

TFRS MS Combined Cleaning Kit




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

LIVE CLEANING EQUIPMENT



Based on DIN VDE 0681 Part 1 and DIN VDE 0682 Part 621
Universal gear coupling acc. to EN/IEC 60832
(DIN VDE 0682 Part 211)

- Not for use in wet weather 
- For indoor and outdoor installations
- Combined kit for dry and damp cleaning under live conditions
- 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
- Rigid and flexible plug-in operating heads allow fast and easy replacement of the sponges



Dry and damp cleaning of a transformer under live conditions using the TFRS MS combined cleaning kit.

Application

Dry cleaning work is performed with operating heads that are used to clean or brush dirty parts of the installation while simultaneously sucking the dirt away. Loose layers of dust and cobwebs are easily cleaned with little effort. Oily and tough pollutant layers are removed by damp cleaning using sponges and special insulating cleaning liquids.

Requirements

TFRS MS allows maintenance work to be done under supervision of a qualified electrician at voltages from 1 to 36 kV according to EN 50110-1 "Operation of electrical installations – Minimum Requirements", observing clauses 6.3.1 to 6.3.12. In Germany apply sections BGV A3 and BGR A3 of the national accident prevention regulations (UVV) "Elektrische Anlagen und Betriebsmittel" [Electrical installations and equipment] issued by the German Employer's Liability Association for Precision and Electrical Engineering (BGFE).

A TFRS MS Combined Cleaning Kit

| Pos. | Qty. | Type | Description | Part No. |
|---|------|-------------------|---|----------|
| Standard Equipment – Leather bag | | | | |
| 1 | 1 | IS 36 ZK STK 1300 | Insulating rod with handle, and plug-in coupling, single-part | 785 325 |
| 3 | 1 | SRH 1180 MS | Intake tube with handle | 785 120 |
| 42 | 1 | RB 50 MS | Cleaning brush, for individual kit parts | 785 210 |
| 44 | 1 | RB 20 NS | Cleaning brush, for individual kit parts Ø25 mm | 785 585 |
| 45 | 1 | AS MS | Locking rod | 785 109 |
| 48 | 1 | KLT 140 28 | Storage bag | 785 952 |



Leather bag

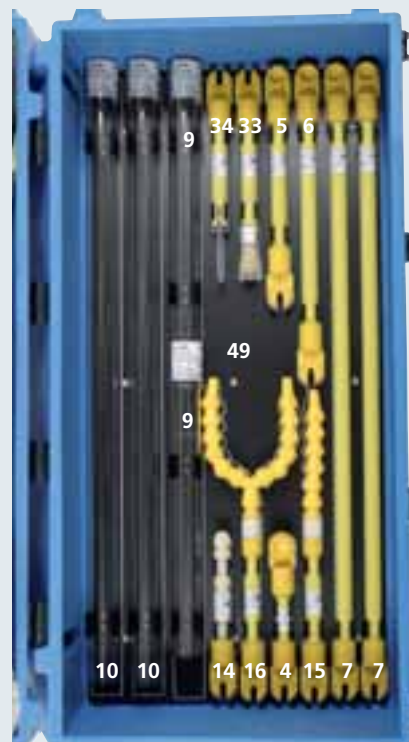
LIVE CLEANING EQUIPMENT

| Type | Model | Part No. |
|------|-------|----------|
|------|-------|----------|

