

Rotational feed through Type DDF-V 31,5–50 Assembly and Operating Manual



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1 About this manual

1.1 Purpose/validity

This manual is part of the module and describes the safe and proper use during all phases of operation.

This manual is valid only for the module specified on the front page.

1.2 Target groups

Target group	Task
Manufacturer, operator	<ul style="list-style-type: none"> ➔ Keep this manual available for the personnel at all times. ➔ Require personnel to read and observe this manual and the applicable documents, especially the safety notes and warnings.
Skilled personnel, fitter	<ul style="list-style-type: none"> ➔ Read, observe and follow this manual and the applicable documents, especially the safety notes and warnings.

Table 1

1.3 Applicable documents

You can find the following documents on our homepage:

Document	Purpose
Catalog	Technical data or application parameters of the module and information on accessories. The last version is always valid.
General terms of business	Including notes on the warranty.

Table 2

1.4 Symbols in this manual

To give you quick access to information, the following symbols will be used in this guide:






Symbol	Meaning
 WARNING	Dangers for persons. Nonobservance can cause death or serious injuries.
 CAUTION	Dangers for persons. Nonobservance can cause slight injuries.
 NOTICE	Information on avoiding material damage, for explanation or to optimize the work processes.
✓	Prerequisite for a handling instruction.
➔	Handling instruction, also measures in a warning or note.
1. 2. 3. ...	Step-by-step handling instruction. ➔ Observe the order.
	Component/spare part represented in a graphic.
	Part shown in a graphic that must be ordered separately or provided by the customer.
(10), (/10/)	Reference in the text or in a handling instruction to a part that is represented in a graphic.

Table 3

2 Basic safety notes

2.1 Intended use

The rotary feed-through (DDF-V) was designed to transfer the energy (electrical signals and air) to the handling module in robotic applications with endless rotation.

The module is intended for installation in a machine. The requirements of the applicable guidelines must be observed and complied with.

The module may be used only in the context of its defined application parameters.

Any other use or use exceeding that specified is an infringement of use for intended purpose. The manufacturer bears no liability for damage resulting from such use.

2.2 Ambient conditions and operating conditions

- ➔ Use the module only in the context of its defined application parameters (see chapter 5, page 11, and catalog).
- ➔ Observe the requirements for compressed air quality per ISO 8573-1: **6 4 4**.
- ➔ Make sure that the environment is clean and the ambient temperature corresponds to the specifications per the catalog. Observe maintenance and lubrication intervals (see chapter 9.1, page 24).
- ➔ Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Excepted are modules that are designed specially for contaminated environments.

2.3 Controlled production

The module represents the state of the art and the recognized safety rules at the time of delivery. However, it can present risks if, for example:

- The module is not used in accordance with its intended purpose.
- The module is not installed or maintained properly.
- The EC Machinery Directive, the VDE directives, the safety and accident-prevention regulations valid at the usage site, or the safety and installation notes are not observed.

2.3.1 Protective equipment

➔ Provide protective equipment per EC Machinery Directive.

2.3.2 Constructional changes, attachments, or conversions

Additional drill holes, threads, or attachments that are not offered as accessories by SCHUNK may be attached only with permission of SCHUNK.

2.4 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the module may be performed only by trained specialist personnel.

Every person called upon by the operator to work on the module must have read and understood the complete Assembly and Operating Manual, especially the chapter 2 "Basic safety notes". This applies particularly to occasional personnel such as maintenance personnel.

2.5 Safety-conscious working

- ➔ Avoid any manner of working that may interfere with the function and operational safety of the module.
- ➔ Observe the safety and accident-prevention regulations valid at the usage site.

2.6 Notes on particular risks

Risk of injury from objects falling and being ejected

- ➔ Provide protective equipment to prevent objects from falling or being ejected, such as processed workpieces, tools, chips, fragments, rejects.

Risk of injury when the machine/system moves unexpectedly

- ➔ Do not move parts by hand when the energy supply is connected.
- ➔ Do not reach into the open mechanism or the movement area of the module.
- ➔ Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- ➔ Perform maintenance, modifications, and additions outside the danger zone.
- ➔ For all work, secure the module against accidental operation.

3 Warranty

The warranty is valid for 24 months from the delivery date to the production facility under the following conditions:

- Intended use in 1-shift operation
- Observation of the maintenance and lubrication intervals (see chapter 9.1, page 24)
- Observation of the ambient conditions and operating conditions (see chapter 2.2, page 7)

Parts touching the workpiece and wearing parts are not part of the warranty. Also observe our general terms of business.

4 Scope of delivery

The scope of delivery comprises:

- Rotational feed through Type DDF-V in the size ordered
- Enclosed pack (for contents, see chapter 11, page 30)

The following accessories are required for the module:

- ISO adapter plate

➔ Order accessories separately.

➔ For additional accessories, see catalog.

5 Technical data

You can view additional technical data in our catalog.
The last version is always valid.

Note

- Observe the requirements for the air supply: Compressed air, compressed air quality per ISO 8573-1: **6 4 4**.
- ➔ When the quick-change system SWS-I-011 is attached, the max. pressure is 6 bar.

Size	DDF-V-31.5	DDF-V-40	DDF-V-50
Deadweight [kg]	1.19	1.21	1.23
Max. speed [rpm]	100	100	100
Max. continuous torque [Nm]	0.35	0.35	0.35
Max. starting torque [Nm] (after shutdown)	1.1	1.1	1.1
Rotary movement	Unlimited	Unlimited	Unlimited
Round mechanical interface per ISO 9409-1	A31.5	A40	A50
Noise emission [dB(A)]	≤ 70	≤ 70	≤ 70
IP rating	50	50	50
Energy transmission			
Number of compressed air through- feeds	1	1	1
Max. pressure [bar]	6	6	6
Number of electric signal through- feeds	14	14	14
Max. voltage [V] per contact	60	60	60
Max. current [A] per contact	1	1	1

Table 4

6 Assembly

6.1 Mechanical connection

WARNING

Risk of injury when the machine/system moves unexpectedly

→ Switch off energy supply.

