

Ku-band 25W GaN BUC

RF Frequency:

13.75 to 14.5 GHz and 14.0 to 14.5 GHz

Model No. NJT8370 series

- RF Frequency : 14.0 to 14.5 GHz / 13.75 to 14.5 GHz
- LO Frequency : 13.05 GHz / 12.80 GHz
- IF Frequency : 950 to 1,450 MHz / 950 to 1,700 MHz
- Saturation Output Power : +44 dBm (25W)
- IF / Ref. (10MHz) Input: N-type / F-type, Female Connector
- DC Power Input : MS Connector
- M&C Option : FSK Communication M&C
RS-232C Interface M&C

Specifications

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New Japan Radio Co., Ltd.
Microwave Division

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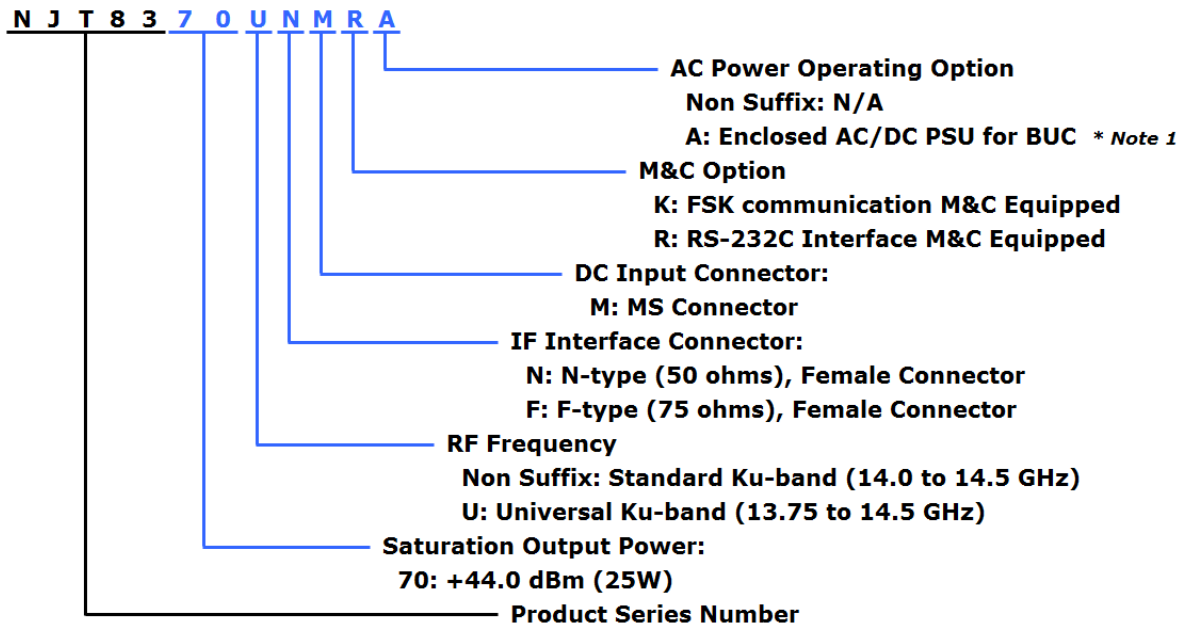
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* Above Specifications are subject to change without notice.



Model Number

● Numbering System



● Line-up

Model No.	RF Frequency	Local Frequency	IF Frequency	Output Power	IF Connector	Power Supply	Port for Voltage Input	M&C Option	
NJT8370NMK	14.0 to 14.5 GHz (Standard Ku-band)	13.05 GHz	950 to 1,450 MHz	25W Saturation (+44dBm)	N-type	+36 to +60 V DC Power	MS Connector	FSK M&C	
NJT8370FMK					F-type				
NJT8370NMKA					N-type	AC Power	MS Connector * Note 1		
NJT8370FMKA					F-type				
NJT8370NMR					N-type	+36 to +60 V DC Power	MS Connector		RS-232C M&C
NJT8370FMR					F-type				
NJT8370NMRA	N-type	AC Power	MS Connector * Note 1						
NJT8370FMRA	F-type								
NJT8370UNMK	13.75 to 14.5 GHz (Universal Ku-band)	12.80 GHz	950 to 1,700 MHz		N-type	+36 to +60 V DC Power	MS Connector	FSK M&C	
NJT8370UFMK					F-type				
NJT8370UNMKA					N-type	AC Power	MS Connector * Note 1		
NJT8370UFMKA					F-type				
NJT8370UNMR				N-type	+36 to +60 V DC Power	MS Connector	RS-232C M&C		
NJT8370UFMR				F-type					
NJT8370UNMRA	N-type	AC Power	MS Connector * Note 1						
NJT8370UFMRA	F-type								

