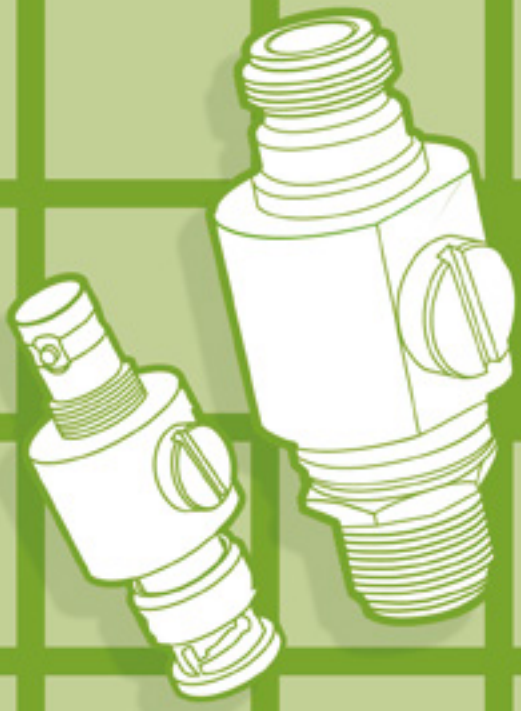
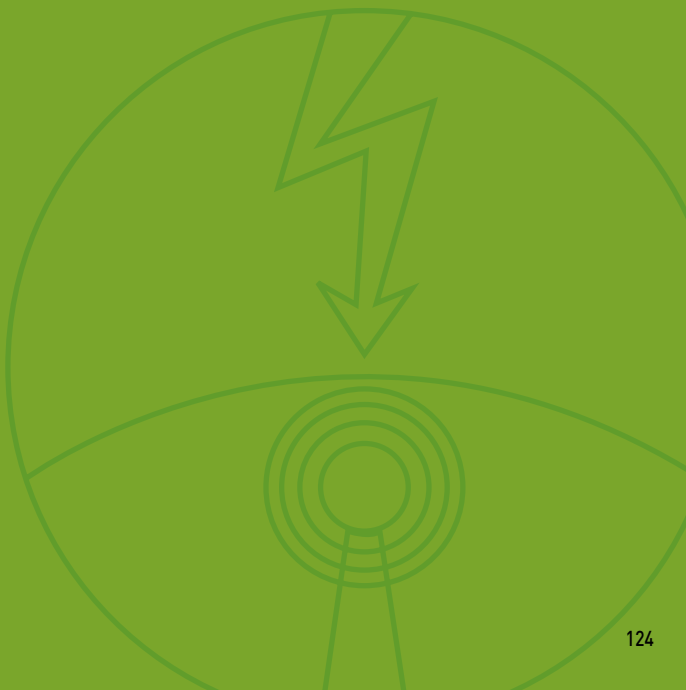
CITEL



COAXIAL RF

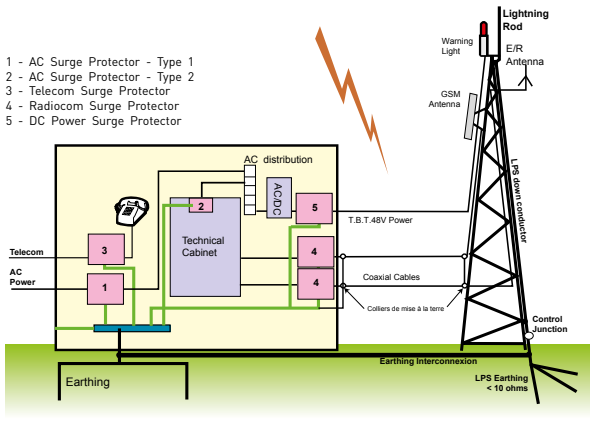
Surge Protectors

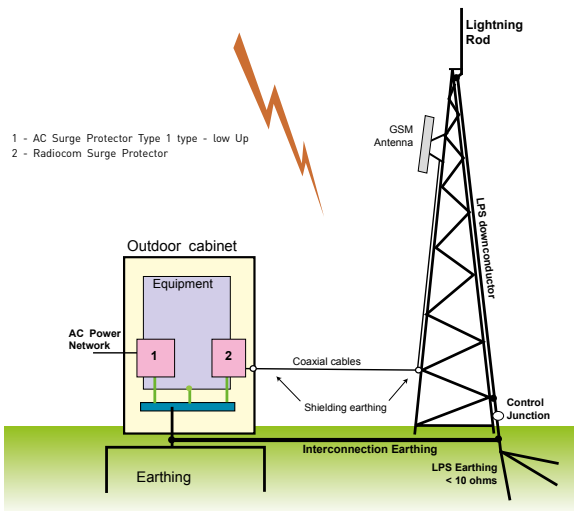


RF Surge Protection

Protection of radiocommunication equipment

Radiocommunication systems, connected to antennae, are especially exposed to lightning phenomena, the maximum risk being a direct strike on the antenna pole.
Equipment, as GSM/UMTS or TETRA base stations, must consider this risk in order to insure a relevant service continuity.
CITEL offers several surge protection technologies for RF lines to comply to the different operation requirements.