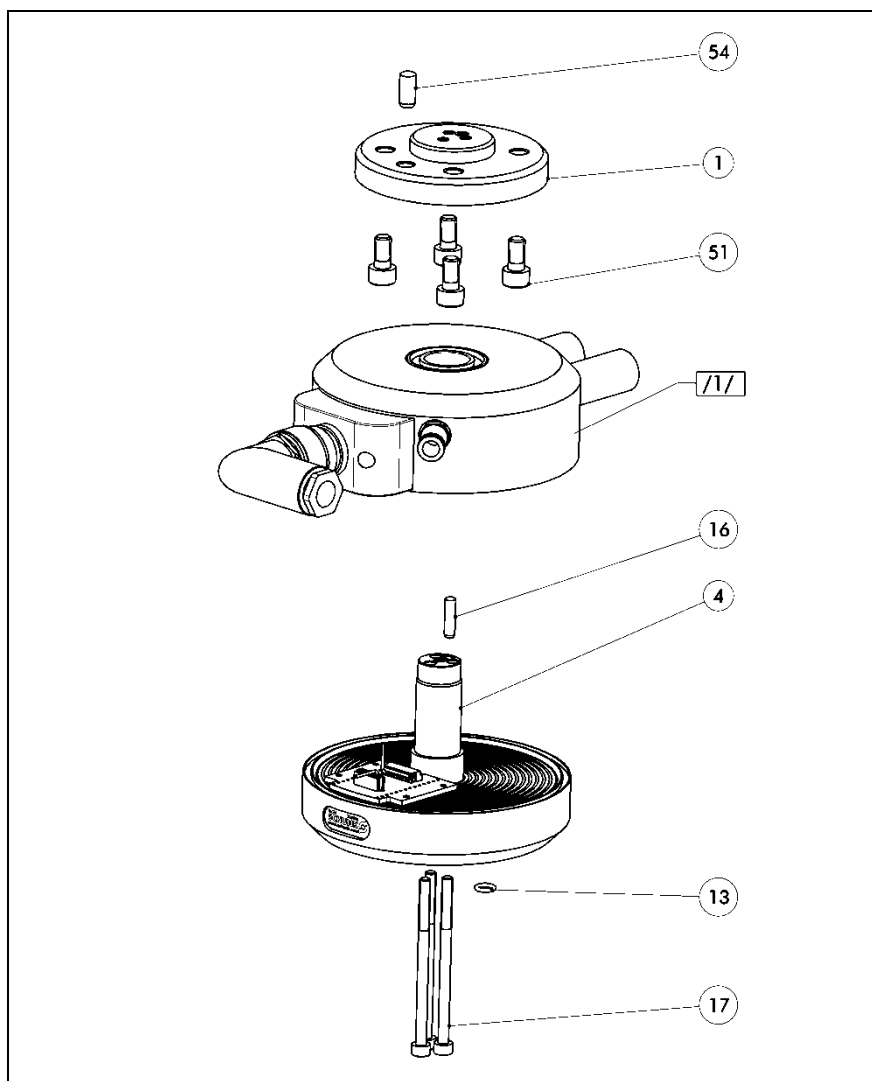


Fig. 1 Fastening of the DDF-V

Note

The centering is done between adapter plate (1) and shaft (4) of the module (/1/).

Mounting

1. To center the adapter plate (1) on the robot interface, use the cylindrical pin (54) (enclosed pack). Insert the cylindrical pin (54) into the adapter plate (1).
2. Position the adapter plate on the robot interface and fasten it on the robot with the four screws (51) (enclosed pack).
3. To center the module (/1/) on the adapter plate (1), use the cylindrical pin (16) (enclosed pack). Insert the cylindrical pin (16) into the adapter plate (1).
4. Place the completely pre-assembled module (/1/) onto the adapter plate and fasten it with the three screws (17).
5. Insert the seal (13) for sealing the air duct. Mount the handling module (e.g. quick-change system or gripper).

Item	Designation	DDF-V-31.5	DDF-V-40	DDF-V-50
13	O-ring	5 x 1.5	5 x 1.5	5 x 1.5
16	Cylindrical pin for centering DIN 6325	4m6 x 16	4m6 x 16	4m6 x 16
17	Mounting screws ISO 4762	M4 x 65	M4 x 65	M4 x 65
51	Mounting screws ISO 4762	M5 x 14	M6 x 12	M6 x 12

Table 5 Cylindrical pin and screws

6.2 Assembly example

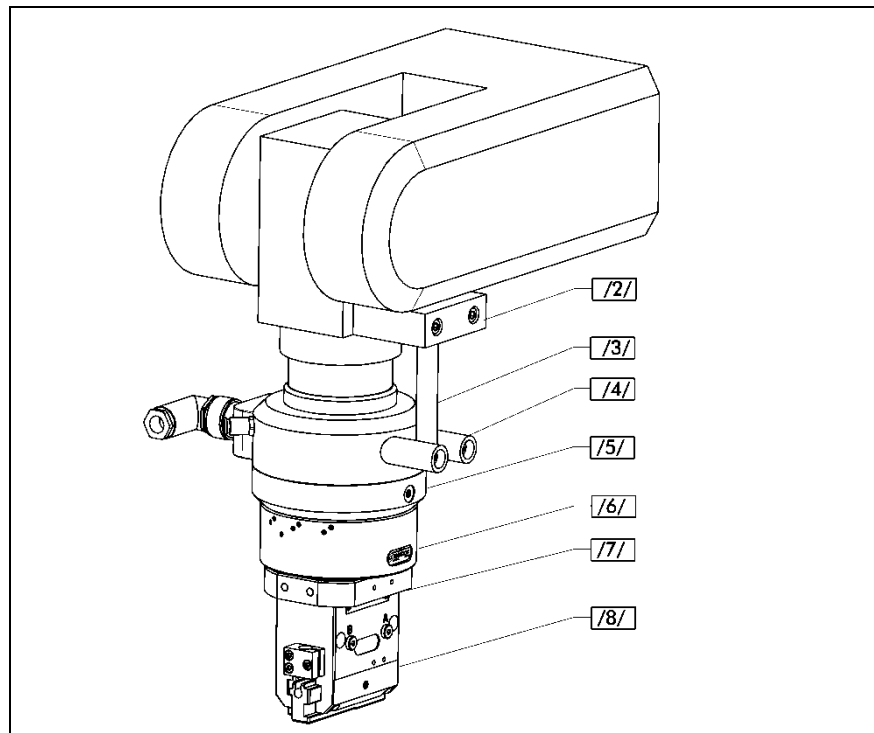


Fig. 2 Assembly on the robot arm

Item	Designation
/2/	Torque support
/3/	Shaft $\varnothing 12$
/4/	Bracket (pre-assembled)
/5/	Rotary feed-through DDF-V
/6/	Handling module (SWS-I-011)
/7/	Adapter plate
/8/	Handling module (2-finger parallel gripper)

Table 6

- ✓ The torque support (/2/) must be fastened to the nonmovable housing of the robot.
 - ✓ The bracket (/4/) is pre-assembled on the DDF-V (/5/).
1. Mount the shaft (/3/) on the bracket (/4/) of the DDF-V (/5/).
 2. Fasten the DDF-V /5/ to the robot as described in chapter 6.1.

