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ANEXO A: ANTENAS

MODELO 4B+DD**Triple-multiband Panel
Dual Polarization****Half-power Beam Width****Adjust. Electr. Downtilt**

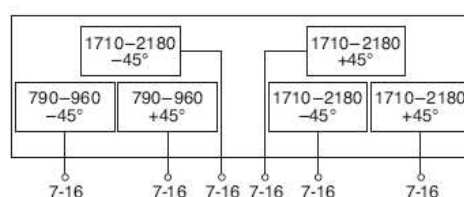
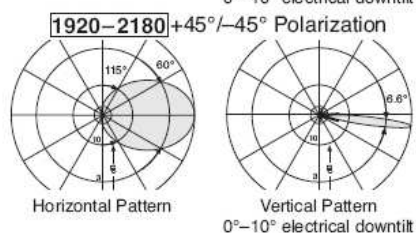
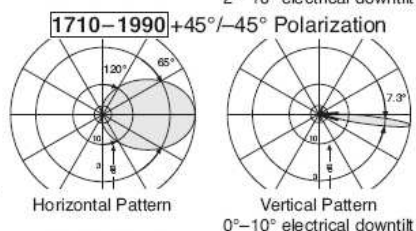
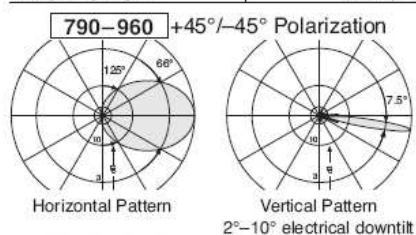
set by hand or by optional RCU (Remote Control Unit)

790–960	1710–2180	1710–2180
X	X	X
65°	65°	65°
2°–10°	0°–10°	0°–10°

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XXXPol Panel 790–960/1710–2180/1710–2180 65°/65°/65° 17.5/17.5/17dB 2°–10°/0°–10°/0°–10°T

Type No.	80010292v03					
	790–960			1710–2180		1710–2180
Frequency range	790–862 MHz	824–894 MHz	880–960 MHz	1710–1880 MHz	1850–1990 MHz	1920–2180 MHz
Polarization	+45°, –45°	+45°, –45°	+45°, –45°	+45°, –45°	+45°, –45°	+45°, –45°
Average gain: (dBi)	17.0 ... 17.0 ... 16.8	17.2 ... 17.2 ... 16.9	17.4 ... 17.4 ... 17.0	17.1 ... 17.2 ... 16.6	17.2 ... 17.4 ... 16.8	17.2 ... 17.3 ... 16.7
1710–2180 MHz (Syst. bottom)				16.5 ... 16.7 ... 16.2	16.6 ... 16.8 ... 16.3	16.8 ... 17.0 ... 16.3
1710–2180 MHz (Syst. top)				0° ... 5° ... 10°	0° ... 5° ... 10°	0° ... 5° ... 10°
Tilt	2° ... 6° ... 10°	2° ... 6° ... 10°	2° ... 6° ... 10°			
Horizontal Pattern:						
Half-power beam width	69°	68°	66°	65°	62°	61°
Front-to-back ratio, copolar	>30 dB	>30 dB	>30 dB	>30 dB	>30 dB	>30 dB
Cross polar ratio	Typically: 25 dB	Typically: 25 dB	Typically: 25 dB	Typically: 25 dB	Typically: 25 dB	Typically: 25 dB
Main direction	0°					
Sector	±60°					
	±60°	avg. 20 dB	avg. 20 dB	avg. 16 dB	avg. 16 dB	avg. 16 dB
Tracking, Avg.	1.0 dB					
1710–2180 MHz (Syst. bottom)				1.0 dB		
1710–2180 MHz (Syst. top)				0.5 dB		
Squint	±3.5°			±3.5°		
Vertical Pattern:						
Half-power beam width	7.8°	7.6°	7.1°	7.6°	7.5°	6.8°
Electrical tilt	2°–10°, continuously adjustable			0°–10°, continuously adjustable		
Sidelobe suppression for 1st sidelobe above main beam	2° ... 6° ... 10° T 17 ... 16 ... 14 dB	2° ... 6° ... 10° T 18 ... 16 ... 15 dB	2° ... 6° ... 10° T 18 ... 16 ... 15 dB	0° ... 5° ... 10° T 15 ... 16 ... 15 dB	0° ... 5° ... 10° T 16 ... 16 ... 15 dB	0° ... 5° ... 10° T 16 ... 16 ... 14 dB
Impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
VSWR	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Isolation: Intrasystem	>30 dB	>30 dB	>30 dB	>30 dB	>30 dB	>30 dB
Isolation: Intersystem	> 36 dB (790–960 // 1710–2180 MHz) > 36 dB (1710–2180 // 1710–2180 MHz)					
Intermodulation IM3	< –150 dBc (2 x 43 dBm carrier)			< –150 dBc (2 x 43 dBm carrier)		
Max. power per input	250 W (at 50 °C ambient temperature)			200 W (at 50 °C ambient temperature)		



Mechanical specifications	
Input	6 x 7-16 female
Connector position	Bottom
Adjustment mechanism	3x, Position bottom continuously adjustable
Wind load	Frontal: 1210 N (at 150 km/h) Lateral: 510 N (at 150 km/h) Rearside: 1270 N (at 150 km/h)
Max. wind velocity	200 km/h
Height/width/depth	2598 / 261 / 146 mm
Category of mounting hardware	H (Heavy)
Weight	27 kg / 29 kg (clamps incl.)
Packing size	2902 x 284 x 184 mm
Scope of supply	Panel and 2 units of clamps for 42–115 mm diameter





MULTI-BAND PANEL ANTENNA

BAND (850 + 900) + 2 X BROADBAND 1710-2170

LM2D3-800TV

(790 – 960)	2 X (1710 – 2170)
H64° V7.5°	H65° V6.5°
Variable Tilt	Variable Tilt
2° - 10°	2° - 12°

ELECTRICAL SPECIFICATIONS

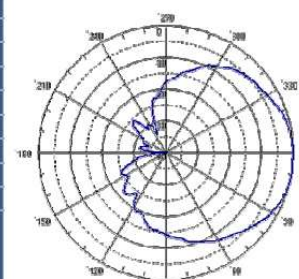
Antenna Model	LM2D3-800TV	
Polarization	± 45°	
Frequency (MHz)	(790 – 960)	2 X (1710 – 2170)
Horizontal Beamwidth	62°	65°
Vertical Beamwidth	7.5°	6.5°
Gain (dBi)	16.5	17
Vertical Electrical Tilt	VARIABLE 2°-10°	VARIABLE 2°-12°
Upper Sidelobe Suppression for the 1 st lobe above main beam (dB)	17	17
Front-to-Back Ratio @ 180° ± 20° (dB)	> 23	> 22
VSWR	< 1.5 : 1	< 1.5 : 1
Cross Polar Ratio @ -3° (dB) Typically	> 13	> 10
Isolation between Ports (dB)	> 30	> 30
Interband Isolation (dB)	> 40 (790-960//1710-2170) > 30 (1710-2170//1710-2170)	
Maximum Power Per Input (W)	500	250
Intermodulation (dBc)	< -150	
Impedance (Ω)	50	



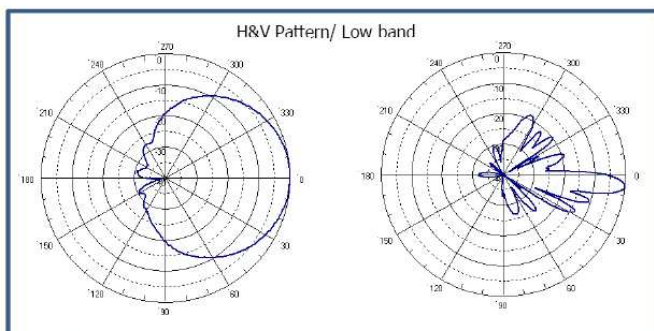
MECHANICAL SPECIFICATIONS

Connectors	6 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed (Km/h)	200
Front Windload (N @ 160 km/h)	1400
Lateral Windload (N @ 160 km/h)	330
Radome Color	Grey, paintable
Humidity	100%
Antenna Weight (Kg)	37
Antenna Dimension (mm) H X W X D	2615 x 350 x 145

H&V Pattern/ Broadband



H&V Pattern/ Low hand



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MODELO 4C+DD

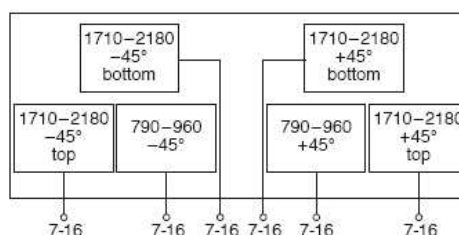
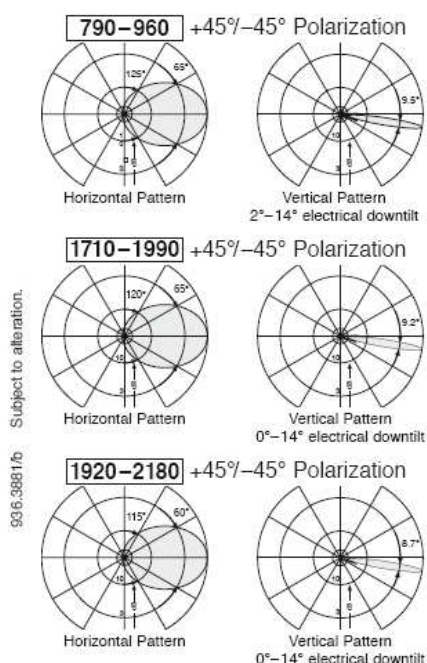
Triple-multiband Panel
Dual Polarization
Half-power Beam Width
Adjust. Electr. Downtilt
 set by hand or by optional RCU (Remote Control Unit)

790–960	1710–2180	1710–2180
X	X	X
65°	65°	65°
2°–14°	0°–14°	0°–14°

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XXXPol Panel 790–960/1710–2180/1710–2180 65°/65°/65° 16.5/16.5/16.5dBi 2°–14°/0°–14°/0°–14°T

Type No.	80010291v02					
Frequency range	790–960		880–960 MHz	1710–2180		1920–2180 MHz
Polarization	+45°, –45°		+45°, –45°	+45°, –45°		+45°, –45°
Average Gain: (dBi)	16.2 ... 16 ... 15.7	16.3 ... 16.1 ... 15.8	16.4 ... 16.2 ... 15.8	15.9 ... 15.9 ... 15.5	16.2 ... 16.2 ... 15.7	16.3 ... 16.3 ... 15.8
1710–2180 MHz (Syst. bottom)				15.8 ... 15.8 ... 15.4	16.1 ... 16.1 ... 15.4	16.3 ... 16.2 ... 15.5
1710–2180 MHz (Syst. top)				0° ... 7° ... 14°	0° ... 7° ... 14°	0° ... 7° ... 14°
Tilt	2° ... 8° ... 14°	2° ... 8° ... 14°	2° ... 8° ... 14°			
Horizontal Pattern:						
Half-power beam width	68°	67°	65°	65°	64°	60°
Front-to-back ratio (180°±30°)	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross polar ratio	Typically: 25 dB	Typically: 25 dB	Typically: 25 dB	Typically: 18 dB	Typically: 19 dB	Typically: 20 dB
Main direction	0°					
Sector	±60°	> 10 dB	> 10 dB	> 10 dB	> 10 dB	> 10 dB
Tracking	1.0 dB					
Vertical Pattern:						
Half-power beam width	10°	9.7°	9.3°	9.5°	9°	8.7°
Electrical tilt	2°–14°, continuously adjustable			0°–14°, continuously adjustable		
Sidelobe suppression for first sidelobe above main beam	2° ... 8° ... 14° T 17 ... 17 ... 15 dB	2° ... 8° ... 14° T 17 ... 17 ... 16 dB	2° ... 8° ... 14° T 17 ... 17 ... 16 dB	0° ... 7° ... 14° T 18 ... 17 ... 17 dB	0° ... 7° ... 14° T 18 ... 17 ... 17 dB	0° ... 7° ... 14° T 18 ... 17 ... 17 dB
Impedance	50 Ω					
VSWR	< 1.5					
Isolation: Intrasystem	> 30 dB					
Isolation: Intersystem	> 35 dB (790–960 // 1710–2180 MHz) > 30 dB (1710–2180 // 1710–2180 MHz)					
Intermodulation IM3	< –153 dBc (2 x 43 dBm carrier)					
Max. power per input	400 W (at 50 °C ambient temperature)			250 W (at 50 °C ambient temperature)		