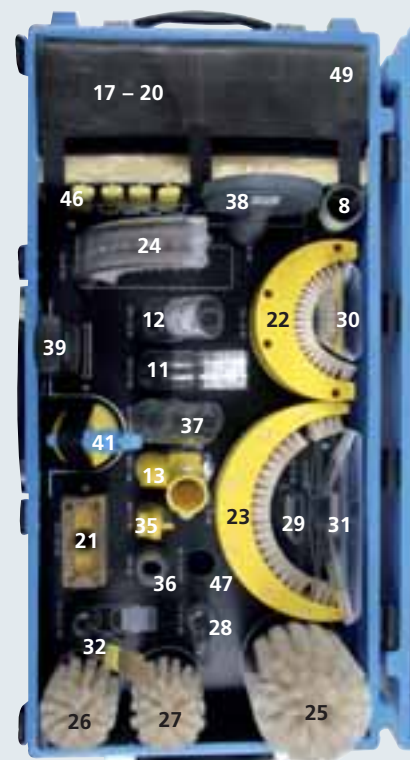
A TFRS MS Combined Cleaning Kit

| Pos. | Qty. | Type | Description | Part No. |
|---|------|----------------|--|----------|
| Standard Equipment – Case Cover | | | | |
| 4 | 1 | ISV 220 ZK MS | Extension, 220 mm | 785 316 |
| 5 | 1 | ISV 320 ZK MS | Extension, 320 mm | 785 317 |
| 6 | 1 | ISV 420 ZK MS | Extension, 420 mm | 785 318 |
| 7 | 2 | ISV 820 ZK MS | Extension, 820 mm | 785 319 |
| 9 | 2 | SRV 400 MS | Extension, 400 mm | 785 122 |
| 10 | 2 | SRV 800 MS | Extension, 800 mm | 785 123 |
| 14 | 1 | AK RS S ZK MS | Operating head, rigid | 785 324 |
| 15 | 1 | AK RS ZK MS | Single operating head, flexible | 785 322 |
| 16 | 1 | AK RS 2 ZK MS | Dual operating head, flexible | 785 323 |
| 33 | 1 | RP 15 ZK MS | Round brush | 785 321 |
| 34 | 1 | S 30 ZK MS | Scraper | 785 320 |
| Standard Equipment – Case Bottom | | | | |
| 8 | 1 | SRV 200 MS | Extension, 200 mm | 785 121 |
| 11 | 1 | SRW 90 MS | Angled intake tube 90° | 785 131 |
| 12 | 1 | SRW 135 MS | Angled intake tube 135° | 785 132 |
| 13 | 1 | SRW V MS | Angled intake tube, lockable | 785 130 |
| 17 | 10 | RS 1544 MS | Rectangular cleaning sponge | 785 274 |
| 18 | 5 | RS 1574 MS | Rectangular cleaning sponge | 785 275 |
| 19 | 5 | RS 15104 Z MS | Rectangular cleaning sponge, serrated | 785 279 |
| 20 | 5 | RSD 15104 Z MS | Triangular cleaning sponge, serrated | 785 280 |
| 21 | 1 | REB 1095 MS | Rectangular brush | 785 160 |
| 22 | 1 | HRB 120 MS | Half-round brush 120 | 785 140 |
| 23 | 1 | HRB 190 MS | Half-round brush 190 | 785 150 |
| 24 | 1 | BB 245 MS | Arc brush | 785 151 |
| 25 | 1 | STB 120 MS | Tubular brush, 250 mm | 785 170 |
| 26 | 1 | STB 80 MS | Tubular brush, cylindrical bristles | 785 171 |
| 27 | 1 | STB 80 K MS | Tubular brush, conical bristles | 785 172 |
| 28 | 1 | FD 35 S MS | Flat cleaning head 35 | 785 551 |
| 29 | 1 | FD 60 MS | Cleaning head 60 | 785 220 |
| 30 | 1 | FD 110 MS | Cleaning head 110 | 785 221 |
| 31 | 1 | FD 210 MS | Cleaning head 210 | 785 223 |
| 32 | 1 | FD 35 W P MS | Flat cleaning head with brush | 785 552 |
| 35 | 1 | AKA TF MS | Operating head adapter | 785 259 |
| 36 | 1 | SRA MS | Intake tube adapter | 785 212 |
| 37 | 1 | SSA W D | Intake hose adapter | 785 200 |
| 38 | 1 | ISP 135 ZK MS | Insulated mirror | 785 190 |
| 39 | 1 | DHTM T 615 | Digital hygrometer/thermometer | 785 181 |
| 41 | 1 | SF FRF MS | Spray bottle | 785 953 |
| 46 | 4 | EP 25 L MS | Spare brush | 785 224 |
| 47 | 1 | RSI ... | Reducing insert (not included in delivery) | — |
| 49 | 1 | KKL TFRS MS | GRP case, blue | 785 951 |

Case cover



Case bottom



| | | |
|---------|---|----------------|
| TFRS MS | Contents, GRP case and leather bag included | 785 950 |
|---------|---|----------------|

Customised kits are available on request.

