



Power capacitors

# MEDIUM VOLTAGE SURGE CAPACITORS



# COMPANY PROFILE



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European manufacturer  
of capacitors



Tradition of capacitor  
production since 1930



Emphasis to quality of  
products



Quality control system (ISO 9001)  
since 1999



IRIS certification since  
2014



Products are exported to countries  
all around the world



## General information

These surge capacitors are used to limit the surge wave shape to prevent damage of insulation of MV motors, generators and transformers. The best protection solution is to use surge arresters together with the surge capacitors. Then both wave shape and magnitude are limited.

## Basic characteristics

- High reliability
- High transient voltage withstand
- Long lifetime
- Low loss dielectric

## Surge protection for:

- MV motors and generators
- MV switchgears
- MV transformers

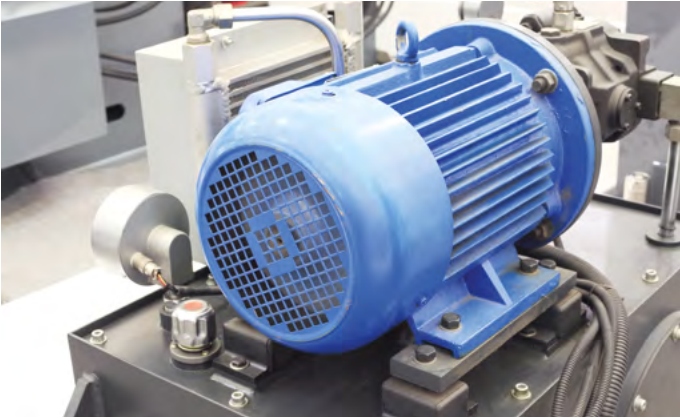
## Installation and maintenance

Surge capacitors are connected to ground  
and the motor, generator or transformer terminals.

## For maintenance please follow these instructions:

- prevent mechanical stress of the insulators
- max. torque for clamping bolt of insulators M12 – 20/25 Nm
- max. torque for clamping bolt of grounding clamp M10 – 15 Nm
- check all electric connections and visually check the tightness of the capacitors after several days of operation
- device must be discharged before manipulation with capacitor cans or capacitor terminals and the terminals must be short-circuited

## Applications



# MV Surge Capacitors



## General technical parametres

|                                  |                                                              |
|----------------------------------|--------------------------------------------------------------|
| Standards                        | IEC 60871-1, EN 60871-1                                      |
| Rated voltage                    | 1 - 36 kV                                                    |
| Rated frequency                  | 50 / 60 Hz                                                   |
| Capacitance tolerance            | -5 / +10 %                                                   |
| Test voltage terminal - terminal | 2 x U <sub>N</sub> AC / 10 s or 4 x U <sub>N</sub> DC / 10 s |
| Test voltage terminal - case     | According to the insulation level / 10 s                     |
| Capacitor losses                 | 0,06 ÷ 1 W / kvar                                            |
| Discharge resistors              | Built-in 75 V / 10 min                                       |
| Statistical life expectancy      | > 130 000 hours under standard conditions                    |
| Protection degree                | IP 00                                                        |
| Temperature category             | -25 / C - other on request                                   |
| Max. relative humidity           | 95 %                                                         |
| Cooling                          | Natural Air                                                  |
| Max. altitude                    | 4 000 m                                                      |
| Mounting position                | Vertical or horizontal (narrow side)                         |
| Case                             | Stainless - steel                                            |
| Dielectric system                | All - film                                                   |
| Impregnant                       | Jarylec (environmentally - friendly, non - toxic, non - PCB) |

