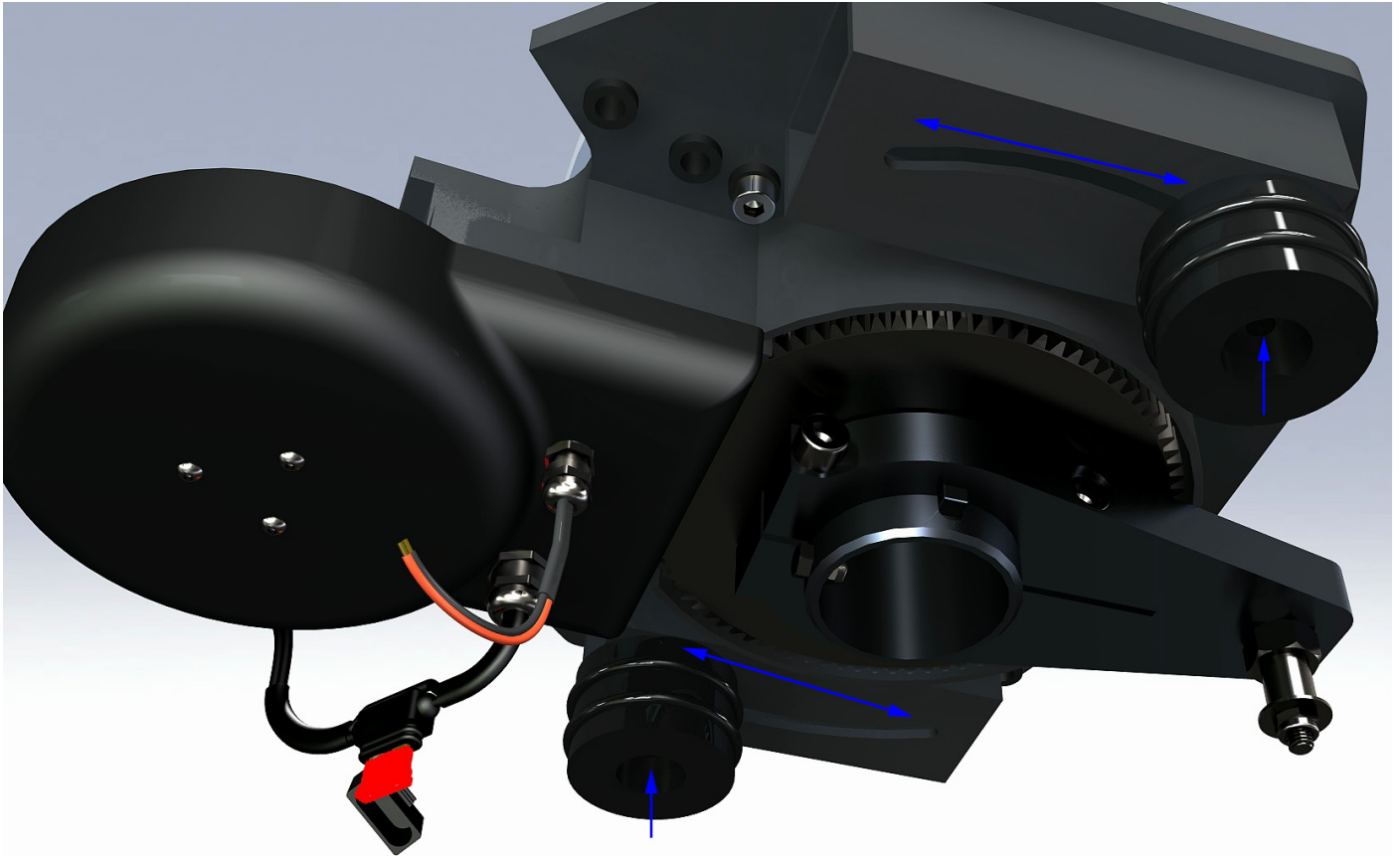
The hole to use depends on the type of Rack and Pinion pedestal you are using.

