

# FWS-050

## FLAT CHANGING SYSTEM



Dear Customer,

Congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

**You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.**

**SCHUNK products are inspiring.**

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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## 1. Safety

### 1.1. Explanation of symbols



This symbol is displayed wherever there is a possibility of **danger to life and limb**.



This symbol is displayed wherever the possibility of **damage to the product** exists.



This symbol denotes **important information** about the product and its handling.

### 1.2. Intended use

The unit may be used only within the range of its technical data. Intended use also includes compliance with the manufacturer's commissioning, installation, operating, environmental and maintenance conditions. Any other use is deemed improper and unintended use. The manufacturer will not be liable for any damages resulting from improper use.

The product was designed for the manual changing of tools.

### 1.3. Environmental and operating conditions

- Use the unit only within the application parameters defined in the Technical Catalog. The most recent version applies (according to Chapter 2.3 of the General Terms and Conditions).
- Clean ambient conditions at room temperature are required.
- The environment must be free of splashing water and vapors, and also of abrasive dust and process dust. This does not apply to units designed especially for unclean environments.

## 1.4. Safety notes



### **IMPORTANT!**

**During operation, the energy transmission should always be switched off during coupling and uncoupling! Otherwise, the pins of the electric modules could be damaged!**

1. There are potential risks associated with the manual changing system, for example if:
  - the system is improperly used, installed or serviced.
  - the system is used other than for the intended purpose.
  - the EC Machine Directive, the accident prevention regulations, the VDE guidelines or the safety and installation instructions are not observed.
2. All personnel who are responsible for installation, commissioning and servicing must have read and understood the entire operating manual, in particular Chapter 1, page 4 . It is recommended to have this confirmed in writing.
3. Installation and dismantling, connections and commissioning may be carried out only by authorized personnel.
4. Work procedures that impair the correct functioning and operational safety of the manual changing system are prohibited.



5. Do not reach into the open mechanical parts and the area between the manual changing head and the manual changing adapter.



6. The power supply cables must be removed for assembly, modification, maintenance and adjustment of the unit.



7. For maintenance, modifications or attachments, it is recommend that the manual changing system be removed from the machine table so that the work can be performed outside of the hazard zone.



8. During installation, connection, adjusting, commissioning and testing, measures must be taken to prevent the risk of inadvertent activation of the manual changing system by the fitter or other persons.



9. Protective covers must be provided for the use of all handling modules in accordance with EC Machine Directive.



10. There is a danger due to falling or ejected objects. Preventive measures must be taken to prevent the falling or ejection of potentially dangerous objects (machined workpieces, tools, chips, debris, waste, etc.).

11. Additional bore holes, threads or attachments not installed as accessories from SCHUNK require the approval of SCHUNK.

12. In addition, the applicable safety regulations and accident prevention regulations must be observed.

## 2. Warranty

The warranty period is 24 months from the date of delivery when utilized as intended in single-shift operations and in compliance with the specified maintenance and lubrication intervals. These workpiece-contacting parts and wearing parts have to be marked clearly in the chapter with the bill of materials. See also our General Terms and Conditions in this regard. Our terms and conditions are available at [www.de.schunk.com](http://www.de.schunk.com) under "Service".

## 3. Scope of delivery

The scope of delivery includes:

- Manual changing adapter (FWA)
- manual changing head (FWK)
- Assembly and Operating Manual Flat Changing System (FWS)



### Notes

- The accessories (see catalog) are included in the scope of delivery only if ordered separately. Example: Adapter plates
- When using a SCHUNK Dexterous Hand (SDH) no separate FWK is necessary, as it is already integrated in the SDH.

## 4. Technical data

Additional technical data can be found in our catalog. The most recent version applies (according to Chapter 2.3 of the General Terms and Conditions).

## 5. Assembly and installation

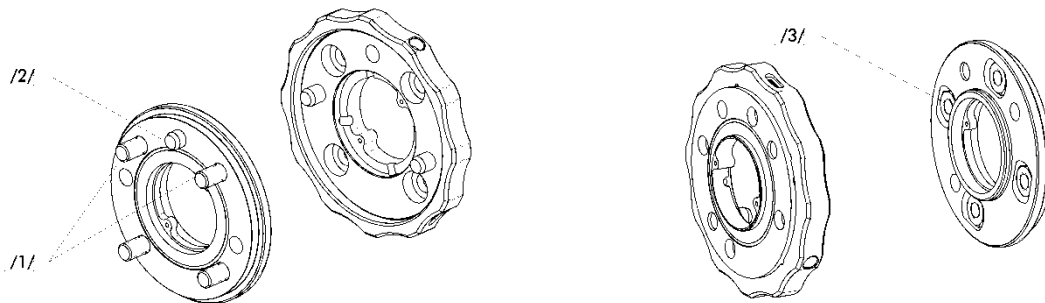
### 5.1. Mounting the manual changing adapter (FWA)



**IMPORTANT!**

During assembly of the manual changing system the power supply must be switched off. Also observe the safety instructions in Chapter 1, page 4.

The manual changing adapter FWA can be mounted using the following screws or nuts. Use a cylindrical pin for centering.



**Figure 1: Mounting FWA**

	Type FWA	050
/1/	Mounting screw DIN 7984	M6 x 12
/2/	Cylindrical pin for centering DIN 6325	6m6 x 12
/3/	Nut DIN EN ISO 4035	M6

**Table 1: Overview of screws, cylindrical pins and nuts for FWA**

## 5.2. Mounting the manual changing head (FWK)



### IMPORTANT!

During mounting of the manual changing system the power supply must be switched off. Also observe the safety instructions in Chapter 1, page 4.



