

## Live Working

## Selection Guide

## Live Working Product Range

Devices	Nominal voltage $U_N$ / Frequency $f_N$	Application	Page	
TRS NS Dry Cleaning Kit	up to 1000 V / 15 ... 60 Hz	Live cleaning by suction Specially adapted operating heads for intensive cleaning Plug-in coupling system allows fast replacement of operating heads	132	
TRS MS  TRS MS V1  Dry Cleaning Kit	up to 36 kV / 15 ... 60 Hz	Live cleaning by suction Transparent intake tubes for enhanced safety Specially adapted operating heads for intensive cleaning Plug-in coupling system allows fast replacement of operating heads	135	
FRS ZK MS Damp Cleaning Kit	up to 36 kV / 15 ... 60 Hz	Damp cleaning element for use under live conditions with special cleaning liquid Universal gear coupling for replacing and adjusting the angle of operating heads Plug-in operating heads allows fast and easy replacement of sponges	137	
TFRS MS Combined Cleaning Kit	up to 36 kV / 15 ... 60 Hz	Combined equipment for dry and damp cleaning Transparent intake tubes for enhanced safety Specially adapted operating heads for intensive cleaning Universal gear coupling for replacing and adjusting the angle of operating heads Plug-in operating heads allows fast and easy replacement of sponges	138	
NFG MS Refilling Device	up to 36 kV / 15 ... 60 Hz	Refilling of insulating oil under live conditions Safe, fast and easy refilling procedure	144	
MS Insulated Screw Driver	up to 36 kV / 15 ... 60 Hz	For loosening and tightening the screw plugs of cable sealing ends under live conditions With interchangeable operating heads	146	

## Maintenance tests

According to German regulations (BGV A3), operating sticks have to be tested for compliance with the prescribed limits as stated in the Electrical Safety Rules. This test includes:

- measurement of the leakage current,
- test for protection against bridging,
- visual inspection

This maintenance test is documented in a test report and on the device.

The test intervals depend on the operating conditions of the operating stick e.g. frequency of use, environmental conditions and transport. According to German regulations, however, it is advisable to carry out a maintenance test **at least every 6 years**.



## TRS NS Dry Cleaning Kit

## Live Working

Nominal voltages up to 1000 V / 15 ... 60 Hz

Cleaning Equipment



Live cleaning of a low-voltage switchgear installation using the TRS NS dry cleaning kit

### General Information:

Standard	Based on DIN VDE 0680 Part 3
Use	Not suitable for use in wet weather conditions

### Requirements

Cleaning work up to 1000 V must be carried out under supervision of a qualified electrician according to EN 50110-1 "Operation of electrical installations – Minimum Requirements". In Germany TRS NS dry cleaning kits are subject to BGV A3 of the national accident prevention regulations (UVV) "Elektrische Anlagen und Betriebsmittel" [Electrical installations and equipment] stipulated by the German Employer's Liability Association for the energy, textile, electrical and media product sector (BGEM).



Chamfered flat cleaning head in use



Tubular brush in use

- For indoor and outdoor installations
- Equipment for suction cleaning under live conditions
- For dry cleaning of cable distribution cabinets, open indoor installations and control cabinets
- Specially adapted operating heads for intensive cleaning
- Plug-in coupling system allows fast replacement of operating heads
- Regulation of intake air in the handle area



- 1 Intake hose
- 2 Intake hose adapter
- 3 Intake tube with
  - a Lower connecting part
  - b Handle
  - c Hand guard
  - d Insulating element
  - e Top connecting part
- 4 Extension tube
- 5 Intake tube adapter
- 6 Cleaning head

### Dimensions:

$l_{G \min} = 560 \text{ mm}$   
 $l_{G \max} = 1350 \text{ mm}$

Design

## Live Working

## TRS NS Dry Cleaning Kit

## Cleaning Equipment

Fully equipped plastic case

Type	TRS NS
Part No.	785 502
Dimensions	530 x 390 x 170 mm



## Single Parts for TRS NS Dry Cleaning Kit

## Plastic Case, empty

With retaining clips

Type	KKL TRS NS
Part No.	785 506
Colour	Black
Dimensions	530 x 390 x 170 mm



## Extension

Insulating tube, with top and lower connecting part

Type	SRV 200 NS	SRV 300 NS	SRV 400 NS
Part No.	785 521	785 522	785 523
Diameter	40 mm	40 mm	40 mm
Dimensions	200 mm	300 mm	400 mm