**Alignment
of the torque
support**

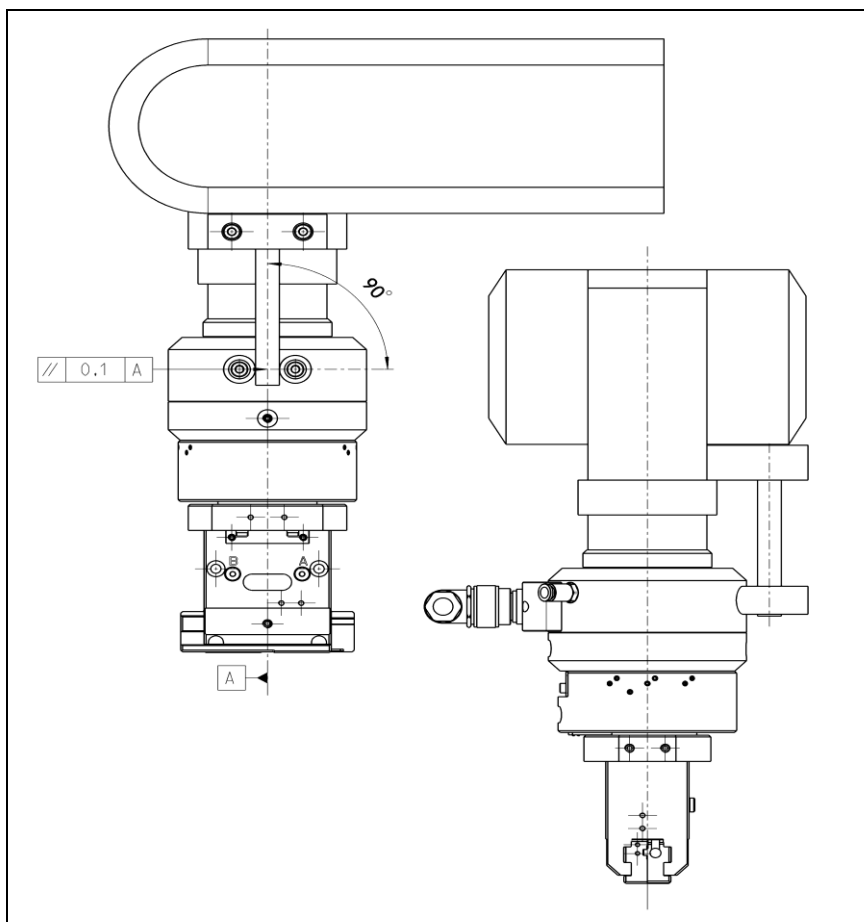


Fig. 3 Torque support

Mounting

- ✓ The shaft (/3/) for torque support should run parallel to the "middle axis" of the rotary feed-through DDF-V (/5/) and at a "right angle" (90°) to the bracket (/4/).
1. Screw the quick-change system SWS-I-011 (/6/) to the DDF-V (/5/).
 2. Fasten the adapter plate (/7/) to the changing head of the SWS-I-011 (/6/).
 3. Screw a handling module (/8/) (here 2-finger parallel gripper) to the adapter plate (/7/).
 4. So that the greatest possible freedom of movement is available during use, fasten and bundle the pneumatic connection and electrical cables and mount them with strain relief.

6.3 Compressed air connection

⚠ WARNING

Risk of injury when the machine/system moves unexpectedly

➔ Switch off energy supply.

Note

- Observe requirements of the air supply (see chapter 5, page 11).
- Observe the maximum pressure values (see chapter 5, page 11).

➔ With a hose-free direct connection (13), use an O-ring 5 x 1.5.

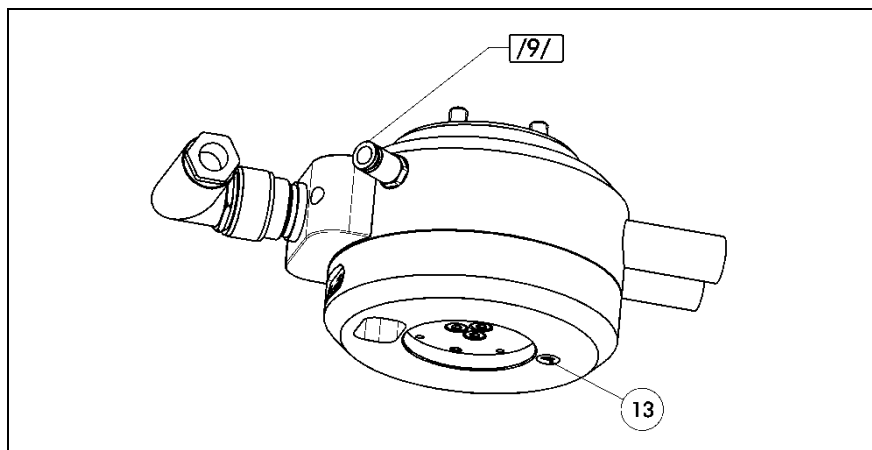


Fig. 4 Air connection

Item	Designation
/9/	Air connection M5
13	Hose-free direct connection (O-ring 5x1.5)

Table 7

1. Connect the robot-side compressed air line to the assembled air connection (/9/).
2. The assembled handling module is supplied with compressed air via the hose-free direct connection (13).

6.4 Electrical connection

WARNING

Risk of injury when the machine/system moves unexpectedly

→ Switch off energy supply.

Note

- Observe the maximum electrical energy values (see chapter 5, page 11).
- Transmission of bus signals is not possible.

6.4.1 Connectors

Position of the connectors

The rotary feed-through DDF-V has a flanged panel plug (12) on the robot side, to which the angle junction box (50), provided by the customer, is attached. There are two miniature blade connectors (/10/) and (/11/) on the tool side that can be led through in the axial direction.