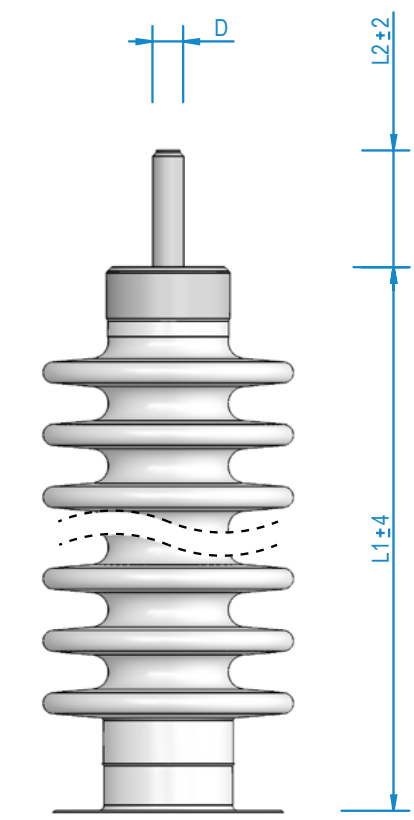
## Standard insulation levels

|                                                              |      |     |     |     |    |      |     |     |     |
|--------------------------------------------------------------|------|-----|-----|-----|----|------|-----|-----|-----|
| Highest voltage for equipment U <sub>m</sub> (RMS)           | (kV) | 2,4 | 3,6 | 7,2 | 12 | 17,5 | 24  | 36  | 52  |
| Rated power-frequency short duration withstand voltage (RMS) | (kV) | 8   | 10  | 20  | 28 | 38   | 50  | 70  | 95  |
| Rated lightning impulse withstand voltage (peak)             | (kV) | 35  | 40  | 60  | 75 | 95   | 125 | 170 | 200 |

## Bushings

| Type | Creepage (mm) | Insulating level (kV) | No. of skirts | L1 (mm) | L2 (mm)  | Type of stud (D) |
|------|---------------|-----------------------|---------------|---------|----------|------------------|
| K2   | 190           | 28/75                 | 4             | 151     | 45<br>55 | M12<br>M16       |
| K3   | 305           | 38/95                 | 6             | 215     | 45<br>55 | M12<br>M16       |
| K4   | 458           | 50/125                | 8             | 253     | 45<br>55 | M12<br>M16       |
| K5   | 686           | 70/170                | 11            | 278     | 45<br>55 | M12<br>M16       |