**Mechanical specifications**

Input	6 x 7-16 female (long neck)
Connector position	Bottom
Adjustment mechanism	3x, Position bottom continuously adjustable
Wind load	Frontal: 640 N (at 150 km/h) Lateral: 400 N (at 150 km/h) Rearside: 950 N (at 150 km/h)
Max. wind velocity	200 km/h
Height/width/depth	2058 / 262 / 149 mm
Category of mounting hardware	M (Medium)
Weight	27 kg / 29 kg (clamps incl.)
Packing size	2385 x 282 x 182 mm
Scope of supply	Panel and 2 units of clamps for 50 – 115 mm diameter



MODELO 3C+DD**Dual-band Panel****Dual Polarization****Half-power Beam Width****Adjust. Electr. Downtilt**

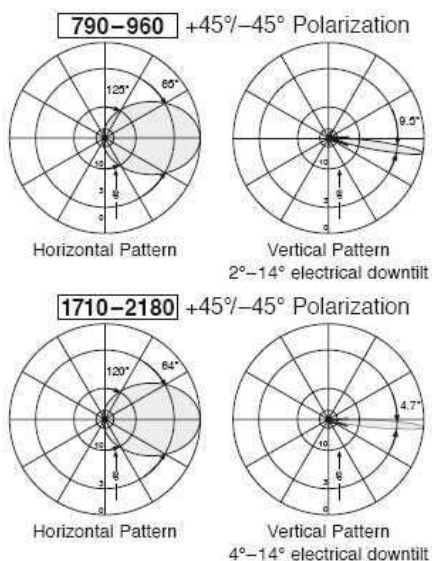
set by hand or by optional RCU (Remote Control Unit)

790–960**1710–2180****X****X****65°****65°****2°–14°****4°–14°****KATHREIN**

Antennen · Electronic

XXPol Panel 790–960/1710–2180 65°/65° 16.5/18.5dBi 2°–14°/4°–14°T

Type No.	80010485v01					
Frequency range	790–960		1710–2180			
	790 – 862 MHz	824 – 896 MHz	880 – 960 MHz	1710 – 1880 MHz	1850 – 1990 MHz	1920 – 2180 MHz
Polarization	+45°, –45°		+45°, –45°	+45°, –45°	+45°, –45°	+45°, –45°
Average gain (dBi)	16.2 ... 16 ... 15.7	16.3 ... 16.1 ... 15.8	16.4 ... 16.2 ... 15.8	18 ... 18.2 ... 17.7	18.4 ... 18.5 ... 17.8	18.7 ... 18.6 ... 18
Tilt	2° ... 8° ... 14°	2° ... 8° ... 14°	2° ... 8° ... 14°	4° ... 9° ... 14°	4° ... 9° ... 14°	4° ... 9° ... 14°
Horizontal Pattern:						
Half-power beam width	68°	67°	65°	66°	64°	60°
Front-to-back ratio (180°±30°)	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross polar ratio	Typically:	Typically:	Typically:	Typically:	Typically:	Typically:
Main direction	25 dB	25 dB	25 dB	20 dB	20 dB	21 dB
Sector	±60°	> 10 dB	> 10 dB	> 10 dB	> 10 dB	> 10 dB
Vertical Pattern:						
Half-power beam width	10°	9.7°	9.3°	5°	4.7°	4.5°
Electrical tilt	2°–14°, continuously adjustable			4°–14°, continuously adjustable		
Sidelobe suppression for first sidelobe above main beam	2° ... 8° ... 14° T 17 ... 17 ... 15 dB	2° ... 8° ... 14° T 17 ... 17 ... 16 dB	2° ... 8° ... 14° T 17 ... 17 ... 16 dB	4° ... 9° ... 14° T 20 ... 18 ... 15 dB	4° ... 9° ... 14° T 19 ... 18 ... 15 dB	4° ... 9° ... 14° T 18 ... 17 ... 15 dB
Impedance	50 Ω					
VSWR	< 1.5					
Isolation: Intrasystem	> 30 dB					
Isolation: Intersystem	> 35 dB (790–960 // 1710–2180 MHz)					
Intermodulation IM3	< –153 dBc (2 x 43 dBm carrier)					
Max. power per input	400 W (at 50 °C ambient temperature)			250 W (at 50 °C ambient temperature)		
Total power	800 W (at 50 °C ambient temperature)			500 W (at 50 °C ambient temperature)		



1710–2180 –45°	790–960 –45°	790–960 +45°	1710–2180 +45°
7-16	7-16	7-16	7-16
Mechanical specifications			
Input	4x 7-16 female (long neck)		
Connector position	Bottom		
Adjustment mechanism	1x, Position bottom continuously adjustable		
Wind load:	Frontal: 750 N (at 150 km/h) Lateral: 380 N (at 150 km/h) Rearside: 900 N (at 150 km/h)		
Max. wind velocity	200 km/h		
Height/width/depth	2038 / 262 / 139 mm		
Category of mounting hardware	M (Medium)		
Weight	24 kg / 26 kg (clamps incl.)		
Packing size	2356 x 282 x 172 mm		
Scope of supply	Panel and 2 units of clamps for 50 – 115 mm diameter		



MODELOS 26B+DD**LOW BAND SIDE BY SIDE PANEL ANTENNA**

2 X BAND 900

BAT40-684 TV

2 X (790 - 960)

H69° V7.3°

Variable Tilt 0°-8°

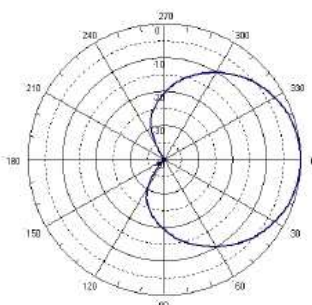
ELECTRICAL SPECIFICATIONS

2 X BAND 900

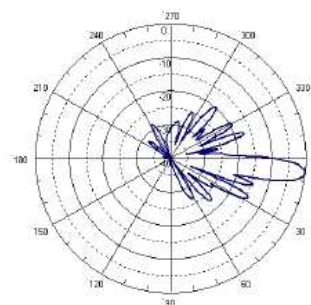
Antenna Model	BAT40-684TV
Polarization	± 45°
Frequency (MHz)	2 X (790 - 960)
Horizontal Beamwidth	69°
Vertical Beamwidth	7.3°
Gain (dBi)	16.5
Vertical Electrical Tilt	VARIABLE 0°-8°
Upper Sidelobe Suppression for the 1 st lobe above main beam (dB)	15
Front-to-Back Ratio @180° ± 20° (dB)	> 25
VSWR	< 1.5 : 1
Cross Polar Ratio @ ± 60° (dB) <i>Typically</i>	> 8
Isolation Between Ports	> 25
Maximum Power Per Input (W)	500
Intermodulation (dBc)	< -150
Impedance (Ω)	50

MECHANICAL SPECIFICATIONS

Connectors	4 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed km/h (mph)	200 (125)
Front Windload N @ 160 km/h (lbs @100 mph)	1940 (440)
Lateral Windload N @ 160 km/h (lbs @100 mph)	860 (195)
Radome Color	Grey, paintable
Humidity	100%
Antenna Weight kg (lbs)	40 (88)
Antenna Dimension mm (in.) H X W X D	2700 X 420 X 240 (106 X 16 X 10)



H&V Pattern



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Antena panel Dualbanda (2xWGSN)

ANTENA PANEL

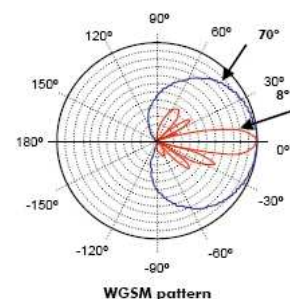
TNA190A14 - Especificaciones técnicas

Radio-Eléctricas	x2 WGSN
Rango de Frecuencias	790-960 MHz
Polarización	Xpol, +/- 45°
Máxima Ganancia	16,8 dBi
Ganancia +/- Desviación Media	16,5 +/- 0,3 dBi
Ángulo de Radiación Horizontal	70°
Ángulo de Radiación Vertical	8°
Discriminación Cross Polar Bore sight	Typ 18 dB
Copolar F/B Ratio (180° +/- 30° cono)	25 dB
Atenuación del primer lóbulo lateral sobre el horizonte	18 20 14 dB 2° 6° 10°
Tilt Eléctrico con ajuste continuo	2° - 10° (Independiente por banda)
VSWR	< 1,5:1
Aislamiento Intrabanda	> 30 dB
Aislamiento Interbanda	> 30 dB
Null fill	Typ 27 dB
Impedancia	50 Ohms
Máx. Potencia por entrada	300W
PIM (2*20W)	150dBc
Preparada para RET	OK



Mecánicas	
Entradas	4 x 7/16 hembra
Posición	Inferior, 4 (7/16)
Conectores	
Dimensiones	2700mm 500 mm 164 mm
Peso	35 Kg.
Máx. velocidad del viento	200 Km/h

Materiales	
Radomo	Fibra de vidrio + poliéster
Tapa	Plástico para exteriores de alta resistencia
Tornillería	Acero Inoxidable

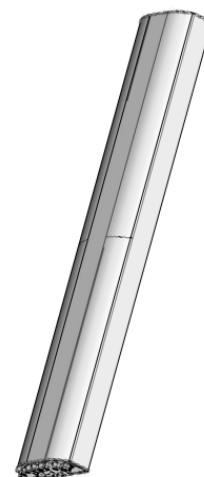


Ensayos mecánicos y medioambientales	
IEC 60068-2-2: Calor Seco	IEC 60068-2-27: Prueba de impacto
IEC 60068-2-56: Calor húmedo Método	IEC 60068-2-6: Vibración sinusoidal
IEC 60068-2-30: Calor húmedo	IEC 60068-2-14: Variación de la temperatura
IEC 60068-2-64: Vibración aleatoria	IEC 60068-2-32: Prueba de caída libre
IEC 60068-2-1: Frío	IEC 60068-2-29: Prueba de golpes permanentes (transporte)
IEC 60068-2-18: Agua (Ducha manual)	

Las antenas TELNET han superado las pruebas medioambientales recomendadas en la norma ETS 300 019-2-4, y los ensayos adicionales recomendados por los principales operadores mundiales.

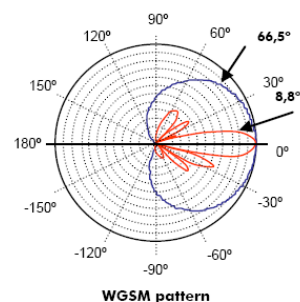
MODELO 30B+DD**Antena panel Tetrabanda (2xWGSW/2xBB)****ANTENA PANEL****TNA190A12 - Especificaciones técnicas**

Radio-Eléctricas	x2 WGSW	x2 Broadband
Rango de Frecuencias	790-960 MHz	1710-2170 MHz
Polarización	Xpol, +/- 45°	Xpol, +/- 45°
Máxima Ganancia	16,7 dBi	17,8 dBi
Ganancia +/- Desviación Media	16,4 +/- 0,3 dBi	17,5 dBi +/- 0,3
Ángulo de Radiación Horizontal	66,5°	57°
Ángulo de Radiación Vertical	8,8°	7,8°
Discriminación Cross Polar Bore sight	Typ 18 dB	Typ 18 dB
Copolar F/B Ratio (180° +/- 30° cono)	25 dB	22 dB
Atenuación del primer lóbulo lateral sobre el horizonte	18 20 14 dB 2° 6° 10°	21 21 16 dB 2° 6° 10°
Tilt Eléctrico con ajuste continuo	2° - 10° (Independiente por banda)	2° - 10° (Independiente por banda)
VSWR	< 1,5:1	< 1,5:1
Aislamiento Intrabanda	> 30 dB	> 30 dB
Aislamiento Interbanda	> 30 dB	> 30 dB
Null fill	Typ 27 dB	Typ 20 dB
Impedancia	50 Ohms	50 Ohms
Máx. Potencia por entrada	300W	300W
PIM (2*20W)	150dBc	150dBc
Preparada para RET	OK	OK

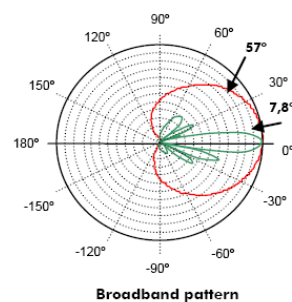


Mecánicas	
Entradas	8 x 7/16 hembra
Posición	Inferior, 8 (7/16)
Conectores	
Dimensiones	2700mm 500 mm 164 mm
Peso	38 Kg.
Máx. velocidad del viento	200 Km/h

Materiales	
Radomo	Fibra de vidrio + poliéster
Tapa	Plástico para exteriores de alta resistencia
Tornillería	Acero Inoxidable



WGSM pattern



Broadband pattern

Ensayos mecánicos y medioambientales

IEC 60068-2-2: Calor Seco	IEC 60068-2-27: Prueba de impacto
IEC 60068-2-56: Calor húmedo Método	IEC 60068-2-6: Vibración sinusoidal
IEC 60068-2-30: Calor húmedo	IEC 60068-2-14: Variación de la temperatura
IEC 60068-2-64: Vibración aleatoria	IEC 60068-2-32: Prueba de caída libre
IEC 60068-2-1: Frío	IEC 60068-2-29: Prueba de golpes permanentes (transporte)
IEC 60068-2-18: Agua (Ducha manual)	

Las antenas TELNET han superado las pruebas medioambientales recomendadas en la norma ETS 300 019-2-4, y los ensayos adicionales recomendados por los principales operadores mundiales.