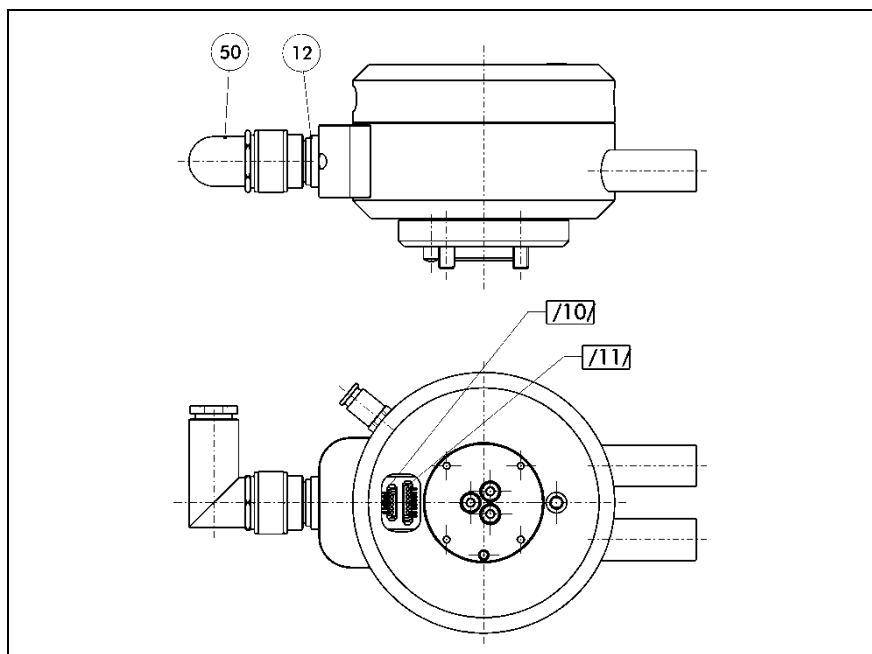


Fig. 5 Arrangement of the connectors

Item	Designation	Connector on the DDF-V	Connector supplied by the customer
12, 50	Pin terminal, 14-pin	Binder series 723 flanged panel plug 09-0453-80-14	Binder series 723 angle junction box 99-0452-75-14
/10/	Miniature blade connector, 6-pin	JST series ZH type B6B-ZR-ABG	JST series ZR type 06ZR-8M
/11/	Miniature blade connector, 8-pin	JST series ZH type B8B-ZR-ABG	JST series ZR type 08ZR-8M

Table 8 Components of the electrical connection

6.4.2 Pin allocation of the connectors

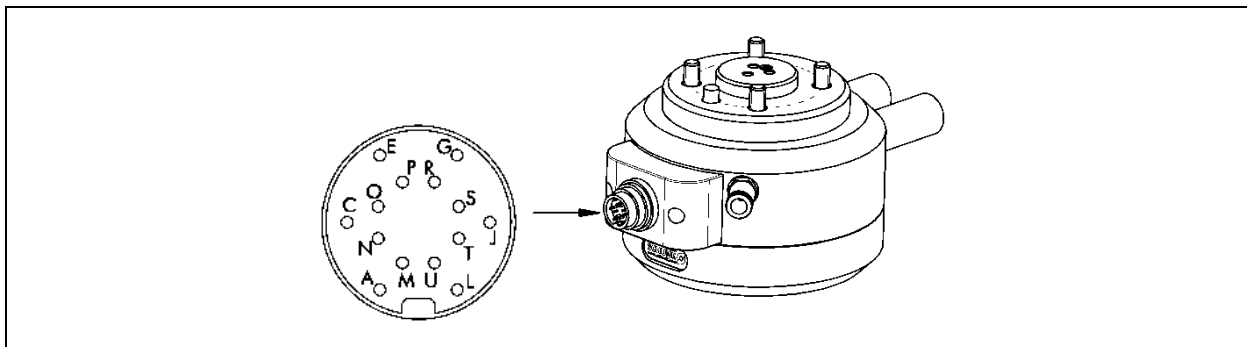


Fig. 6 Pin arrangement of the pin terminal, 14-pin

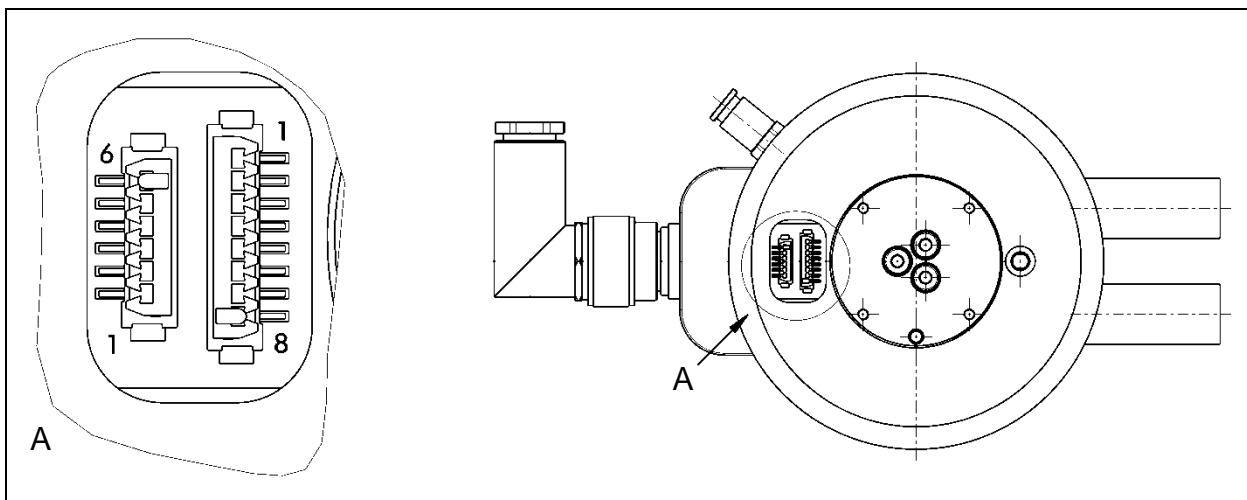


Fig. 7 Pin arrangement of the miniature blade connectors (6-pin and 8-pin)

Slip ring	Pin terminal, 14-pin	Cable color, pin terminal	Miniature blade connector 6-pin	Miniature blade connector, 8-pin	Function with handling module (here SWS-I-011) attached
1	A	wh	-	Pin 1	Signal valve 1 switches air feed-through L1
2	C	bn	-	Pin 2	Signal valve 2 locking
3	E	gn	-	Pin 3	Signal valve 3 switches air feed-through L3
4	G	ye	-	Pin 4	GND valve 1-3
5	J	bu	-	Pin 5	Signal valve 4 switches air feed-through L4
6	L	rd	-	Pin 6	Signal valve 5 unlocking
7	M	bk	-	Pin 7	Signal valve 6 switches air feed-through L6
8	N	pr	-	Pin 8	GND valve 4-6
9	O	wh	Pin 1	-	El. feed-through 1
10	P	bn	Pin 2	-	El. feed-through 2
11	R	gn	Pin 3	-	El. feed-through 3
12	S	ye	Pin 4	-	El. feed-through 4
13	T	bu	Pin 5	-	El. feed-through 5
14	U	rd	Pin 6	-	El. feed-through 6

Table 9 Pin allocation of the connectors

7 Coupling the DDF-V to a quick-change system

CAUTION

Risk of injury from faulty signal transmission

This can cause a short-circuit or unexpected movement of the machine/system.