## Single Parts for TRS NS Dry Cleaning Kit

## Intake Tube with Handle

For use as operating tube with handle and hand guard, with top and lower connecting part

Type	SRH 400 NS
Part No.	785 520
Dimensions	380 mm



## Adjustable Angle

Lockable, adjustable due to 15° gearing, with top and lower connecting part

Type	SRW V NS
Part No.	785 530
Diameter	40 mm
Dimensions	300 mm



## Flat Cleaning Head 55

Width: 55 mm

Type	FD 55 NS
Part No.	785 540
Diameter	40 mm
Dimensions	200 mm



## Flat Cleaning Head 35

Width: 35 mm

Type	FD 35 NS
Part No.	785 541
Diameter	25 mm
Dimensions	200 mm



## Flat Cleaning Head 35

Width: 35 mm, 60° outlet, chamfered

Type	FD 35 S NS
Part No.	785 542
Diameter	25 mm
Dimensions	200 mm



## Flat Cleaning Head 35

Width: 35 mm, straight, with detachable brush

Type	FD 35 P NS
Part No.	785 590
Diameter	25 mm
Dimensions	230 mm



## Flat Cleaning Head 35

Width: 35 mm, 30° angled, with detachable brush

Type	FD 35 W P NS
Part No.	785 591
Diameter	25 mm
Dimensions	240 mm



## Round Cleaning Head

With scraper (50 mm)

Type	RD 25 S NS
Part No.	785 560
Diameter	25 mm
Dimensions	240 mm



## TRS NS Dry Cleaning Kit

## Live Working

### Single Parts

### Cleaning Equipment

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#### Cross Cleaning Head 35

Width: 35 mm, 30° angled

Type	QD 35 W NS
Part No.	785 543
Diameter	25 mm
Dimensions	200 mm

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#### Round Cleaning Head

With brush

Type	RD 25 P NS
Part No.	785 570
Diameter	25 mm
Dimensions	230 mm

15



#### Tubular Brush 85 mm

Cylindrical bristles

Type	STB 85 Z NS
Part No.	785 550
Diameter	25 mm
Dimensions	240 mm

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#### Tubular Brush 85 mm

Conical bristles

Type	STB 85 K NS
Part No.	785 555
Diameter	25 mm
Dimensions	240 mm

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#### Intake Tube Adapter

For brushes and cleaning heads (Ø25 mm)

Type	SRA NS
Part No.	785 515
Diameter	40 / 25 mm
Dimensions	100 mm

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#### Intake Hose Adapter

Adjustable, 120° angled, regulation of intake air, for use with intake hose system (Ø35 mm)

Type	SSA W D
Part No.	785 200
Diameter	35 / 40 mm

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#### Spare Brush

Short bristles, for flat cleaning heads with detachable brush

Type	EP 25 K NS
Part No.	785 595
Dimensions	25 mm
PU	3 pieces

20



#### Spare Brush

Long bristles, for flat cleaning heads, with detachable brush

Type	EP 25 L NS
Part No.	785 596
Dimensions	40 mm
PU	3 pieces

21



#### Cleaning Brush

For individual kit parts (Ø40 mm)

Type	RB 40 NS
Part No.	785 580
Diameter	45 mm
Dimensions	410 mm

22



#### Cleaning Brush

For individual kit parts (Ø25 mm)

Type	RB 20 NS
Part No.	785 585
Diameter	30 mm
Dimensions	330 mm

## Live Working

### Cleaning Equipment

- For indoor and outdoor installations
- Equipment for live cleaning by means of suction
- For dry cleaning of transformers and switch-gear installations
- Transparent intake tubes ensure enhanced safety
- Specially adapted operating heads for intensive cleaning
- Plug-in coupling system allows fast replacement of operating heads