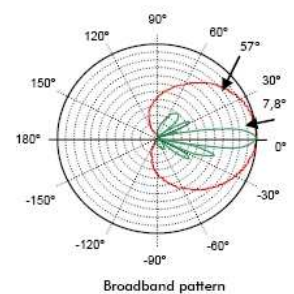
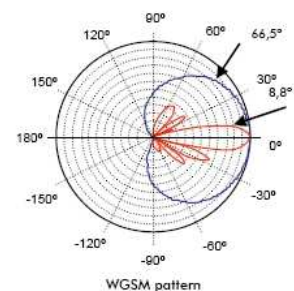
MODELO 30C+DD**Quad-band (2xWGSN/2xBB) Panel Antenna****PANEL ANTENNA****TNA190A02 - Technical Features**

Radio-Electrical	x2 WGSN	x2 Broadband
Frequency Range	790-960 MHz	1710-2170 MHz
Polarization	Xpol, +/- 45°	Xpol, +/- 45°
Gain Max	15,7 dBi	16,3 dBi
Gain +/- Avg dev dBi	15,4 +/- 0,3 dBi	16 dBi +/- 0,3
Horizontal Beam width	66,5°	57°
Vertical Beam width	8,8°	7,8°
Cross Polar Discrimination Bore sight	Typ 18 dB	Typ 18 dB
F/B Ratio Copolar (180° +/- 30° cone)	25 dB	22 dB
Side lobe suppression for first side lobe above horizon	18 20 14 dB 2° 6° 10°	21 21 16 dB 2° 6° 10°
Electrical tilt continuously adjustable	2° - 10°	2° - 10°
VSWR	< 1,5:1	< 1,5:1
Intra band Isolation	> 30 dB	> 30 dB
Inter band Isolation	> 30 dB	> 30 dB
Null fill	Typ 27 dB	Typ 20 dB
Impedance	50 Ohms	50 Ohms
Max. Power per input	300W	300W
PIM (2*20W)	150dBc	150dBc
Prepared for RET	OK	OK



Mechanical	
Input	8 x 7/16 female
Connectors position	Bottom, 8 (7/16)
Dimensions (HxWxD)	2230mm 500 mm 164 mm
Weight	35 Kg.
Max. wind speed	200 Km/h

Material	
Radome	Fiber glass + polyester
End Caps	Plastic of high resistance for the exterior
Screws and Nuts	Stainless Steel



Environmental and mechanical tests	
IEC 60068-2-2: Dry Heat	IEC 60068-2-64: Random Vibration
IEC 60068-2-56: Damp Heat Steady State	IEC 60068-2-6: Sine Vibration
IEC 60068-2-30: Damp Heat Cyclic	IEC 60068-2-27: Shock Test
IEC 60068-2-14: Change of Temperature	IEC 60068-2-32: Free Fall Test
IEC 60068-2-1: Cold	IEC 60068-2-29: Bump Test
IEC 60068-2-18: Water (Handheld shower)	

Telnet antennas have passed environmental tests recommended in ETS 300 019-2-4, and extensive test recommended by the main operators over the world.

MODELO SUANCES/DEPÓSITO

MULTI BAND PANEL ANTENNA (TRIPLE)

BAND 900 + 2x BROADBAND 1710 – 2170 MHz

TTD3-800TV

870 - 960	2 X 1710 - 2170		
870 - 960	1710-1880	1850-1990	1920-2170
H60° V7.5°	H67° V6.8°	H64° V6.6°	H61° V6.3°
Variable Tilt 2° - 10°	Variable Tilt 2° - 10°	Variable Tilt 2° - 10°	Variable Tilt 2° - 10°

ELECTRICAL SPECIFICATIONS

BAND 900

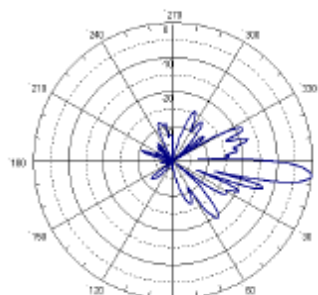
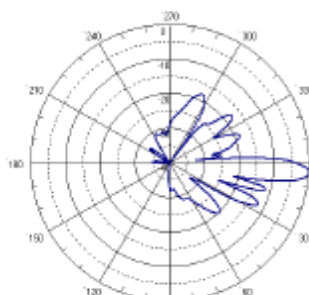
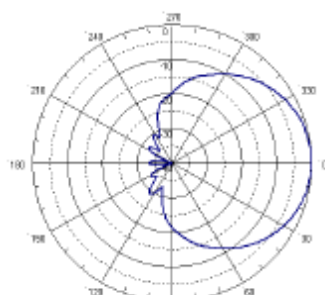
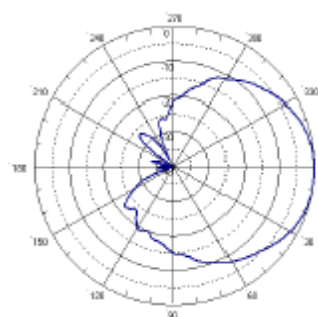
2 X BROADBAND 1710-2170 MHz

Antenna Model	TTD3-800TV			
Polarization	± 45°			
Frequency	870 - 960	2 X (1710 – 2170)		
	870 - 960	1710-1880	1850-1990	1920-2170
Horizontal Beamwidth	60°	67°	64°	61°
Vertical Beamwidth	7.5°	6.8°	6.6°	6.3°
Gain (dBi)	16.6	17.1	17	17.1
Vertical Electrical Tilt	VARIABLE 2°-10°	VARIABLE 2°-10°	VARIABLE 2°-10°	VARIABLE 2°-10°
Upper Sidelobe Suppression for the 1 st lobe above main beam (dB)	T2 T6 T10 20 20 17	T2 T6 T10 19 19 15	T2 T6 T10 20 20 17	T2 T6 T10 20 17 17
Front-to-Back Ratio @ 180° ± 20° (dB)	> 25	> 22	> 22	> 22
VSWR	< 1.5 : 1	< 1.5 : 1	< 1.5 : 1	< 1.5 : 1
Cross Polar Ratio @ -3° (dB) <i>Typically</i>	> 16	> 15	> 15	> 15
Isolation between Ports (dB)	> 30	> 30	> 30	> 30
Interband Isolation (dB)	> 40 (870-960//1710-2170) > 30 (1710-2170//1710-2170)			
Maximum Power Per Input (W)	500	250		
Intermodulation (dBc)	< - 150			
Impedance (Ω)	50			



MECHANICAL SPECIFICATIONS

Connectors	6 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed km/h (mph)	200 (125)
Front Windload N @ 160 km/h (lbs @ 100 mph)	1400 (315)
Lateral Windload N @ 160 km/h (lbs @ 100 mph)	330 (74)
Radome Color	Grey, paintable
Humidity	100%
Antenna Weight kg (lbs)	37 (82)
Antenna Dimension mm (in) H X W X D	2615 x 350 x 145 (103 X 14 X 6)

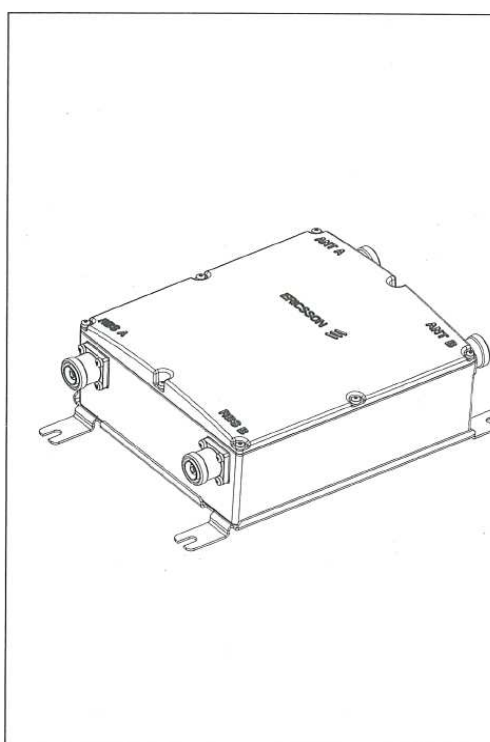


This antenna is available with variable electrical tilt 4°-14°

ANEXO B: AMPLIFICADORES

PTMA

Installation Instruction Quick Guide



Double TMA 900 FB

KRY 112 587/1
KRY 112 587/2

ERICSSON 

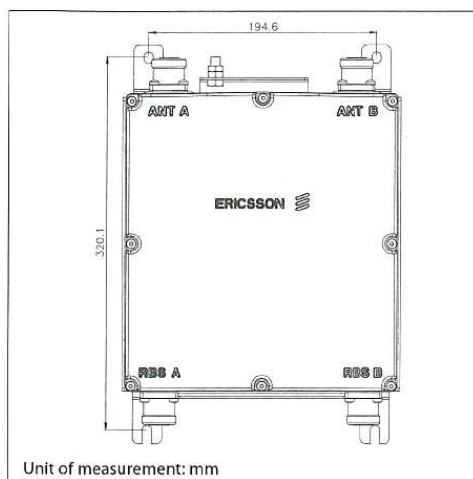
Mounting

The Tower-Mounted Amplifier (TMA) may be mounted either on a wall or on a pole.

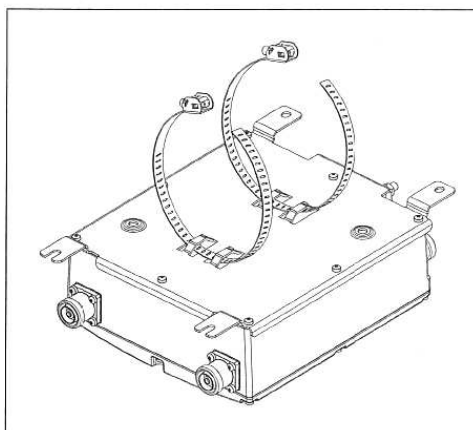
Mount the TMA as close to the antenna as possible.

Mounting on a Wall

Use the footprint of the TMA to mark the positions of the screw holes. Mount the TMA with four suitable screws. (recommended screw diameter 6 mm).



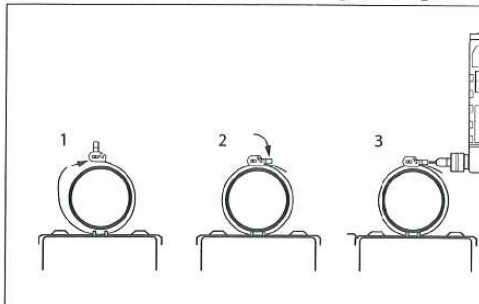
Mounting on a Pole



Mounting on a pole or cable ladder can be done using the two enclosed pole clamps. For the enclosed pole clamps the

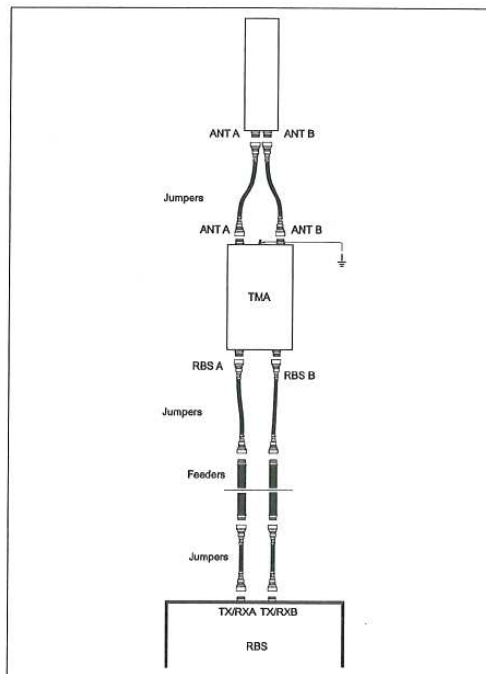
diameter of the pole may vary between 40 and 150 mm (1.6-5.9 inches).

