

1 AISG Series



RET(Remote Electrical Tilt-unit)



External RET

Maintenance Type RET(1CH/2CH/4CH/8CH/12CH/nCH)

Conversion(Smart) Bias-Tee

TOWER MOUNTED AMPLIFIER

KPAC (KGPTech Portable AISG Controller)

MCU (Master Control Unit)

RET (Remote Electrical Tilting-unit)

For antennas with electrical down-tilt and appropriate mechanical interface

- Remote Electrical Tilting-unit for antennas with electrical down-tilt
- Compliant to AISG 2.0 / 3GPP
- Compact size(Light, Thin, Short and Small) & Embedded motor
- Suitable for operation under outdoor conditions

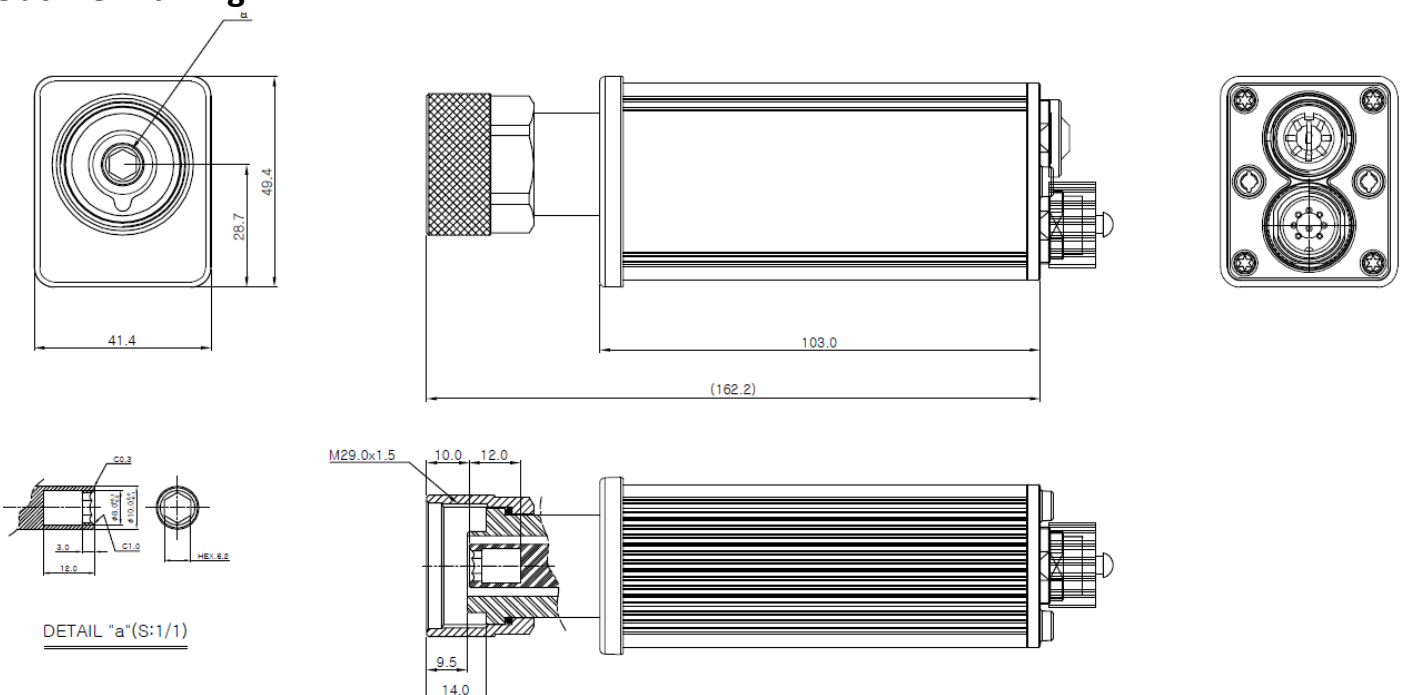


Technical Specification

Model	ACS-RU304
Protocols	Compliant to AISG 2.0 / 3GPP
Input voltage range	10 ~ 30VDC (pin 6)
Power consumption	< 2W (stand by); < 13W (motor activated)
Connectors	2 x 8 pin connector according to IEC 60130-9 According to AISG Daisy chain in: male; Daisy chain out: female
Hardware interface	RS 485A/B (pin 5 / pin 3), Power supply (pin 6), DC return (pin 7), According to AISG
Adjustment time(full range)	40 sec (typically, depending on antenna)
Adjustment resolution	0.1°
Temperature range	-40 ~ +70°C
Protection class	IP55(when connected to the antenna)
Surge protection	8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)
Housing material	Body: Al (Acrylic Urethane Coated) Cover: Al (Acrylic Urethane Coated)
Weight	< 600g
Dimensions (W x D x H)	41.4 × 49.4 × 162.2 mm(Excluded AISG Connector)



Outline Drawing



- Remote Electrical Tilting-unit for Single antenna with electrical down-tilt
- Remote firmware updatable
- Compliant to AISG 2.0 / 3GPP
- Compact size
- **Antenna bottom plug-in type** & Easy maintenance
- **Only Single** antenna control supports

