

## Line Protectors

### TELECOM OUTSIDE PLANT

A wide range of protection products are offered which are an important part of the QDF product line. Solid state as well as gas tube overvoltage protection is available, and overcurrent protection is also provided in 5-point protectors

#### 3-Point Protection

The QDF-3CGS-260 and QDF-3CGS-230 contain a heavy-duty 3-electrode gas discharge tube. They are used when many large lightning induced voltages are expected on the telecom pairs.

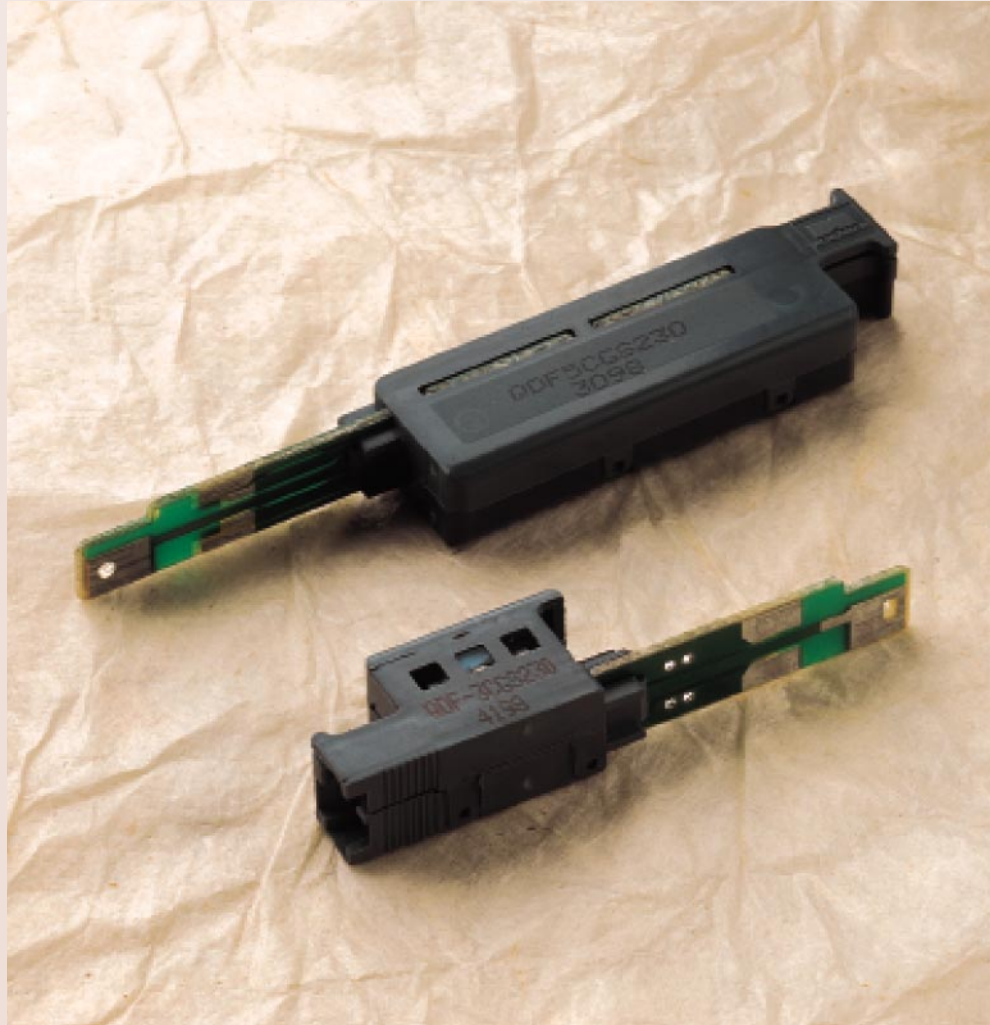
The QDF-3CHY-200 and the QDF-3CHY-260 incorporate an overvoltage surge protection device utilising both gas-tube and semi-conductor technologies resulting in a package which delivers the high current-handling capability of a gas-discharge tube with the speed of a silicon device.