RF surge protection technology

P8AX series (Gas Tube Protection)

The gas discharge tube (GDT) is the only surge protection component usable on very high frequency transmission (several GHz) due to its very low capacitance. In a coaxial surge protector, the GDT is connected in parallel between the central conductor and the external shield ; when its sparkover voltage is reached, during an overvoltage, the line is briefly shorted (arc voltage). The sparkover voltage depends on the rise front of the overvoltage. The higher the dV/dt of the overvoltage, the higher the sparkover voltage of the surge protector.
When the overvoltage disappears, the gas discharge tube returns to its original condition of high isolation and is ready to operate again.
The gas tube is removable, making maintenance rapid in the end-of-life scenario (short-circuit).

The greater advantage of this technology is its very wide bandwidth: from DC (so, compatible with DC voltage injection) to several GHz.

Main characteristics :

- Insertion losses < 0,2 dB
- VSWR < 1,2
- Imax : 20 kA (8/20µs)
- Bandwidth : DC to several GHz
- Connectors : N, BNC, TNC, 7/16, F, SMA, UHF,
- Waterproof IP65

Main characteristics VG option :

- Imax : 6 kA (8/20µs)
- Connector : N
- Prevents the short-circuit of the transmitter (output) and the receiver (input) during a disturbance

CNP/CXP series (GDT protection) and CXP-DCB series (DC Blocked Protection)

CXP protectors are based on GDT to provide high discharge current capability without destruction. This type of products allows for installation in ungrounded systems. In these cases, the CXP isolates the shield from the earth ground and is typically found in applications including wireless radio terminals and TV monitors (antenna, cable or satellite).

CXP-DBC version is a relevant hybrid association between a filter stage and a gas tube : this configuration has the advantage of reducing low frequency disturbances (DC and lightning voltages) while providing a high discharge current capability.

Main characteristics (CXP) :

- isolated ground through GDT
- Insertion losses < 0.5 dB
- VSWR < 1.3
- Imax : 20 kA (8/20µs)
- Bandwidth : DC - 1000 MHz
- Connectors : F, BNC, SE, N...

Main characteristics (CXP-DBC) :

- "DC Block" feature
- Insertion losses < 0.15 dB
- VSWR < 1.2
- Imax : 10 kA (8/20µs)
- Bandwidth : 125 - 1000 MHz
- Connectors : N, BNC

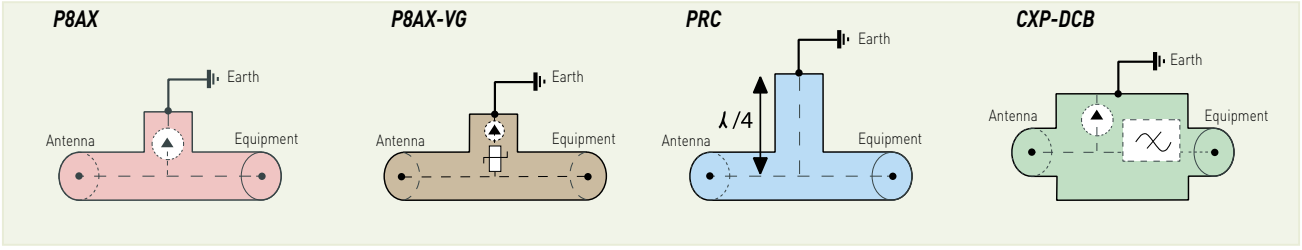
PRC series (Quarter Wave Protection)

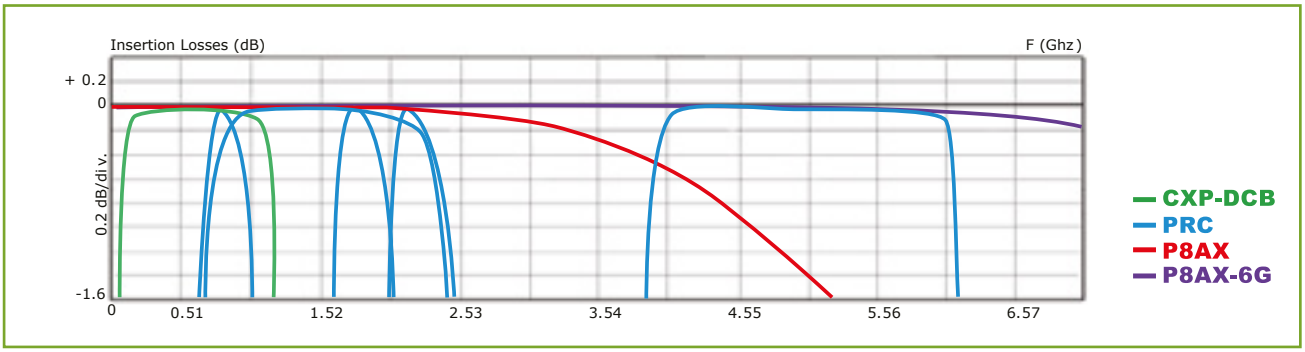
The other way to protect antenna lines is relevant replacement of the gas tube by a proper short-circuit chosen according to the operating frequency band. This short-circuit is tuned to one quarter of the wavelength, giving its name to «quarter-wave protection». This tuned short-circuit between the conducting core and the external ground acts as a band-pass filter.
The filter may be selective (narrow band or wide-band), according to the calculation of various mechanical elements.
Since lightning has a low-frequency spectrum (from a few hundred kHz to a few MHz), it will be filtered out from the operating frequencies.
The typical application is the protection of radio lines that do not have a source voltage.