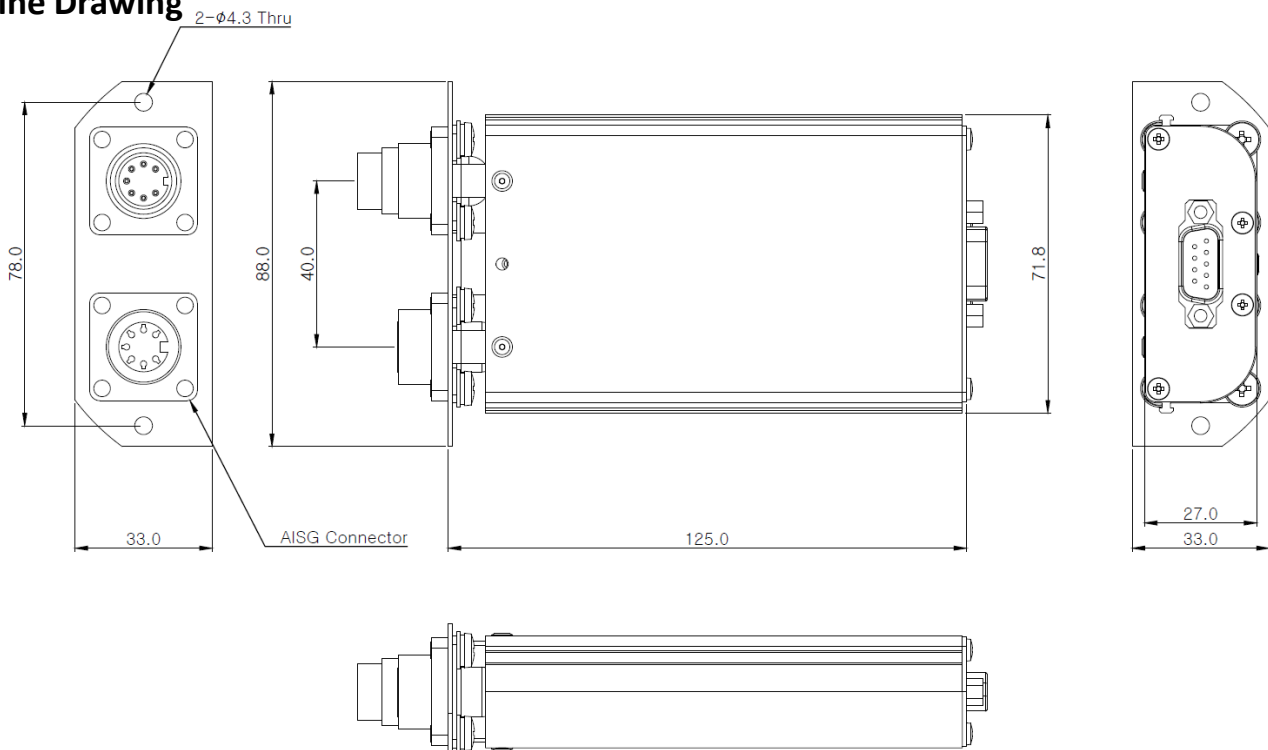


Technical Specification

Model		ACS-RM110
Protocols		Compliant to AISG 2.0 / 3GPP
Input voltage range		+10 ~ +30VDC (pin 6)
Power consumption		< 2W (stand by); < 13W (motor activated)
Connectors	AISG	2 x 8 pin connector acc. to IEC 60130-9 Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	9 pin D-Sub male
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)		40 sec (typically, depending on antenna)
Adjustment resolution		0.1°
Temperature range		-40 ~ +70°C
Protection class		IPx4(@plugged in antenna)
Surge protection		8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)
Housing material		Body: Al (WHITE CROMATE) Cover: Al (WHITE CROMATE) FRONT PANEL : Al (WHITE CROMATE)
Weight		< 500g
Dimensions (W x D x H)		125.0 × 71.8 × 33.0 mm(Only Body)



Outline Drawing



- Remote Electrical Tilting-unit for Single antenna with electrical down-tilt
- Remote firmware updatable
- Compliant to AISG 2.0 / 3GPP
- Compact size
- **Antenna bottom plug-in type** & Easy maintenance
- **Only Single** antenna control supports



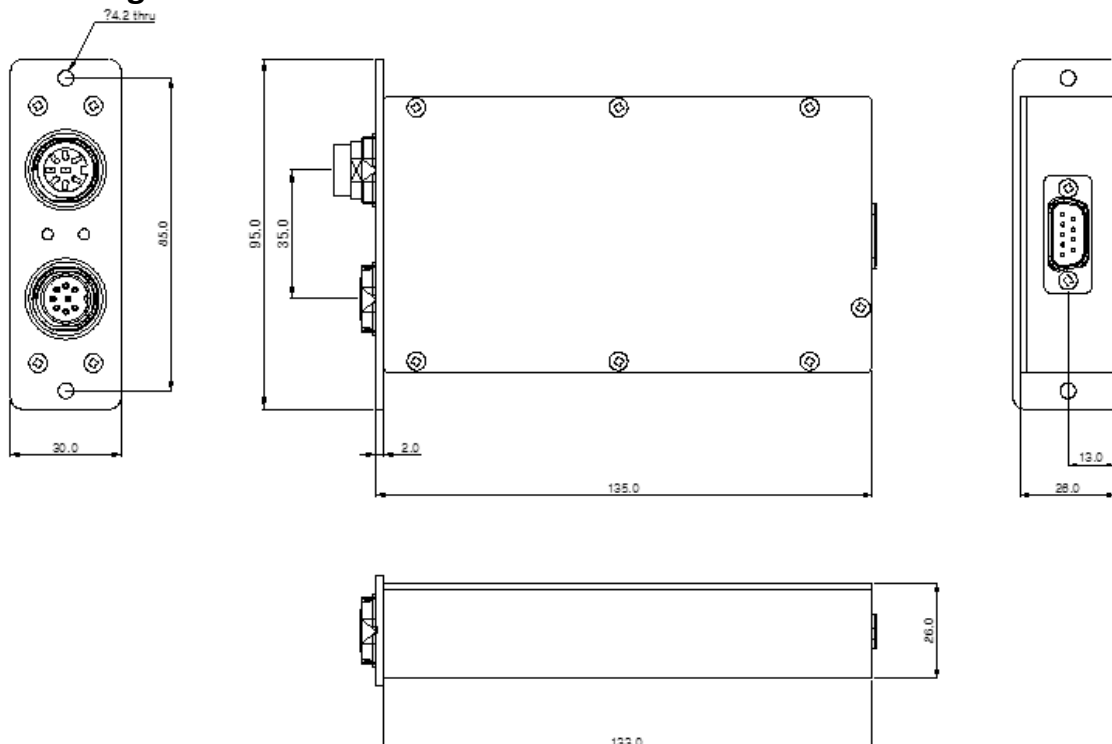
Technical Specification

Model		ACS-RM120
Protocols		Compliant to AISG 2.0 / 3GPP
Input voltage range		+10 ~ +30VDC (pin 6)
Power consumption		< 2W (stand by); < 13W (motor activated)
Connectors	AISG	2 x 8 pin connector acc. to IEC 60130-9 Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	9 pin D-Sub male
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)		40 sec (typically, depending on antenna)
Adjustment resolution		0.1°
Temperature range		-40 ~ +70°C
Protection class		IPx4(@plugged in antenna)
Surge protection		8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)
Housing material		Body: Al (WHITE CROMATE) Cover: Al (WHITE CROMATE) FRONT PANEL : Al (WHITE CROMATE)
Weight		< 500g
Dimensions (W x D x H)		95.0 × 135.0 × 30.0 mm(Excluded connector)



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Outline Drawing



- Remote Electrical Tilting-unit for Multi/Single antennas with electrical down-tilt
- Remote firmware updatable & Flexibly change mode(Multi or Single)
- Compliant to AISG 2.0 / 3GPP
- Compact size & **Embedded two motors**
- **Antenna bottom plug-in type** & Easy maintenance
- **Max. 2channel** antenna control supports