#### 5-Point Protection

The QDF-5CGS-260R(N) and QDF-5CGS-230CN contain a heavy duty 3-electrode gas discharge tube.

The QDF-5CSS-220RN is a thyristor-based solid-state protector designed for use in applications that demand the extremely fast operation and low operating voltage that only solid-state protectors can provide.

The QDF-5CHY-200RN and QDF-5CHY-260R incorporate an overvoltage surge protection device utilising both gas-tube and semi-conductor technologies, combining to deliver the high current handling capability of a gas-discharge tube with the speed of a silicon device.



Q D F - E

# QDF-E

Overcurrent protection has been added to all of these 5-point protectors in the form of 2 PTCRs\*. The overcurrent devices are fast-acting, have low room-temperature resistance and are completely self-restoring when the fault current source is removed from the line.

All QDF protectors are equipped with a heat-operated fail-safe (shorting) mechanism. Sustained operation of the protector, because of contact with or induction from power lines, will cause operation of the fail-safe device.

The fault current may continue to flow, but the heat-generating protector has been bypassed by the fail-safe shunt.

All of the QDF protectors fit into the QDF-E 10-pair magazine. They have an intermediate position to which they can be temporarily withdrawn to remove protection from the equipment side to allow testing of the equipment. This is a partial withdrawal which maintains contact on the cable side.

Testing can then be performed using the 4-wire retractable test/patch cord inserted into the top of the protector.

Non-intrusive testing may be carried out by using the same cord inserted into the top of the protector while it is in the fully inserted position.

## 3-Point Protectors

### Specifications

#### Electrical Characteristics

Overvoltage

	QDF-3CGS-260	QDF-3CGS-230	QDF-3CHY-260	QDF-3CHY-200
DC breakdown	210 - 310 V	184 - 276 V	210 - 350 V	140 - 250 V
	Measured @ 100 V/sec.			
Insulation resistance* *	1000 M $\Omega$ min. measured at 100 Vdc		100 M $\Omega$ min. measured at 175 Vdc	100 M $\Omega$ min. measured at 120 Vdc
Capacitance (line to earth)	1.5 pF		200 pF	
	Measured at 1 MHz			
Impulse breakdown	600 V max.	450 V max.	350 V max.	250 V max.
	@ ramp speed of 1 kV/ $\mu$ sec (ITU K 12 Recommendation)			

Life

AC discharge	5 A RMS for 1 second, 5 applications each line side, @ 3-minute intervals, 50 Hz
Impulse discharge current	5 kA measured at 8/20 $\mu$ sec, 5 shots each polarity (IEC 1000-4-5)

#### Mechanical Characteristics

Endurance	Repeated insertion/withdrawals: 200 cycles from fully inserted to intermediate position. Maximum change in protector/block contact resistance is 50 m $\Omega$
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#### Materials

Housing	Glass-filled polyamide. Self-extinguishing, UL-94 V0 rated.
Gas tube	Aluminium oxide ceramic/metal construction. Inert gas filled, contains no radionuclides.
Printed circuit board	Glass-fibre/epoxy blend, self-extinguishing, UL-94 V0 rated.

\* Positive Temperature Coefficient Resistor

\*\* Other values are possible with a different component selection

# QDF-E

## 5-Point Protectors - Gas-Tube & Hybrid Versions

### Specifications

	5CGS-260R(N)	5CGS-230CN	5CHY-200CN	5CHY-260 RN
Overvoltage component	GDT	GDT	Hybrid	Hybrid
Overcurrent component	PTCR	PTCR	PTCR	PTCR