### Note

When using a SCHUNK Dexterous Hand (SDH) no separate FWK is necessary, as it is already integrated in the SDH.

The manual changing head FWK can be mounted using the following screws.  
Use a cylindrical pin for centering.

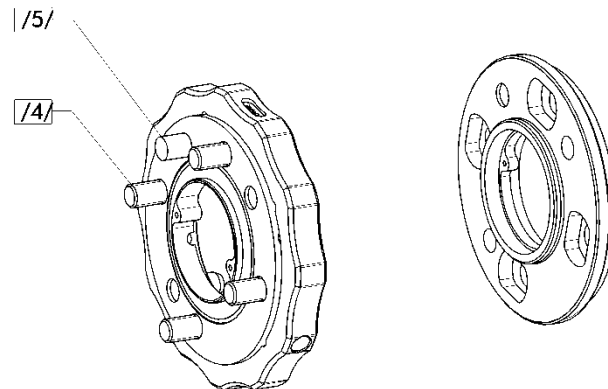


Figure 2: Mounting FWK

	Type FWK	050
/4/	Mounting screw DIN 7984	M6 x 12
/5/	Cylindrical pin for centering DIN 6325	6m6 x 14

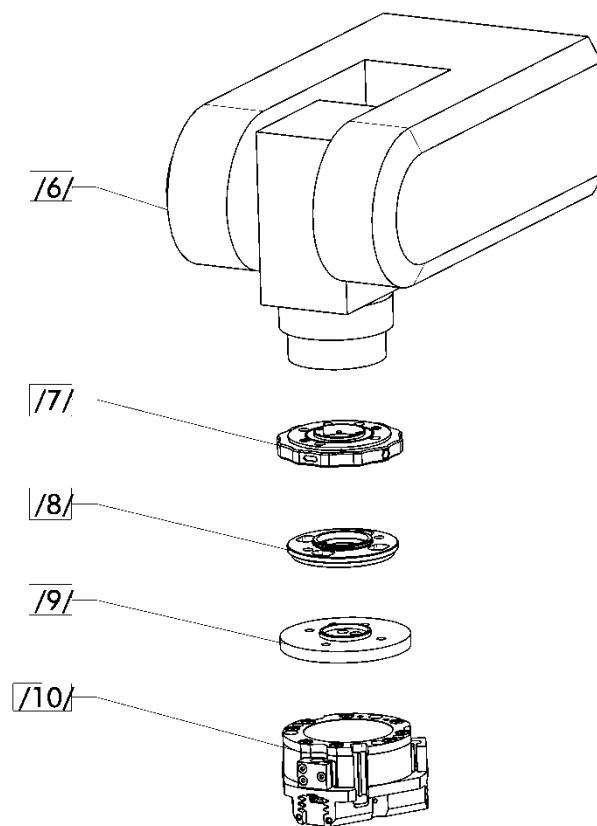
Table 2: Overview of screws and cylindrical pins for FWK

### 5.3. Assembly example

The illustration shows the adaptation of the manual changing system FWS, consisting of the manual changing head FWK and the manual changing adapter FWA, to a standard ISO 9409-1-A50 flange.

The handling module is normally mounted on the manual changing adapter using an interface plate.

The pneumatic connection and electric cables are fastened, bundled and mounted with strain relief to ensure maximum freedom of movement during the application.



**Figure 3: Assembly example**

	Description
/6/	Robot arm
/7/	Manual changing head FWK
/8/	Manual changing adapter FWA
/9/	Interface plate for handling module (provided by customer)
/10/	Handling module, e.g. gripper

**Table 3: Description of the components**

## 5.4. Commissioning

The connection dimensions can be found in the corresponding drawings in the current catalog; or you can make use of our CAD data service on the web (link at [www.schunk.com](http://www.schunk.com)).

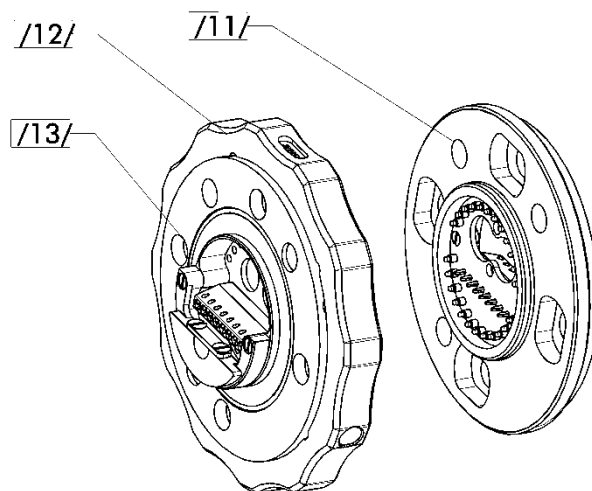
### 5.4.1. Mounting the manual changing adapter FWA on the manual changing head FWK



**IMPORTANT!**

**When connecting the manual changing system the power supply must be switched off. Also observe the safety instructions in Chapter 1, starting on page 4.**

Place the coupling ring on the manual changing adapter and tighten by hand. Make sure that the coupling ring is straight and does not tilt. To tighten the coupling ring, use a 60 – 90 mm spanner wrench (diameter of dog point 5mm) to firmly connect the manual changing adapter FWS with the manual changing head FWK



**Figure 4: Tightening the coupling ring**

	Components
/11/	Manual changing adapter FWA
/12/	Coupling ring
/13/	Manual changing head FWK