## TRS MS Dry Cleaning Kit

Nominal voltages up to 36 kV / 15 ... 60 Hz



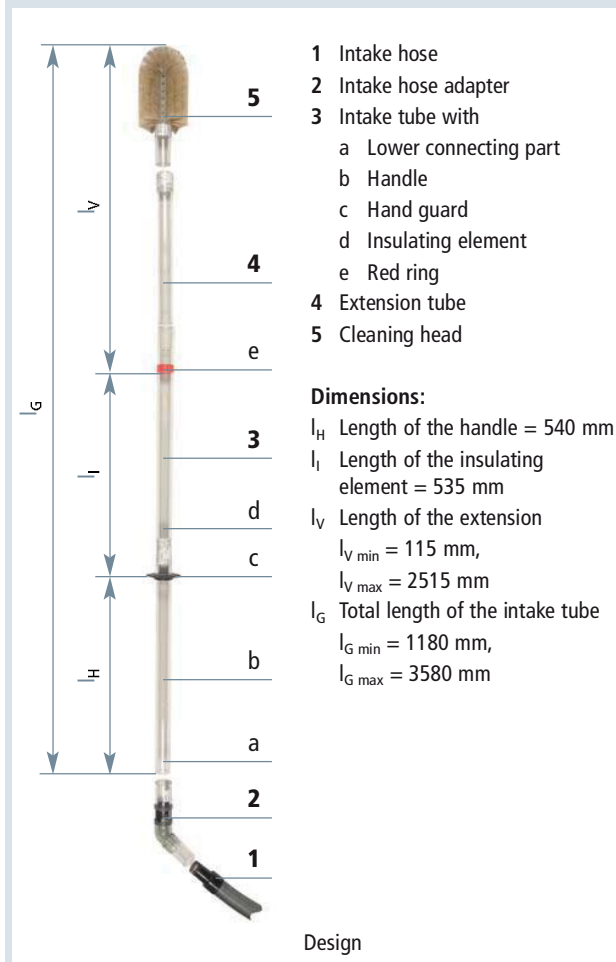
Live cleaning of a transformer using the TRS MS dry cleaning kit

### General Information:

Standard	DIN VDE 0682 Part 621
Use	Not suitable for use in wet weather conditions

### Requirements

Cleaning work from 1 to 36 kV must be carried out under supervision of a qualified electrician according to EN 50110-1 "Operation of electrical installations – Minimum Requirements", observing clauses 6.3.1 to 6.3.12. In Germany TRS MS dry cleaning kits are subject to BGV A3 and BGR A3 of the national accident prevention regulations (UVV) "Elektrische Anlagen und Betriebsmittel" [Electrical installations and equipment] stipulated by the German Employer's Liability Association for the energy, textile, electrical and media product sector (BGITEM).



Cleaning an insulator with a flat cleaning head and 135° angled intake tube



Cleaning an insulator with a tubular brush



**TRS MS Dry Cleaning Kit**

**Live Working**  
 Cleaning Equipment



Fully equipped GRP case

Type	TRS MS
Part No.	785 100
Dimensions	1200 x 270 x 165 mm

TRS MS V1 Dry Cleaning Kit



Fully equipped GRP case

Type	TRS MS V1
Part No.	785 112
Dimensions	1200 x 270 x 165 mm

## Live Working

### Cleaning Equipment

- For indoor and outdoor installations
- Damp cleaning equipment for use under live conditions with special cleaning liquid
- Universal gear coupling for replacing and adjusting the angle of operating heads
- Rigid and flexible plug-in operating heads allow fast and easy replacement of the sponges