Main characteristics :

- Insertion losses < 0.2 dB
- VSWR < 1.2
- Bandwidth : - 400-500 MHz
  - 870-950 MHz
  - 1700-1950 MHz
  - 1700-2200 MHz
  - 870-220 MHz
- Imax : up to 100 kA (8/20µs)
- Connectors : 7/16, N, BNC, TNC, 7/8 câble

RF Surge Protectors diagrams



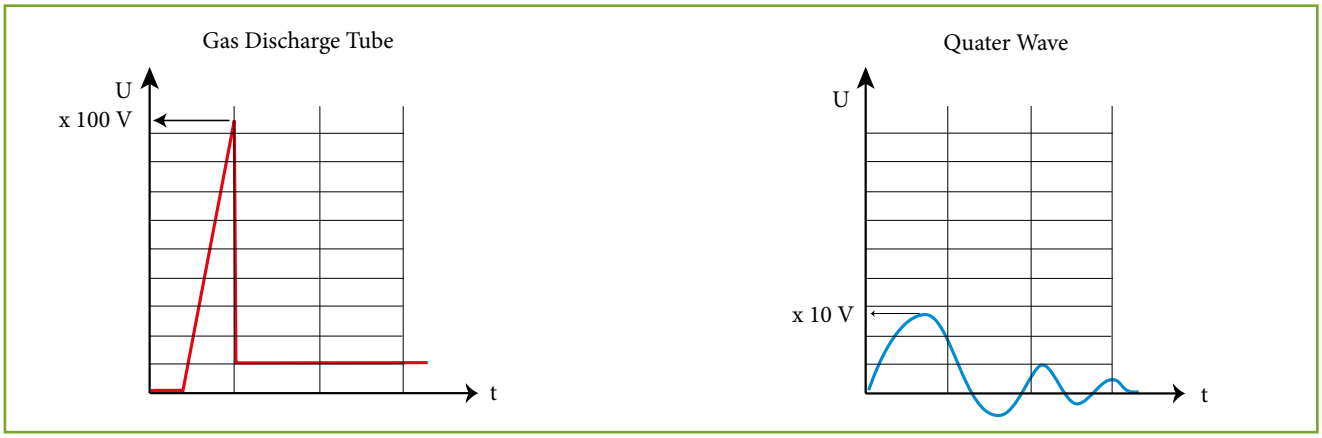


RF Surge Protection

Comparison

Table below allows comparison between the 3 technologies of RF coaxial surge protectors, in order to select the right solution regarding the application and the requirements.

Technology	Gas tube	DC Block	Quarter wave
CITEL series	*P8AX*	*CXP-DCB*	*PRC*
			
Principle	Sparkover	Sparkover + Filtering	Adapted short-circuit/selective band filter
Residual voltage	from 600V to 2400 V in relation with the dV/dt, then arc regime (short-circuit of the line in the full bandwidth). RF signal disturbed during the protection operation. Except for the option VG	< 100 V Short-circuit of the line in the full bandwidth : RF signal disturbed during the protection operation.	< 20 V RF signal not disturbed during the protection operation.
Bandwidth	DC to 3GHz (dependent oN the coaxial connector and the impedance)	125-1000 MHz	Narrow band (GSM, DCS1800, PCS, DECT, GPS....) up to 5800 MHz
DC injection	Compatible	Not compatible	Not compatible
8/20µs discharge current capability	20 kA	10 kA	Function of the connector : 100 kA for the 7/16, 50 kA for the N
Life expectancy	Linked to the GDT stress	Linked to the GDT stress	Unlimited
Connectors	N, BNC, TNC, UHF, SMA, 7/16 option VG : only N	N, BNC, TNC.	7/16, N, TNC....



Radio Frequency bands

LF : Low Frequency	30-300 kHz
MF : Medium Frequency	300-3000 kHz
HF : High Frequency	3-30 MHz
VHF : Very High Frequency	30-300 MHz
UHF : Ultra High Frequency	300-3000 MHz
SHF : Super High Frequency	3-30 GHz

A few Microwave applications

Tetra, Tetrapol	380-512 MHz
GSM850	824-894 MHz
Tetra	870-925 MHz
GSM 900	880-960 MHz
GPS	1575 MHz
GSM 1800	1710-1785 MHz
GSM 1900	1850-1990 MHz
DECT	1880-1900 MHz
WCDMA/TD-SCDMA	1850-2025 MHz
UMTS (IMT-2000)	1885-2200 MHZ
WLL (WiMax)	2400-5825 MHz