- ➔ Observe number of pins when connecting the blade connectors (6- and 8-pin).
- ➔ Observe the position orientation and pin allocation of the connectors. (see chapter 6.4.2, page 18)

Note

- Observe the maximum electrical energy values (see chapter 5, page 11).
 - Transmission of bus signals is not possible.
 - Orderable variant from DDF-V and SWS-I-011 is already pre-assembled.
-
- ➔ The air transmission is made via the hose-free direct connection (/12/).
 - ➔ For energy transmission, the axial cable outlet (/13/) of the quick-change system (/14/) is plugged into the two miniature blade connectors (/15/) of the rotary feed-through (/16/).

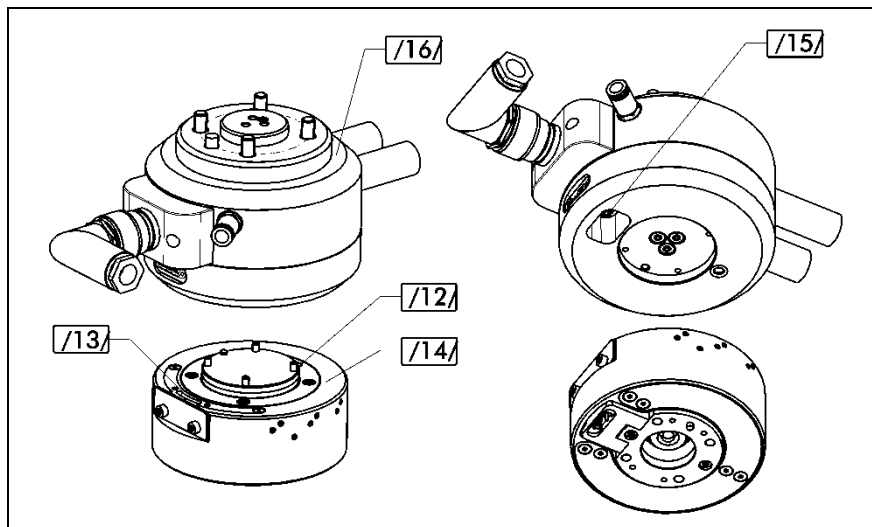


Fig. 8 Variant DDF-V with SWS-I-011

Item	Designation
/12/	Axial air connection SWS-I-011
/13/	Axial cable outlet SWS-I-011
/14/	Quick-change system SWS-I-011
/15/	Miniature blade connector
/16/	Rotary feed-through DDF-V

Table 10 Components of the variant

8 Troubleshooting

8.1 DDF-V lets out air when shut down?

Possible causes	Remedial measures
Air connection not installed correctly	<ul style="list-style-type: none"> ➔ Tighten air connection. ➔ See chapter 6.3, page 16

Table 11

8.2 DDF-V lets out air when operating?

Possible causes	Remedial measures
O-ring defective	<ul style="list-style-type: none"> ➔ Replace O-ring. ➔ Please get in touch with your SCHUNK contact person.

Table 12

8.3 Electric signals are not transmitted?

Possible causes	Remedial measures
Cables not connected correctly	<ul style="list-style-type: none"> ➔ Check that the pin terminal and the two miniature blade connectors are positioned correctly.
Wire strands mixed up	<ul style="list-style-type: none"> ➔ Check whether wire strands are mixed up. ➔ Observe pin allocation: see chapter 6.4.2, page 18.
Bus signals should be transmitted	<ul style="list-style-type: none"> ➔ Bus signals cannot be transmitted. Please get in touch with your SCHUNK contact person.
Slip ring defective	<ul style="list-style-type: none"> ➔ Please get in touch with your SCHUNK contact person.

Table 13

8.4 Variants DDF-V and SWS-I-011 let out air when shut down?

Possible causes	Remedial measures
Air connection not installed correctly	→ Tighten air connection. (see chapter 6.3, page 16)
O-rings missing on the quick-change system	→ Insert O-rings (13) and (26). (see Fig. 10, page 29)
Cover missing on the quick-change system	→ Insert cover item 50 (see Fig. 10, page 29)
Pressure too high, over 6 bar	→ Reduce pressure to max. 6 bar

Table 14

9 Maintenance and care

9.1 Maintenance and lubrication intervals

! NOTICE

The lubricants harden faster at ambient temperatures above 60°C.

➔ Reduce interval accordingly.

Recommended at every maintenance:

➔ Replace wearing parts marked in the bill of materials.
(see chapter 11 from page 30)

Size	DDF-V-31.5	DDF-V-40	DDF-V-50
Operating hours [h]	6000	6000	6000

Table 15 Interval

9.2 Lubricants/grease areas (basic lubrication)

We recommend the lubricants listed. Provably equivalent lubricants can also be used.

➔ During maintenance, treat all grease areas with lubricant.

Grease area	Lubricant
Bare outside steel parts	Fin Assembly Grease (Interflon)
All seals (O-rings)	Fin Assembly Grease with Teflon
Slip ring tracks	LTN oil (art. no. 4605575)

Table 16

9.3 Disassembling the module

9.3.1 Standard variant DDF-V

(For item, see Fig. 9, page 28)

WARNING

Risk of injury when the machine/system moves unexpectedly

→ Switch off energy supply.

NOTICE

Possible damage to the slip ring contacts if cleaning is not done correctly

→ Clean brush block (/17/) and slip ring disk (/18/) very carefully without water.

→ Lightly oil the traces of the slip ring track.

NOTICE

Possible damage to the components if assembly is not done correctly

→ Preventing damage to the seals and connectors.

→ Avoid touching the slip ring contacts of the electrical feed-through.

1. Remove compressed air lines.
2. Detach cable connections.
3. Unscrew screws (17).

Note

Adapter plate (1) and shaft (4) are bolted to each other (16).

4. Pull shaft (4) away from adapter plate (1).
5. Replace all seals (9).

6. Check all parts for defects and wear. Replace as needed.
7. Clean all parts except brush block /17/ and slip ring disk /18/ thoroughly with a damp cloth.
8. Very carefully clean the slip ring tracks in the shaft (4) with a clean, dry cloth.
Lightly oil the traces; preferably use oil by LTN (art. no. 4605575).