## Drawing of Bushing

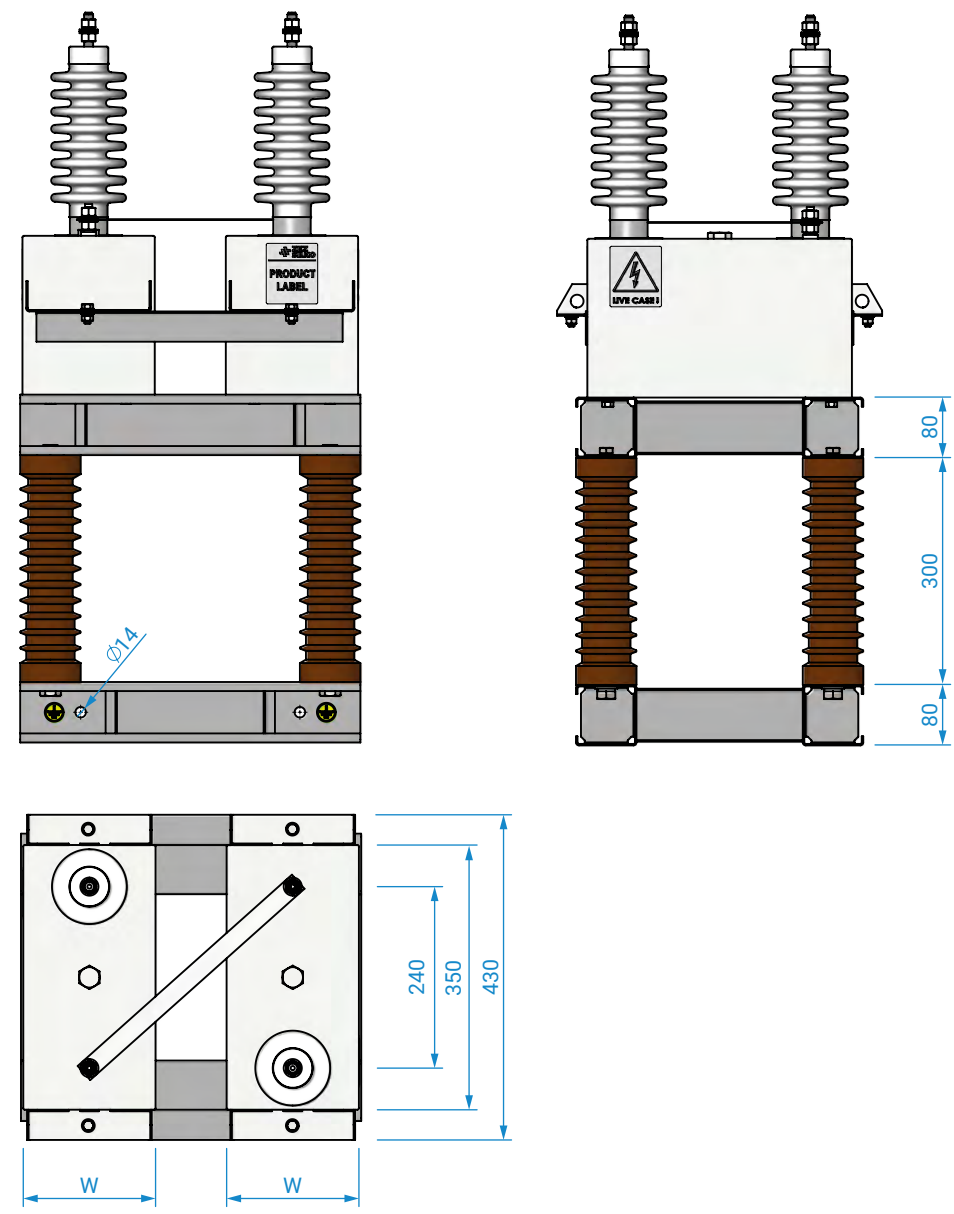


SCA

SCA - surge suppressor, serial assemblies, live case, single phase type

| Type          | U <sub>N</sub> (kV) | C <sub>N</sub> (μF) | I <sub>N</sub> (A) | U <sub>E</sub> (kV/1 min) | Impulse (kVp) |
|---------------|---------------------|---------------------|--------------------|---------------------------|---------------|
| SCA 36-0,1/1  | 36                  | 0,10                | 1,1                | 70                        | 170           |
| SCA 36-0,13/1 |                     | 0,13                | 1,5                |                           |               |
| SCA 36-0,15/1 |                     | 0,15                | 1,7                |                           |               |
| SCA 36-0,2/1  |                     | 0,20                | 2,3                |                           |               |
| SCA 36-0,25/1 |                     | 0,25                | 2,8                |                           |               |
| SCA 36-0,3/1  |                     | 0,30                | 3,4                |                           |               |

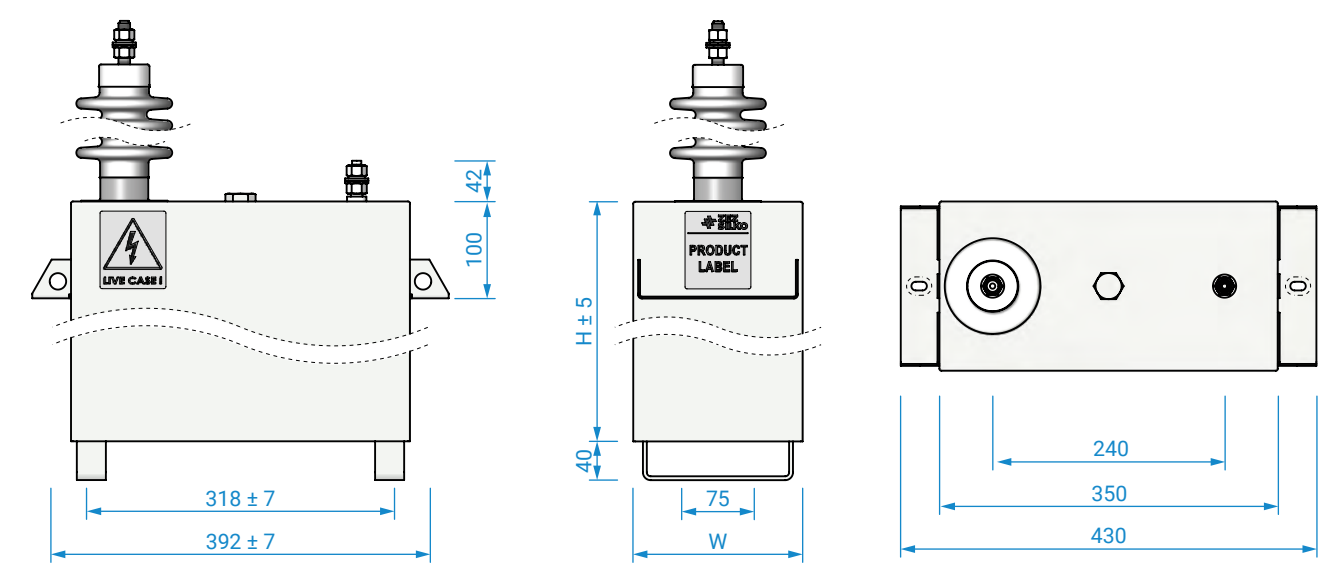
Indoor installation  
Other values of capacitance and voltage are available on request.