Installation

The efficiency of coaxial protectors is highly dependent on proper installation, in particular their connection to the earthing network of the installation.
The following installations rules must be strictly observed to ensure the efficiency :

- Equipotential bonding network : all the bonding conductors of the installation must be interconnected and connected to the installation earthing network.
- Optimized connection of the protector to the bonding network : to reduce the residual voltages during lightning discharge currents, the connection of the protector to the bonding network must be as short as possible (less than 50 cm) and has a proper cross section (at least 4 mm²).
  The «feedthrough mounting» versions meet perfectly all these requirements.
  Warning : for good contact, remove carefully all paintings or insulating coatings.
- Location of the protectors : they should preferably be placed at the entrance of the installation (to limit the penetration of lightning currents) and also near sensitive equipment (to enhance protection).

2 types of mounting

- ***Feedthrough mounting***

Direct mounting of the surge protector on the grounded frame at the installation entrance (or on specific bracket see p. 136) :
- perfect connection to the bonding network
- best location (conduction of the surge currents at the entrance of the installation)
- good mechanical withstand.

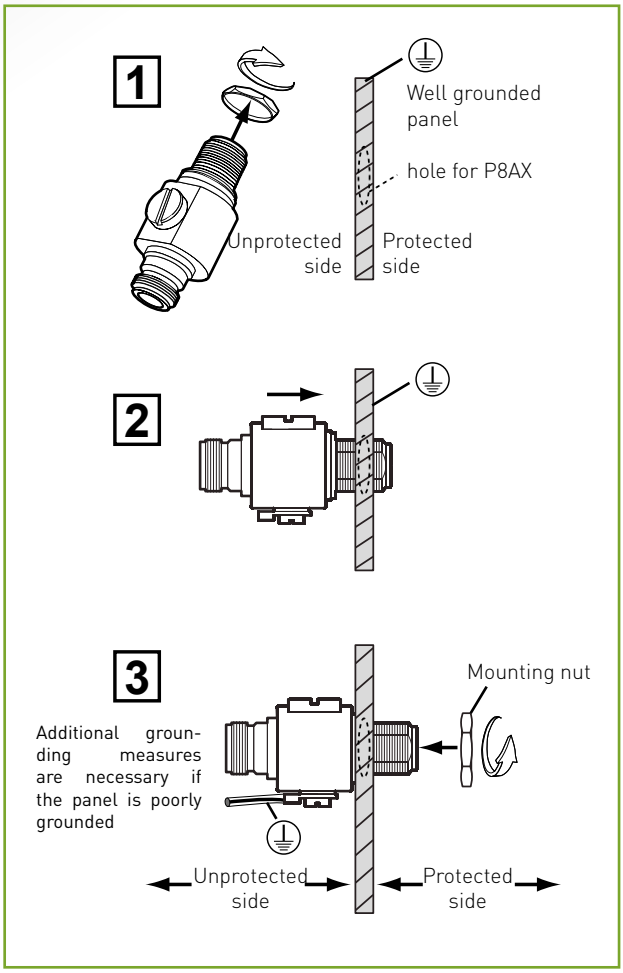
- ***Alternative mounting***

- connection to the bonding network by wire (4 mm² minimum and shortest length possible).

Standards

IEC 61643-21
UL497C
UL497E

Mounting coaxial surge protectors in feedthrough



Reference system

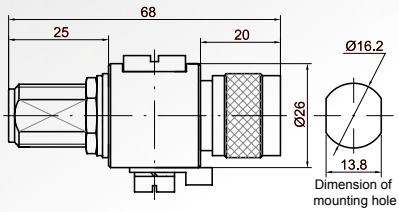
CITEL part number	Max. peak power
P8AX09	25 W
P8AX15	70W
P8AX25	190 W
P8AX35	380 W
P8AX50	780 W

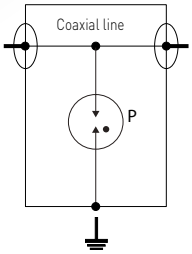
CITEL part number	Connectors
P8AX -N	N
P8AX -B	BNC
P8AX - T	TNC
P8AX -716	7/16
P8AX -F	F
P8AX -SMA	SMA

RF Coaxial Protectors - 4 GHz
P8AX series

P8AX09-N/MF

P8AX09-N/MF
(example)





P: 2-electrode gas discharge tube

- **Coaxial surge protector 4 GHz**
- **Low insertion losses**
- **Waterproof**
- **Removable GDT**
- **DC-pass**
- **Bi-directional protection**

P8AX□-□-□

- Type : MF = Male/Female
  FF = Female/Female
- Connectors (see reference system page 126)
- Voltage (see reference system page 126)