Enter the free end of the clamps into the opening in the mounting bracket and pass them through, see figure.



Apply the clamps around the pole. Insert the free end of clamps into and through the screw-nipple and turn the nipple into locked position. Tighten the screw to 5.5 Nm (4 ft.lb.) by means of a 5 mm head hex sock

Connecting the TMA

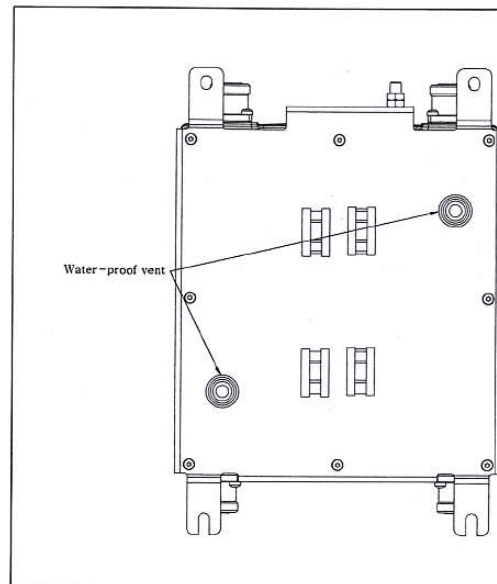


NOTE!

Do Not Cover the Water-proof vent Valve!

The unit is ventilated through Water-proof vent valve. important that the valve is not silted up. The TMA c painted as long as the Water-proof vent valve is not clo and the connectors are not painted.

Mount the TMA in an upright vertical position with RBS-ports pointing downwards.



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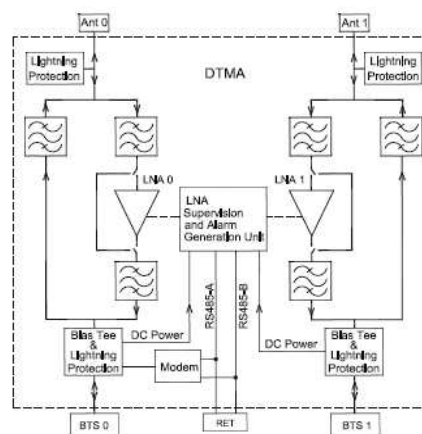
Ericsson AB
SE-164 80 Stockholm
Sweden

DTMA**DTMA-900-12-32-AISG-CWA****Fullband Double Dual Duplex Tower Mounted Amplifier
(Masthead Amplifier)****KATHREIN**
Antennen · Electronic

- Double units for easy use with XPol antennas
- Gain setting switchable from 12 dB (default) to 32 dB
- Both versions support CWA, AISG 1.1 and AISG 2.0 (default)
782 10440: CWA alarm 170 – 200 mA / 800 – 900 mA
782 10442: CWA alarm 230 – 295 mA / 800 – 900 mA
- AISG and gain setting switchable as described on page 2
- CWA and AISG configurations as described on page 2
- Suitable for antenna RET control according to AISG/3GPP standard
- By-pass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = Remote Electrical Tilt**AISG** = Antenna Interface Standards Group**CWA** = Current Window Alarm**Technical Data**

Type No.	CWA alarm 170 – 200 mA / 800 – 900 mA	782 10440 DTMA-900-12-32-AISG-CWA (12/32 dB gain)
	CWA alarm 230 – 295 mA / 800 – 900 mA	782 10442 DTMA-900-12-32-AISG-CWA (12/32 dB gain)
Tx Characteristics		
Frequency range	925 – 960 MHz	
Insertion loss	Typically 0.5 dB	
Input power (per input)	< 180 W (+52.5 dBm) CW / < 1.6 kW (+62 dBm) peak	
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	880 – 915 MHz	
Loss in by-pass mode	Typically 4 dB (DC OFF)	
Return loss	> 16 dB (DC ON)	
Gain	12/32 dB nominal	
Noise figure	Typically 1.3 dB	
Input 3 rd order intercept point (IIP3)	Typically 5 dBm	
Environmental Characteristics		
Operating temperature range	–40 ... +55 °C	
IP rating	IP 67*	
MTBF	> 1 000 000 hours (per TMA)	
EMC	According to ETS 300 342-3	
DC and Alarm Characteristics		
	CWA Mode	AISG Mode
DC supply	8.5 – 19 V (12 dB gain) 8.5 – 15 V (32 dB gain)	10 – 30 V
Operating current per TMA (without RET)	80 – 120 mA (12 dB gain) 360 – 400 mA (32 dB gain)**	< 110 mA (12 dB gain) < 350 mA (32 dB gain)
Alarm management	782 10440: 170 – 200 mA 782 10442: 230 – 295 mA 800 – 900 mA	AISG*
12 dB gain		
32 dB gain		
Mechanical Characteristics		
Material	Aluminium housing	
Connectors	RF AISG 7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)	
Weight	8.7 kg	
Packing size	342 x 579 x 212 mm	
Mounting	Wall mounting: with 4 screws (max. 8 mm diameter) Mast mounting: with additional clamp set	
Dimensions (w x h x d)	250 x 353 x 94 mm (without connectors, without mounting brackets)	

**Accessories (order separately)**

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm



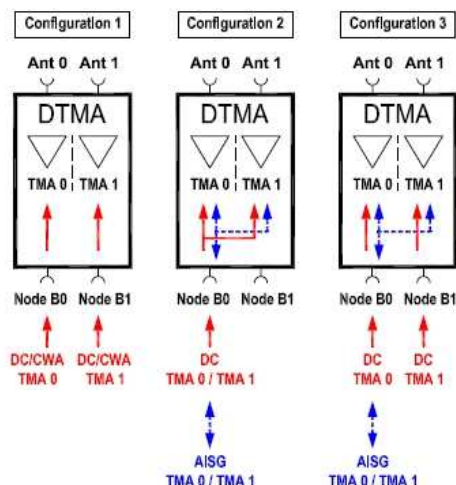
DTMA-900-12-32-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN

Antennen · Electronic

DC Supply, Current Window Alarm and AISG Configuration (automatically chosen by the DTMA depending on incoming signals)



Mounting Instructions

The coupling torque at 7-16 connectors is 25 – 30 Nm!

The tightening torque for fixing the AISG connector must be 0.5 – 1.0 Nm ('hand-tightened').

It is recommended to install the DTMA's with the antenna connectors pointing upwards and the BTS connectors pointing downwards.

In case of DTMA's with RET-connectors (Remote Electrical Tilt-connectors according to AISG Standard) it is **recommended** to mount the DTMA's in such a way that the RET-connector **always points downwards!** A downward slanted mounting position between the vertical and horizontal plane is also allowed.

AISG and Gain Setting

The protocol of the software interface can be switched between AISG 2.0 / 3GPP and AISG 1.1 and vice versa with a vendor specific command (depending on default setting). If the primary station does not support the default setting, it has to be switched over before system start-up. Please contact Kathrein for further information. Gain setting according to AISG commands.

Please note

The DTMA is not designed for permanent operation under water. Test conditions for the IP67 rating: submerge depth 1 m, submerge time 1 hour.

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of a mast mounted device or even cause it to fall to the ground.

KATHREIN tower mounted amplifiers are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1E and have passed environmental tests as specified in ETS 300 019-2-4. The homogenous design of KATHREIN's tower mounted amplifiers use identical modules and materials. Extensive tests have been performed on typical samples and models.

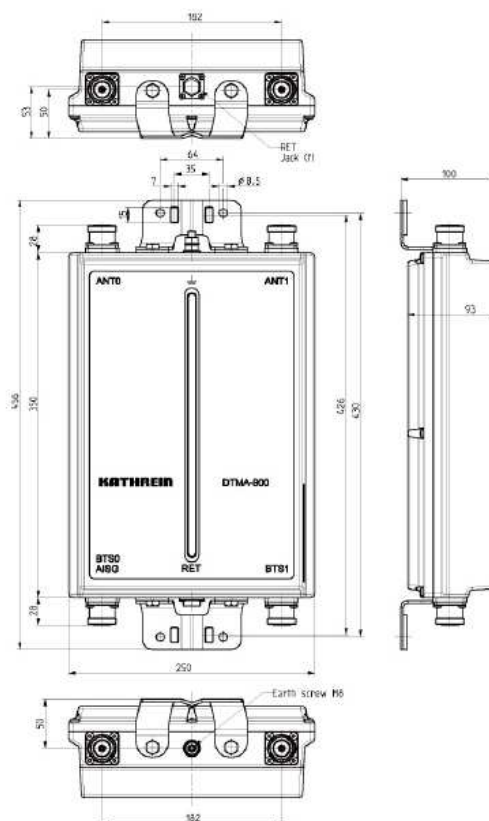
The installation team must be properly qualified and also be familiar with the relevant national safety regulations.



The details given on our data sheets have to be followed carefully when installing the antennas, filters, combiners, amplifiers and accessories.

The limits for the coupling torque of RF connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.



ANEXO C: COMBINADORES

COMBINADOR DE CAVIDAD

Installation Recommendation

Revision: TME-FT-IR-R03

900MHz GSM/UMTS In-band Combiner

(P/N : KCBDR1310001)

Caution !

Permanent damage may occur to this product if BTS ports are interchanged or Tx frequencies are incorrectly allocated.

[Frequency Allocation]

BTS 0 bands (Band Stop)

Rx band : 890.1~894.6MHz & 899.8~903.9MHz

Tx band : 935.1~939.6MHz & 944.8~948.9MHz

BTS 1 bands (4.2MHz Band Pass)

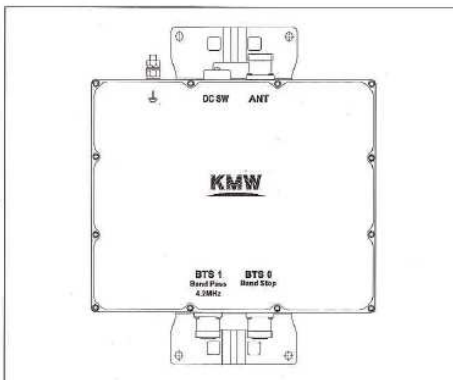
Rx band : 895.1~899.3MHz

Tx band : 940.1~944.3MHz

Do Not Cover the Gore-Tex Hole

The unit is ventilated through the Gore-Tex hole. It is important that the Gore-Tex hole should not be silted up. The Combiner can be painted as long as the Gore-Tex hole is not clogged and the connectors are not painted.

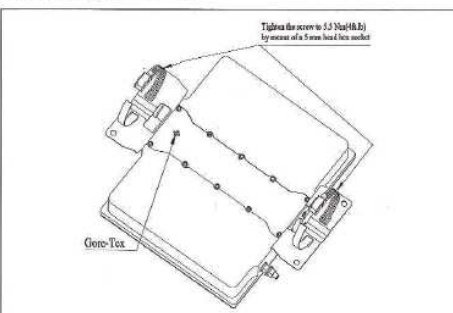
Port Location



Mounting

The Combiner may be mounted either on a wall or on a pole.

Mounting on a Pole



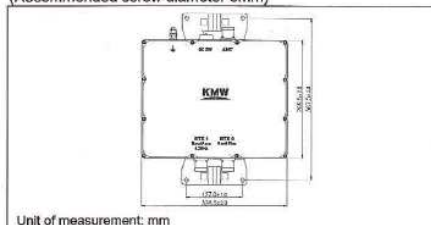
Mounting on a pole or cable ladder can be done using two pole clamps. It is recommended to use the clamp diameter between 40mm and 150mm.