*Note1: Additional outdoor 250W AC/DC PSU is enclosed for AC Power Option and DC Power is supplied at MS connector of BUC from AC/DC PSU via power cable.

* Above Specifications are subject to change without notice.



1. Electrical Specifications

#	Items	Specifications
1-1.	Output Frequency Range	
	<Universal Ku-band>	13.75 to 14.5 GHz
	<Standard Ku-band>	14.0 to 14.5 GHz
1-2.	Input Frequency Range	
	<Universal Ku-band>	950 to 1,700 MHz
	<Standard Ku-band>	950 to 1,450 MHz
1-3.	Maximum IF Input Level (without damage)	+13 dBm max.
1-4.	Conversion Type	Single, fixed L.O.
1-5.	L.O. Frequency	
	<Universal Ku-band>	12.80 GHz
	<Standard Ku-band>	13.05 GHz
1-6.	Frequency Sense	Positive
1-7.	Saturation Output Power (P _{sat})	+44 dBm min. @ +25 °C +43 dBm min. over temperature
1-8.	Linear Gain	72 dB nom., 66 dB min.
1-9.	Gain Variation over frequency @ fixed temperature	
	<Universal Ku-band>	5 dBp-p max. over 750 MHz 2 dBp-p max. over 54 MHz
	<Standard Ku-band>	5 dBp-p max. over 500 MHz 2 dBp-p max. over 54 MHz
1-10.	Gain Stability over temperature @ fixed frequency	4 dBp-p max. 2 dBp-p typ.
1-11.	ACPR	-30 dBc typ., -26 dBc min. @ P _{out} = +42 dBm
1-12.	Requirement for External Reference [Frequency] [Input Power] [Phase Noise]	10 MHz (sine-wave) -5 to +5 dBm @ Input port -125 dBc/Hz max. @ 100 Hz -135 dBc/Hz max. @ 1 kHz -140 dBc/Hz max. @ 10 kHz
1-13.	L.O. Phase Noise	-60 dBc/Hz max. @ 100 Hz -70 dBc/Hz max. @ 1 kHz -80 dBc/Hz max. @ 10 kHz -90 dBc/Hz max. @ 100 kHz -100 dBc/Hz max. @ 1MHz
1-14.	Spurious @ P _{out} = +42dBm [in band] [in receive and] [Out-of-band]	-50 dBc max. @ RF Frequency -70 dBm max. @ 10.95 to 12.75 GHz -50 dBc max.
1-15.	Receive Band Noise Density <Universal Ku-band>	Tx: 14.0 to 14.5 GHz -156 dBm/Hz max. @10.95 to 12.75 GHz Tx: 13.75 to 14.0 GHz -156 dBm/Hz max. @10.95 to 12.25 GHz -123 dBm/Hz max. @12.25 to 12.75 GHz
	<Standard Ku-band>	Tx: 14.0 to 14.5GHz -156 dBm/Hz max. @ 10.95 to 12.75 GHz
1-16.	Noise Figure	20 dB max.
1-17.	Group Delay over any 54MHz	2.5 nS p-p max.