Characteristics

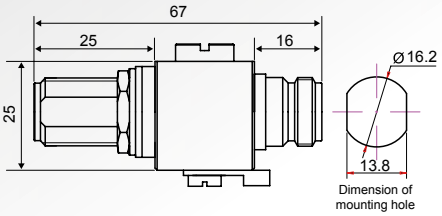
CITEL Model		P8AX09*		P8AX25*		P8AX50*	
Description		RF coaxial protector - 4 GHz		Parafoudre coaxial HF- 4 GHz		RF coaxial protector - 4 GHz	
Technology		Gas discharge tube		Gas discharge tube		Gas discharge tube	
Max. frequency	f	DC-4GHz		DC-4GHz		DC-4GHz	
Max Power	P	25 W		190 W		780 W	
Impedance	Z	50 ohms		50 ohms		50 ohms	
Insertion loss		< 0.2dB		< 0.2dB		< 0.2dB	
Return loss		> 20 dB		> 20 dB		> 20 dB	
VSWR		<1.2:1		<1.2:1		<1.2:1	
Max. Load current	IL	10A		10A		10A	
Nominal discharge current - *8/20µs Test x 10 - C2 Category*	In	5 kA		5 kA		5 kA	
Max. discharge current -*max. withstand ⍵ 8/20 µs by pole*	Imax	20 kA		20 kA		20 kA	
Impulse current - *2 x 10/350µs Test - D1 Category*	Iimp	2.5 kA		2.5 kA		2.5 kA	
Protection level	Up	< 650 V		< 800 V		<1200 V	
Failsafe behavior		Short-circuit		Short-circuit		Short-circuit	
Mechnical characteristics							
Dimensions		see diagram					
Connection to Network		N . TNC. SMA. F. BNC. 7/16					
Disconnection indicator		transmission interrupt					
Mounting		Feedthrough					
Operating temperature		-40/+85°C					
Protection rating		IP65					
Housing material		Brass/Surface plating : Cu Zn Sn					
Contacts		Bronze/Surface Au-Ag					
Insulation material		PTFE					
RohS compliance		yes					
Spare unit		BBHF-90V		BBHF-250V		BBHF-500V	
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497C / UL497E					
*** Part number**							
BNC connector Female/Female		P8AX09-B/FF	60111	P8AX25-B/FF	60114	P8AX50-B/FF	60117
BNC connector Male/Female		P8AX09-B/MF	60101	P8AX25-B/MF	60104	P8AX50-B/MF	60107
N connector Female/Female		P8AX09-N/FF	60011	P8AX25-N/FF	60014	P8AX50-N/FF	60017
N connector Male/Female		P8AX09-N/MF	60001	P8AX25-N/MF	60004	P8AX50-N/MF	60007
F connector Female/Female		P8AX09-F/FF	60211	P8AX25-F/FF	60214	-	-
F connector Male/Female		P8AX09-F/MF	60201	P8AX25-F/MF	60204	-	-
SMA connector Female/Female		P8AX09-SMA/FF	60511	P8AX25-SMA/FF	60514	P8AX50-SMA/FF	0
SMA connector Male/Female		P8AX09-SMA/MF	60501	P8AX25-SMA/MF	60504	P8AX50-SMA/MF	0
7/16 connector Female/Female		P8AX09-716/MF	60401	P8AX25-716/MF	60404	P8AX50-716/MF	60407
7/16 connector Male/Female		P8AX09-716/FF	60411	P8AX25-716/FF	60414	P8AX50-716/FF	60417

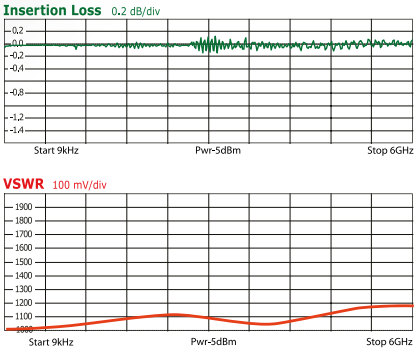
[1] Max. frequency type F : 2 GHz
[2] Impedance for F type connector is 75 ohms

RF Coaxial Protectors - 6 GHz
P8AX-6G series

P8AX09-6G-N/MF

P8AX09-6G-N/FF
(example)





- **Coaxial surge protector 6 GHz**
- **Low insertion losses**
- **Waterproof**
- **Removable GDT**
- **DC-pass**
- **Bi-directional protection**

P8AX ▢-6G-▢-▢

- Type : MF = Male/Female
  FF = Female/Female
- Connectors (see reference system page 126)
- Voltage (see reference system page 126)