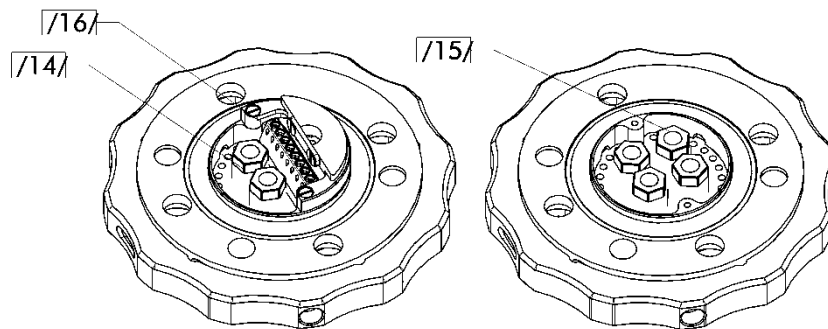
**Table 4: Description of the components**

### 5.4.2. Media feed-through

The manual changing system is available in three versions.

Types	Description
FWA-050-0-0 and FWK-050-0-0	without media feed-through
FWA-050-2-8 and FWK-050-2-8	2 air feed-throughs, 8 electric signal feed-throughs
FWA-050-4-0 and FWK-050-4-0	4 air feed-throughs

**Table 5**



**Figure 5: Media feed-through**

	Variants
/14/	2 air feed-throughs
/15/	4 air feed-throughs
/16/	8 electric signal feed-throughs

**Tabel 6: Description of the variants**

### 5.4.3. Pin layout of the electric signal feed-through



If more than 8 electric signals are needed, up to 16 additional signal lines can be fixed directly on the solder pads. To do this, the stranded wires must be soldered directly to the solder pads.

Max. electric load 1A per pin (24 VDC).

#### Structure of the PCB in the FWK

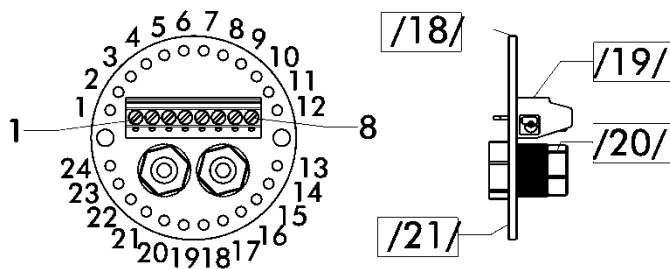


Figure 6: PCB in FWK

	Description
/18/	PCB in FWK
/19/	8-pin terminal
/20/	Hose connection
/21/	Solder pad

Table 7: Structure of PCB in FWK

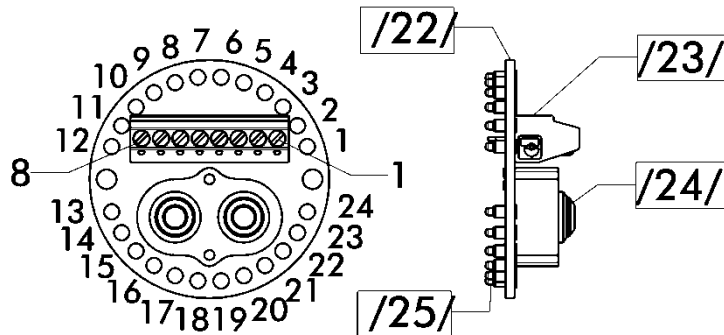
The allocation of the solder pads to the 8-pin terminal is as follows:

Solder pads	8-pin terminal
1	Pin 1
2	Pin 2
3	Pin 3
4	n.c.
5	Pin 4
6	Pin 5
7	n.c.
8	Pin 6
9	Pin 7
10	n.c.
11	n.c.
12	Pin.8

Solder Pads	8-pin terminal
13	n.c.
14	n.c.
15	n.c.
16	n.c.
17	n.c.
18	n.c.
19	n.c.
20	n.c.
21	n.c.
22	n.c.
23	n.c.
24	n.c.

Table 8: Allcoation of pins for FWK

**Structure of the PCB in the FWA**



**Figure 7: PCB in FWA**

	Description
/22/	PCB FWA
/23/	8-pin terminal
/24/	Plug for air feed-through
/25/	Solder pad with spring contact

**Table 9: Structure of PCB in FWA**

The allocation of the solder pads to the 8-pin terminal is as follows:

Solder pads	8-pin terminal
1	Pin 1
2	n.c.
3	n.c.
4	Pin 2
5	Pin 3
6	n.c.
7	Pin 4
8	Pin 5
9	n.c.
10	Pin 6
11	Pin 7
12	Pin.8

Solder Pads	8-pin terminal
13	n.c.
14	n.c
15	n.c
16	n.c
17	n.c
18	n.c
19	n.c
20	n.c
21	n.c
22	n.c
23	n.c
24	n.c