Step 6: mount the output lever:



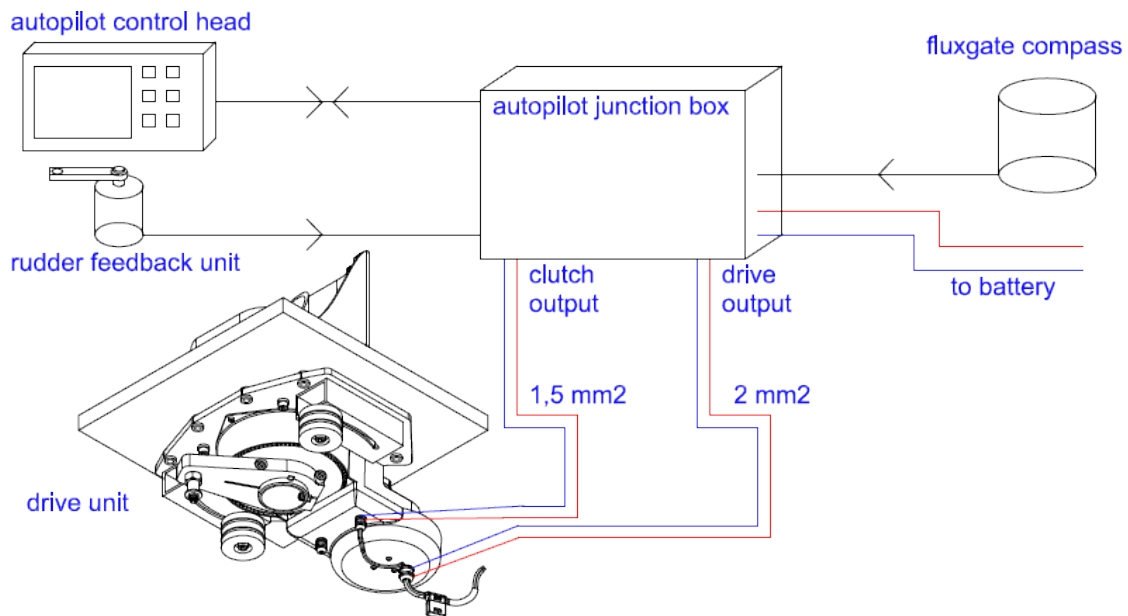
Mount the output lever on the downshaft and tighten the locking bolts and security bolt with nut.

Step 7: adjust the stops.



Loosen the nut in the stop block and slide the stop to the correct position. The output lever should rotate 130° ($2 \times 65^\circ$) in total. Please revert to the Rack and Pinion installation manual for this.

Step 8: Connecting the electronics.



The connection of the Jefa autopilot drive to the autopilot junction box is quite simple. The two 1.5 mm² red and black wires have to be connected to the plus and minus of the autopilot clutch line. This will make sure that when the autopilot user engages the autopilot on the control screen, the clutch will engage and allow the autopilot motor to drive the rudder. The two 2 mm² red and black wires have to be connected to the autopilot drive output connection.

Step 9: Test the system.

Before you can test the system, make sure following things are correct:

- Solid rudder stops should be fitted limiting the rudder travel to an equal travel of 36 degrees from midships to port and starboard.
- Make sure all bolted parts (tiller pins, rosejoints, mounting plate bolts, tillerarm, etc) are firmly tightened and will not come loose even when exposed to heavy vibrations. Use loctite when necessary.
- No part of the drive unit should contact the vessel, the draglink, or the tiller arm throughout the full range of movement..
- Make sure no (drip) water can reach the drive unit as it is NOT waterproof. When the drive is submerged or heavily splashed with water, immediately remove the drive unit, dry it and return it to our factory for overhaul. Continuing using the wet drive will jeopardise the functioning and it will be not repairable any more

Please follow the instructions in the installation manual of the electronics and connect the electronics. Make absolutely sure the autopilot is set to “reversible drive” or equivalent. Don’t use settings like “solenoid” or “hydraulic drive” as these settings will disable the speed control of the autopilot leaving the drive running at 100% speed or 0%, but nothing in between. Make sure the clutch voltage is set to 12 volts. Some autopilots pulse the clutch and slowly drop to 6 Volts instead of a steady 12 volts. A contactor (relais) with a capacitor should be used. See the separate appendix on this subject.