Characteristics

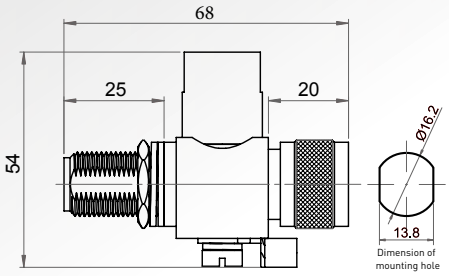
CITEL Model		P8AX09-6G*		P8AX25-6G*	
Description		RF coaxial protector - 6 GHz		RF coaxial protector - 6 GHz	
Technology		Gas discharge tube		Gas discharge tube	
Max. frequency	f	DC-6GHz		DC-6GHz	
Max Power	P	25 W		190 W	
Impedance	Z	50 ohms		50 ohms	
Insertion loss		< 0.2dB		< 0.2dB	
Return loss		> 20 dB		> 20 dB	
VSWR		<1.25:1		<1.25:1	
Max. Load current	IL	10A		10A	
Nominal discharge current - *8/20µs Test x 10 - C2 Category*	In	5 kA		5 kA	
Max. discharge current -*max. withstand ⍵ 8/20 µs by pole*	Imax	20 kA		20 kA	
Impulse current - *2 x 10/350µs Test - D1 Category*	Iimp	2.5 kA		2.5 kA	
Protection level	Up	< 1100 V		< 2300 V	
Failsafe behavior		Short-circuit		Short-circuit	
Mechnical characteristics					
Dimensions		see diagram			
Connection to Network		N . TNC. SMA			
Disconnection indicator		transmission interrupt			
Mounting		Feedthrough			
Operating temperature		-40/+85°C			
Protection rating		IP65			
Housing material		Brass/Surface plating : Cu Zn Sn			
Contacts		Bronze/Surface Au-Ag			
Insulation material		PTFE			
RohS compliance		yes			
Spare unit		2 x BA HF -90/20		2 x BA HF -150/20	
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497C / UL497E			
*** Part number**					
TNC connector Female/Female		P8AX09-6G-T/FF	68311	P8AX25-6G-T/FF	68314
TNC connector Male/Female		P8AX09-6G-T/MF	68301	P8AX25-6G-T/MF	68304
N connector Female/Female		P8AX09-6G-N/FF	68011	P8AX25-6G-N/FF	68014
N connector Male/Female		P8AX09-6G-N/MF	68001	P8AX25-6G-N/MF	68004
SMA connector Female/Female		P8AX09-6G-SMA/FF	68511	P8AX25-6G-SMA/FF	68514
SMA connector Male/Female		P8AX09-6G-SMA/MF	68501	P8AX25-6G-SMA/MF	68504

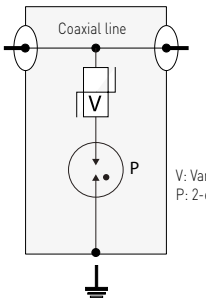
CE EAC

RF Coaxial Protectors - 6 GHz
P8AX-VG series

P8AX09-VG-N/MF

P8AX-VG-N/MF





V: Varistor
P: 2-electrode gas tube

- **DC to 6 Ghz**
- **Imax : 6 kA**
- **VSWR ⩽ 1.25**
- **Insertion Loss ⩽ 0.2 dB**
- **Feedthrough mounting**
- **Bi-Directional protection**
- **DC pass**
- **Waterproof**
- **The transmitter does not short-circuit while the surge protector is operating**

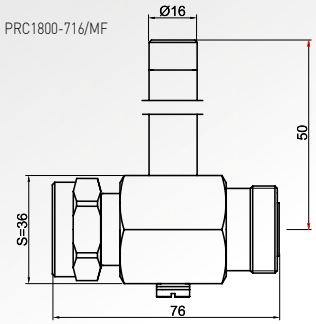
Characteristics

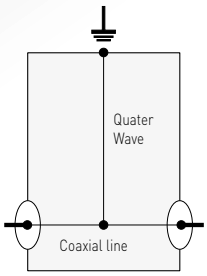
CITEL Model		P8AX09-VG-N/MF	P8AX25-VG-F/FF
Description		RF coaxial protector - 6 GHz - VG technology	RF coaxial protector - 6 GHz - VG technology
Technology		VG	VG
Max. frequency	f	DC to 6 GHz	DC to 6 GHz
Max Power	P	25 W	190 W
Impedance	Z	50 ohms	50 ohms
Insertion loss		< 0.2dB	< 0.2dB
Return loss		> 20 dB	> 20 dB
VSWR		⩽ 1.25:1	⩽ 1.25:1
Max. Load current	IL	10A	10A
Nominal discharge current - *8/20µs Test x 10 - C2 Category*	In	3 kA	3 kA
Max. discharge current -*max. withstand (à 8/20 µs by pole*	Imax	6 kA	6 kA
Impulse current - *2 x 10/350µs Test - D1 Category*	Iimp	1 kA	1 kA
Protection level	Up	< 650 V	< 650 V
Failsafe behavior		Short-circuit	Short-circuit
Mechnical characteristics			
Dimensions		see diagram	see diagram
Connection to Network		connector N Male/Female	connector F Female/Female
Disconnection indicator		transmission interrupt	transmission interrupt
Mounting		Feedthrough	Feedthrough
Operating temperature		-40/+85°C	-40/+85°C
Protection rating		IP65	IP65
Housing material		Brass/Surface plating : Cu Zn Sn	Brass/Surface plating : Cu Zn Sn
Contacts		Bronze/Surface Au-Ag	Bronze/Surface Au-Ag
Insulation material		PTFE	PTFE
RohS compliance		yes	yes
Spare unit		-	-
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497C / UL497E	IEC 61643-21 / EN 61643-21 / UL497C / UL497E
Part number		60601	60701