**Table 10: Allocation of pins for FWA**

5.4.4. Pin layout when using the Gripper MEG

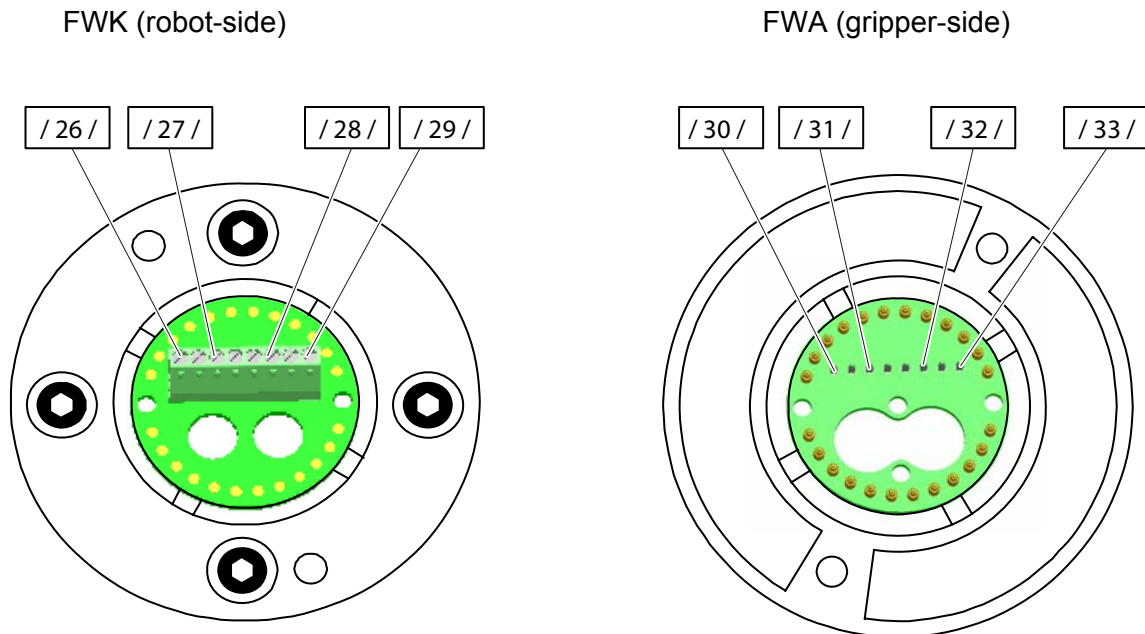


Figure 8: Pin layout FWS with MEG

	Description
/26/	M1 to Controller MEG C50 Kl. 1
/27/	M1 to Controller MEG C50 Kl. 3
/28/	M2 to Controller MEG C50 Kl. 9
/29/	M2 to Controller MEG C50 Kl. 7
/30/	M1(red)
/31/	M1(red/White)
/32/	M2(green/white)
/33/	M2(green)

Table 11

The Figure shows the contacting side of the FWS and connectors, i.e. **not** the side where the cables are soldered.