PUFFS - Un/Cn

PUFFS - surge suppressor, live case, single phase type

| Type            | U <sub>N</sub> (kV) | C <sub>N</sub> (μF) | I <sub>N</sub> (A) | U <sub>E</sub> (kV/1 min) | Impulse (kVp) |
|-----------------|---------------------|---------------------|--------------------|---------------------------|---------------|
| PUFFS-7,2/0,5   | 7,2                 | 0,50                | 1,1                | 28                        | 75            |
| PUFFS-12/0,1    | 12,0                | 0,10                | 0,4                | 38                        | 95            |
| PUFFS-12/0,2    |                     | 0,20                | 0,8                |                           |               |
| PUFFS-12/0,25   |                     | 0,25                | 0,9                |                           |               |
| PUFFS-12/0,3    |                     | 0,30                | 1,1                |                           |               |
| PUFFS-12/0,4    |                     | 0,40                | 1,5                |                           |               |
| PUFFS-12/0,5    |                     | 0,50                | 1,9                |                           |               |
| PUFFS-17,5/0,1  | 17,5                | 0,10                | 0,5                | 50                        | 125           |
| PUFFS-17,5/0,2  |                     | 0,20                | 1,1                |                           |               |
| PUFFS-17,5/0,25 |                     | 0,25                | 1,4                |                           |               |
| PUFFS-17,5/0,3  |                     | 0,30                | 1,6                |                           |               |
| PUFFS-17,5/0,4  |                     | 0,40                | 2,2                |                           |               |
| PUFFS-17,5/0,5  |                     | 0,50                | 2,7                |                           |               |
| PUFFS-24/0,1    | 24,0                | 0,10                | 0,8                | 70                        | 170           |
| PUFFS-24/0,2    |                     | 0,20                | 1,5                |                           |               |
| PUFFS-24/0,25   |                     | 0,25                | 1,9                |                           |               |
| PUFFS-24/0,3    |                     | 0,30                | 2,3                |                           |               |
| PUFFS-24/0,4    |                     | 0,40                | 3,0                |                           |               |
| PUFFS-24/0,5    |                     | 0,50                | 3,8                |                           |               |



Medium voltage surge capacitors

Medium voltage surge capacitors

PUFFS - Un/Cn

PUFFS - RC-surge suppressor with built in damping resistor,  
live case, single phase type

| Type            | U <sub>N</sub> (kV) | C <sub>N</sub> (μF) | I <sub>N</sub> (A) | U <sub>E</sub> (kV/1 min) | Impulse (kVp) |
|-----------------|---------------------|---------------------|--------------------|---------------------------|---------------|
| PUFFS-12/0,1    | 12,0                | 0,10                | 0,38               | 28                        | 75            |
| PUFFS-12/0,15   |                     | 0,15                | 0,57               |                           |               |
| PUFFS-12/0,2    |                     | 0,20                | 0,75               |                           |               |
| PUFFS-12/0,25   |                     | 0,25                | 0,94               |                           |               |
| PUFFS-12/0,3    |                     | 0,30                | 1,13               |                           |               |
| PUFFS-12/0,4    |                     | 0,40                | 1,51               |                           |               |
| PUFFS-12/0,5    |                     | 0,50                | 1,88               |                           |               |
| PUFFS-17,5/0,1  | 17,5                | 0,10                | 0,55               | 38                        | 95            |
| PUFFS-17,5/0,15 |                     | 0,15                | 0,82               |                           |               |
| PUFFS-17,5/0,2  |                     | 0,20                | 1,10               |                           |               |
| PUFFS-17,5/0,25 |                     | 0,25                | 1,37               |                           |               |
| PUFFS-17,5/0,3  |                     | 0,30                | 1,65               |                           |               |
| PUFFS-17,5/0,4  |                     | 0,40                | 2,20               |                           |               |
| PUFFS-17,5/0,5  |                     | 0,50                | 2,75               |                           |               |
| PUFFS-24/0,1    | 24,0                | 0,10                | 0,75               | 50                        | 125           |
| PUFFS-24/0,15   |                     | 0,15                | 1,13               |                           |               |
| PUFFS-24/0,2    |                     | 0,20                | 1,51               |                           |               |
| PUFFS-24/0,25   |                     | 0,25                | 1,88               |                           |               |
| PUFFS-24/0,3    |                     | 0,30                | 2,26               |                           |               |
| PUFFS-24/0,4    |                     | 0,40                | 3,02               |                           |               |
| PUFFS-24/0,5    |                     | 0,50                | 3,77               |                           |               |