Single Parts of TFRS MS Combined Cleaning Kit



Standard Equipment – Leather Bag

LIVE CLEANING EQUIPMENT

Artificial Leather Bag, empty

With zip and shoulder strap



| Type | Colour | Dimensions | Position | Part No. |
|------------|--------|---------------|----------|----------|
| KLT 140 28 | ● | 1400 x 280 mm | 48 | 785 952 |

Insulating Rod with Handle and Plug-In Coupling

Single-part unit



| Type | Diameter | Dimensions | Position | Part No. |
|-------------------|----------|------------|----------|----------|
| IS 36 ZK STK 1300 | 30 mm | 1300 mm | 1 | 785 325 |

Intake Tube with Handle

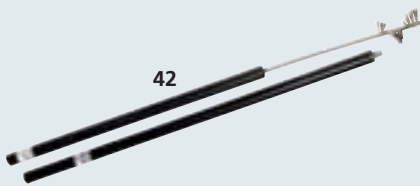
For use as operating tube with handle, handguard, insulating part, red ring and extension



| Type | Diameter | Dimensions | Position | Part No. |
|-------------|----------|------------------------------|----------|----------|
| SRH 1180 MS | 40 mm | 1180, insulating part 525 mm | 3 | 785 120 |

Cleaning Brush

For individual kit parts Ø40 mm, modular



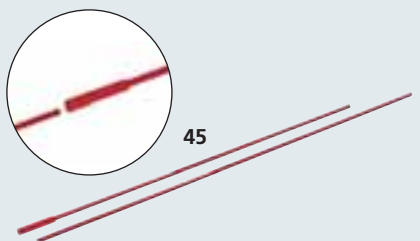
| Type | Diameter | Dimensions | Position | Part No. |
|----------|----------|------------|----------|----------|
| RB 50 MS | 45 mm | 1430 mm | 42 | 785 210 |

Cleaning Brush

For individual kit parts Ø25 mm



| Type | Diameter | Dimensions | Position | Part No. |
|----------|----------|------------|----------|----------|
| RB 20 NS | 30 mm | 330 mm | 44 | 785 585 |



Locking Rod

Modular, for use as visible working limit

| Type | Dimensions | Position | Part No. |
|-------|------------|----------|----------|
| AS MS | 2200 mm | 45 | 785 109 |



Single Parts of TFRS MS Combined Cleaning Kit

LIVE CLEANING EQUIPMENT

Standard Equipment – Case

GRP Case, empty

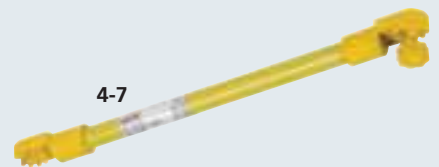
With retaining clips and printed top and bottom insert

| Type | Colour | Dimensions | Position | Part No. |
|-------------|--------|--------------------|----------|----------|
| KKL TFRS MS | ● | 850 x 410 x 400 mm | 49 | 785 951 |



Extension

| Type | Diameter | Dimensions | Position | Part No. |
|---------------|----------|------------|----------|----------|
| ISV 220 ZK MS | 20 mm | 220 mm | 4 | 785 316 |
| ISV 320 ZK MS | 20 mm | 320 mm | 5 | 785 317 |
| ISV 420 ZK MS | 20 mm | 420 mm | 6 | 785 318 |
| ISV 820 ZK MS | 20 mm | 820 mm | 7 | 785 319 |



Extension

| Type | Diameter | Dimensions | Position | Part No. |
|------------|----------|------------|----------|----------|
| SRV 200 MS | 40 mm | 200 mm | 8 | 785 121 |
| SRV 400 MS | 40 mm | 400 mm | 9 | 785 122 |
| SRV 800 MS | 40 mm | 800 mm | 10 | 785 123 |



Angled Intake Tube, 90°

| Type | Diameter | Dimensions | Position | Part No. |
|-----------|----------|------------|----------|----------|
| SRW 90 MS | 40 mm | 120 mm | 11 | 785 131 |



Angled Intake Tube, 135°

| Type | Diameter | Dimensions | Position | Part No. |
|------------|----------|------------|----------|----------|
| SRW 135 MS | 40 mm | 100 mm | 12 | 785 132 |