5.4.5. Pin layout and wiring when using the Schunk Dextrous Hand (SDH)

Pin layout

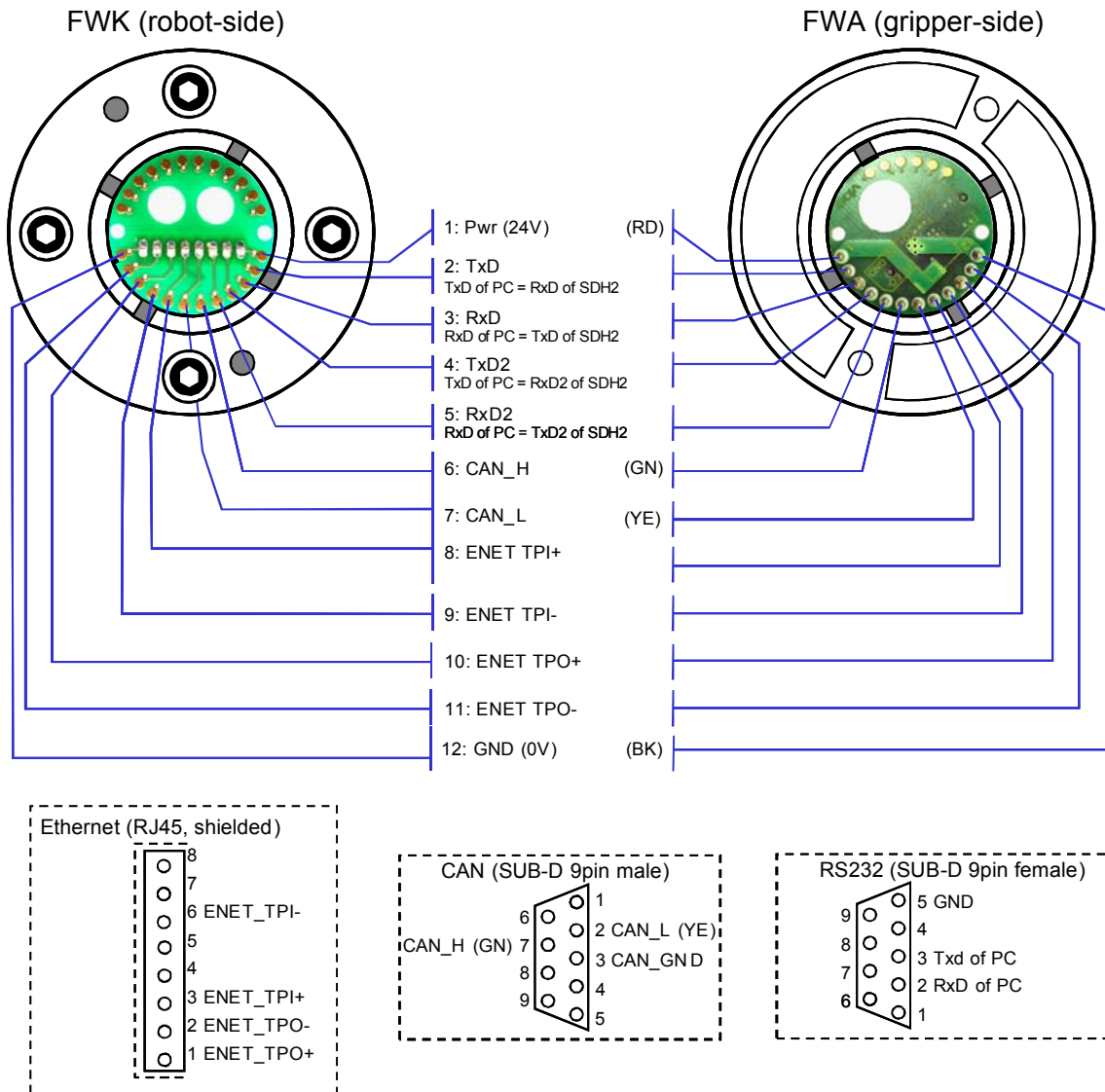
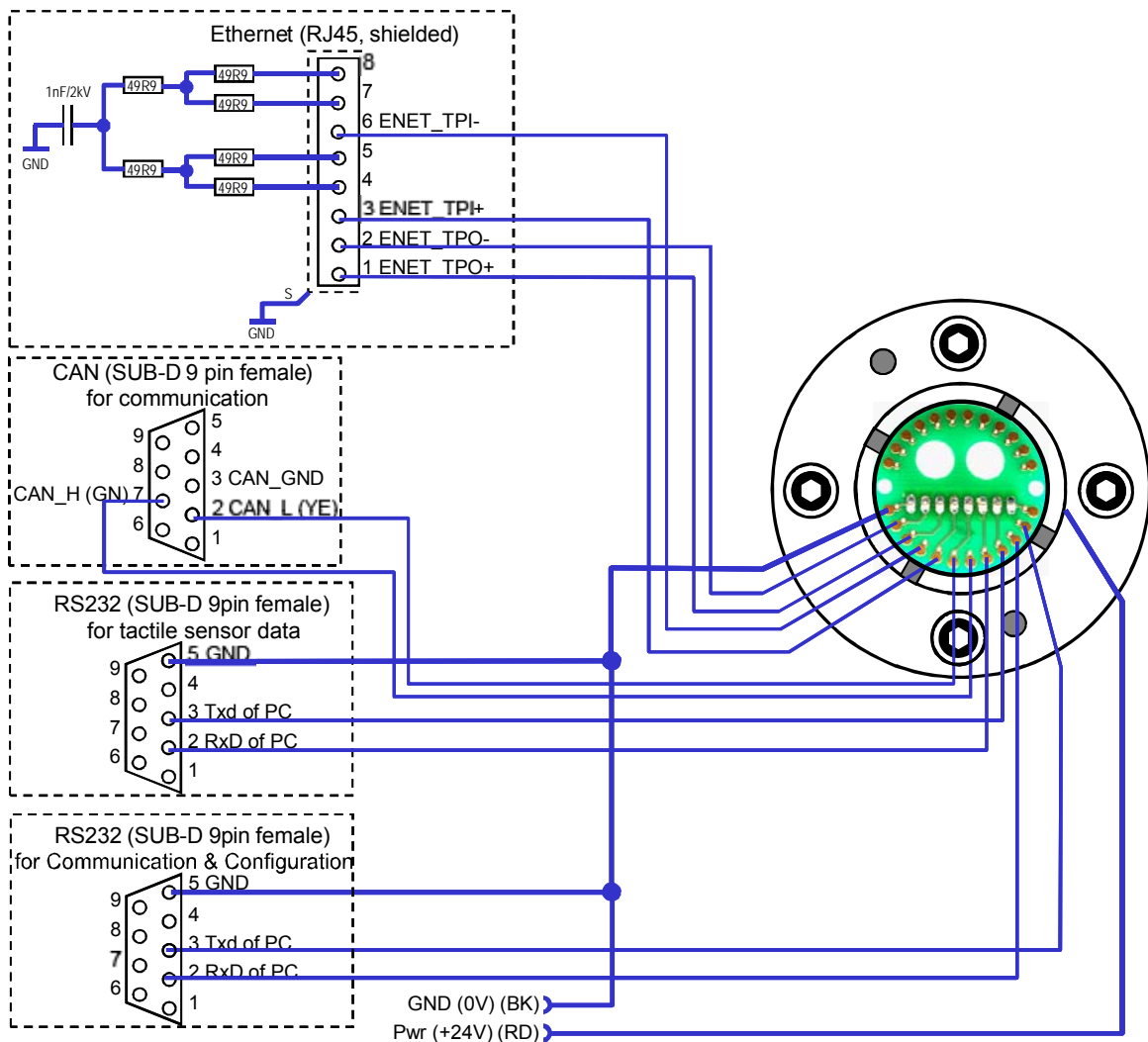


Figure 9: Pin layout FWS with SDH

RD = Red, GN= Green, YE= Yellow, BK = Black

The Figure shows the contacting side of the FWS and connectors, i.e. **not** the side where the cables are soldered.

Wiring when connection the SDH



**Figure 10: Pin layout FWS**

RD = Red, GN= Green, YE= Yellow, BK = Black

The Figure shows the contacting side of the FWS and connectors, i.e. **not** the side where the cables are soldered.

Standard Parameter	RS232	CAN
Baud rate	115200 bit/s	1000000 bit/s
Data bits	8	-
Parity	none	-
Stopp-bits	1	-
Flow control	none	-

**Table 12: allocation of the pins at FWA**

	RS232	CAN
normal communication	Baud rate is configurable	Baud rate is configurable
Configuration and tactile sensor data	Baud rate is not configurable	-

**Table 13: configurable parameters**

## 6. Disassembly of the manual changing system



### **IMPORTANT!**

**During assembly and disassembly of the manual changing system the power supply must be switched off. Also observe the safety instructions in Chapter 1 page 4.**

(For item no. See Assembly, Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** page **Fehler! Textmarke nicht definiert.**)

### **6.1. Disassembly of the FWK-050-0-0 with FWA-050-0-0**

1. Switch off energy supply.
2. Loosen coupling ring (Item 3) and disconnect manual changing adapter (Item 7) from manual changing head (Item 8).
3. Detach manual changing adapter (Item 7) from handling module and remove O-ring (Item 24).
4. Detach manual changing head (Item 8) from robot flange and remove O-ring (Item 25).
5. Remove O-ring (Item 26).