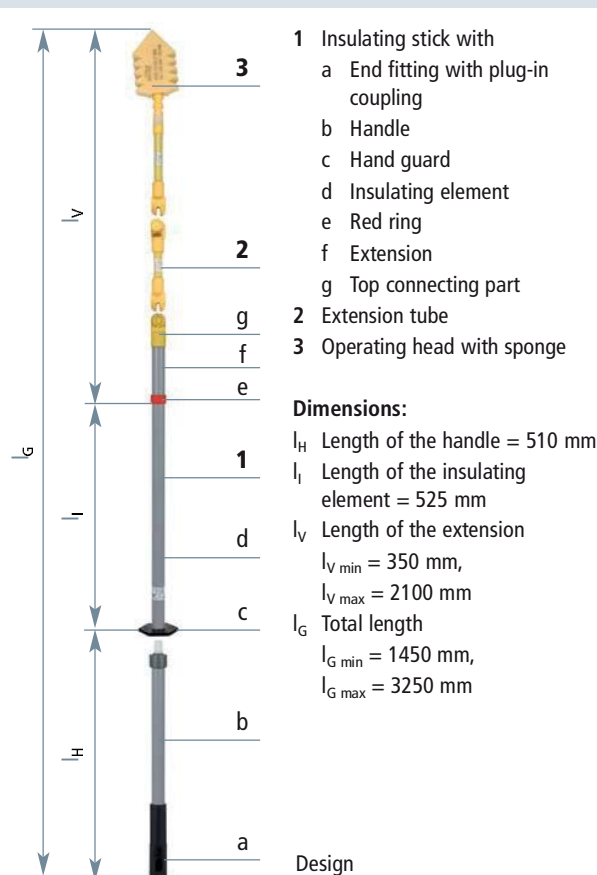


### Application

Damp sponges allow to remove tough pollution layers and to clean oily transformer surfaces. Special insulating cleaning liquids (e.g. Rivolta SLX 500; SLX TOP or SLX Super from Bremer & Leguil, Duisburg/Germany, and Florin 2000 from Flore, Koblenz/Germany) must be selected according to the rated voltage of the installation and the environmental conditions.

### Requirements

Cleaning work from 1 to 36 kV must be carried out under supervision of a qualified electrician according to EN 50110-1 "Operation of electrical installations – Minimum Requirements", observing clauses 6.3.1 to 6.3.12. In Germany FRS ZK MS damp cleaning kits are subject to BGV A3 and BGR A3 of the national accident prevention regulations (UVV) "Elektrische Anlagen und Betriebsmittel" [Electrical installations and equipment] stipulated by the German Employer's Liability Association for the energy, textile, electrical and media product sector (BGITEM).



## FRS ZK MS Damp Cleaning Kit

Nominal voltages up to 36 kV / 15 ... 60 Hz



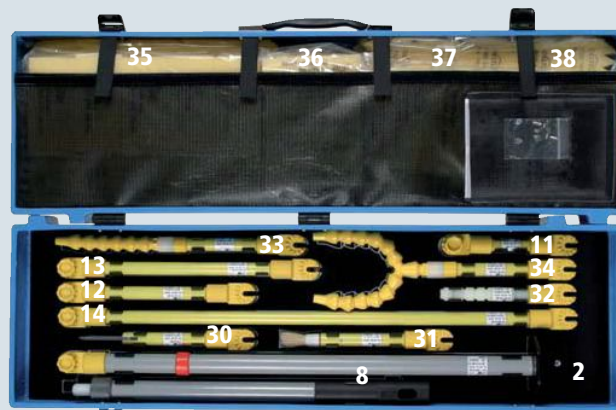
Damp cleaning of a transformer using the FRS ZK MS damp cleaning kit

### General Information:

Standard	Based on DIN VDE 0681 Part 1 and DIN VDE 0682 Part 621
Standard (universal gear coupling)	EN/IEC 60832 (DIN VDE 0682 Part 211)
Use	Not suitable for use in wet weather conditions



The universal gear coupling permits fast replacement of operating heads and extensions



Fully equipped GRP case

Type	FRS ZK MS
Part No.	785 940
Dimensions	850 x 300 x 200 mm

## TFRS MS Combined Cleaning Kit

Live Working

Nominal voltages up to 36 kV / 15 ... 60 Hz

Cleaning Equipment



TFRS MS combined cleaning kit used for dry and damp cleaning of a transformer under live conditions

### General Information:

Standard	Based on DIN VDE 0681 Part 1 and DIN VDE 0682 Part 621
Standard (universal gear coupling)	EN/IEC 60832 (DIN VDE 0682 Part 211)
Use	Not suitable for use in wet weather conditions



Fully equipped GRP case and leather bag

Type	TFRS MS
Part No.	785 950
Dimensions (bag)	1400 x 280 mm
Dimensions (case)	850 x 410 x 400 mm

Customised kits are available on request.

- For indoor and outdoor installations
- Combined dry and damp cleaning kit for cleaning under live conditions
- Transparent intake tubes ensure enhanced safety
- Specially adapted operating heads for intensive cleaning
- Universal gear coupling for replacing and adjusting the angle of operating heads
- Rigid and flexible plug-in operating heads allow fast and easy replacement of the sponges



### Application

Dry cleaning work is performed by suction cleaning with operating heads or brushing soiled parts of the installation while simultaneously sucking the dirt away. Loose dust layers and cobwebs are easily removed with little effort. Damp cleaning eliminates oily and tough contaminants with the help of sponges soaked with special insulating cleaning liquids.