CE EAC

«Quarter-Wave» Coaxial Protectors
PRC series

PRC1800-716/MF





- **Low insertion losses**
- **Imax > 50 kA**
- **Available for wide-band application**
- **No maintenance**

PRC□-□□-□

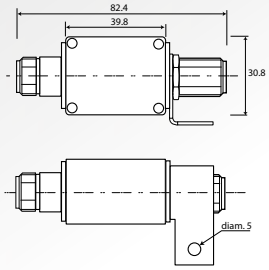
- Type : MF = Male/Female
  FF = Female/Female
- Mounting : ¨ ¨ = on connector
  W = on feedthrough
- Connectors (see reference system page page 126)
- Voltage (see reference system pagepage 126)

Characteristics

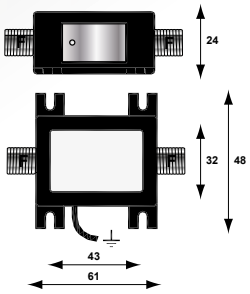
CITEL Model		PRC822S*	PRC900*	PRC1800*	PRC2100*	PRC5800*
Description		"Quarter wave" coaxial protector	"Quarter wave" coaxial protector	"Quarter wave" coaxial protector	"Quarter wave" coaxial protector	"Quarter wave" coaxial protector
Technology		Quarter Wave	Quarter Wave	Quarter Wave	Quarter Wave	Quarter Wave
Max. frequency	f	800-2200MHz	870-960MHz	1700-1950MHz	1800-2400MHz	4500-6000MHz
Max Power	P	1500 W (7/16 = 2500 W)	1500 W (7/16 = 2500 W)	1500 W (7/16 = 2500 W)	1500 W	1500 W
Impedance	Z	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
Insertion loss		< 0.2dB	< 0.2dB	< 0.2dB	< 0.2dB	< 0.2dB
Return loss		> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB
VSWR		<1.2:1	<1.2:1	<1.2:1	<1.2:1	<1.2:1
Max. Load current	IL	10A	10A	10A	10A	10A
Nominal discharge current *8/20µs Test x 10 - C2 Category*	In	25 kA	50 kA	50 kA	25 kA	25 kA
Max. discharge current *-max. withstand (ø 8/20 µs by pole*	Imax	50 kA	100 kA	100 kA	50 kA	50 kA
Impulse current *2 x 10/350µs Test - D1 Category*	Iimp	25 kA	50 kA	50 kA	25 kA	25 kA
Protection level	Up	< 30 V	< 30 V	< 30 V	< 30 V	< 30 V
Failsafe behavior		without	without	without	without	without
Mechnical characteristics						
Dimensions		see diagram				
Connection to Network		N or 7/16 connector	N, TNC or 7/16 connector	N, TNC or 7/16 connector	N connector	N connector
Mounting		on connector or feedthrough (W version)				connector
Operating temperature		-40/+85°C				
Protection rating		IP65				
Housing material		Brass/Surface plating : Cu Zn Sn				
Contacts		Bronze/Surface Au-Ag				
Insulation material		PTFE				
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497C / UL497E				
*** Part number**						
N connector Female/Female		PRC822S-N/FF 61013	PRC900-N/FF 621124	PRC1800-N/FF 621125	PRC2100-N/FF -	PRC5800-N/FF 621151
N connector Male/Female		PRC822S-N/MF 61003	PRC900-N/MF 621111	PRC1800-N/MF 621112	PRC2100-N/MF 621183	PRC5800-N/MF 621112
N connector Female/Female - Feedthrough mounting		- -	- -	- -	PRC2100-NW/FF 621172	- -
N connector Male/Female - Feed-through mounting		- -	- -	PRC1800-NW/MF 61108	PRC2100-NW/MF -	- -
T connector Female/Female		- -	PRC900-T/FF 621126	PRC1800-T/FF 621127	- -	- -
T connector Male/Female		- -	PRC900-T/MF 621113	PRC1800-T/MF 621115	- -	- -
7/16 connector Female/Female		PRC822S-716/MF 621139	PRC900-716/MF 621110	PRC1800-716/MF 621108	- -	- -
7/16 connector Male/Female		PRC822S-716/FF 67413	PRC900-716/FF 621109	PRC1800-716/FF 621107	- -	- -

Coaxial surge protector
CNP and CXP series

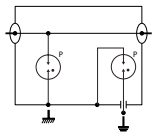
CXP09-NW/FF-DCB



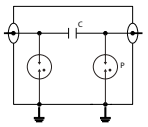
CNP



CNP
CXP



CXP-DCB



P : Gas discharge tube
C : Capacitance

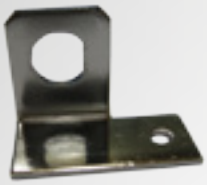
- **Coaxial surge protector low frequency**
- **RoHS 6 compliance**
- **Waterproof**
- **Mounting on plate**
- **Bi-directional**