Note

Assembly takes place in the opposite order. Observe the following:

- ➔ Clean all parts thoroughly and check for damage and wear.
- ➔ Replace all seals.
- ➔ Treat all grease areas with lubricant (see chapter 9.2, page 24).
- ➔ Oil or grease bare outside steel parts.
- ➔ Unless otherwise specified, secure all screws and nuts with Loctite no. 243 and tighten with the appropriate tightening torque (per DIN).

9.3.2 Detaching and attaching the combination variants DDF-V and SWS-I-011

(For item, see Fig. 10, page 29)

 **WARNING**

Risk of injury when the machine/system moves unexpectedly

- ➔ Switch off energy supply.

! NOTICE**Possible damage to the components if assembly is not done correctly**

➔ Preventing damage to the seals and connectors.

1. Unlock quick-change head SWK /20/.
2. Take off quick-change adapter SWA /21/ and place it in the stacker or another safe place.
3. Remove compressed air lines.
4. Detach cable connections.
5. Unscrew screws (18).

Note

The electrical feed-through connects the quick-change head /20/ with the rotary feed-through DDF-V.

6. Carefully tip the quick-change head /20/ to the side.
7. Remove cover (50) and replace the O-ring (13).
8. Carefully release the connector of the electrical feed-through from the DDF-V /19/ and separate it from quick-change head /20/.
9. Completely unscrew screws (17).
10. Disassemble and service DDF-V /19/.
(see chapter 9.3.1, page 25, step 3)

Note

Assembly takes place in the opposite order. Observe the following:

- ➔ Clean all parts thoroughly and check for damage and wear.
- ➔ Treat all grease areas with lubricant (see chapter 9.2, page 24).
- ➔ Oil or grease bare outside steel parts.