### Electrical Characteristics

#### Overvoltage

DC breakdown	210 - 310 V	184 - 276 V	140 - 240 V	210 - 250 V
		measured @ 100 V/sec.		
Insulation resistance	1000 M $\Omega$ min. (measured @ 100 Vdc)	10 G $\Omega$ min. (measured @ 100 Vdc)	100 M $\Omega$ min. (measured @ 120 Vdc)	100 M $\Omega$ min. (measured @ 175 Vdc)
Capacitance (line to earth)	1.5 pF	1.5 pF	200 pF	200 pF
		measured @ 1 MHz		
Impulse breakdown	600 V max.	450 V max.	250 V max.	350 V max.
		@ ramp speed of 1 kV/ $\mu$ sec.(ITU K12 Recommendation)		

#### Overcurrent

PTCR room-temperature resistance	6 - 10 $\Omega$	4 - 8 $\Omega$	6 - 10 $\Omega$	6 - 10 $\Omega$
Hold current	120 A RMS			
Maximum operating voltage	250 V RMS			
Maximum switching current	3.0 A RMS			

#### Life

AC discharge	5 A RMS for 1 second, 5 applications each line side, @ 3-minute intervals, 50 Hz
Impulse discharge current	5 kA measured at 8/20 $\mu$ sec, 5 shots each polarity (IEC 1000-4-5)

### Mechanical Characteristics

Endurance	Repeated insertion/withdrawals: 200 cycles from fully inserted to intermediate position. Maximum change in protector/block contact resistance is 50 m $\Omega$ .
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### Materials

Housing	Glass-filled polyamide. Self-extinguishing, UL-94 V0 rated.
Gas tube	Aluminium oxide ceramic/metal construction. Inert gas filled, contains no radiosotopes.
PTCR	Conductive polymer
Printed circuit board	Glass fibre/epoxy blend, self-extinguishing, UL-94 V0 rated.

# QDF-E

## 5-Point Protectors - Solid State Version

### Specifications

	5CSS-220RN
Overvoltage component	Dual bi-directional resistor
Overcurrent component	PTCR

### Electrical Characteristics

#### Overvoltage

DC breakdown	215 - 265 V measured @ 100 V/sec.
Insulation resistance*	200 M $\Omega$ minimum measured @ 200 Vdc
Capacitance (line to earth)	< 200 pF measured @ 1 MHz
Impulse breakdown	350 V max. @ ramp speed of 1 kV/ $\mu$ sec (ITU K12 recommendation)

#### Overcurrent

PTCR room-temperature resistance	6 - 10 $\Omega$
Hold current	120 A RMS
Maximum operating voltage	250 V RMS
Maximum switching current	3.0 A RMS
Switching time @ max. switching current	< 200 msec.

#### Life

Impulse discharge current	10/1000 $\mu$ sec. 100 A 10/700 1.5 kV 125A 8/20 $\mu$ sec. 250 A
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### Mechanical Characteristics

Endurance	Repeated insertion/withdrawals: 200 cycles from fully inserted to intermediate position. Maximum change in protector/block contact resistance is 50 m $\Omega$ .
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### Materials

Housing	Glass-filled polyamide. Self-extinguishing, UL-94 V0 rated.
Gas tube	Aluminium oxide ceramic/metal construction. Inert gas filled, contains no radiosotopes.
PTCR	Conductive polymer
Printed circuit board	Glass fibre/epoxy blend, self-extinguishing, UL-94 V0 rated.

### Safety

The protectors fail in short circuit mode on heating from sustained discharge.  
They will conduct 20 A RMS (10 A RMS each-line side) for 15 minutes with no flames, sparks or molten plastic.