**Assemble in reverse order.**

### **6.2. Disassembly of the FWK-050-2-8 with FWA-050-2-8**

1. Switch off energy supply.
2. Loosen coupling ring (Item 3) and disconnect manual changing adapter (Item 7) from manual changing head (Item 8).
3. Detach manual changing adapter (Item 7) from handling module and remove O-ring (Item 24).
4. Detach manual changing head (Item 8) from robot flange and remove O-ring (Item 25).
5. Remove O-ring (Item 26).
6. Loosen screws (Item 23) and remove PCB gripper side 2 (Item 5).
7. Loosen screws (Item 27) and remove holder for 2 air feed-throughs (Item 6).
8. Press out plug (Item 20).
9. Loosen hose from screw-in connection (Item 12) and remove hose.
10. Detach all stranded wires from terminal (Item 31) and remove screws (Item 28) with jumper (Item 2).
11. Remove cables and loosen screws (Item 22) and remove strain relief (Item 1).
12. Now remove the PCB robot-side 2 (Item 4) by loosening the screws (Item 29).
13. The coupling ring (Item 3) can be removed from the manual changing head (Item 8) by pressing.

**Assemble in reverse order.**

### **6.3. Disassembly of the FWK-050-4-0 with FWA-050-4-0**

1. Switch off energy supply.
2. Loosen coupling ring (Item 3) and disconnect manual changing adapter (Item 7) from manual changing head (Item 8).
3. Detach manual changing adapter (Item 7) from handling module and remove O-ring (Item 24).
4. Detach manual changing head (Item 8) from robot flange and remove O-ring (Item 25).
5. Remove O-ring (Item 26).
6. Loosen screws (Item 23) and remove PCB on gripper side 2 (Item 5).
7. Loosen screws (Item 27) and remove holder for 4 air feed-throughs (Item 13).
8. Press out plug (Item 20).
9. Loosen hose from screw-in connection (Item 12) and remove hose.
10. Now remove the PCB robot-side 3 (Item 4) by loosening the screws (Item 29).
11. The coupling ring (Item 3) can be removed from the manual changing head (Item 8) by pressing.

**Assemble in reverse order.**

### 7. Assembly drawings

#### 7.1. FWK-050-0-0 with FWA-050-0-0

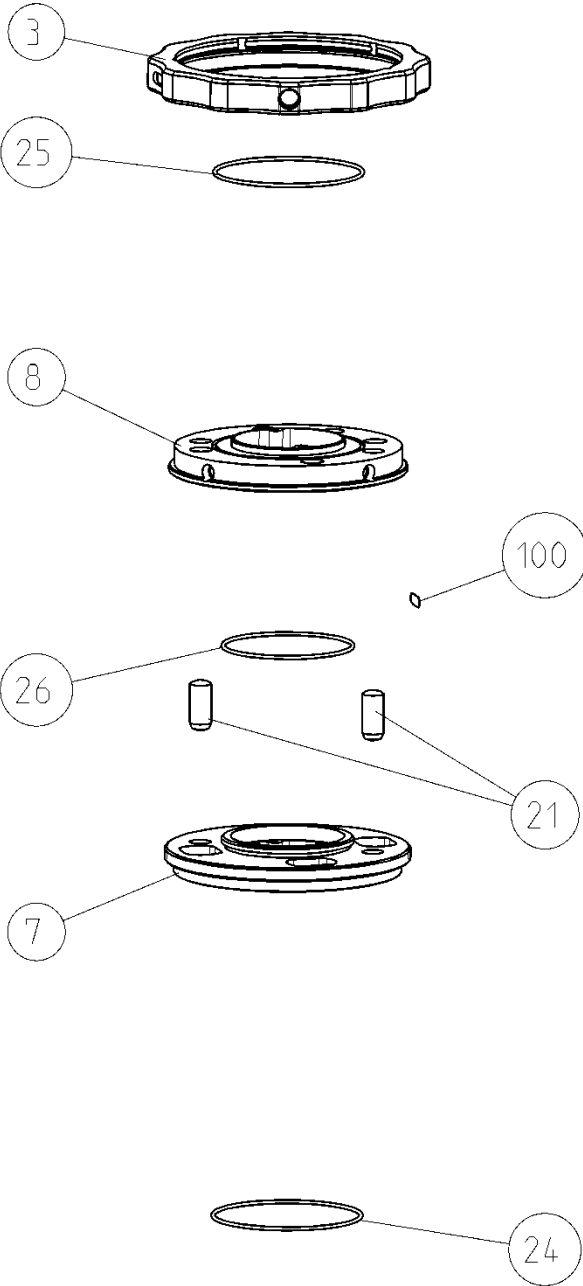
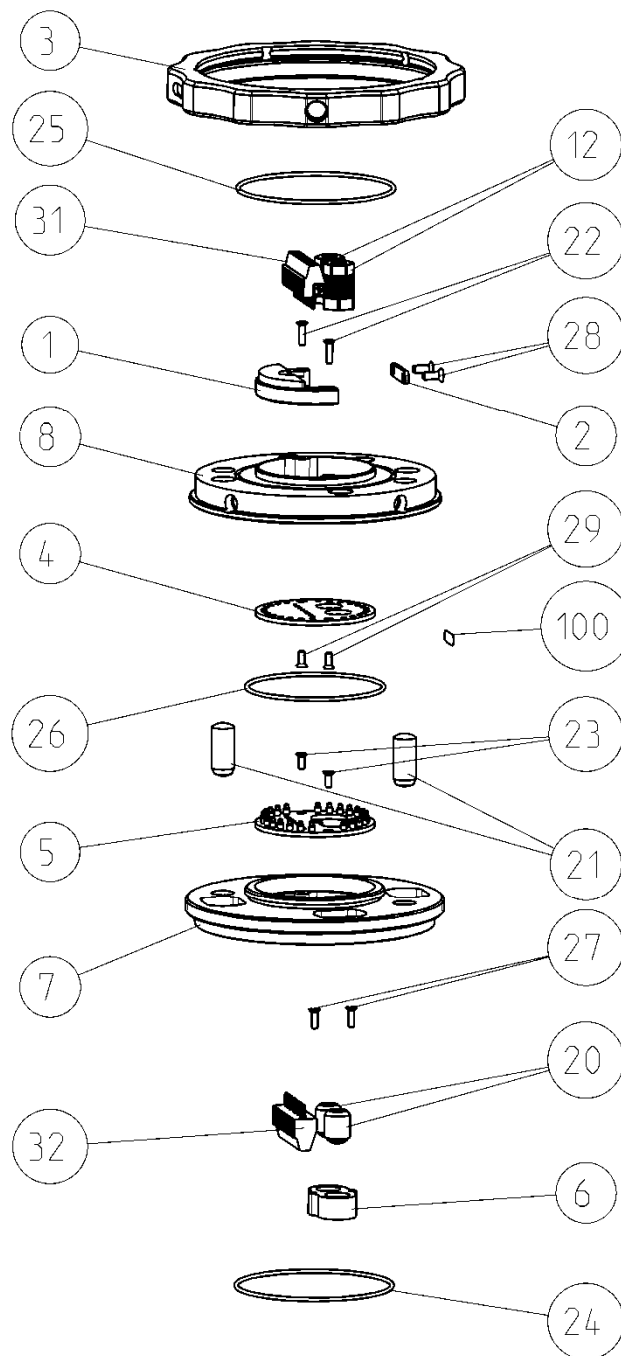