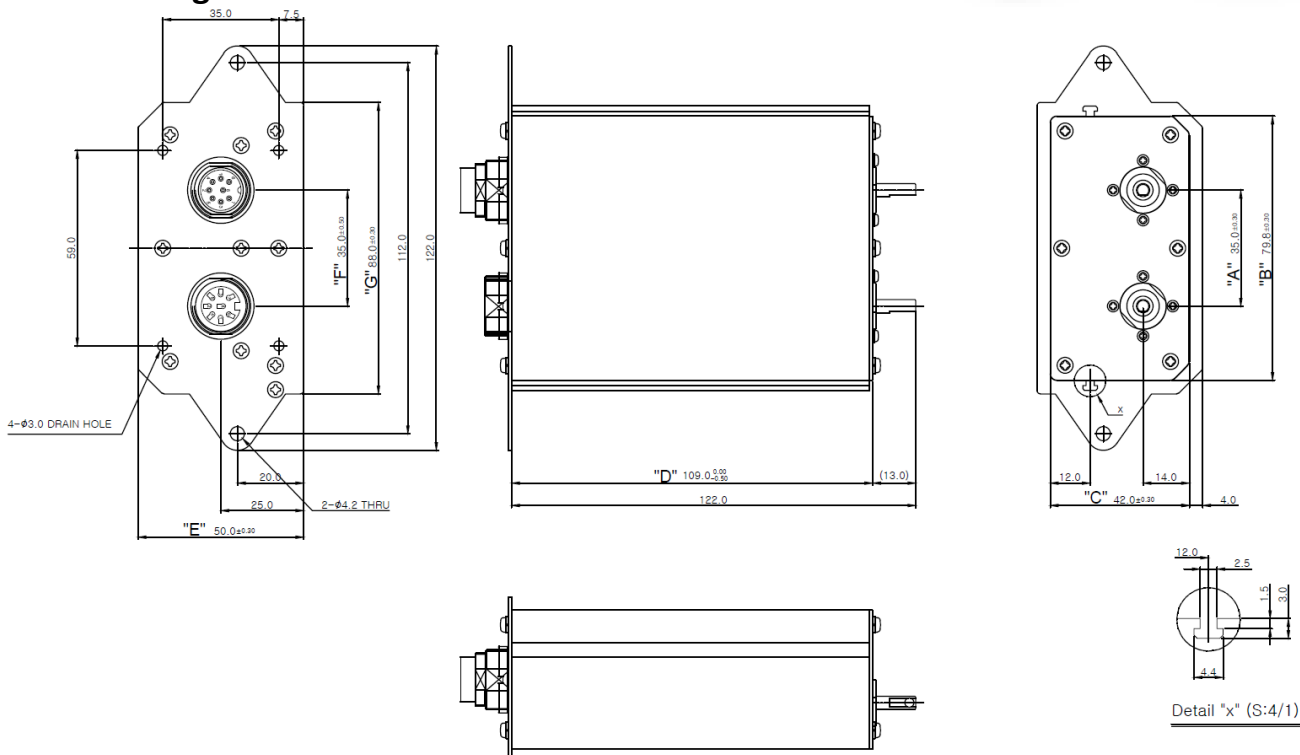


Technical Specification

Model		ACS-RM210
Protocols		Compliant to AISG 2.0 / 3GPP
Input voltage range		+10 ~ +30VDC (pin 6)
Power consumption		< 2W (stand by); < 13W (motor activated) 2 x 8 pin connector acc. to IEC 60130-9
Connectors	AISG	Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	Two motor shaft(Embedded motor)
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)		40 sec (typically, depending on antenna)
Adjustment resolution		0.1°
Temperature range		-40 ~ +70°C
Protection class		IPx4 (@plugged in antenna)
Surge protection		8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)
Housing material		Body: Al (WHITE CROMATE) Cover: Al (WHITE CROMATE) FRONT PANEL : Al (WHITE CROMATE)
Weight		< 500g
Dimensions (W x D x H)		109.0 × 79.8 × 50.0 mm(Only Body)



Outline Drawing

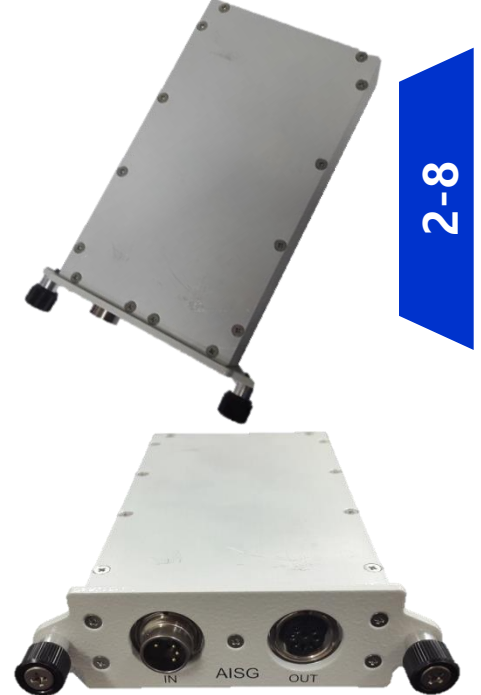


- Remote Electrical Tilting-unit for Multi/Single antennas with electrical down-tilt
- Firmware updatable & Flexibly change mode(Multi or Single)
- Compliant to AISG 2.0 / 3GPP
- Compact size
- **Antenna bottom plug-in type** & Easy maintenance
- **Max. 4channel** antenna control supports