Mounting on a Wall

Use the footprint of the Combiner to mark the positions of the screw holes.

Mount the Combiner with four suitable screws.

(Recommended screw diameter 8mm)



DC/AISG Switch Operation

To change DC path:

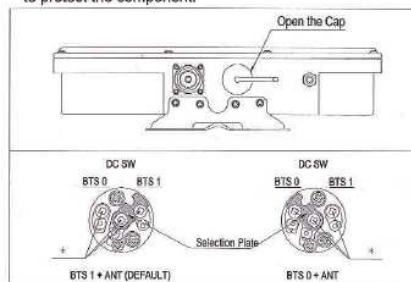
- 1) Open the DC Switch Cap
- 2) Loosen the three screws marked with * in the drawing.
- 3) Rotate the selection plate according to drawing.
- 4) Tighten all three screws (Torque: 0.35±0.1Nm).

* Default is BTS 1 (4.2MHz Band Pass) - ANT

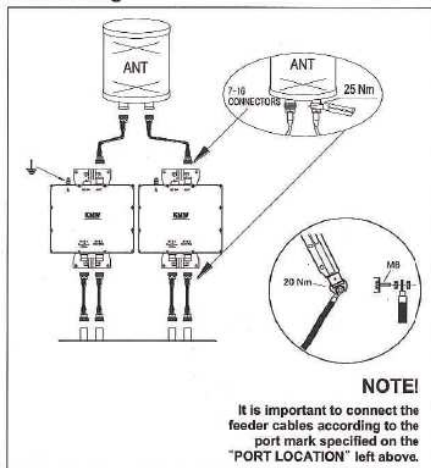
Caution !

When closing the DC Switch Cap after changing DC path, lock the Cap properly.

It is recommended to seal the Cap with Silicon molding paste to protect the component.



Connecting

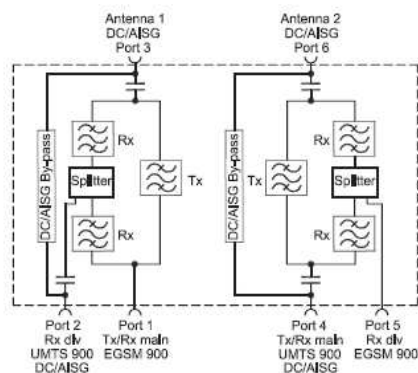


COMBINADOR HÍBRIDO

Duplex Hybrid Combiner (Same-Band Combiner)

880 – 960 MHz
EGSM900880 – 960 MHz
UMTS900**KATHREIN**
Antennen · Electronic

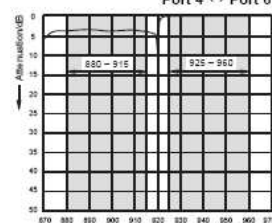
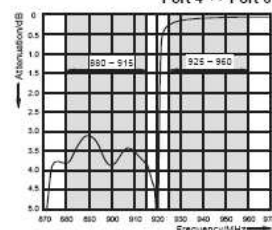
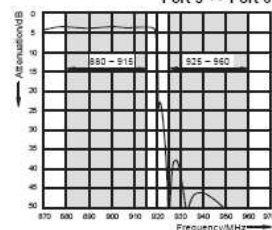
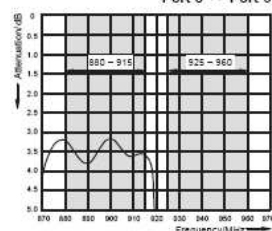
- Enables antenna and feeder sharing for two base stations in the 900 MHz frequency band
- Very low insertion loss over full EGSM/UMTS900 Tx bandwith compared to standard hybrid combiners
- Double unit in one housing for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG by-pass for DTMA supply (for UMTS paths only)
- Rx diversity ports protected against incorrectly connected Tx power



Technical Data

Type No.	782 10805
Pass band	
Rx	880 – 915 MHz
Tx	925 – 960 MHz
Insertion loss	
Port 1 ↔ Port 3 / Port 4 ↔ Port 6	< 0.4 dB, typically 0.2 dB (925 – 960 MHz) – see Diagram I and II < 4.3 dB, typically 3.6 dB (880 – 915 MHz) – see Diagram I and II
Port 2 ↔ Port 3 / Port 5 ↔ Port 6	< 4.0 dB, typically 3.5 dB (880 – 915 MHz) – see Diagram III and IV
Isolation	
Port 1 ↔ Port 2 / Port 4 ↔ Port 5	> 25 dB (880 – 915 MHz) > 35 dB (925 – 960 MHz)
VSWR	< 1.2 (880 – 915 / 925 – 960 MHz)
Impedance	50 Ω
Input power	Port 1: < 250 W Port 4: < 250 W Port 2: < 50 W Port 5: < 50 W
Intermodulation products	< -160 dBc (3 rd order; with 2 x 20 W)
Temperature range	-40 ... +60 °C
Connectors	7-16 female (long neck)
Application	Indoor or outdoor (IP 66)
DC/AISG transparency	Stop By-pass (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse
Mounting	With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	6.5 kg
Packing size	390 x 470 x 160 mm
Dimensions (w x h x d)	287.1 x 278.6 x 71 mm (without connectors, without mounting brackets)

Typical Attenuation Curves

Diagram I Port 1 ↔ Port 3
Port 4 ↔ Port 6Diagram II Port 1 ↔ Port 3
Port 4 ↔ Port 6Diagram III Port 2 ↔ Port 3
Port 5 ↔ Port 6Diagram IV Port 2 ↔ Port 3
Port 5 ↔ Port 6

Duplex Hybrid Combiner (Same-Band Combiner)

KATHREIN
Antennen · Electronic

880 – 960 MHz
EGSM900

880 – 960 MHz
UMTS900

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm
Type No.	Description
782 10850	DC stop
784 10367	50-Ω load 1.5 W / indoor or outdoor

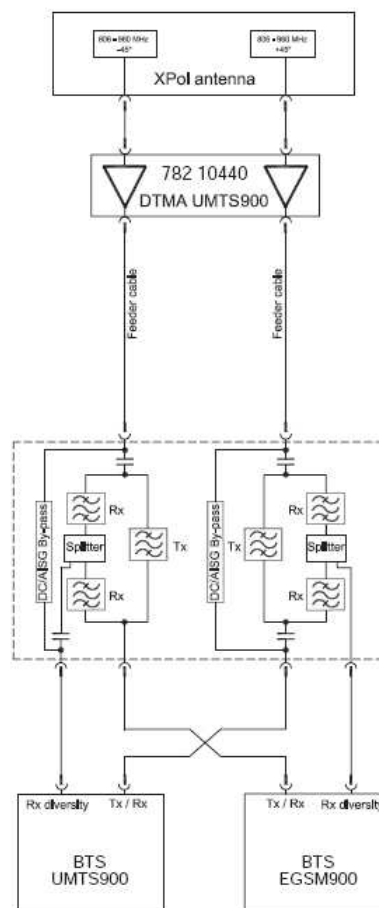
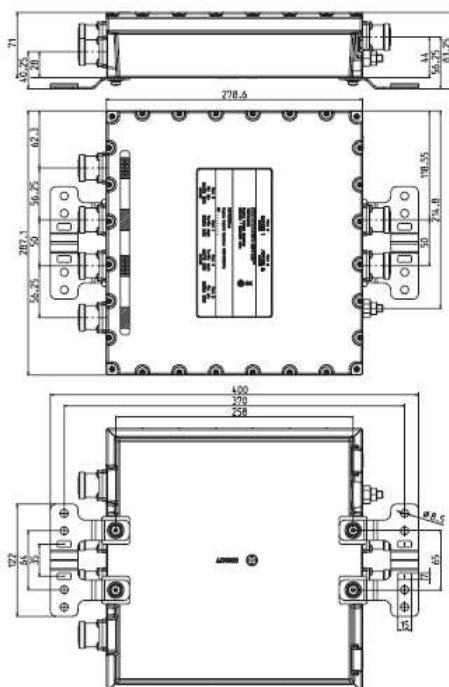
Clamp Set



DC stop



50-Ω load



Application example

Please note:

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of a mast mounted device or even cause it to fall to the ground.

These facts must be considered during the site planning process.

The Duplex Hybrid Combiner is designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E and have passed environmental tests as recommended in ETS 300 019-2-4.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.

The details given in our data sheets have to be followed carefully when installing the antennas, filters, combiners, amplifiers and accessories.

Installation is possible in any direction (horizontally or vertically).

The limits for the coupling torque of RF connectors, recommended by the connector manufacturers must be obeyed.

Terminate unused inputs with a suitable 50-Ω load, e.g. 784 10367.

Any previous datasheet issues have now become invalid.



ANEXO D: DESCARGADORES **CON PASO DE CORRIENTE**

HUBER+SUHNER® DATA SHEET

EMP Protector



Description

High-power/low-IM GDT hybrid technology

Benefits

The protector can also be installed reversely
DC continuity for outdoor powering
Compliant to IEC 61643-21

Mounting screw set 9075.99.0023 included
With GDT 9071.99.0548, 90 V
Compliant to IEC 61643-21



Product Configuration

Main path connectors Port 1: unprotected, 7/16 plug (male) - Port 2: protected, 7/16 jack (female)
Mounting and grounding MH74/M8/brk (MH=bulkhead mounting/M=screw/brk=bracket)
Side of bulkhead protected side

Technical Data

Electrical Data

Impedance	50 Ω		
Frequency range	806 to 2500 MHz	806 to 960 MHz	1710 to 2500 MHz
Return loss	≥ 20.8 dB	≥ 26 dB	≥ 26 dB
Insertion loss	≤ 0.1 dB	≤ 0.1 dB	≤ 0.1 dB
RF CW power	≤ 1500 W	≤ 3000 W	≤ 1500 W
PIM 3 rd order	-150 dBc max.		
Surge current handling capability	30 single / 20 multiple kA (test pulse 8/20 μ s)		
Residual pulse energy	250 μ J typically (test pulse 4 kV 1.2/50 μ s / 2 kA 8/20 μ s) main path - protected side		

Environmental Data

Operating temperature	-40 °C to +85 °C
Waterproof degree	IP 67 (according to IEC 60529, data refer to the coupled state)
2002/95/EC (RoHS)	Telecom compliant

Material Data

Piece Parts

Housing
Port 1 center contact
Port 2 center contact

Material

Brass
Brass
Copper Beryllium Alloy

Surface Plating

SUCOPLATE (R) Plating
Silver Plating
Silver Plating

Related Documents

Outline drawing	DOU-00004583.1
Mounting instruction	DOC-0000176104

Remarks

- Current-handling capability: 30 kA once and 20 kA multiple (8 / 20 μ s test pulse)
- Residual pulse energy: typ. 250 μ J (test pulse 4 kV, 1.2 / 50 μ s 2 kA, 8 / 20 μ s IEC 6100-4-5) (measured with gas capsule 73 Z-0-0-548 (90 V))
- Screw set 9075.99.00

Product Specifications



APTDC-BDFDF-DB

Arrestor Plus® Dual Band Quarterwave dc Passing Surge Arrestor (T-shaped), 806–960 MHz and 1700–2170 MHz, with interface types DIN Female Bulkhead and DIN Female



CHARACTERISTICS

General Specifications

Interface	7-16 DIN Female Bulkhead
Interface 2	7-16 DIN Female
Body Style	Bulkhead

Electrical Specifications

Operating Frequency Band	1710 – 2000 MHz 2000 – 2170 MHz 806 – 960 MHz
3rd Order IMD	-117.0 dB
3rd Order IMD Test Method	Two +43 dBm carriers
Average Power	3000 W
Connector Impedance	50 ohm
Gas Tube Voltage	350 V
Lightning Surge Capability	10 times @ 30 kA
Lightning Surge Capability Test Method	IEEE C62.42-1991
Lightning Surge Capability Waveform	8/20 waveform
Lightning Surge Current	30 kA
Lightning Surge Current Waveform	8/20 waveform
Peak Power, maximum	40.00 kW
Insertion Loss, typical	0.05 dB

Product Specifications



APTDC-BDFDM-DB

Arrestor Plus® Dual Band Quarterwave dc Passing Surge Arrestor (T-shaped), 806–960 MHz and 1710–2170 MHz, with interface types DIN Female Bulkhead and DIN Male