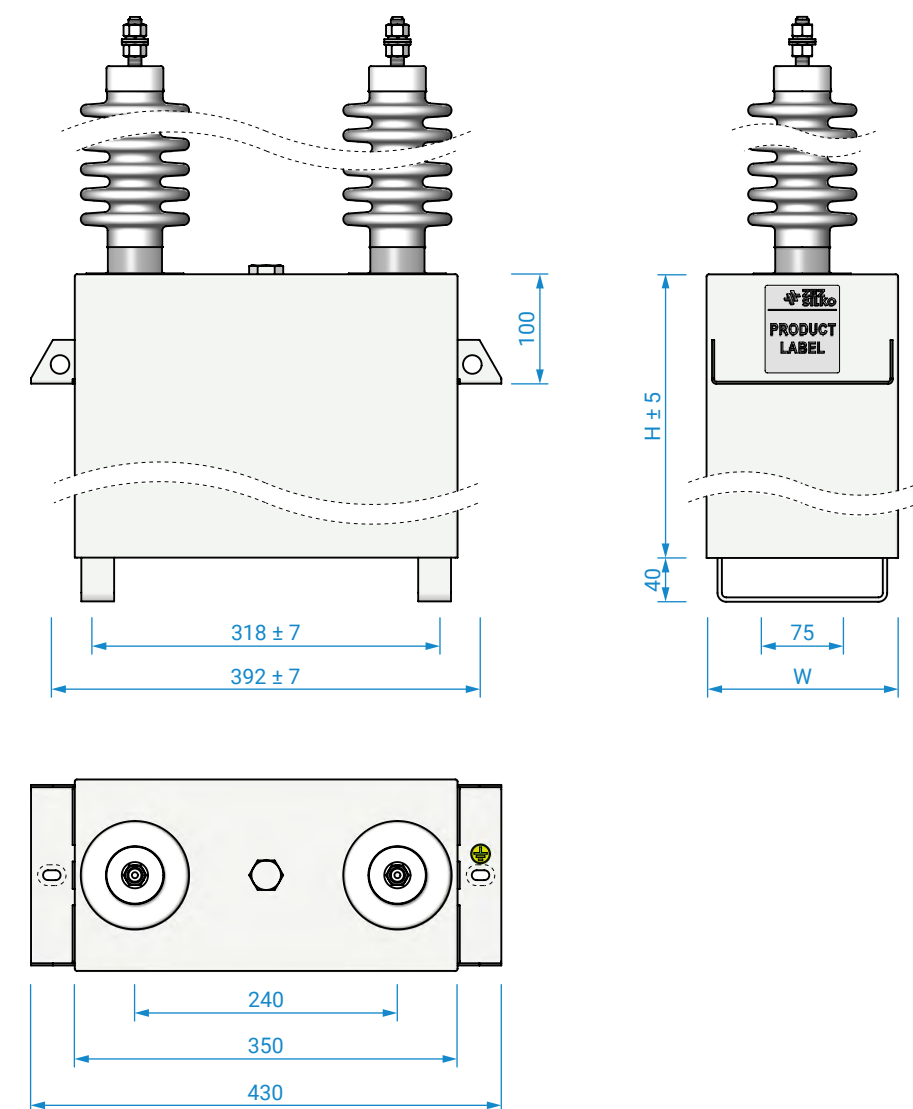
Damping resistance up to 100 Ω (preferred values 20Ω, 25Ω, 33Ω, 50Ω 100Ω). Losses (R x I<sub>2</sub>) max. 100 W (continuous).

PUEFS - Un/Cn

PUEFS - surge suppressor, dead case, single phase type

| Type            | U <sub>N</sub> (kV) | C <sub>N</sub> (μF) | I <sub>N</sub> (A) | U <sub>E</sub> (kV/1 min) | Impulse (kVp) |
|-----------------|---------------------|---------------------|--------------------|---------------------------|---------------|
| PUEFS-12/0,25   | 12,0                | 0,25                | 0,9                | 28                        | 75            |
| PUEFS-12/0,5    |                     | 0,50                | 1,9                |                           |               |
| PUEFS-15/0,5    | 15,0                | 0,50                | 2,4                | 38                        | 95            |
| PUEFS-17,5/0,25 | 17,5                | 0,25                | 1,4                |                           |               |
| PUEFS-20/0,3    | 20,0                | 0,30                | 1,9                | 50                        | 125           |
| PUEFS-24/0,3    | 24,0                | 0,30                | 2,3                | 70                        | 170           |

Other values of capacitance and voltage are available on request.