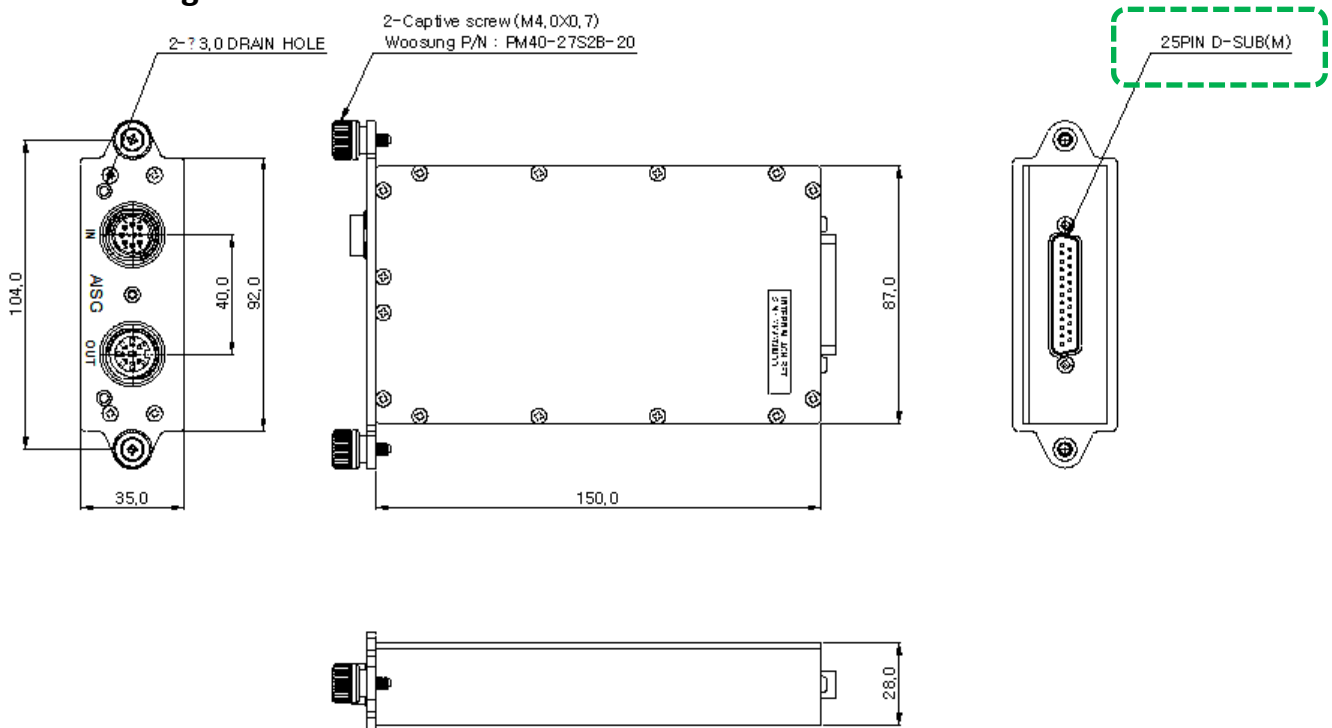


Technical Specification

Model	ACS-RM410	
Protocols	Compliant to AISG 2.0 / 3GPP	
Input voltage range	+10 ~ +30VDC (pin 6)	
Power consumption	< 2W (stand by); < 13W (motor activated)	
Connectors	AISG	2 x 8 pin connector acc. to IEC 60130-9 Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	25 pin D-Sub male
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)	40 sec (typically, depending on antenna)	
Adjustment resolution	0.1°	
Temperature range	-40 ~ +70°C	
Protection class	IP55(@plugged in antenna)	
Surge protection	8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)	
Housing material	Body: Al (WHITE CROMATE)	
	Cover: Al (WHITE CROMATE)	
Weight	< 500g	
Dimensions (W x D x H)	150.0 × 87.0 × 35.0 mm(Only Body)	



Outline Drawing

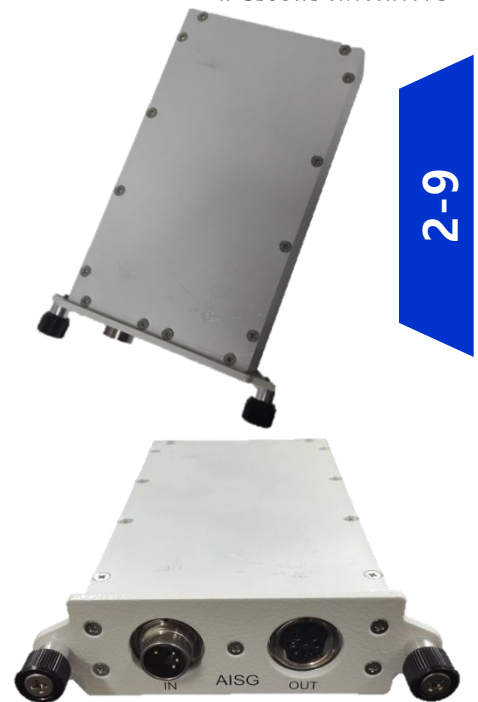


- Remote Electrical Tilting-unit for Multi/Single antennas with electrical down-tilt
- Remote firmware updatable & Flexibly change mode(Multi or Single)
- Compliant to AISG 2.0 / 3GPP
- Compact size
- **Antenna bottom plug-in type** & Easy maintenance
- **Max. 8channel** antenna control supports



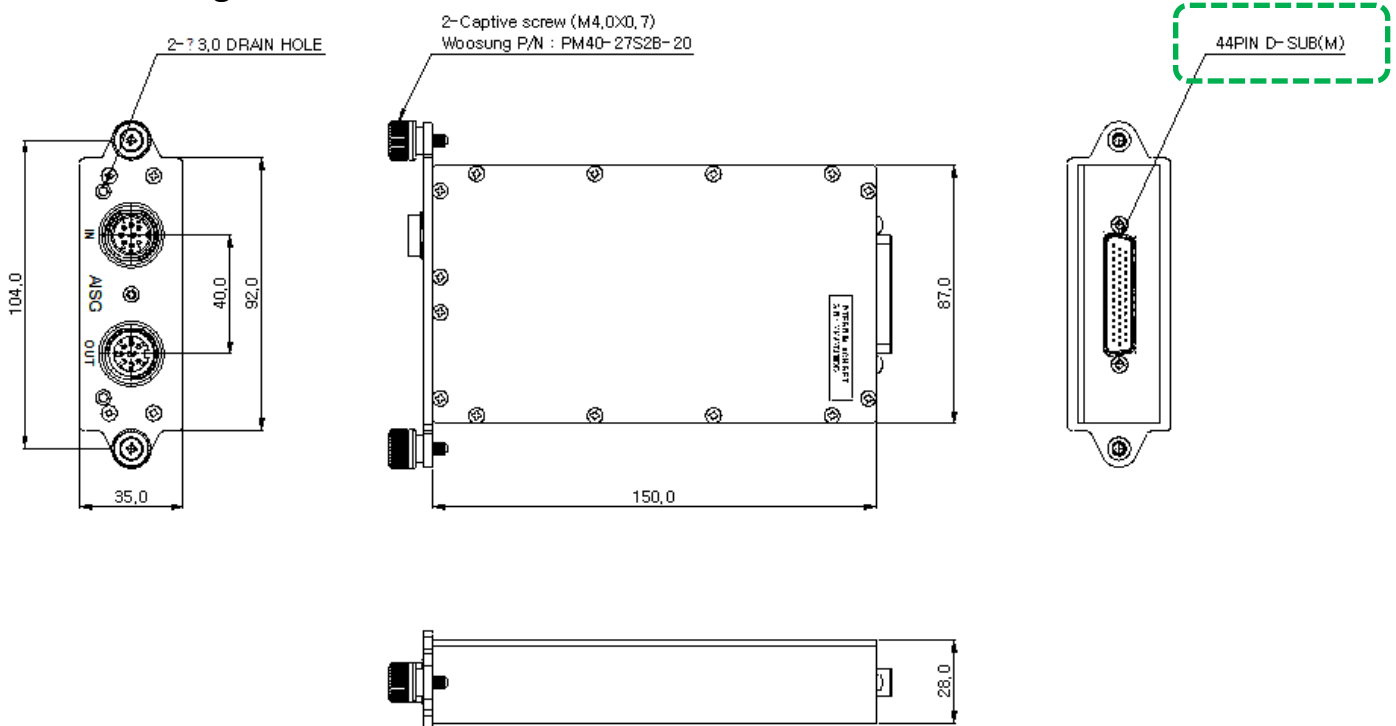
Technical Specification

Model	ACS-RM800	
Protocols	Compliant to AISG 2.0 / 3GPP	
Input voltage range	+10 ~ +30VDC (pin 6)	
Power consumption	< 2W (stand by); < 13W (motor activated) 2 x 8 pin connector acc. to IEC 60130-9	
Connectors	AISG	Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	44 pin D-Sub male
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)	40 sec (typically, depending on antenna)	
Adjustment resolution	0.1°	
Temperature range	-40 ~ +70°C	
Protection class	IP55(@plugged in antenna)	
Surge protection	8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)	
Housing material	Body: Al (WHITE CROMATE)	
	Cover: Al (WHITE CROMATE) FRONT PANEL : Al (Acrylic Urethane Coated)	
Weight	< 500g	
Dimensions (W x D x H)	150.0 × 87.0 × 35.0 mm(Only Body)	