Angled Intake Tube

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

| Type | Diameter | Dimensions | Position | Part No. |
|----------|----------|------------|----------|----------|
| SRV V MS | 40 mm | 160 mm | 13 | 785 130 |



Single Parts of TFRS MS Combined Cleaning Kit



Standard Equipment – Case

LIVE CLEANING EQUIPMENT

Rigid Operating Head

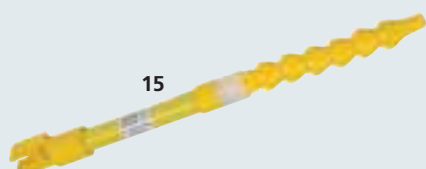
For attaching the cleaning sponges



| Type | Diameter | Dimensions | Position | Part No. |
|---------------|----------|------------|----------|----------------|
| AK RS S ZK MS | 20 mm | 200 mm | 14 | 785 324 |

Single Operating Head

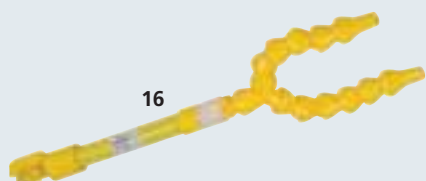
Flexible, for attaching the cleaning sponges



| Type | Diameter | Dimensions | Position | Part No. |
|-------------|----------|------------|----------|----------------|
| AK RS ZK MS | 20 mm | 400 mm | 15 | 785 322 |

Dual Operating Head

Flexible, for attaching the cleaning sponges



| Type | Diameter | Dimensions | Position | Part No. |
|---------------|----------|------------|----------|----------------|
| AK RS 2 ZK MS | 20 mm | 415 mm | 16 | 785 323 |

Rectangular Cleaning Sponge



| Type | Dimensions | PU | Position | Part No. |
|------------|------------------|----------|----------|----------------|
| RS 1544 MS | 150 x 40 x 40 mm | 5 pc(s). | 17 | 785 274 |

Rectangular Cleaning Sponge



| Type | Dimensions | PU | Position | Part No. |
|------------|------------------|----------|----------|----------------|
| RS 1574 MS | 150 x 70 x 40 mm | 5 pc(s). | 18 | 785 275 |

Rectangular Cleaning Sponge, serrated



| Type | Dimensions | PU | Position | Part No. |
|---------------|-------------------|----------|----------|----------------|
| RS 15104 Z MS | 150 x 100 x 40 mm | 5 pc(s). | 19 | 785 279 |

Triangular Cleaning Sponge, serrated



| Type | Dimensions | PU | Position | Part No. |
|----------------|-------------------|----------|----------|----------------|
| RSD 15104 Z MS | 150 x 100 x 40 mm | 5 pc(s). | 20 | 785 280 |

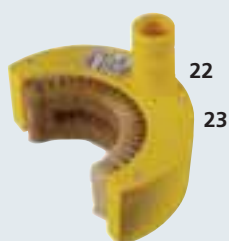
Rectangular Brush



| Type | Diameter | Dimensions | Position | Part No. |
|-------------|----------|------------------|----------|----------------|
| REB 1095 MS | 40 mm | 105 x 90 x 50 mm | 21 | 785 160 |

Half-round Brush

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



| Type | Diameter | Position | Part No. |
|------------|-------------|----------|----------------|
| HRB 120 MS | 40 / 120 mm | 22 | 785 140 |
| HRB 190 MS | 40 / 190 mm | 23 | 785 150 |



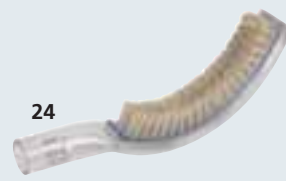
Single Parts of TFRS MS Combined Cleaning Kit

LIVE CLEANING EQUIPMENT

Standard Equipment – Case

Arc Brush

| Type | Diameter | Dimensions | Position | Part No. |
|-----------|----------|------------|----------|----------|
| BB 245 MS | 40 mm | 390 mm | 24 | 785 151 |



Tubular Brush

| Type | Diameter | Dimensions | Position | Part No. |
|------------|-------------|------------|----------|----------|
| STB 120 MS | 40 / 120 mm | 250 mm | 25 | 785 170 |