\* Other values are possible with a different component selection

# QDF-E

## Part Name Key

### QDF - 3 C XX - XXX

HY = hybrid  
GS = gas tube

Gas tube voltage rating

### QDF - 5 C XX - XXX - X X

GS = gas tube + 2 PTCRs  
SS = solid state + 2 PTCRs  
HY = hybrid

Overtoltage rating

R = PTCR  
C = coated

N = narrow  
S = short

## Ordering Information

Description	Product Name	PCN Number
3-point protector, 230 V gas tube, grey	QDF-3CGS-230	323726-000
3-point protector, 260 V gas tube, grey	QDF-3CGS-260	669104-000
3-point protector, 200 V hybrid, green	QDF-3CHY-200	493099-000
3-point protector, 260 V hybrid, green	QDF-3CHY-260	712614-000
5-point protection, 260 V gas discharge tube plus 2 PTCRs. Colour: grey	QDF-5CGS-260R	809666-000
Narrow version	QDF-5CGS-260RN	861293-000
5-point protection, 230 V gas discharge tube plus 2 PTCRs. Colour: grey	QDF-5CGS-230CN	133454-000
5-point protection, solid state, 220 V plus 2 PTCRs. Colour: blue	QDF-5CSS-220RN	038914-000
5-point 200 V hybrid protector with 2 PTCRs. Colour: green	QDF-5CHY-200RN	577955-000
5-point 260 V hybrid protector with 2 PTCRs. Colour: green	QDF-5CHY-260RN	840870-000



3-Point Protector



5-Point Protector  
Gas-tube & hybrid version



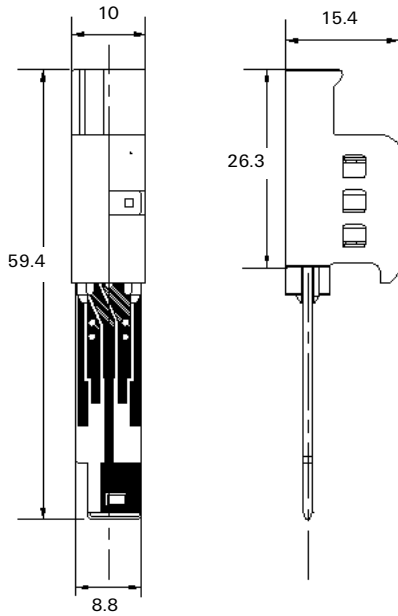
5-Point Protector  
Solid State version

# QDF-E

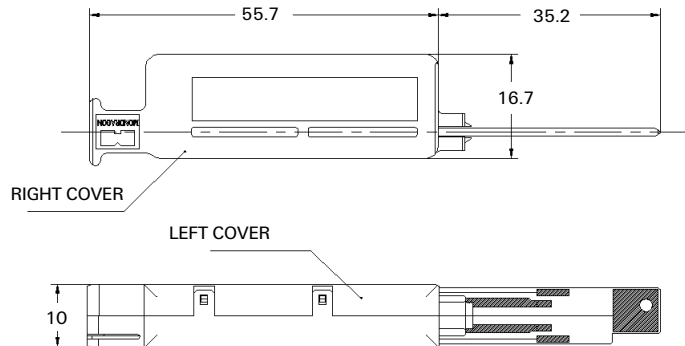
## Dimensions

Values in mm

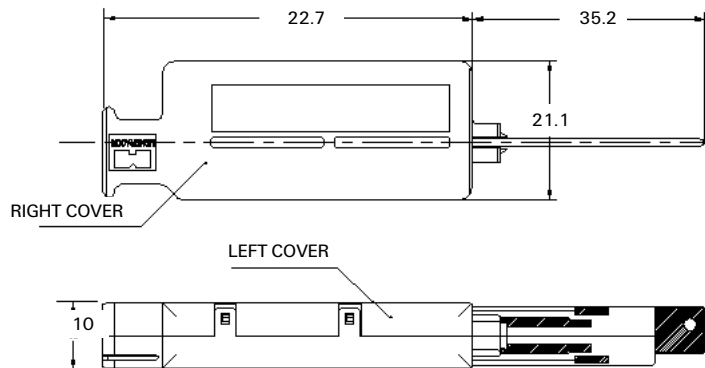
### 3-Point Protectors



### QDF-5XXX-XXXXN (Narrow Versions)



### QDF-5CGS-260R/QDF-5CSS-220R



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