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Outline Drawing



- Remote Electrical Tilting-unit for Multi/Single antennas with electrical down-tilt
- Remote firmware updatable & Flexibly change mode(Multi or Single)
- Compliant to AISG 2.0 / 3GPP
- Compact size
- **Antenna bottom plug-in type** & Easy maintenance
- **Max. 12channel** antenna control supports

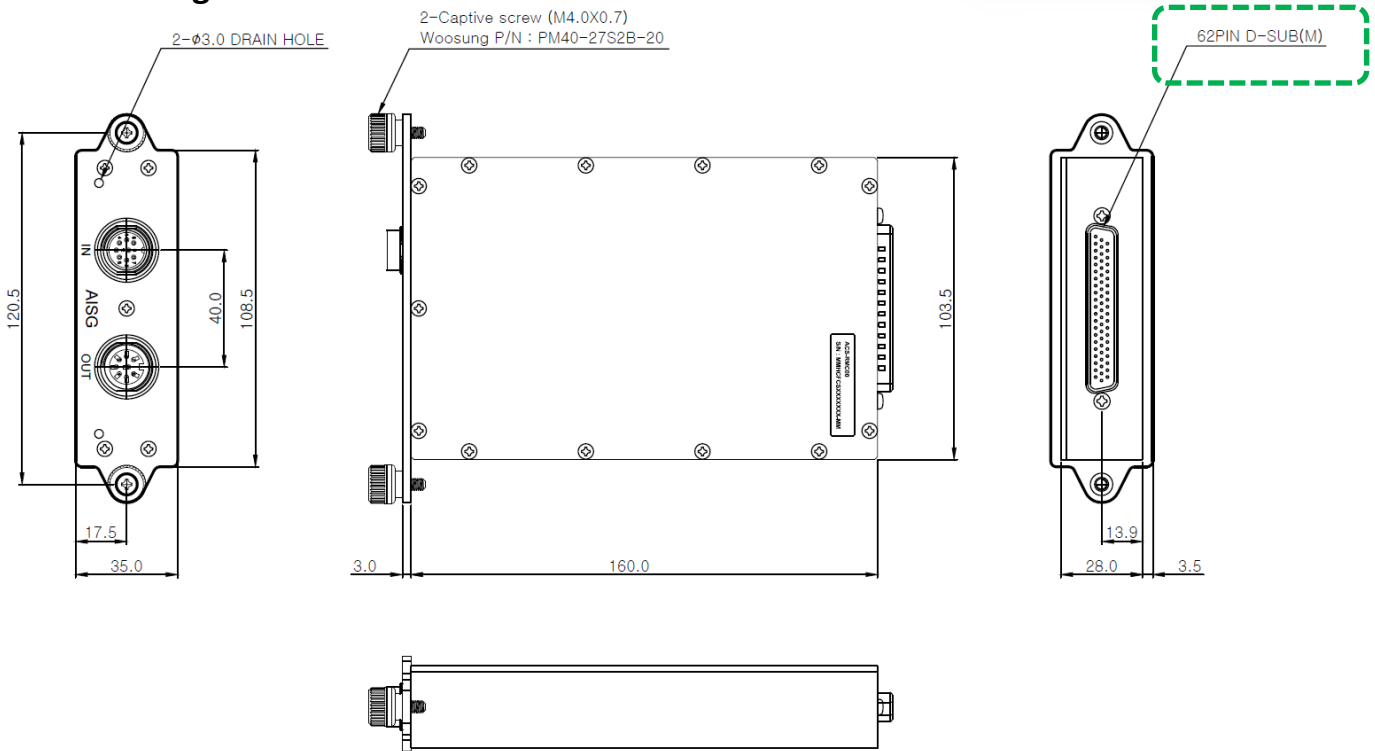


Technical Specification

Model	ACS-RMC00	
Protocols	Compliant to AISG 2.0 / 3GPP	
Input voltage range	+10 ~ +30VDC (pin 6)	
Power consumption	< 2W (stand by); < 13W (motor activated)	
Connectors	AISG	2 x 8 pin connector acc. to IEC 60130-9 Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	62 pin D-Sub male
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)	40 sec (typically, depending on antenna)	
Adjustment resolution	0.1°	
Temperature range	-40 ~ +70°C	
Protection class	IP55(@plugged in antenna)	
Surge protection	8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)	
Housing material	Body: Al (WHITE CROMATE)	
	Cover: Al (WHITE CROMATE)	
Weight	< 500g	
Dimensions (W x D x H)	160.0 × 103.5 × 35.0 mm(Only Body)	



Outline Drawing



- Remote Electrical Tilting-unit for Multi/Single antennas with electrical down-tilt
- Remote firmware updatable & Flexibly change mode(Multi or Single)
- Compliant to AISG 2.0 / 3GPP
- Compact size & **Embedded two motors**
- **Antenna bottom plug-in type** & Easy maintenance
- **N-channel** antenna control supports