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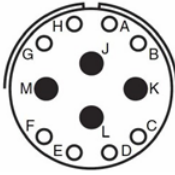


#	Items	Specifications
1-18.	Input Impedance	
	<N-type Model>	50 ohms nom.
	<F-type Model>	75 ohms nom.
1-19.	Input V.S.W.R.	2 : 1 max.
1-20.	Output V.S.W.R.	2 : 1 max.
1-21.	Output Load VSWR for Non Damage	2 : 1 max.
1-22.	DC Power Requirement [Voltage Range] [Power Consumption]	+48 VDC (+36 to +60 VDC) 120 W typ. @ No IF signal 180 W typ. @ Pout=+42dBm 200 W typ., 230 W max. @ Psat
1-23.	Mute	Shut off the HPA in case of L.O. unlocked, no 10 MHz reference signal, or Over temperature. * Note 2
1-24.	LED Indicator	GREEN: L.O. locked RED: L.O. unlocked (or no 10 MHz reference signal)
1-25.	Monitor and Control <FSK Communication M&C> [Interface] [Functions]	650kHz FSK Signal on IF Connector Monitor: Tx Output Power / Temperature / Tx Status / Alarm (Over temperature * Note 2 / L.O. unlock) / Step Attenuator Control: Transmit On/Off / Step Attenuator
	[Performance]	Tx Output Power: Detector Range: 15 dB (up to Psat) Reading Accuracy: +/- 1.0 dB Step Attenuator: Attenuator Range: 0 to 15.5 dB Attenuator Step: 0.5 dB <i>*Details are mentioned on Appendix of "Specifications Monitor & Control".</i>
	<RS-232C Interface M&C > [Interface] [Functions]	RS-232C Interface on MS connector Monitor: Tx Output Power / Temperature / Tx Status / Alarm (Over temperature * Note 1 / L.O. unlock) / Step Attenuator Control: Transmit On/Off / Step Attenuator
	[Performance]	Tx Output Power: Detector Range: 15 dB (up to Psat) Reading Accuracy: +/- 1.0 dB Step Attenuator: Attenuator Range: 0 to 15.5 dB Attenuator Step: 0.5 dB <i>*Details are mentioned on Appendix of "Specifications Monitor & Control".</i>

*Note2: Regardless of cooling fan status, the unit will operate until status of over temperature which turn out at internal temperature of around 106 °C, and the Mute and Alarm will function at status of over temperature.

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2. Mechanical Specifications

#	Items	Specifications
2-1.	Input Interface [IF Connector] [Circular Connector]	IF / Ref. / FSK M&C Signal Input: N-type female connector, 50 ohms F-type female connector, 75 ohms DC / M&C Input: MS Connector Part No.: PT02E-14-12P (025) Mating connector: PT06E-14-12S (470) Assignment:  <ul style="list-style-type: none"> Pin A: N.C. Pin B: N.C. Pin C: N.C. Pin D: N.C. Pin E: GND COMMON (RS-232C) Pin F: N.C. Pin G: RS-232C TxD* Pin H: RS-232C RxD* Pin J: DC Power (+) / Prime Pin K: DC Power (-) / Return; GND COMMON (RS-232C) Pin L: N.C. Pin M: N.C. <p><i>* Pin G: RS-232C TxD and Pin H: RS-232C RxD are available for only RS-232C Interface M&C models.</i></p>
2-2.	Output Interface	Waveguide, WR-75 (with Groove)
2-3.	Cooling	Forced-air-cooled
2-4.	Dimension & Housing	180(L) × 130(W) × 80(H) mm [7.09" (L) x 5.12" (W) x 3.15" (H)] without interface connectors and screws
2-5.	Weight	2.5 kg [5.5 lbs]