10 Assembly drawing

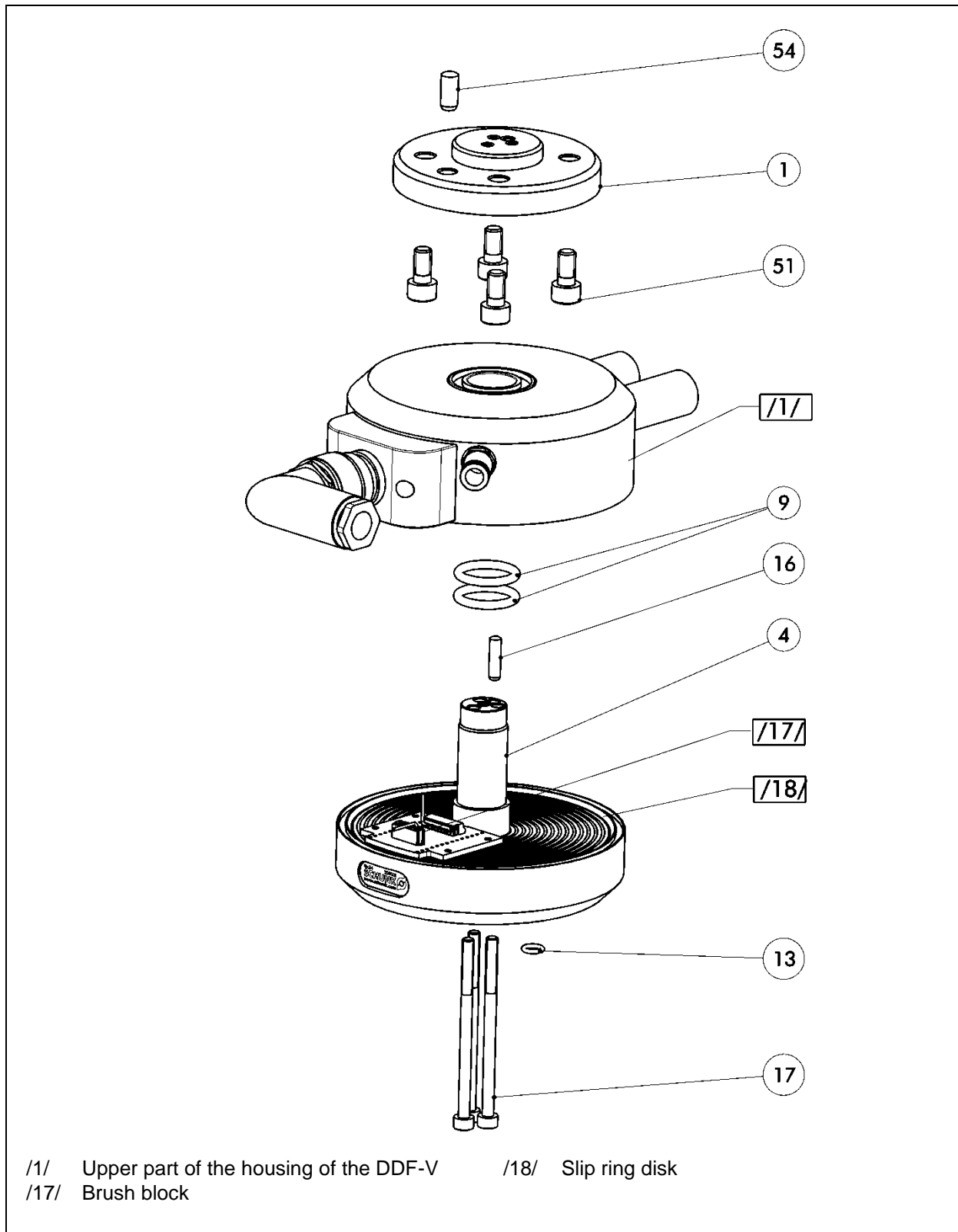


Fig. 9 Assembly drawing DDF-V

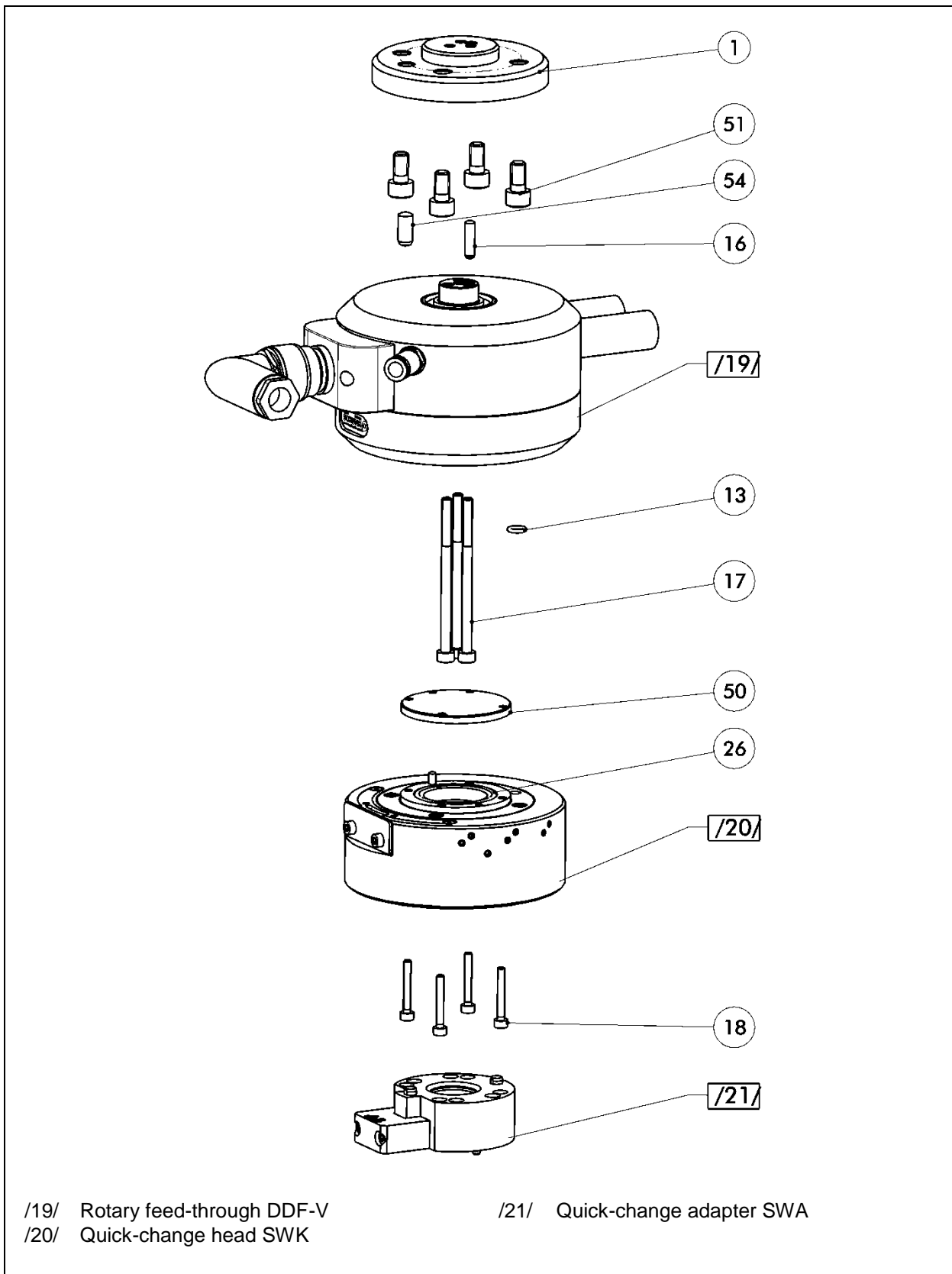


Fig. 10 Assembly drawing DDF-V with SWS-I-011

11 Spare parts

11.1 DDF-V-31.5

ID no. 323 210

(For item, see Fig. 9, page 28)

Item	ID no.	Quantity	Designation	Note
1	5518018	1	Base DDF-V-31.5	
4	5518023	1	Shaft DDF-V-31.5740/50	
9	9942068	2	O-ring $\varnothing 17 \times 3$	Wearing part
12	9949859	1	Pin terminal series 723	
13	9611131	1	O-ring $\varnothing 5 \times 1.5$	Wearing part
16	9682012	1	Cylindrical pin 4 M6 x 16	
17	9660517	3	Screw M4 x 65	
50	9949866	1	KAS-SWK-I-011-90	Enclosed pack
51	9660411	4	Screw M5 x 14	
52	9951088	1	ZR connector type 06ZR-8M	Enclosed pack
53	9951089	1	ZR connector type 08ZR-8M	Enclosed pack
54	9682299	1	Cylindrical pin 5 M6 x 14	Enclosed pack

Table 17

11.2 DDF-V-40

ID no. 323,211

(For item, see Fig. 9, page 28)

Item	ID no.	Quantity	Designation	Note
1	5518019	1	Base DDF-V-40	
4	5518023	1	Shaft DDF-V-31.5740/50	
9	9942068	2	O-ring $\varnothing 17 \times 3$	Wearing part
12	9949859	1	Pin terminal series 723	
13	9611131	1	O-ring $\varnothing 5 \times 1.5$	Wearing part
16	9682012	1	Cylindrical pin 4 M6 x 16	
17	9660517	3	Screw M4 x 65	
50	9949866	1	KAS-SWK-I-011-90	Enclosed pack
51	9942375	4	Screw M6 x 12	
52	9951088	1	ZR connector type 06ZR-8M	Enclosed pack
53	9951089	1	ZR connector type 08ZR-8M	Enclosed pack
54	9907092	1	Cylindrical pin 6 M6 x 14	Enclosed pack

Table 18

11.1 DDF-V-50

ID no. 323 212

(For item, see Fig. 9, page 28)

Item	ID no.	Quantity	Designation	Note
1	5518020	1	Base DDF-V-50	
4	5518023	1	Shaft DDF-V-31.5740/50	
9	9942068	2	O-ring $\varnothing 17 \times 3$	Wearing part
12	9949859	1	Pin terminal series 723	
13	9611131	1	O-ring $\varnothing 5 \times 1.5$	Wearing part
16	9682012	1	Cylindrical pin 4 M6 x 16	
17	9660517	3	Screw M4 x 65	
50	9949866	1	KAS-SWK-I-011-90	Enclosed pack
51	9942375	4	Screw M6 x 12	
52	9951088	1	ZR connector type 06ZR-8M	Enclosed pack
53	9951089	1	ZR connector type 08ZR-8M	Enclosed pack
54	9907092	1	Cylindrical pin 6 M6 x 14	Enclosed pack

Table 19

11.2 Combination variants

(For item, see Fig. 10, page 29)

11.2.1 DDF-V-31.5 and SWS-I-011

ID no. 302,816

Item	ID no.	Quantity	Designation	Note
1	5518056	1	DDF-V-31.5	
2	5518059	1	SWK-I-011-4-6 for DDF-V	

Table 20

11.2.1 DDF-V-40 and SWS-I-011

ID no. 302,817

Item	ID no.	Quantity	Designation	Note
1	5518057	1	DDF-V-40	
2	5518059	1	SWK-I-011-4-6 for DDF-V	

Table 21

11.2.1 DDF-V-50 and SWS-I-011

ID no. 302,818

Item	ID no.	Quantity	Designation	Note
1	5518058	1	DDF-V-50	
2	5518059	1	SWK-I-011-4-6 for DDF-V	