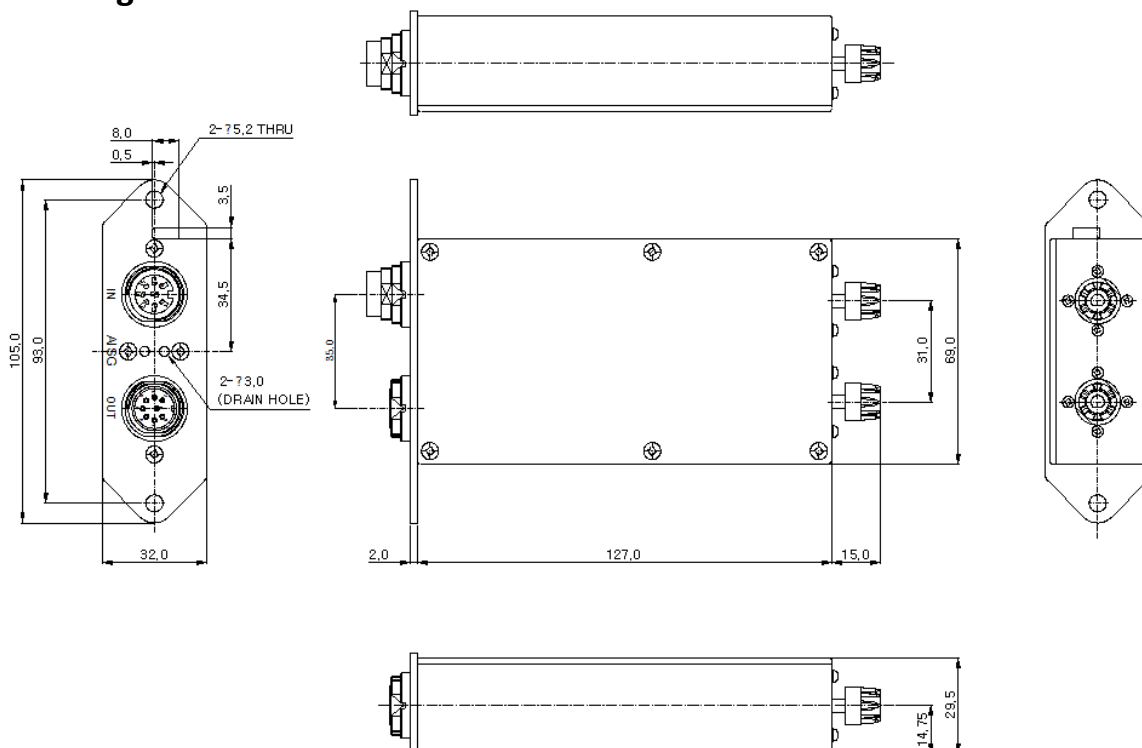


Technical Specification

Model	ACS-RMN00	
Protocols	Compliant to AISG 2.0 / 3GPP	
Input voltage range	+10 ~ +30VDC (pin 6)	
Power consumption	< 2W (stand by); < 13W (motor activated)	
Connectors	AISG	2 x 8 pin connector acc. to IEC 60130-9 Acc. to AISG Daisy chain in : male; Daisy chain out : female
	Antenna	Two motor shaft(Embedded motor)
Hardware interface	AISG	RS485A/B (pin5/pin3); Power supply (pin6); DC return (pin7) Acc. to AISG
Adjustment time(full range)	40 sec (typically, depending on antenna)	
Adjustment resolution	0.1°	
Temperature range	-40 ~ +70°C	
Protection class	IPx4(only RET)	
Surge protection	8/20US ±5KA(Line to Line, IEC61000-4-5 Class 4)	
Housing material		Body: Al (WHITE CROMATE) Cover: Al (WHITE CROMATE) FRONT PANEL : Al (Acrylic Urethane Coated)
Weight	< 450g	
Dimensions (W x D x H)	127.0 × 69.0 × 29.5 mm(Only Body)	



Outline Drawing



The **Conversion Bias-Tee** combines the performance of a standard Bias-Tee with the function of an additional modem (AISG standard) in order to provide either DC voltage as well as remote control signals via an RF feeder cable to a TMA or RET.

The **Conversion Bias-Tee** provides low RF signal insertion loss from BTS or ANT port to Feeder port and vice versa. The measures taken to protect against static discharge and lightning ensure a high level of reliability and operational safety.

- Top Conversion Bias-Tee
+10 ... +30 VDC (DC on pin6)
version for use near the antenna, in order to control an RET (only required if no TMA is in use)
- Bottom Conversion Bias-Tee
+10 ... +30 VDC (DC on pin6)
version for use near the BTS, in order to feed-in DC voltage and RET control signals into a feeder cable

Abbreviations:

RET	Remote Electrical Tilt-unit
BTS	Base Transceiver Station
TMA	Tower Mounted Amplifier
AISG	Antenna Interface Standard Group
ANT	ANTenna



AISG Connector	TOP	BOTTOM
Pin.3	RS485-B	RS485-B
Pin.5	RS485-A	RS485-A
Pin.6	+10 ~ +30VDC	+10 ~ +30VDC
Pin.7	DC return	DC return

Technical Specification

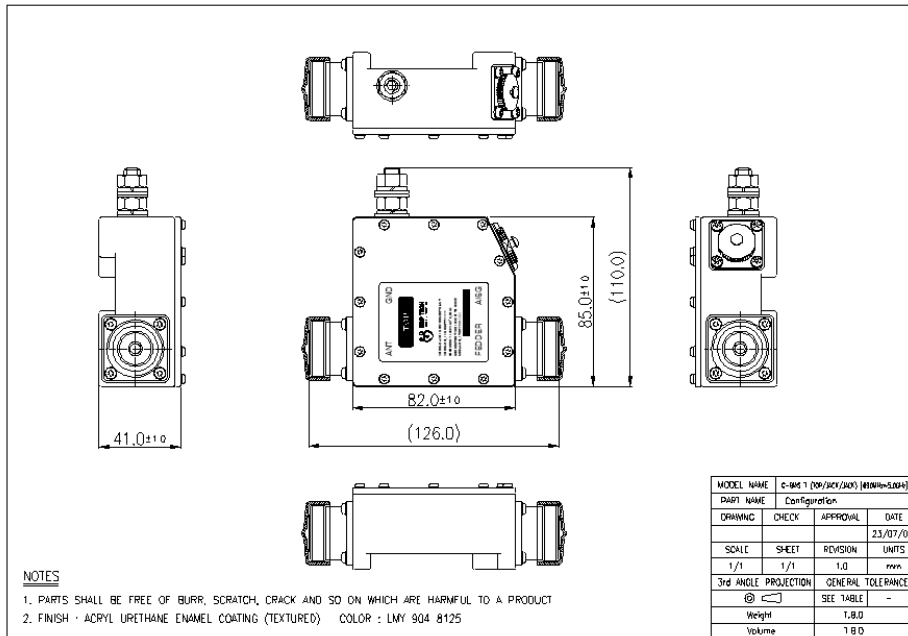
Product Type (Part #)	Top Conversion Bias-Tee
ANT port (Top)	7-16 Female
Feeder port (Top)	7-16 Female
Product Type (Part #)	Bottom Conversion Bias-Tee
BTS port (Bottom)	7-16 Female
Feeder port (Bottom)	7-16 Female
Frequency range	690 ~ 5000MHz
Insertion Loss BTS/ANT port to Feeder port	0.15dB Max (0.12dB Typical)
Return Loss	20dB Max (21dB Typical)
Impedance	50 ohm
Input power	750W
Lightning protection	RET port: ±5 kA, 8/20us ANT port: ±3 kA, 10/350us
Intermodulation products	< -160dBc (3 rd order; with 2 x 20W)
Temperature range	-40 ~ +65°C (-40°F to 158°F)
Modem carrier frequency	2.176MHz
Weather protection	IP67
Weight	< 600g
Dimensions (W x D x H)	82.0 × 85.0 × 41.0 mm (without connector)

Technical Specification(Continue)