Characteristics

CITEL Model		CNP90TV-F/FF	CNP230TV-F/FF	CXP09*	CXP25*	CXP09*-DCB	CXP25*-DCB
Description		Coaxial SPD for video transmission networks	Coaxial SPD for video transmission networks	Coaxial SPD low frequency	Coaxial SPD low frequency	Coaxial SPD low frequency	Coaxial SPD low frequency
Technology		Gas discharge tube	Gas discharge tube	Gas discharge tube	Gas discharge tube	GDT+Filter	GDT+Filter
Max. frequency	f	DC-1 GHz	DC-1 GHz	DC-1 GHz	DC-1 GHz	125-1000 MHz	125-1000 MHz
Max Power	P	25 W	190 W	25 W	190 W	25 W	190 W
Impedance	Z	50/75 ohms	50/75 ohms	50/75 ohms	50/75 ohms	50/75 ohms	50/75 ohms
Insertion loss		< 0.6 dB	< 0.6 dB	< 0.5 dB	< 0.5 dB	< 1 dB	< 1 dB
Return loss		> 20 dB	> 20 dB	> 18 dB	> 18 dB	> 20 dB	> 20 dB
VSWR		< 1.35:1	< 1.35:1	< 1.3:1	< 1.3:1	<1.3:1	<1.3:1
Max. Load current	IL	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
Nominal discharge current *8/20µs Test x 10 - C2 Category*	In	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
Max. discharge current *-max. withstand @ 8/20 µs by pole*	Imax	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Impulse current *2 x 10/350µs Test - D1 Category*	Iimp	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA
Protection level	Up	600 V	600 V	600 V	600 V	600 V	600 V
Failsafe behavior		Short-circuit	Short-circuit	short-circuit	short-circuit	short-circuit	short-circuit
Mechnical characteristics							
Dimensions		see diagram					
Connection to Network		Connector F. female/female		N or F connector		N or F connector	
Disconnection indicator		transmission interrupt					
Mounting		on plate					
Operating temperature		-40/+85°C					
Protection rating		IP20		IP20			
Housing material		Metal+plastic		Brass			
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497C / UL497E					
***Part number**							
N connector Female/Female		- -	- -	CXP09-N/FF 631655	CXP25-N/FF -	CXP09-N/FF-DCB 631652	CXP25-N/FF-DCB 631652
N connector Male/Female		- -	- -	CXP09-N/MF -	CXP25-N/MF 631754	CXP09-N/MF-DCB 631653	CXP25-N/MF-DCB 631653
F connector Female/Female		CNP90TV-F/FF 6329012	CNP230TV-F/FF 632302	CXP09-F/FF 631651	CXP25-F/FF 631757	- -	- -
F connector Male/Female		CNP90TV-F/MF 6329011	- -	CXP09-F/MF 631611	CXP25-F/MF -	- -	- -

Bracket for coaxial surge protector

- **Screw fixing**
- **Grounding**
- **Requires a feedthrough connector**

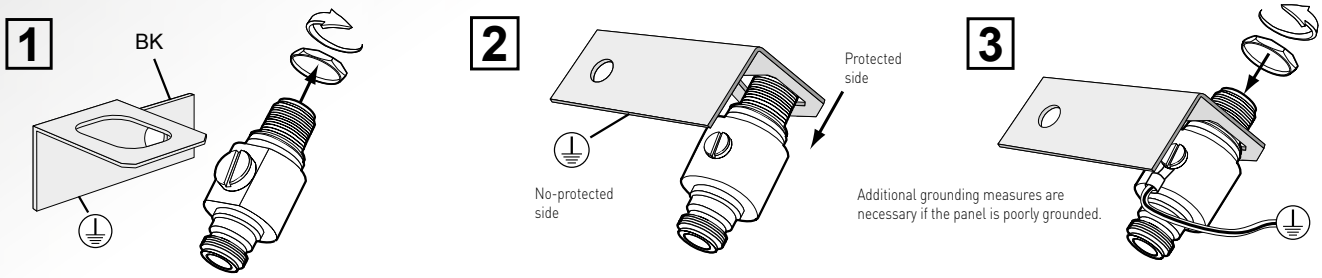


BK-T
bracket for TNC connector

BK-N
bracket for N connector

BK-SMA
bracket for SMA connector

Mounting bracket



Reference braket

CITEL	Part number	Connection
BK-D	66001	7/16
BK-F	66002	F
BK-N	66003	N
BK-SMA	66006	SMA
BK-T/BK-B	66007	BNC and TNC

Gas discharge tube

- **GDT for maintenance of coaxial surge protectors P8AX**
- **Adapted for use in very high frequency**
- **Selection according to the RF signal power**

CITEL P/N	Part number	Packaging	P8AX reference
BBHF 90/20	927000107	Packing*10	P8AX09-xxx
BBHF 150/20	927000207	Packing*10	P8AX15-xxx
BBHF 250/20	927005907	Packing*10	P8AX25-xxx
BBHF 350/15	927006507	Packing*10	P8AX35-xxx
BBHF 500/20	927002207	Packing*10	P8AX50-xxx
BAHF 90/20	927100107	Packing*10	P8AX09-6G
BAHF 150/20	927100207	Packing*10	P8AX 25-6G

BB HF