### Requirements

Cleaning work from 1 to 36 kV must be carried out under supervision of a qualified electrician according to EN 50110-1 "Operation of electrical installations – Minimum Requirements", observing clauses 6.3.1 to 6.3.12. In Germany TFRS MS combined cleaning kit are subject to BGV A3 and BGR A3 of the national accident prevention regulations (UVV) "Elektrische Anlagen und Betriebsmittel" [Electrical installations and equipment] stipulated by the German Employer's Liability Association for the energy, textile, electrical and media product sector (BGITEM).





## Live Working

## Single Parts for MS Cleaning Kit

## Cleaning Equipment

## GRP Case, empty

With retaining clips and printed top and bottom insert

Type	KKL TRS MS
Part No.	785 301
Colour	Blue
Dimensions	1200 x 270 x 165 mm



## GRP Case, empty

With retaining clips and printed bottom insert

Type	KKL FRS ZK MS
Part No.	785 229
Colour	Blue
Dimensions	850 x 300 x 200 mm



## GRP Case, empty

With retaining clips and printed top and bottom insert

Type	KKL TFRS MS
Part No.	785 951
Colour	Blue
Dimensions	850 x 410 x 400 mm



## Artificial Leather Bag, empty

With zip and shoulder strap

Type	KLT 140 28
Part No.	785 952
Colour	Black
Dimensions	1400 x 280 mm



## 90° angled Intake Tube

Type	SRW 90 MS
Part No.	785 131
Diameter	40 mm
Dimensions	120 mm



## 135° angled Intake Tube

Type	SRW 135 MS
Part No.	785 132
Diameter	40 mm
Dimensions	100 mm



## Angled Intake Tube

Lockable, adjustable due to 15° gearing, for positioning the cleaning heads

Type	SRW V MS
Part No.	785 130
Diameter	40 mm
Dimensions	160 mm



## Insulating Stick with Handle and plug-in Coupling

For use as operating stick with handle, hand guard, insulating element, red ring and extension, extendible handle

Type	ISH T 1300 ZK MS
Part No.	785 315
Diameter	30 mm
Dimensions	1300 mm



## Intake Tube with Handle

For use as operating tube with handle, hand guard, insulating element, red ring and extension

Type	SRH 1180 MS
Part No.	785 120
Diameter	40 mm
Dimensions	1180, insulating element 525 mm



## Insulating Stick with Handle and plug-in Coupling

Consisting of one element

Type	ISH 1300 ZK MS
Part No.	785 325
Diameter	30 mm
Dimensions	1300 mm



## Extension

Type	ISV 220 ZK MS	ISV 320 ZK MS
Part No.	785 316	785 317
Diameter	20 mm	20 mm
Dimensions	220 mm	320 mm

Type	ISV 420 ZK MS	ISV 820 ZK MS
Part No.	785 318	785 319
Diameter	20 mm	20 mm
Dimensions	420 mm	820 mm



## Extension

Type	SRV 200 MS	SRV 400 MS	SRV 800 MS
Part No.	785 121	785 122	785 123
Diameter	40 mm	40 mm	40 mm
Dimensions	200 mm	400 mm	800 mm



## Single Parts for MS Cleaning Kit

## Live Working

### Cleaning Equipment

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#### Rectangular Brush

Type	REB 1095 MS
Part No.	785 160
Diameter	40 mm
Dimensions	105 x 90 x 50 mm

19-20



#### Half-round Brush

For cleaning insulators as well as horizontal and vertical openings. The brush can be attached to SRW V MS angled intake tubes that can be adjusted to lead the brush around the complete insulator.