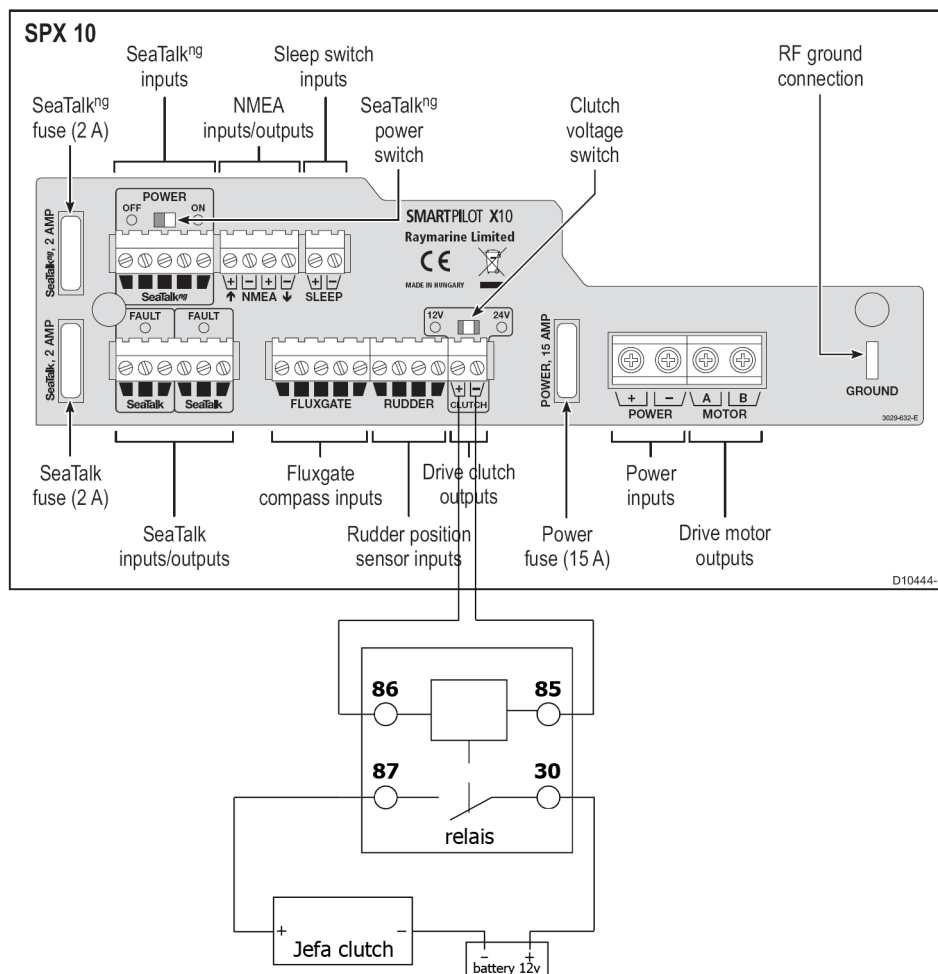
When the drive doesn’t react to the electronics, test the drive by bypassing the electronics: Connect a plus and minus wire to the battery or fuse box and first connect the clutch, one should hear a click when connecting and disconnecting. With the clutch under power, connect power for a short time to the motor cables. The system should get in motion now. Don’t connect the cables too long as the drive will try to continue, even when the rudder stops are reached, with potential damage to the structure and drive unit. If motion is detected, one can rule out the drive causing the malfunction.

Maintenance:

The direct drive is “greased for life”, so should not be opened. No maintenance is required except for periodic checks of all bolted connections. As the rudder system, the steering system and the autopilot drive is exposed to heavy vibrations (mainly by cruising on motor), all bolted connections should be yearly checked. The only parts that could wear in time are the balls of the draglink. These balls are easy exchangeable and available for around 10 € each from any Jefa distributor.

Special installation instructions for low power clutch lines

The Jefa drive units DU-DD1-12 (Direct drive type 1), the DU-TSxx-12 (transmission drives), the DU-WS150-12 (sprocket drive) and the DU-CP-12 compact drive can operate with a relatively small course computer. This is due to their high efficiency. The above drive units require a current of 1,4 Amps to contract the clutch and to keep it contracted. Many small course computers can't deliver this power. To overcome this, a car contactor (relais) between the clutch ports and the clutch of the drive unit has to be installed. This contactor has to be ordered separately with the code number DU-RE-12.