CHARACTERISTICS

General Specifications

Interface	7-16 DIN Female Bulkhead
Interface 2	7-16 DIN Male
Body Style	Bulkhead

Electrical Specifications

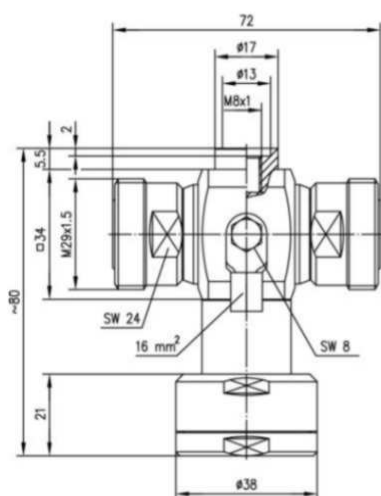
Operating Frequency Band	1710 – 2000 MHz 2000 – 2170 MHz 806 – 960 MHz
3rd Order IMD	-117.0 dB
3rd Order IMD Test Method	Two +43 dBm carriers
Average Power	3000 W
Connector Impedance	50 ohm
dc Current, continuous	3 A
Gas Tube Voltage	350 V
Lightning Surge Capability	10 times @ 30 kA
Lightning Surge Capability Test Method	IEEE C62.42-1991
Lightning Surge Capability Waveform	8/20 waveform
Lightning Surge Current	30 kA
Lightning Surge Current Waveform	8/20 waveform
Peak Power, maximum	40.00 kW
Insertion Loss, typical	0.07 dB

TECHNICAL DATA SHEET		Rosenberger®	
7/16	SURGE ARRESTER BULKHEAD JACK - JACK	60BK561-K00N1	
All dimensions are in mm; tolerances according to ISO 2768 m-H			
Interface			
According to		IEC 60169-4, VG 95250, EN 122190, DIN 47223	
Documents			
Panel piercing		B 75	
Assembly instruction		60 X02	
Material and plating			
Connector parts		Material	Plating
Center contact jack side		Spring bronze	Silver, 3-6 µm
Outer contact		Brass	Flash white bronze over silver(e.g. Optargen®)
Body		Brass	Flash white bronze over silver(e.g. Optargen®)
Dielectric		PTFE	
Gasket		Silicone	
Rosenberger Hochfrequenztechnik GmbH & Co. KG P.O.Box 1260 D-84526 Tittmoning Germany www.rosenberger.de		Tel.: +49 8684 18-0 Fax: +49 8684 18-499 email: info@rosenberger.de	
		Page 1 / 2	

TECHNICAL DATA SHEET		Rosenberger®					
7/16	SURGE ARRESTER BULKHEAD JACK - JACK	60BK561-K00N1					
Electrical data							
Impedance	50 Ω						
Operating frequency	800 to 2500 MHz						
Return Loss	≥ 26 dB, 800 to 960 MHz						
	≥ 21 dB, 960 to 1700 MHz						
	≥ 26 dB, 1700 to 2500 MHz						
Insertion Loss	≤ 0.1 dB						
Center contact resistance	< 0.4 mΩ						
Outer contact resistance	< 1.5 mΩ						
Power handling (at 20 °C, sea level, VSWR 1.0)	P=U²/R (W) (depending on the gas capsule)						
DC bypass	20A @ 50V, max. Voltage depends on gas capsule						
Rated threshold voltage DC	90 V,	Gas capsule order no.:	53Z B01-090				
(depending on the gas capsule(90V included))	230 V,	Gas capsule order no.:	53Z B01-230				
	350 V,	Gas capsule order no.:	53Z B01-350				
RF-leakage	≥ 128 dB @1 GHz						
Intermodulation (3 rd Order)	< -115 dBm @ 2 x 20 W						
Nominal impulse discharge current	20 kA, Wave 8/20 μS						
Impulse spark over voltage	< 700 V (90V, 230V gas caps)						
	< 800 V (250V, 350V gas caps)						
Mechanical data							
Mating cycles	min. 500						
Coupling nut retention	≥ 1000 N						
Center contact captivation: axial	≥ 200 N						
radial	≥ 2 Ncm						
Coupling torque (recommended)	25 to 30 Nm						
Proof torque	max. 35 Nm						
Environmental data							
Temperature range	-45°C to +85°C						
Rapid change of temperature	IEC 60068-2-14 Test Na						
Corrosion salt mist	IEC 60068-2-11 Test Ka						
Vibration	IEC 60068-2-6 Test Fc						
Shock	IEC 60068-2-27 Test Ea						
Climatic class	IEC 60068-1 (45/85/56)						
Cold	IEC 60068-2-1 Test A						
Dry heat	IEC 60068-2-2 Test B						
Damp heat (steady state)	IEC 60068-2-3 Test Ca						
Degree of protection (mated pair)	IEC 60529, IP68 2.5 bar, mated condition						
2002/95/EC (RoHS)	compliant						
Packing							
Standard	1 pce in box						
Weight	527 g/pce						
While the information has been carefully compiled to the best of our knowledge, nothing is intended as representation or warranty on our part and no statement herein shall be construed as recommendation to infringe existing patents. In the effort to improve our products, we reserve the right to make changes judged to be necessary.							
Draft	Date	Approved	Date	Rev.	Engineering change number	Name	Date
A. König	05/11/05	E.Schwangler	23/11/07	b00	07-0823	S_Krautenb.	23/11/07
Rosenberger Hochfrequenztechnik GmbH & Co. KG P.O.Box 1260 D-84526 Tittmoning Germany www.rosenberger.de				Tel.: +49 8684 18-0 Fax: +49 8684 18-499 email: info@rosenberger.de			Page 2 / 2

Artikelnummer: J01125A0029

7-16 Überspannungsableiter Bu-Bu mit Lambda/4 Kurzschluss DC-Pass 85 V


 Anschlussmaße nach IEC 60169-4 /
 mating face according to IEC 60169-4

 Innenleiter/
 inner conductor CuZn39Pb3 Cu2Ag5

 federnde Kontakte /
 spring contacts CuBe2 Cu2Ag5

 Außenleiter/
 outer conductor CuZn39Pb3 CuSnZn3

 Isolierungen/
 insulators PTFE

 Dichtungen/
 gaskets Silikon

 mit Aufkleber/
 with label

 Montageanweisung /
 assembly instruction B76 (d)

 mit Transportschutzkappe aus Kunststoff /
 with plastic protective cover for transport

(c)

 max. zulässige Betriebsspannung / max. allowable continuous DC voltage
 max. Ableitstrom mehrfach (8/20µs Testimpuls) / max. surge current multiple (8/20µs test pulse)
 max. Leistung bei 2200 MHz / max. power transmission at 2200 MHz

 85 V (d)
 30 kA
 500 W


 Frequenzbereich / frequency range 806-960/1710-2200 MHz
 VSWR <1.15 (<-23 dB)
 Einfügedämpfung / insertion loss <0.1 dB (b)

Intermodulation

 Intermodulationsprodukte 3.Ordnung (min) / IMP 3rd order (min)
 2 unmodulierte Test-Signale bei 43 dBm (20 W) / 2 unmodulated test tones each at 43 dBm (20 W) level -117 dBm/-160 dBc

Schutzklasse nach DIN 40050 / protection degree acc. to DIN 40050: IP 67

ANEXO E: CABLES COAXIALES

Especificaciones Técnicas		
	Cable Coaxial Corrugado 1/2" Foam baja densidad	
		F.DC.01.0009
		Ed.: 1 Rev.: 5
		Fecha: 03/06/2011
		Página: 3 de 15

2. ESPECIFICACIONES TÉCNICAS DE PRODUCTO

2.1. Cable.

Referencias

	HANSEN	MCC
Cubierta estándar	RF50 1/2"	120002
Cubierta retardante a la llama	RF50Z 1/2"	120009



Construcción

Conductor interno	Alambre de aluminio con recubrimiento de cobre	Ø4.8±0.05mm
Dieléctrico	Espuma de PE	Ø12.2±0.3mm
Conductor externo	Tubo corrugado anular de cobre	Ø13.8±0.2mm
Cubierta	PE o PE retardante a la llama	Ø15.8±0.2mm
Peso	Estándar/retardante	250/275Kg/Km

Características mecánicas

Fuerza de tracción	1130N
Radio mínimo doblado único	70mm
Radio mínimo múltiples doblados	125mm
Momento de doblado	3.8Nm
Resistencia al aplastamiento	20N/mm

Características eléctricas

Impedancia	50±1Ω
Resistencia c.c. conductor interno	2Ω/Km.
Resistencia c.c. conductor externo	2.65Ω/Km.
Resistencia de aislamiento	>5000MΩKm.
Capacidad	75.8pF/m.
Rigidez dieléctrica del aislamiento en c.c.	4KV.
Velocidad de propagación	88%
Frecuencia de corte	8.8GHz.
Tensión de pico de RF	1.41KV.
Potencia de pico	40KW.
Perdida de retorno (800-1000MHz)	≤1.15
Perdida de retorno (1700-2200MHz)	≤1.15


Atenuación y potencia media

Frecuencia MHz	Atenuación nominal @20°C, dB/100m	Potencia @20°C, KW
10	0,672	11,30
100	2,17	3,49
200	3,10	2,44
450	4,75	1,59
800	6,46	1,17
900	6,87	1,10
1000	7,28	1,04
1500	9,09	0,833
1800	10,10	0,753
2000	10,70	0,710
2300	12,10	0,627
3000	13,40	0,565

El valor máximo, puede llegar al 105% del valor nominal de atenuación.

Manipulación (rangos de temperatura)

Instalación (cubierta estándar)	-40°C ÷ +60°C
Operación (cubierta estándar)	-55°C ÷ +85°C
Instalación (cubierta retardante)	-25°C ÷ +60°C
Operación (cubierta retardante)	-30°C ÷ +80°C

Especificaciones Técnicas		
	Cable Coaxial Corrugado 1/2" Superflexible Foam baja densidad (Fabricante: Zhuhai Hansen Technology)	F.DC.01.0003
		Ed.: 1 Rev.: 4
		Fecha: 25/09/2009
		Página: 3 de 15

2. ESPECIFICACIONES TÉCNICAS DE PRODUCTO

2.1. Cable.

Referencias

	HANSEN	MCC
Cubierta estándar	RF50 1/2"SF	120001
Cubierta retardante a la llama	RF50Z 1/2"SF	120008



Construcción

Conductor interno	Alambre de aluminio con recubrimiento de cobre	Ø3.60±0.04mm
Dieléctrico	Espuma de PE	Ø8.80±0.20mm
Conductor externo	Tubo corrugado anular de cobre	Ø12.20±0.20mm
Cubierta	PE o PE retardante a la llama	Ø13.60±0.20mm
Peso	Estándar/retardante	210/225Kg/Km

Características mecánicas

Fuerza de tracción	800N
Radio mínimo doblado único	25mm
Radio mínimo múltiples doblados	30mm
Resistencia al aplastamiento	19N/mm

Características eléctricas

Impedancia	50±1Ω
Resistencia c.c. conductor interno	2.69Ω/Km.
Resistencia c.c. conductor externo	3.98Ω/Km.
Resistencia de aislamiento	>5000MΩKm.
Capacidad	82pF/m.
Rigidez dieléctrica del aislamiento en c.c.	4KV.
Velocidad de propagación	81%
Frecuencia de corte	8.8GHz.
Tensión de pico de RF	1.41KV.
Potencia de pico	40KW.
Perdida de retorno (800-1000MHz)	≤1.15
Perdida de retorno (1700-2200MHz)	≤1.15


Atenuación y potencia media

Frecuencia MHz	Atenuación nominal @20°C, dB/100m	Potencia @20°C, KW
10	1,04	10,10
100	3,41	3,08
200	4,91	2,14
450	7,59	1,38
800	10,40	1,01
900	11,20	0,94
1000	11,80	0,889
1500	14,90	0,705
1800	16,60	0,634
2000	17,60	0,597
2300	19,70	0,535
3000	22,40	0,469

El valor máximo, puede llegar al 105% del valor nominal de atenuación.