Type	HRB 120 MS	HRB 190 MS
Part No.	785 140	785 150
Diameter	40 / 120 mm	40 / 190 mm

21



#### Tubular Brush 120 mm

Cylindrical bristles

Type	STB 120 MS
Part No.	785 170
Diameter	40 mm
Dimensions	250 mm

22



#### Tubular Brush 85 mm

Cylindrical bristles

Type	STB 80 MS
Part No.	785 171
Diameter	25 mm
Dimensions	240 mm

23



#### Tubular Brush 85 mm

Conical bristles

Type	STB 80 K MS
Part No.	785 172
Diameter	25 mm
Dimensions	240 mm

24



#### Round Head Brush

Type	BB 245 MS
Part No.	785 151
Diameter	40 mm
Dimensions	390 mm

25



#### Cleaning Head 60

Width: 60 mm

Type	FD 60 MS
Part No.	785 220
Diameter	40 mm
Dimensions	190 mm

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#### Cleaning Head 110

Width: 110 mm

Type	FD 110 MS
Part No.	785 221
Diameter	40 mm
Dimensions	260 mm

27



#### Cleaning Head 210

Width: 210 mm

Type	FD 210 MS
Part No.	785 223
Diameter	40 mm
Dimensions	255 mm

28



#### Flat Cleaning Head 35

Type	FD 35 S MS
Part No.	785 551
Diameter	40 mm
Dimensions	35 mm

29



#### Flat Cleaning Head

Width: 35 mm, 30° angled, with detachable brush

Type	FD 35 W P MS
Part No.	785 552
Diameter	40 mm
Dimensions	35 mm

30



#### Scraper

Type	S 30 ZK MS
Part No.	785 320
Diameter	20 mm
Dimensions	280 mm

31



#### Round Brush

Type	RP 15 ZK MS
Part No.	785 321
Diameter	20 mm
Dimensions	270 mm

## Live Working

## Single Parts for MS Cleaning Kit

## Cleaning Equipment

## Rigid Operating Head

For attaching cleaning sponges

Type	AK RS S ZK MS
Part No.	785 324
Diameter	20 mm
Dimensions	200 mm



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## Single Operating Head

Flexible, for attaching cleaning sponges

Type	AK RS ZK MS
Part No.	785 322
Diameter	20 mm
Dimensions	400 mm



33

## Dual Operating Head

Flexible, for attaching cleaning sponges

Type	AK RS 2 ZK MS
Part No.	785 323
Diameter	20 mm
Dimensions	415 mm



34

## Rectangular Cleaning Sponge

Type	RS 1544 MS
Part No.	785 274
Dimensions	150 x 40 x 40 mm
PU	5 pieces



35

## Rectangular Cleaning Sponge

Type	RS 1574 MS
Part No.	785 275
Dimensions	150 x 70 x 40 mm
PU	5 pieces



36

## Rectangular Cleaning Sponge, serrated

Type	RS 15104 Z MS
Part No.	785 279
Dimensions	150 x 100 x 40 mm
PU	5 pieces



37

## Rectangular Cleaning Sponge, serrated

Type	RSD 15104 Z MS
Part No.	785 280
Dimensions	150 x 100 x 40 mm
PU	5 pieces



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## Intake Hose Adapter

Adjustable, 120° angled, regulation of intake air, for use with intake hose system (Ø35 mm)

Type	SSA W D
Part No.	785 200
Diameter	35 / 40 mm



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## Intake Tube Adapter

For brushes and cleaning heads (Ø25 mm)

Type	SRA MS
Part No.	785 212
Diameter	40 / 25 mm
Dimensions	100 mm



40

## Operating Head Adapter

Universal gear coupling / transparent tube (Ø25 mm)

Type	AKA TF ZK MS
Part No.	785 259
Diameter	40 mm
Dimensions	125 mm



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## Single Parts for MS Cleaning Kit

## Live Working

### Cleaning Equipment

#### Digital Hygrometer/Thermometer

For verifying the climatic conditions that must be adhered to.

Measuring range: - 20 °C ... + 70 °C (temperature),  
10 ... 95 % (relative air humidity)

42



Type	DHTM
Part No.	785 180
Dimensions	140 x 65 mm

#### Digital Hygrometer/Thermometer

For verifying the climatic conditions that must be adhered to.