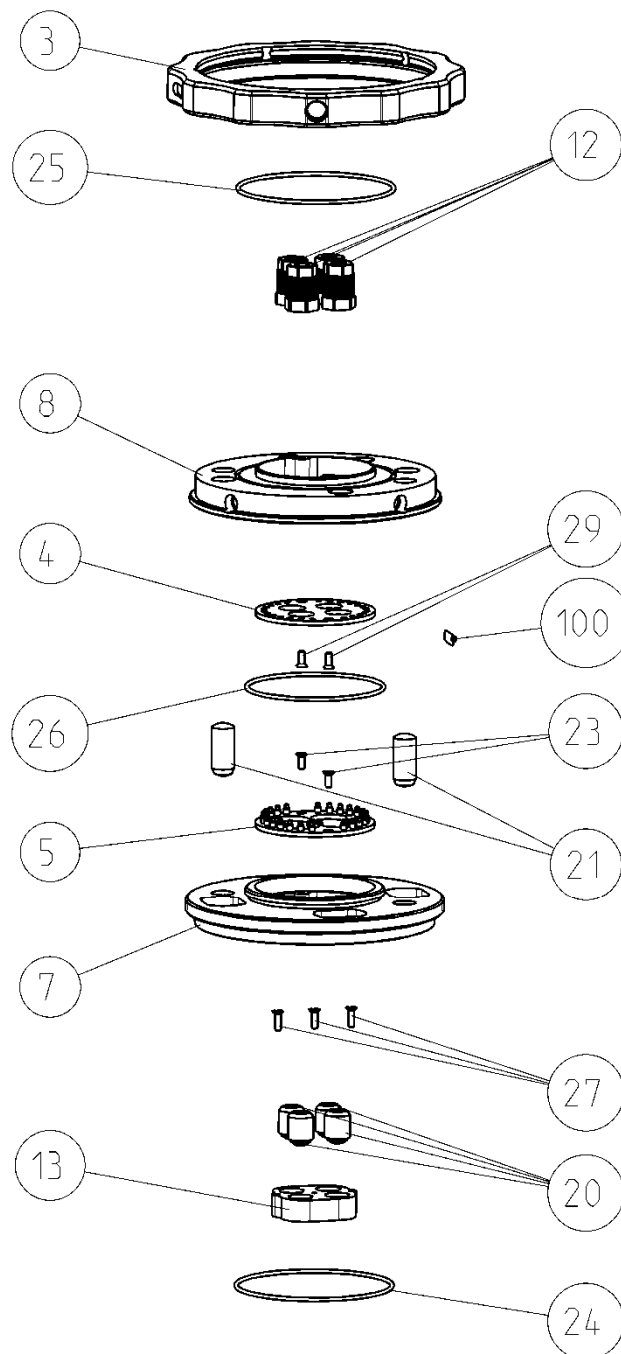
Figure 11 Exploded view (without media feed-through)

**7.2. FWK-050-2-8 with FWA-050-2-8**



**Figure 12 Exploded view (2 air feed-throughs / 8 electric signal feed-throughs)**

**7.3. FWK-050-4-0 with FWA-050-4-0**



**Figure 13 Exploded view (4 air feed-throughs)**

## 8. Bill of materials

FWA-050-0-0 (Id.-Nr. 320601)