Manipulación (rangos de temperatura)

Instalación (cubierta estándar)	-40°C ÷ +60°C
Operación (cubierta estándar)	-55°C ÷ +85°C
Instalación (cubierta retardante)	-25°C ÷ +60°C
Operación (cubierta retardante)	-30°C ÷ +80°C

Especificaciones Técnicas		
	Cable Coaxial Corrugado 7/8" Foam baja densidad	F.DC.01.0008
		Ed.: 1 Rev.: 5
		Fecha: 03/06/2011
		Página: 3 de 15

2. ESPECIFICACIONES TÉCNICAS DE PRODUCTO

2.1. Cable.

Referencias

	HANSEN	MCC
Cubierta estándar	RF-50-7/8"	120003
Cubierta retardante a la llama	RFZ 50-7/8"	120010



Construcción

Conductor interno	Tubo liso de cobre	Ø8.90±0.1mm
Dieléctrico	Espuma de PE	Ø22.30±0.4mm
Conductor externo	Tubo corrugado anular de cobre	Ø24.90±0.3mm
Cubierta	PE o PE retardante a la llama	Ø27.30±0.2mm
Peso	Estándar/retardante	530/590Kg/Km

Características mecánicas

Fuerza de tracción	1470N
Radio mínimo doblado único	120mm
Radio mínimo múltiples doblados	250mm
Momento de doblado	16.3Nm
Resistencia al aplastamiento	14N/mm

Características eléctricas

Impedancia	50±1Ω
Resistencia c.c. conductor interno	1.5Ω/Km
Resistencia c.c. conductor externo	1.6Ω/Km
Resistencia de aislamiento	>5000MΩKm
Capacidad	75pF/m
Rigidez dieléctrica del aislamiento en c.c.	6.0KV
Velocidad de propagación	88%
Frecuencia de corte	5.0GHz
Tensión de pico de RF	2.13KV
Potencia de pico	91KW
Perdida de retorno (800-1000MHz)	≤1.15
Perdida de retorno (1700-2200MHz)	≤1.15

Atenuación y potencia media

Frecuencia MHz	Atenuación nominal @20°C, dB/100m	Potencia @20°C, KW
10	0.366	24.6
100	1.19	7.56
450	2.65	3.41
800	3.63	2.48
900	3.88	2.33
1000	4.12	2.19
1500	5.18	1.74
1800	5.75	1.57
2000	6.11	1.48
2500	6.95	1.30
3000	7.76	1.16

El valor máximo, puede llegar al 105% del valor nominal de atenuación.

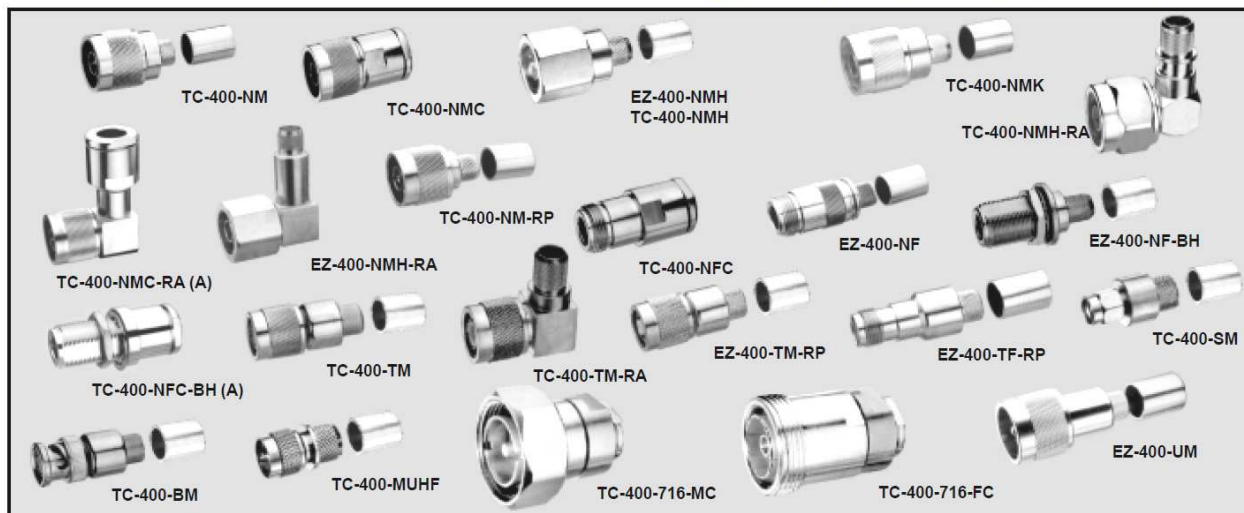
Manipulación (rangos de temperatura)

Instalación (cubierta estándar)	-40°C ÷ +60°C
Operación (cubierta estándar)	-55°C ÷ +85°C
Instalación (cubierta retardante)	-25°C ÷ +60°C
Operación (cubierta retardante)	-30°C ÷ +80°C

ANEXO F: CONECTORES

LMR-400**Cable flexible para comunicaciones****TIMES MICROWAVE SYSTEMS**

A Smiths Group PLC Company

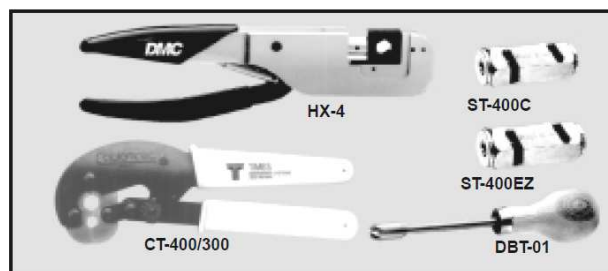
358 Hall Ave., Wallingford, CT, 06492-5039 U.S.A.
Phone: 203-949-8400 Fax: 203-949-8423**Conectores**

Interfase	Descripción	Numero de Parte	Código de Stock	Tuerca de Acople	Contacto Interior	Contacto Exterior	Acabado* Cuerpo/Pin	Largo in	Largo mm	Ancho in	Ancho mm
N Macho	Plug Recto	TC-400-NM	3190-188	Dactilar	Soldado	Anillo	N/G	1.5	38	0.75	19.1
	Plug Recto	TC-400-NMC	3190-277	Dactilar	Soldado	Tuerca	N/G	1.5	38	0.75	19.1
	Plug Recto	EZ-400-NMH	3190-400	Hexagonal	Dedos Resorte	Anillo	S/G	1.5	38	0.89	22.6
	Plug Recto	TC-400-NMH	3190-552	Hexagonal	Soldado	Anillo	S/G	1.5	38	0.89	22.6
	Plug Recto	TC-400-NMK	3190-661	Dactilar	Soldado	Anillo	S/G	1.5	38	0.89	22.6
	En Angulo	TC-400-NMH-RA	3190-422	Hexagonal	Soldado	Anillo	S/G	1.8	46	1.25	31.8
	En Angulo	TC-400-NMC-RA (A)	3190-870	Hexagonal	Soldado	Tuerca	A/G	1.8	46	1.25	31.8
	En Angulo	EZ-400-NMH-RA	3190-761	Hexagonal	Dedos Resorte	Anillo	S/G	1.8	46	1.25	31.8
	Polaridad Inversa	TC-400-NM-RP	3190-960	Dactilar	Soldado	Anillo	N/G	1.5	38	0.75	19.1
	Jack Recto	TC-400-NFC	3190-299	No Aplica	Soldado	Tuerca	N/S	1.6	41	0.75	19.1
N Hembra	Jack Recto	EZ-400-NF	3190-956	No Aplica	Dedos Resorte	Anillo	N/G	1.8	45	0.66	16.8
	Jack para Chasis	EZ-400-NF-BH	3190-518	No Aplica	Dedos Resorte	Anillo	N/G	1.8	46	0.88	22.4
	Jack para Chasis	TC-400-NFC-BH (A)	3190-872	No Aplica	Soldado	Tuerca	A/G	1.8	46	0.88	22.4
	Plug Recto	TC-400-TM	3190-260	Dactilar	Soldado	Anillo	N/S	1.7	43	0.59	15.0
TNC Macho	Plug Recto	EZ-400-TM	3190-650	Dactilar	Dedos Resorte	Anillo	N/S	1.7	43	0.59	15.0
	En Angulo	TC-400-TM-RA	3190-442	Dactilar	Soldado	Anillo	N/G	1.7	43	0.59	15.0
	Polaridad Inversa	EZ-400-TM-RP	3190-794	Dactilar	Dedos Resorte	Anillo	A/G	1.7	43	0.59	15.0
TNC Hembra	Polaridad Inversa	EZ-400-TF-RP	3190-795	No Aplica	Dedos Resorte	Anillo	A/G	1.8	46	0.55	14.0
SMA Macho	Plug Recto	TC-400-SM	3190-439	Hexagonal	Soldado	Anillo	N/G	1.2	29	0.50	12.7
BNC Macho	Plug Recto	TC-400-BM	3190-318	Dactilar	Soldado	Anillo	N/S	1.7	43	0.56	14.2
Mini-UHF	Plug Recto	TC-400-MUHF	3190-520	Dactilar	Soldado	Anillo	N/G	1.1	28	0.50	12.7
UHF Macho	Plug Recto	EZ-400-UM	3190-997	Dactilar	Dedos Resorte	Anillo	N/G	1.9	48	0.80	20.3
7/16 DIN Macho	Plug Recto	TC-400-716-MC	3190-279	Hexagonal	Soldado	Tuerca	S/S	1.4	36	1.40	35.6
7/16 DIN Hembra	Jack Recto	TC-400-716-FC	3190-376	No Aplica	Soldado	Tuerca	S/S	1.6	41	1.13	28.7


*Metales de Acabado: N=Nickel, S=Plata, G=Oro, SS=Acero Inoxidable, A=Alballoy

Accesorios

Tipo Herramienta	Numero Parte	Codigo Stock	Descripción
Crimp Tool	HX-4	3190-200	Pinza sujetadora
Crimp Dies	Y1719	3190-202	Dados Hexagonales .429"
Crimp Tool	CT-400/300	3190-666	Crimp tool para conectores LMR400
Crimp Rings	CR-400	3190-830	Anillos para los conectores TC/EZ-400 (Paquete de 10)
Strip Tool	ST-400C	3190-228	Para conectores de Tuerca
Strip Tool	ST-400EZ	3190-401	Para Conectores de Anillo
Deburr Tool	DBT-01	3190-406	Para conectores 'EZ'
Ground Kit	GK-S400T	GK-S400T	Kit de Grounding standard

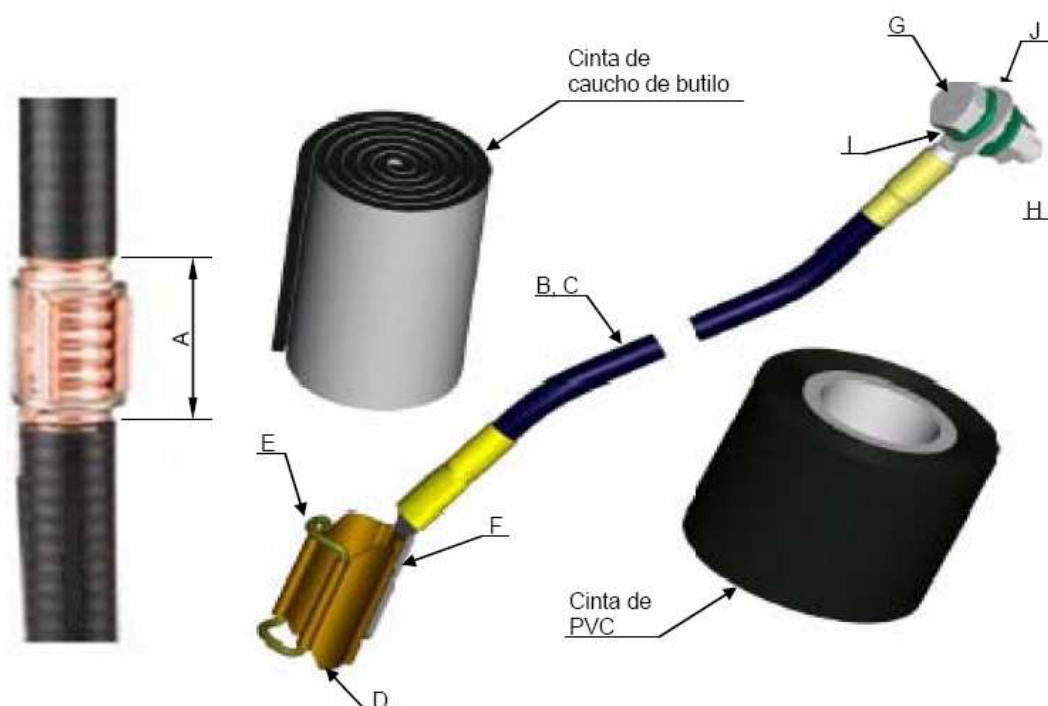
Oficina Regional para Latinoamerica: (305) 364-2825 • www.timesmicrowave.com/espanol
latamsales@timesmicrowave.com