Measuring range: 0 °C ... + 50 °C (temperature),  
5 ... 95 % (relative air humidity)

43



Type	DHTM T 615
Part No.	785 181
Dimensions	57 x 190 x 42 mm

#### Insulating Mirror

For visual inspection of hidden electrical components

44



Type	ISP 135 MS
Part No.	785 190
Diameter	40 / 135 mm

#### Spray Bottle

For cleaning liquids

45



Type	SF FRF MS
Part No.	785 953
Capacity	500 ml

#### Spare Brush

For FD 39 WP MS flat cleaning heads

46



Type	EP 25 L MS
Part No.	785 224
Dimensions	40 mm
PU	3 pieces

#### Cleaning Brush

For individual kit parts (Ø40 mm), modular

47



Type	RB 50 MS
Part No.	785 210
Diameter	45 mm
Dimensions	1430 mm

#### Cleaning Brush

For individual kit parts (Ø25 mm)

48



Type	RB 20 NS
Part No.	785 585
Diameter	30 mm
Dimensions	330 mm

#### Barrier Rod

Modular, for use as visible working limit

49



Type	AS MS
Part No.	785 109
Dimensions	2200 mm



## Live Working

## Accessory for NS and MS Cleaning Kits

### Cleaning Equipment

#### Industrial Vacuum Cleaner

For dry and combined cleaning kits

##### Equipment:

The industrial vacuum cleaner consists of a 25 l plastic container, 2 large wheels, 2 guide wheels with locking brakes, handle and cable holder, socket outlet with automatic switch-on mechanism, electromagnetic pulse filter cleaning, automatic vibration function, speed control, volume flow control, acceleration rate controller, electronic running feature, moisture identification with sensor-controlled disconnection, 2 new polyester filter cassettes, FKP 4300, filter area  $2 \times 4300 \text{ cm}^2 = 8600 \text{ cm}^2$ , dust collection capacity in accordance with BIA, class C, cord length: 8 m

##### Technical data:

- Intake hose with straight connecting adapter ( $\varnothing 35 \text{ mm}$ ), 5 m long

Type	HIS 1400 TRS
Part No.	785 310
Nominal capacity	1400 W
Nominal voltage	230 V
Max. air flow	61 l/s
Max. low air pressure	248 mbars
Capacity (container)	25 l gross volume, 20 l for dust, 15 l for water
Dimensions	400 x 400 x 560 mm



#### Reducing Inserts

For connection between SSA W D intake hose adapter and intake hoses from other manufacturers with different diameters and straight connecting adapter.

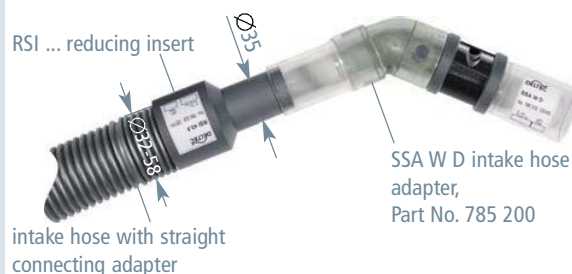
Type	RSI 32	RSI 34	RSI 35
Part No.	785 213	785 214	785 215
Diameter	35 / 32 mm	35 / 34 mm	35 / 35 mm
Dimensions	105 mm	105 mm	105 mm

Type	RSI 38	RSI 45
Part No.	785 216	785 217
Diameter	35 / 38 mm	35 / 45 mm
Dimensions	105 mm	105 mm

Type	RSI 51	RSI 58
Part No.	785 218	785 219
Diameter	35 / 51 mm	35 / 58 mm
Dimensions	105 mm	105 mm



##### Application:



#### 90° angled flat Cleaning Head with detachable Brush

For TRS NS dry cleaning kits

Type	FWD 35 P NS
Part No.	785 592
Diameter	25 mm
Dimensions	200 mm



#### Intake Tube with Handle

For TRS MS and TFRS MS cleaning kits

Type	SRH 1180 IS 650 MS
Part No.	785 119
Diameter	40 mm
Dimensions	1180 mm, insulating element 650 mm



#### HV STK Extension Handle

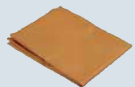
Plug-in coupling at both ends for extending the handle

Type	HV STK 710
Part No.	766 335
Diameter	30 mm
Total length (l <sub>G</sub> )	710 mm
Material	Glass-fibre reinforced polyester tube
Colour	Grey



#### Cover

Type	AP 152 G
Part No.	785 110
Colour	Yellow
Dimensions	1500 x 2000 mm



#### Canvas Bag, empty

With two separate internal pockets and shoulder strap

For intake hose, cover, safety helmet with face shield, working gloves

Type	STT 55 27 30
Part No.	785 111
Colour	Olive
Dimensions	550 x 270 x 300 mm