Item	ID No.	Quantity	Designation	Wearing part
7	5517058	1	Flange gripper-side FWA	no
24	9948507	1	O-ring 40.00 x 1.00	yes
26	9948508	1	O-ring 35.00 x 1.00	yes

**Table 14: Bill of materials FWA-050-0-0**

FWA-050-2-8 (Id.-Nr. 320603)

Item	ID No.	Quantity	Designation	Wearing part
5	9949525	1	PCB gripper-side 2	no
6	5517059	1	Holder for 2 air feed-throughs	no
7	5517058	1	Flange gripper-side FWA	no
20	9938051	2	SWS seal M5	yes
23	9948516	2	Countersunk screw DIN 963 M1.6 x 4	no
24	9948507	1	O-ring 40.00 x 1.00	yes
26	9948508	1	O-ring 35.00 x 1.00	yes
27	9936602	2	Countersunk screw DIN 963 M1.6 x 5	no
32	9948517	1	Connection terminal MPT0.5/8-2.54	no
33	9948518	8	Battery contact 12A BP3	no

**Table 15: Bill of materials FWA-050-2-8**

FWA-050-4-0 (Id.-Nr. 320605)

Item	ID No.	Quantity	Designation	Wearing part
5	9949527	1	PCB gripper-side 3	no
7	5517058	1	Flange gripper-side FWA	no
13	5517061	1	Holder for 4 air feed-throughs	no
20	9938051	4	SWS seal M5	yes
23	9948516	2	Countersunk screw DIN 963 M1.6 x 4	no
24	9948507	1	O-ring 40.00 x 1.00	yes
26	9948508	1	O-ring 35.00 x 1.00	yes
27	9936602	3	Countersunk screw DIN 963 M1.6 x 5	no

**Table 16: Bill of materials FWA-050-4-0**

FWK-050-0-0 (Id.-Nr. 320600)

Item	ID No.	Quantity	Designation	Wearing part
3	5517060	1	Coupling ring	no
8	5517062	1	Flange robot-side FWK	no
21	9907092	2	Cylindrical pin DIN 6325 6m6x14	no
25	9948507	1	O-ring 40.00 x 1.00	yes
30	9948509	4	Spring-loaded pressure pieces M4	no
98	9942375	4	Screw DIN 7984 / A2 M6x12	no
100	9948615	1	Aluminum plate	no

**Table 17: Bill of materials FWK-050-0-0**

FWK-050-2-8 (Id.-Nr. 320602)

Item	ID No.	Quantity	Designation	Wearing part
1	5517056	1	Strain relief FWS	no
2	5517057	1	Jumper FWS	no
3	5517060	1	Coupling ring	no
4	9949524	1	PCB robot-side 2	no
8	5517062	1	Flange robot-side FWK	no
12	9948227	2	Screw-in connection M5 straight	no
21	9907092	2	Cylindrical pin DIN 6325 6m6x14	no
22	9948512	2	Countersunk screw DIN 963 M1.6 x 6	no
25	9948507	1	O-ring 40.00 x 1.00	yes
28	9948514	2	Countersunk screw DIN 963 M2.0 x 5	no
29	9948516	2	Countersunk screw DIN 963 M1.6 x 4	no
30	9948509	4	Spring-loaded pressure pieces M4	no
31	9948517	1	Connection terminal MPT0.5/8-2.54	no
50	9948902	10m	Plastic hose PU-43/3	no
98	9942375	4	Screw DIN 7984 / A2 M6x12	no
100	9948616	2	Aluminum plate	no

**Table 18: Bill of materials FWK-050-2-8**

FWK-050-4-0 (Id.-Nr. 320604)

Item	ID No.	Quantity	Designation	Wearing part
3	5517060	1	Coupling ring	no
4	9949526	1	PCB robot-side 3	no
8	5517062	1	Flange robot-side FWK	no
12	9948227	4	Screw-in connection M5 straight	no
21	9907092	2	Cylindrical pin DIN 6325 6m6x14	no
25	9948507	1	O-ring 40.00 x 1.00	yes
29	9948516	2	Countersunk screw DIN 963 M1.6 x 4	no
30	9948509	4	Spring-loaded pressure pieces M4	no
50	9948902	20m	Plastic hose PU-43/3	
98	9942375	4	Screw DIN 7984 / A2 M6x12	
100	9948617	2	Aluminum plate	no

**Table 19: S Bill of materials FWK-050-4-0**



## 9. Manufacturer's declaration

In accordance with EC Machine Directive 98 / 37 / EC, Appendix II B

Hersteller / Inverkehrbringer

SCHUNK GmbH & CO:KG.  
Precision Workholding Systems  
Bahnhofstr. 106 - 134  
D-74348 Lauffen/ Neckar

We hereby declare that the following

**robot accessory modules of the series FWS (FWK + FWA)**

are intended for installation in a machine and must not be put into service until the machine into which these products are to be installed has been declared to comply with the provisions of EC Machine Directive 98 / 37 / EC.

Product type	ID No.	Product	ID No.
FWK-050-0-0	320600	FWA-050-2-8	320603
FWA-050-0-0	320601	FWK-050-4-0	320604
FWK-050-2-8	320602	FWA-050-4-0	320605

Applied harmonized standards, in particular:

DIN EN ISO 12100-1 and DIN EN ISO 12100-2

Date / Signature:

2008



Position of the undersigned

Manager, Development

## 10. Contact



### GERMANY – HEAD OFFICE

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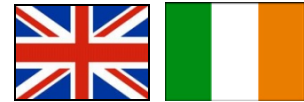
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