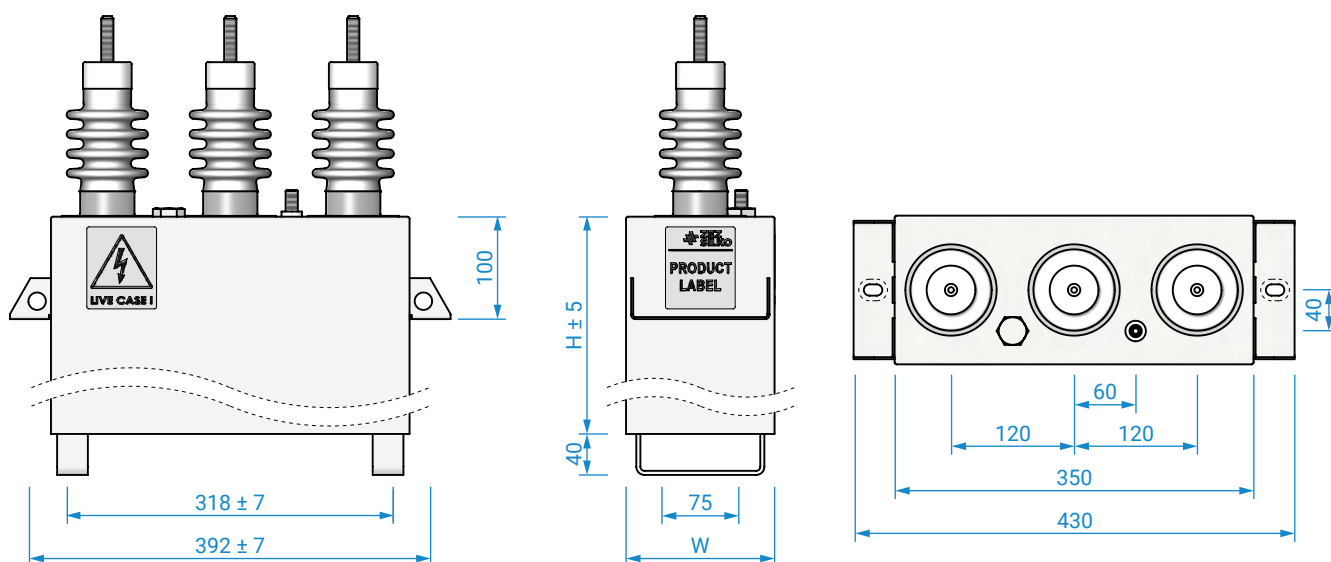


## PPFFS - Un/Cn

PPFFS - surge suppressor, live case YN, up to 12kV, three phase type

| Type             | $U_N$ (kV) | $C_N$ ( $\mu$ F) | $I_N$ (A) | $U_E$ (kV/1 min) | Impulse (kVp) |
|------------------|------------|------------------|-----------|------------------|---------------|
| PPFFS-7,2/3x0,25 | 7,2        | 0,25             | 0,3       | 20               | 60            |
| PPFFS-7,2/3x0,3  |            | 0,30             | 0,4       |                  |               |
| PPFFS-7,2/3x0,4  |            | 0,40             | 0,5       |                  |               |
| PPFFS-7,2/3x0,5  |            | 0,50             | 0,7       |                  |               |
| PPFFS-7,2/3x0,6  |            | 0,60             | 0,8       |                  |               |
| PPFFS-7,2/3x0,8  |            | 0,80             | 1,0       |                  |               |
| PPFFS-7,2/3x1    |            | 1,00             | 1,3       |                  |               |
| PPFFS-12/3x0,1   | 12,0       | 0,10             | 0,2       | 28               | 75            |
| PPFFS-12/3x0,15  |            | 0,15             | 0,3       |                  |               |
| PPFFS-12/3x0,2   |            | 0,20             | 0,4       |                  |               |
| PPFFS-12/3x0,25  |            | 0,25             | 0,5       |                  |               |
| PPFFS-12/3x0,3   |            | 0,30             | 0,7       |                  |               |
| PPFFS-12/3x0,4   |            | 0,40             | 0,9       |                  |               |
| PPFFS-12/3x0,5   |            | 0,50             | 1,1       |                  |               |
| PPFFS-17,5/3x0,4 | 17,5       | 0,40             | 1,3       | 38               | 95            |
| PPFFS-17,5/3x0,8 |            | 0,80             | 2,5       |                  |               |

Other values of capacitance and voltage are available on request.



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