Tubular Brush

Cylindrical bristles

| Type | Diameter | Dimensions | Position | Part No. |
|-----------|------------|------------|----------|----------|
| STB 80 MS | 25 / 85 mm | 240 mm | 26 | 785 171 |



Tubular Brush

Conical bristles

| Type | Diameter | Dimensions | Position | Part No. |
|-------------|------------|------------|----------|----------|
| STB 80 K MS | 25 / 85 mm | 240 mm | 27 | 785 172 |



Flat Cleaning Head 35

| Type | Diameter | Dimensions | Position | Part No. |
|------------|----------|------------|----------|----------|
| FD 35 S MS | 40 mm | 35 mm | 28 | 785 551 |



Cleaning Head 60

Width: 60 mm

| Type | Diameter | Dimensions | Position | Part No. |
|----------|----------|------------|----------|----------|
| FD 60 MS | 40 mm | 190 mm | 29 | 785 220 |



Cleaning Head 110

Width: 110 mm

| Type | Diameter | Dimensions | Position | Part No. |
|-----------|----------|------------|----------|----------|
| FD 110 MS | 40 mm | 260 mm | 30 | 785 221 |



Cleaning Head 210

Width: 210 mm

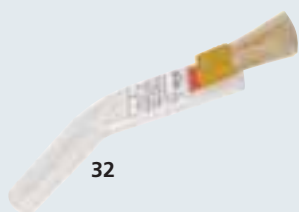
| Type | Diameter | Dimensions | Position | Part No. |
|-----------|----------|------------|----------|----------|
| FD 210 MS | 40 mm | 255 mm | 31 | 785 223 |



Single Parts of TFRS MS Combined Cleaning Kit

Standard Equipment – Case

LIVE CLEANING EQUIPMENT



Flat Cleaning Head 35

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

| Type | Diameter | Dimensions | Position | Part No. |
|--------------|----------|------------|----------|----------|
| FD 35 W P MS | 40 mm | 35 mm | 32 | 785 552 |



Round Brush

| Type | Diameter | Dimensions | Position | Part No. |
|-------------|----------|------------|----------|----------|
| RP 15 ZK MS | 20 mm | 270 mm | 33 | 785 321 |



Scraper

| Type | Diameter | Dimensions | Position | Part No. |
|------------|----------|------------|----------|----------|
| S 30 ZK MS | 20 mm | 280 mm | 34 | 785 320 |



Operating Head Adapter

Universal gear coupling / transparent tube Ø25 mm

| Type | Diameter | Dimensions | Position | Part No. |
|--------------|----------|------------|----------|----------|
| AKA TF ZK MS | 40 mm | 125 mm | 35 | 785 259 |



Intake Tube Adapter

For brushes and cleaning heads Ø25 mm

| Type | Diameter | Dimensions | Position | Part No. |
|--------|------------|------------|----------|----------|
| SRA MS | 40 / 25 mm | 100 mm | 36 | 785 212 |



Intake Hose Adapter

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

| Type | Diameter | Position | Part No. |
|---------|------------|----------|----------|
| SSA W D | 35 / 40 mm | 37 | 785 200 |

Insulating Mirror

For visual inspection of hidden electrical components

| Type | Diameter | Position | Part No. |
|---------------|-------------|----------|----------|
| ISP 135 ZK MS | 40 / 135 mm | 38 | 785 190 |



Digital Hygrometer/Thermometer

For verifying the climatic conditions that must be adhered to.
Measuring range 0° C ... +50° C, 5 ... 95% relative air humidity

| Type | Dimensions | Position | Part No. |
|------------|------------------|----------|----------|
| DHTM T 615 | 57 x 190 x 42 mm | 39 | 785 181 |



Spray Bottle

For cleaning liquids

| Type | Capacity | Position | Part No. |
|-----------|----------|----------|----------|
| SF FRF MS | 500 ml | 41 | 785 953 |



Spare Brush

For flat cleaning heads type FD 39 WP MS

| Type | Dimensions | PU | Position | Part No. |
|------------|------------|----------|----------|----------|
| EP 25 L MS | 40 mm | 3 pc(s). | 46 | 785 224 |