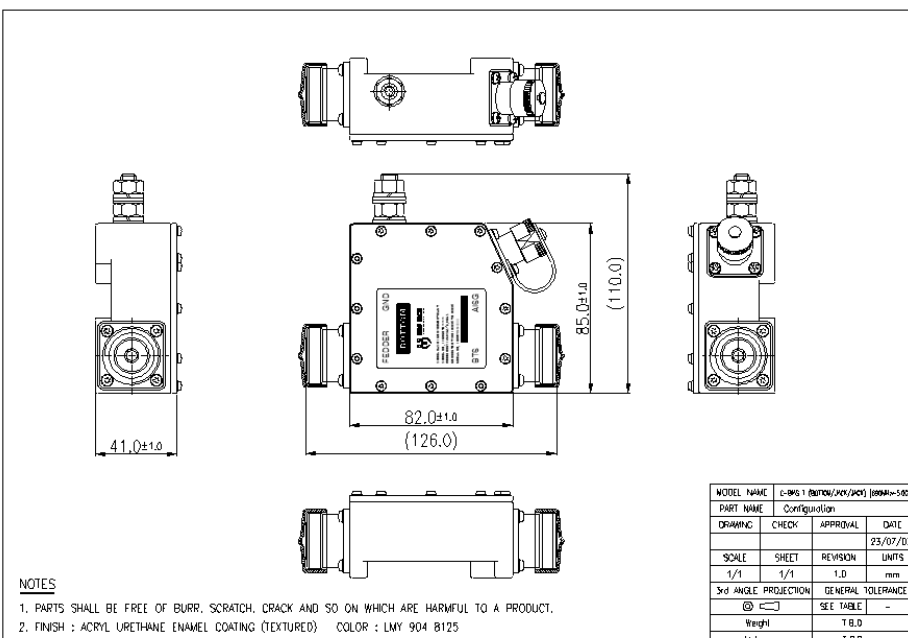
AISG	
Carrier Frequency	2.176 MHz ± 217.6 Hz
Modulator Level	On : +3dBm ± 2dB, Off : < -40dBm
Threshold Level	-15dBm ± 3dBm
Return Loss	> 10.0 dB @ 2.076 ~ 2.276 MHz

Outline Drawings

Top



Bottom



Technical Specification

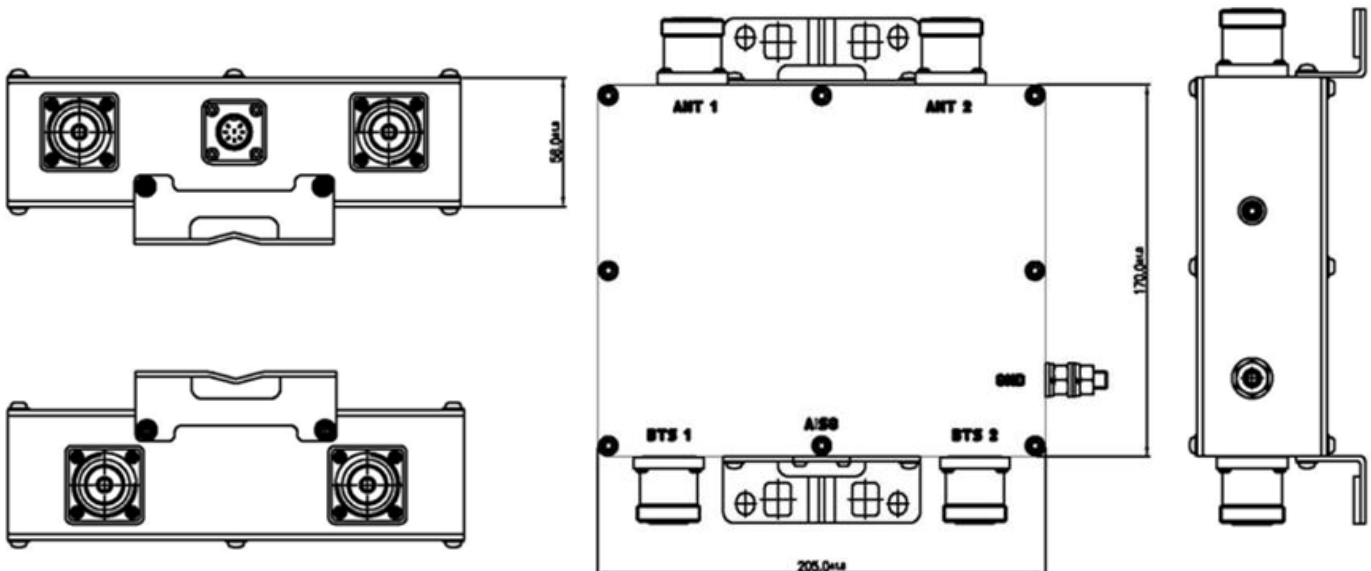


Model		KG-TMA-21-TW-A20
Down-Link	Frequency Range	2110 - 2155 MHz
	Ripple in Band	≤ -0.2 (P-P)
	Power Handling	200 W (avg)
	Insertion loss	0.5 dB (typ)
	Return Loss	> 18 dB
	PIMD(17 th)	< -117 dBm @ 2*43dBm input tones
	Surge Protection	10 KA
Up-Link	Frequency Range	1.5 max
	Gain	≥15 dBm
	N.F	+5dBm min.
	Bypass Loss	-
	Ripple in Band	300 W
	Return Los (normal)	50 Ω
	Return Los (bypass)	+7~30Vdc
	Isolation Tx / Rx	-40~ +65 °C
	Power Supply	IP67
	Surge Protection	8/20us , 10KA,
	AISG	DIN7/16 (F)
	Environmental Specifications	Temperature
	Humidity	5% ~ 95%
	IP Rating	IP 67
Mechanical Specifications	Dimensions	175.0 x 149.0 x 58.0 mm
	Weight	5.5 Kg (about 12lbs)
	Connector Type	Din 7/16 (F)