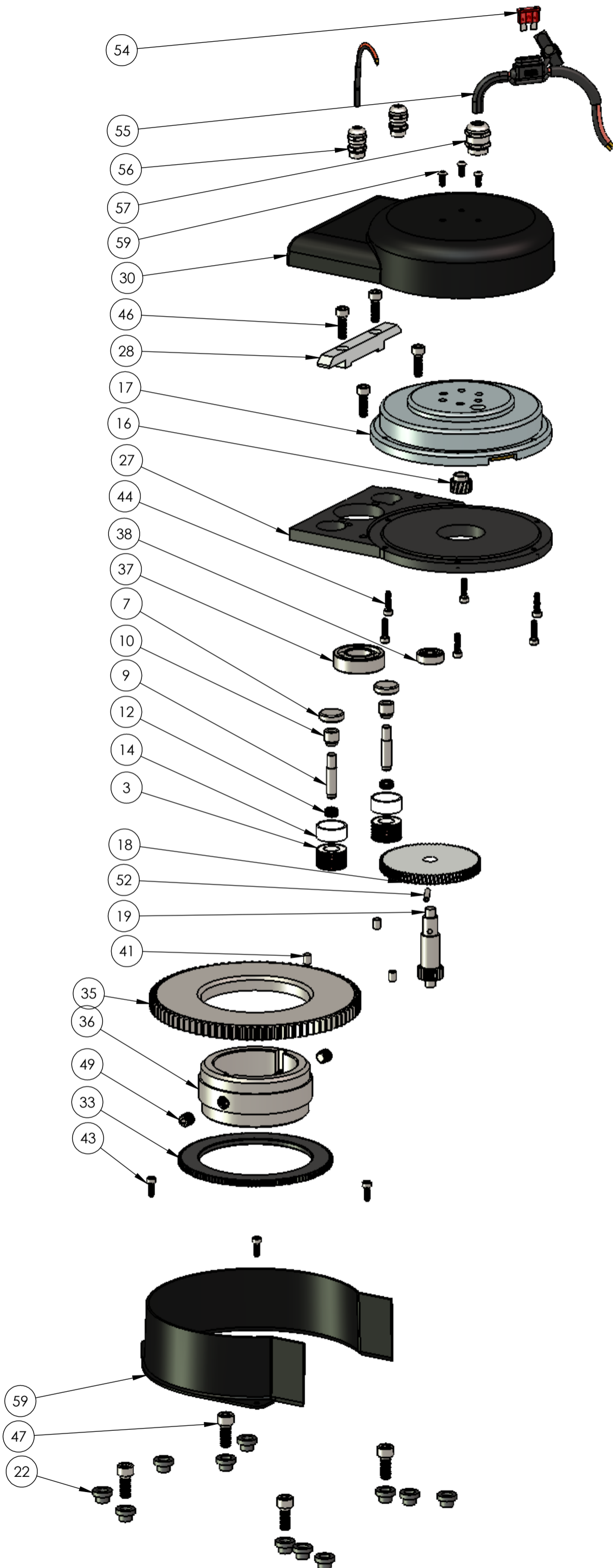


Example of the wiring diagram for the contactor.

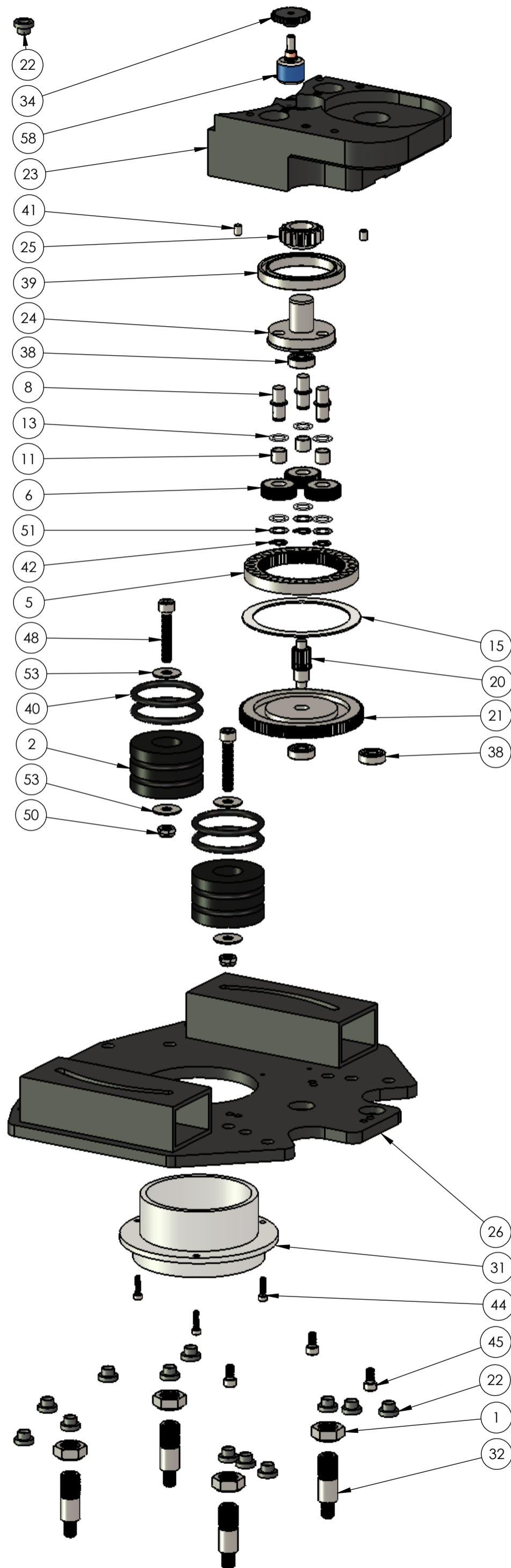
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 Fax: +45 43 695211
www.jefa.com