Table 22

12 Contacts



GERMANY – HEAD OFFICE

SCHUNK GmbH & Co. KG
Spann- und Greiftechnik
Bahnhofstrasse 106 – 134
D-Lauffen/Neckar
Tel. +49-7133-103-0
Fax +49-7133-103-2399
info@de.schunk.com
www.schunk.com



CANADA

SCHUNK Intec Corp.
190 Britannia Road East,
Units 23-24
Mississauga, ON L4Z 1W6
Tel. +1-905-712-2200
Fax +1-905-712-2210
info@ca.schunk.com
www.ca.schunk.com



DENMARK

SCHUNK Intec A/S
Storhaven 7
7100 Vejle
Tel. +45-43601339
Fax +45-43601492
info@dk.schunk.com
www.dk.schunk.com



HUNGARY

SCHUNK Intec Kft.
Széchenyi út. 70.
3530 Miskolc
Tel. +36-46-50900-7
Fax +36-46-50900-6
info@hu.schunk.com
www.hu.schunk.com



AUSTRIA

SCHUNK Intec GmbH
Holzbauernstr. 20
4050 Traun
Tel. +43-7229-65770-0
Fax +43-7229-65770-14
info@at.schunk.com
www.at.schunk.com



CHINA

SCHUNK GmbH & Co.KG
Shanghai
Representative Office
777 Zhao Jia Bang Road
Pine City Hotel, Room 923
Xuhui District
Shanghai 200032
Tel. +86-21-64433177
Fax +86-21-64431922
info@cn.schunk.com
www.cn.schunk.com



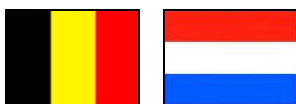
FRANCE

SCHUNK Intec SARL
Parc d'Activités des Trois Noyers
15, Avenue James de Rothschild
Ferrières-en-Brie
77614 Marne-la-Vallée
Cedex 3
Tel. +33-1-64 66 38 24
Fax +33-1-64 66 38 23
info@fr.schunk.com
www.fr.schunk.com



INDIA

SCHUNK India Branch
Office
80 B, Yeswanthpur
Industrial Suburbs,
Bangalore 560 022
Tel. +91-80-41277361
Fax +91-80-41277363
info@in.schunk.com
www.in.schunk.com



BELGIUM, LUXEMBOURG

SCHUNK Intec N.V./S.A.
Bedrijvencentrum Regio Aalst
Industrielaan 4, Zuid III
9320 Aalst-Erembodegem
Tel. +32-53-853504
Fax +32-53-836022
info@be.schunk.com
www.be.schunk.com



CZECH REPUBLIC

SCHUNK Intec s.r.o.
Ernsta Macha 1
643 00 Brno
Tel. +420-545 229 095
Fax +420-545 220 508
info@cz.schunk.com
www.cz.schunk.com



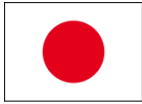
GREAT BRITAIN, IRELAND

SCHUNK Intec Ltd.
Cromwell Business Centre
10 Howard Way,
Interchange Park
Newport Pagnell MK16 9QS
Tel. +44-1908-611127
Fax +44-1908-615525
info@gb.schunk.com
www.gb.schunk.com



ITALY

SCHUNK Intec S.r.l.
Via Caio Plinio 5
22072 Cermenate (CO)
Tel. +39-031-770185
Fax +39-031-771388
info@it.schunk.com
www.it.schunk.com

**JAPAN**

SCHUNK Intec K.K.
45-28 3-Chome Sanno
Ohta-Ku Tokyo 143-0023
Tel. +81-33-7743731
Fax +81-33-7766500
s-takano@tbk-hand.co.jp
www.tbk-hand.co.jp

**POLAND**

SCHUNK Intec Sp.z o.o.
Stara Iwiczna,
ul. Słoneczna 116 A
05-500 Piaseczno
Tel. +48-22-7262500
Fax +48-22-7262525
info@pl.schunk.com
www.pl.schunk.com

**SOUTH KOREA**

SCHUNK Intec Korea Ltd.
907 Joongang
Induspia 2 Bldg.,
144-5 Sangdaewon-dong
Jungwon-gu, Seongnam-si
Kyunggi-do, 462-722
Tel. +82-31-7376141
Fax +82-31-7376142
info@kr.schunk.com
www.kr.schunk.com

**SWITZERLAND,
LIECHTENSTEIN**

SCHUNK Intec AG
Soodring 19
8134 Adliswil 2
Tel. +41-44-7102171
Fax +41-44-7102279
info@ch.schunk.com
www.ch.schunk.com

**MEXICO, VENEZUELA**

SCHUNK Intec S.A. de C.V.
Av. Luis Vega y Monroy # 332
Fracc. Plazas de Sol
Santiago de Querétaro,
Qro. 76099
Tel. +52-442-223-6525
Fax +52-442-223-7665
info@mx.schunk.com
www.mx.schunk.com

**PORTUGAL**

Sales Representative
Victor Marques
Tel. +34-937-556 020
Fax +34-937-908 692
Mobil +351-963-786 445
info@pt.schunk.com
www.pt.schunk.com

**SPAIN**

SCHUNK Intec S.L.
Foneria, 27
08304 Mataró (Barcelona)
Tel. +34-937 556 020
Fax +34-937 908 692
info@es.schunk.com
www.es.schunk.com

**TURKEY**

SCHUNK Intec
Bağlama Sistemleri ve
Otomasyon San. ve Tic. Ltd. Şti.
Küçükyalı İş Merkezi
Girne Mahallesi
Irmak Sodak, A Blok, No: 9
34852 Maltepe, İstanbul
Tel. +90-216-366-2111
Fax +90-216-366-2277
info@tr.schunk.com
www.tr.schunk.com

**NETHERLANDS**

SCHUNK Intec B.V.
Speldenmakerstraat 3d
5232 BH 's-Hertogenbosch
Tel. +31-73-6441779
Fax +31-73-6448025
info@nl.schunk.com
www.nl.schunk.com

**SLOVAKIA**

SCHUNK Intec s.r.o.
Mostná 62
919 01 Nitra
Tel. +421-37-3260610
Fax +421-37-6421906
info@sk.schunk.com
www.sk.schunk.com

**SWEDEN**

SCHUNK Intec AB
Morabergsvägen 28
152 42 Södertälje
Tel. +46-8 554 421 00
Fax +46-8 554 421 01
info@se.schunk.com
www.se.schunk.com

**USA**

SCHUNK Intec Inc.
211 Kitty Hawk Drive
Morrisville, NC 27560
Tel. +1-919-572-2705
Fax +1-919-572-2818
info@us.schunk.com
www.us.schunk.com