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Outline Drawing



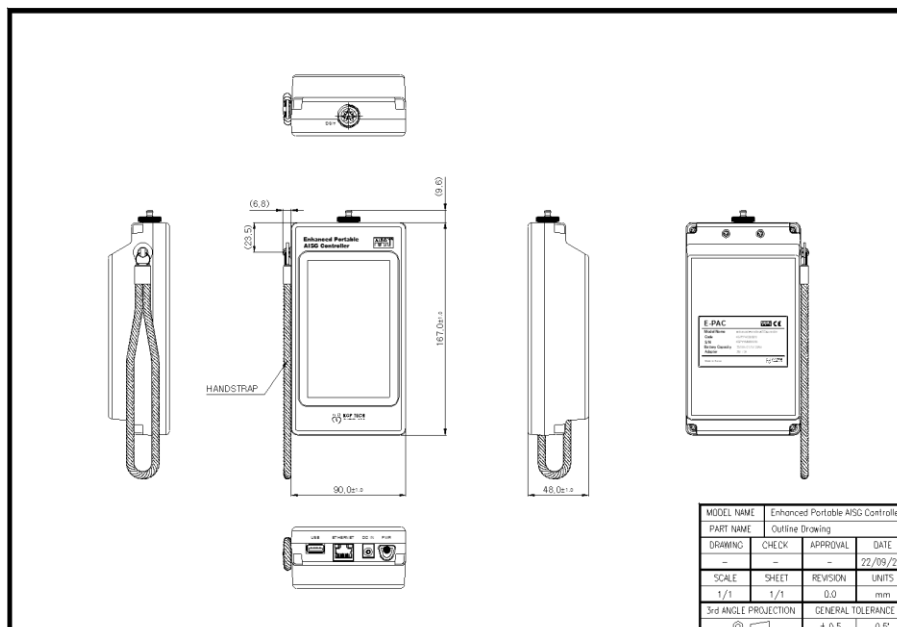
Technical Specification



Part No.	ACS – PC300
Input voltage	28 VDC
Connector	8 pin connector acc. to IEC 60130-9 Acc. to AISG female pin 6
Interface to ALDs	RS485 / Power supply
Protocol to ALDs	HDLC hex coded command set, conforming to AISG 2.x / 3GPP
Max. number of ALDs	9 RETs, depending on system configuration and length of control cable
Max. length of control cable	100 m / 9 RETs(in daisy chain configuration)
Display	5 inch TFT LCD with Touch Screen
Interface	USB
Power supply to ALDs	Lithium ion rechargeable battery 75.6Wh(21.6V(18V~24.88V)/3.5Ah)
Operating temperature	-10 ~ +55 °C
Charging temperature	0 ~ +45 °C
Dimensions(W x D x H)	90.0 x 167.0 x 48.0 mm
Weight	< 750 g



Outline Drawing

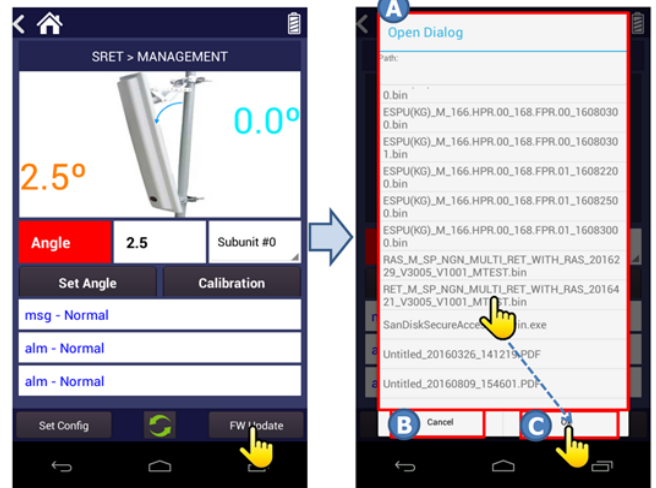


Info setting from Carrier Antenna



- A : RET Setting
- B : Additional Setting
- C : Change Setting
- D : RET Management

Firmware Upgrade



Antenna Angle check and control function





- Compliant to AISG 1.1 and AISG 2.0 / 3GPP
- 12 and 24VDC output voltage
- LED signaling for output power and alarming

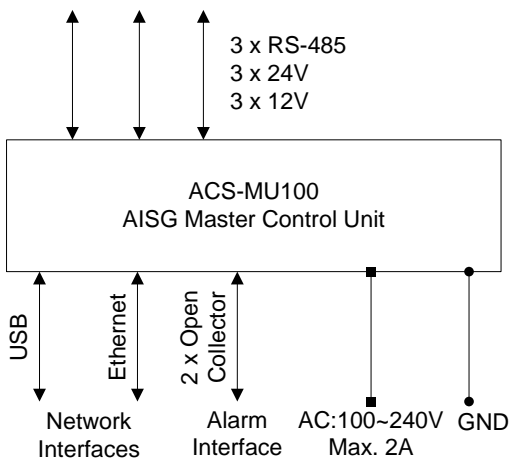


Technical Specification

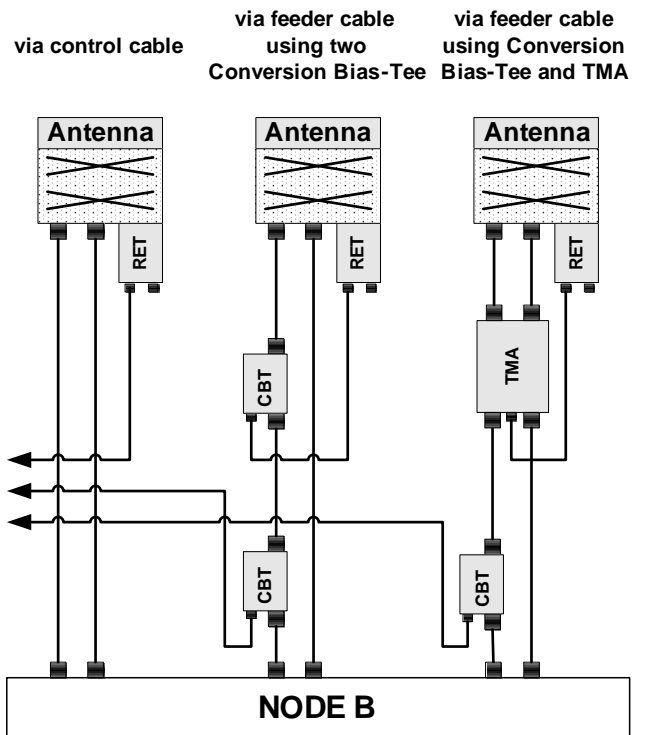
Part No.	ACS-MU100
Connector of ALD Interface	3 x 8 pin connector according to IEC 60130-9, acc. to AISG
Power supply from BTS	AC : 100~240V / 50~60Hz / Max. 2.0A
Power supply to ALD	3 x +12VDC (Max. 1.7A) ; 3 x +24VDC (Max. 1.7A)
Total output power	+12VDC (Max. 130W) ; +24VDC (Max. 130W)
Protocol to ALD	HDLC hex-coded command set, acc. to AISG (AISG1.1, 3GPP/AISG2.0 compliant)
Interface to BTS	Ethernet (100 Base-T) and USB (Debug)
Protocol to BTS	TCP/IP, HTTP/HTML, SNMP, ICMP/PING
Alarm interface to BTS	2 x Open collector output, user programmable
Max. number of ALD's	Up to 24 RET's in daisy chain and up to 6 DTMA's ; depending on cable configuration and max. power
Operating temperature	-30 ~ +55°C
Lightning protection	Common (±1KV, 8/20us), AISG CON'N 3EA
Dimensions(H x W x D)	49.0 x 420.0 x 243.0 mm (1.93 x 16.53 x 9.57 inch)
Front panel dimensions (H x W x D)	49.0 x 482.6 x 243.0 mm (1.93 x 19.0 x 9.57 inch)

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Block Diagram



Applications





Outline Drawing