27.10.2011



ITEM NO.	SW-File Name(File Name)	QTY.
1	Z3-082 nut stainless steel	4
2	Z4-651 Stopping delrin stop.dwg	2
3	Z8-1008-3 Coil spole PETP	2
4	Z8-1008-4 Coil spoling	2
5	Z8-1009 - Inner gear Z70 M1	1
6	Z8-1010 - Gear wheel Z28 M1	3
7	Z8-1015 Magnet N30 20x6mm forniket	2
8	Z8-1105 - 10mm shaft for step3	3
9	Z8-1106 - Clutch shaft	2
10	Z8-1107 - Clutch iron bush	2
11	Z8-1112 Teflon bearing ø10xø12x10mm	3
12	Z8-1114 - Spring for Clutch	2
13	Z8-1130 Washer ø10xø16x1 polycarbonat	6
14	Z8-1135 Lock for spule	2
15	Z8-4117 Lockring for plane gear	1
16	Z8-4130 Gear wheel M1 Z15 H15dg	1
17	Z8-4132 Golden motor	1
18	Z8-4137 Gear wheel M1 Z79 V15dg	1
19	Z8-4138 M1 Z19	1
20	Z8-4141 Shaft with Z14 M1	1
21	Z8-4143 M1 Z101	1
22	Z8-4190 Rubber washer	24
23	Z8-5601 House for clutch FD1	1
24	Z8-5605 Planet gear for FD1	1
25	Z8-5615 16T M2 gear wheel for FD1	1
26	Z8-5620 Bottom plate for FD1	1
27	Z8-5625 Bracket house for FD1	1
28	Z8-5630 Magnet cover for FD1	1
29	Z8-5635 Gearwheel cover FD1	1
30	Z8-5640 Motor cover for FD1	1
31	Z8-5645 Bearing ring for FD1	1
32	Z8-5650 Triple thread stud for FD1	4
33	Z8-5655 125T M1 gear wheel for FD1 POM	1
34	Z8-5660 30T Z1 gear wheel for FD1 POM	1
35	Z8-5662 Output gearwheel M2x85T FD1	1
36	Z8-5664 Output gearwheel hub FD1	1
37	ZBB-6004 ballbearing 2RS 20x42x12mm	1
38	ZBB-608 ballbearing 2RS 8x22x8mm	4
39	ZBB-61811 ballbearing um 55x72x9mm	1
40	ZP3-106 O-ring 50x5mm EPDM	4
41	Z-DIN0007-06x08 Cylindrisk A2 stift 06x08mm	6
42	Z-DIN0471-A10 Lockring outside A10 DIN471	3
43	Z-DIN0912-M04x12 Hexagon socket head screw CH A2 M4x12	3
44	Z-DIN0912-M04x16 Hexagon socket head screw CH A2 M4x16	9
45	Z-DIN0912-M06x12 Hexagon socket head screw CH A2 M6x12	3
46	Z-DIN0912-M06x20 Hexagon socket head screw CH A2 M6x20	4
47	Z-DIN0912-M08x20 Hexagon socket head screw CH A2 M8x20	4
48	Z-DIN0912-M08x45 Hexagon socket head screw CH A2 M8x45	2
49	Z-DIN0976-M10 Studbolt M10x010	2
50	Z-DIN0985-M08 Locknut A2 M08	2
51	Z-DIN0988-10x16x0.2	3
52	Z-DIN1481-04x24 Spring Pin Slotted A2 4x24mm	1
53	Z-DIN9021-M08 Washer for 8mm shaft	4
54	Z-EL109 Automotive fuse 10Amp RED	1
55	Z-EL115 House for automotive fuse	1
56	Z-EL140 Messingforskruning HKS 12x1,5	2
57	Z-EL141 Messingforskruning HKS 16x1,5	1
58	Z-EL146-10 Potentiometer 10kg ohm	1
59	Z-ISO7380-M04x10	3



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