ANEXO G: KITS DE TIERRA

Especificaciones Técnicas		
	Cable Coaxial Corrugado 1/2" Foam baja densidad	
	F.DC.01.0009	
	Ed.: 1	Rev.: 5
	Fecha: 03/06/2011	
	Página: 12 de 15	

2.3.3. Puesta a tierra (tipo Clip-on).


Referencia: 500020



Características

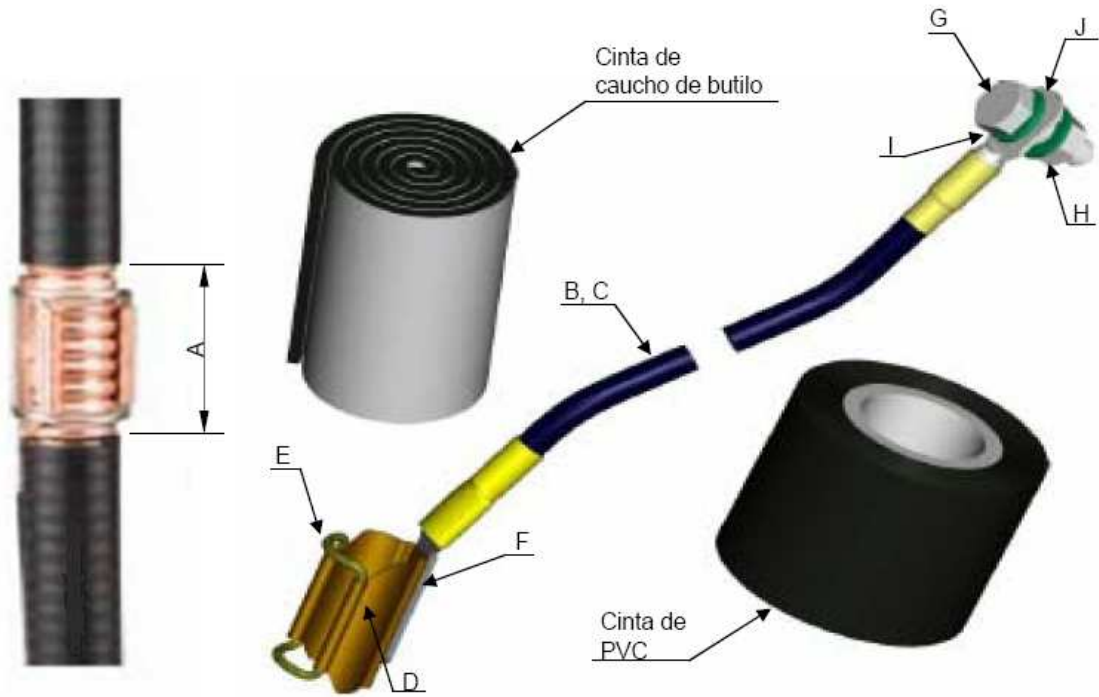
A (desforre)	B (longitud)	C (sección)
42 $^{+2}_{-0}$	800mm.	16mm ² .

	MATERIALES	TRATAMIENTOS
D	contacto	cobre
E	clip	acero inoxidable
F	soporte del contacto	cobre
G	tornillo	acero inoxidable
H	tuerca	acero inoxidable
I	arandela	acero inoxidable
J	terminal	cobre

Especificaciones Técnicas		
	Cable Coaxial Corrugado 1/2" Superflexible Foam baja densidad (Fabricante: Jiangsu ZWY)	
		F.DC.01.0003
		Ed.: 1 Rev.: 4
		Fecha: 25/09/2009
		Página: 12 de 15

2.3.3. Puesta a tierra (tipo Clip-on).


Referencia: 500108



Características

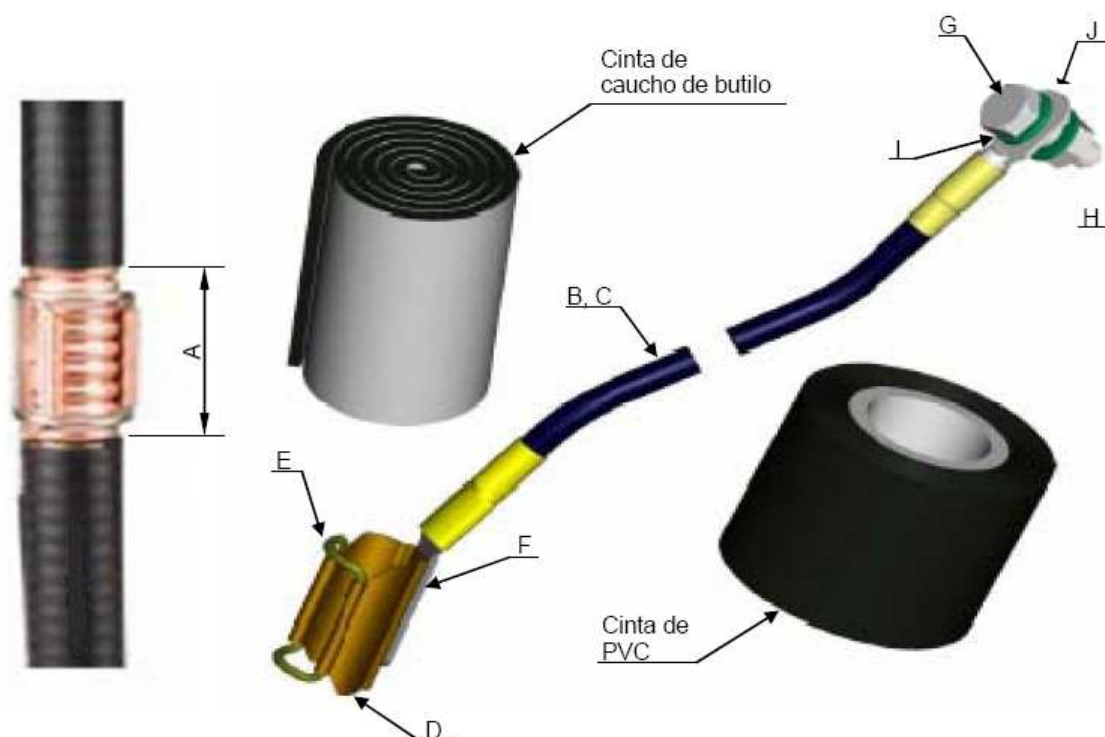
A (desforre)	B (longitud)	C (sección)
42 ⁺² ₋₀	800mm.	16mm ² .

	MATERIALES	TRATAMIENTOS
D contacto	cobre	
E clip	acero inoxidable	
F soporte del contacto	cobre	níquel
G tornillo	acero inoxidable	
H tuerca	acero inoxidable	
I arandela	acero inoxidable	
J terminal	cobre	níquel

Especificaciones Técnicas		
	Cable Coaxial Corrugado 7/8" Foam baja densidad	F.DC.01.0008
		Ed.: 1 Rev.: 5
		Fecha: 03/06/2011
		Página: 12 de 15

2.3.3. Puesta a tierra (tipo Clip-on).

Referencia: 500002

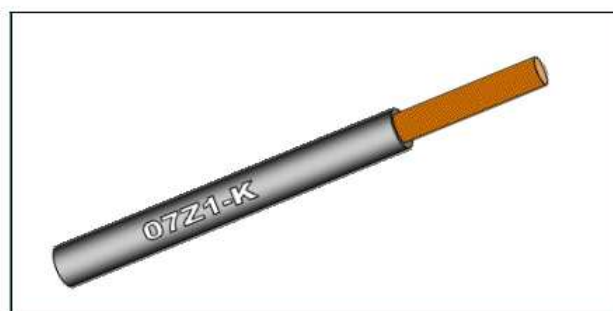


Características

A (desforre)	B (longitud)	C (sección)
52 $^{+2}_{-0}$	800mm.	16mm ² .

	MATERIALES	TRATAMIENTOS
D contacto	cobre	
E clip	acero inoxidable	
F soporte del contacto	cobre	níquel
G tornillo	acero inoxidable	
H tuerca	acero inoxidable	
I arandela	acero inoxidable	
J terminal	cobre	níquel

ANEXO G: CABLES DE **ALIMENTACIÓN**

CABLE ALIMENTACIÓN PARA INTERIORES**Cable Flexible 750v Libre de Halógenos H07Z1-K****Aplicación del producto**

Cables unipolares sin cubierta para utilización general, instalación en conductos situados sobre superficies o empotrados o en sistemas cerrados.

Construcción del cable

Conductor interior	Cobre Pulido
Cubierta exterior	Polioléfina Libre de Halógenos
Tensión Nominal	07ZV-K: 450/750 V

Normativa

IEC-754.1 Y 2 IEC-332.3 A,B,C IEC-754.2,
NFC-20453 UNE-21172

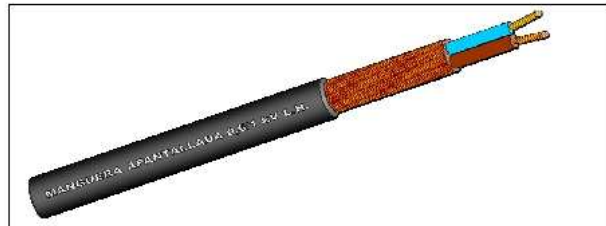
Características Eléctricas

Denominación	Diámetro Exterior	Peso KG/KM	Caída Tens.	Presentación	
H07Z1-K 1X1,5	3,1	21	31,900	200 Mts	Caja
H07Z1-K 1X2,5	3,7	33	19,200	100 Mts	Caja
H07Z1-K 1X4	4,2	48	11,900	100 Mts	Caja
H07Z1-K 1X6	5	70	7,920	100 Mts	Caja
H07Z1-K 1X10	6,7	123	4,580	100 Mts	Rollo
H07Z1-K 1X16	7,7	179	2,900	100 Mts	Rollo
H07Z1-K 1X25	9,6	279	1,870	Cortes o	Bobinas
H07Z1-K 1X35	10,6	373	1,330	Cortes o	Bobinas
H07Z1-K 1X50	12,7	543	0,926	Cortes o	Bobinas
H07Z1-K 1X70	13,5	657	0,653	Cortes o	Bobinas



CABLE ALIMENTACIÓN PARA EXTERIORES

Manguera apantallada RC4Z1-K 0,6/1kv L.H.



Aplicación del producto	
Cable flexible para instalaciones fijas, adecuado para transporte y distribución de energía eléctrica en instalaciones donde se exija un cable apantallado, libre de halógenos y no propagador del incendio. Adecuado para instalación en locales de pública concurrencia según ITC-BT 28	
Características Físicas	
Rango temperatura servicio	-15° a + 90°
No propagación de la llama	Cat C según UNE-EN 50266
Retardante a la llama	Según UNE-EN 60332-1-2
Baja emisión de humos	Según UNE-EN 50268
Libre de Halógenos	Según UNE-EN 50267-2-1
Corrosividad de los gases	Según UNE-EN 50267-2-3

Construcción del cable	
Conductor interior	Cobre Pulido clase v s/UNE-EN60228
Aislamiento	Polietileno reticulado DIX-3 UNE-21123
Espesor aislamiento	0,7 mm s/UNE-21123-4
Identificación conductor	s/ HD-308/UNE 21089-1
2 conductores	Azul +Marrón
Separador de cinta de poliéster	
Pantalla tranza de hilos	cobre pulido al 60% de cobertura
Cubierta exterior	Poliolefina Ignifuga y libre de halógenos según UNE-21123-4
Color de la cubierta	Negro

Características Eléctricas	
Resistencia eléctrica del conductor a 20°C (Ohm/kr)	1,91 Según UNE-EN 60228
Constante de aislamiento a 90°C (Mohm/km)	>3,36 Según UNE-21123-4
Tensión de servicio (v)	de 600 a 1000v s/UNE-21123-4
Tensión de prueba (v)	3.500 v Según UNE-21123-4

Código Ericsson	Nºconductores	Sección(mm2)	Diámetro exterior	Peso (kg/km)
TFLE 424 203	2	4	11,3	168
TFLE 424 204	2	6	12,4	213
TFLE 424 205	2	10	13,8	296
TFLE 424 206	2	16	16,2	433