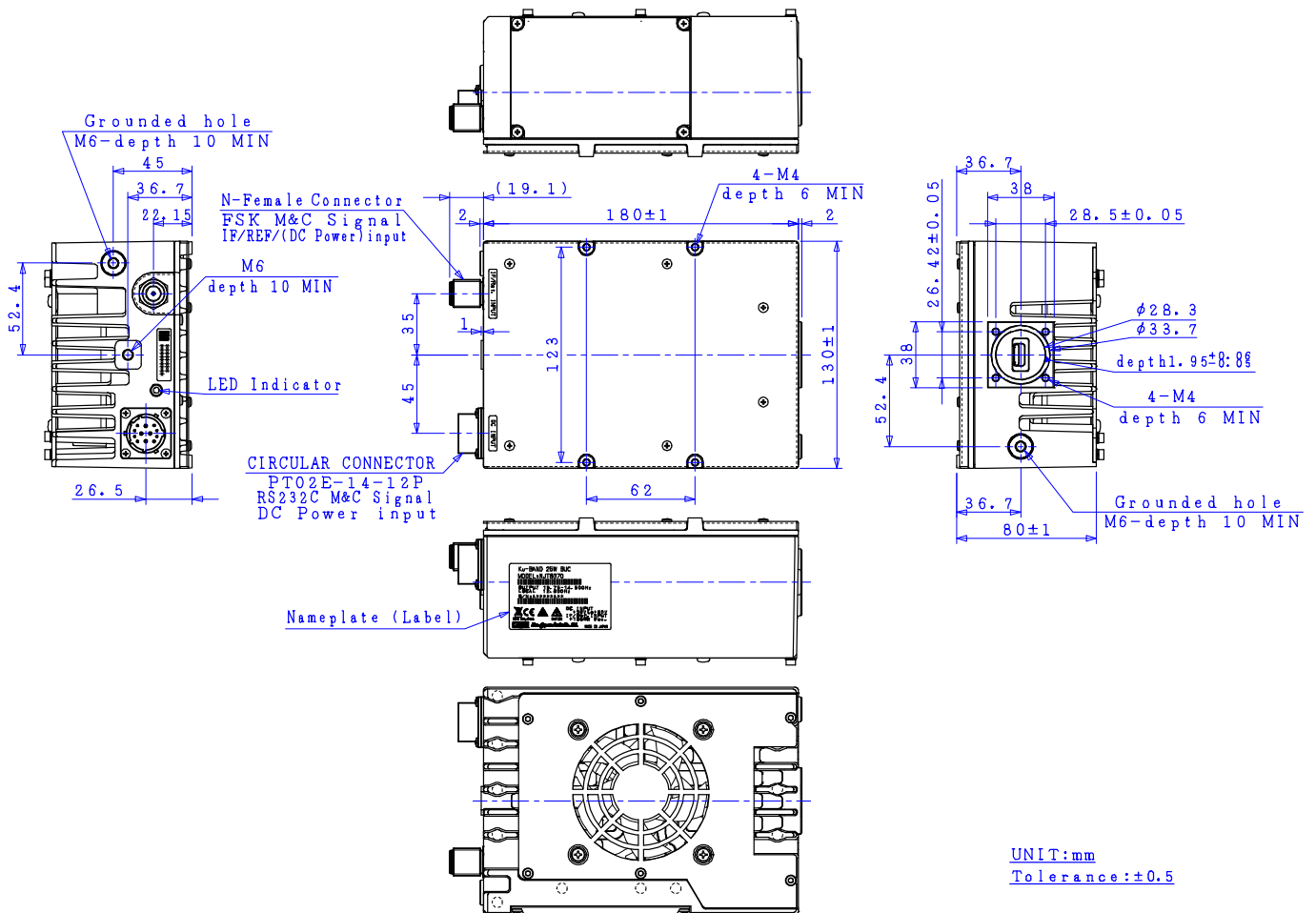
3. Environmental Specifications

#	Items	Specifications
3-1.	Temperature Range (ambient) [Operating] [Storage]	Operation Guarantee: -40 to +75 °C Performance Guarantee: -40 to +60 °C -40 to +75 °C
3-2.	Humidity	0 to 100 %
3-3.	Altitude	15,000 feet (4,572 m)
3-4.	Vibration	5 G [49.03 m/s ²] (3 axis, 50 Hz to 2 kHz) 1 mm p-p (3 axis, 5 to 50 Hz)
3-5.	Shock	30 G [294.20 m/s ²] (3 axis)
3-6.	Waterproof / Dustproof (IP Code)	IP 67
3-7.	Regulations	EU Directive (CE Marking) EMC (2014/30/EC) RoHS (2011/65/EU) Safety: EN60950-1
3-8.	Comply with RoHS (Restricting the use of Hazardous Substances) directives	

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4. Outline Drawing

- IF / Ref. Input: N-type Female Connector
- DC Input: IF Connector

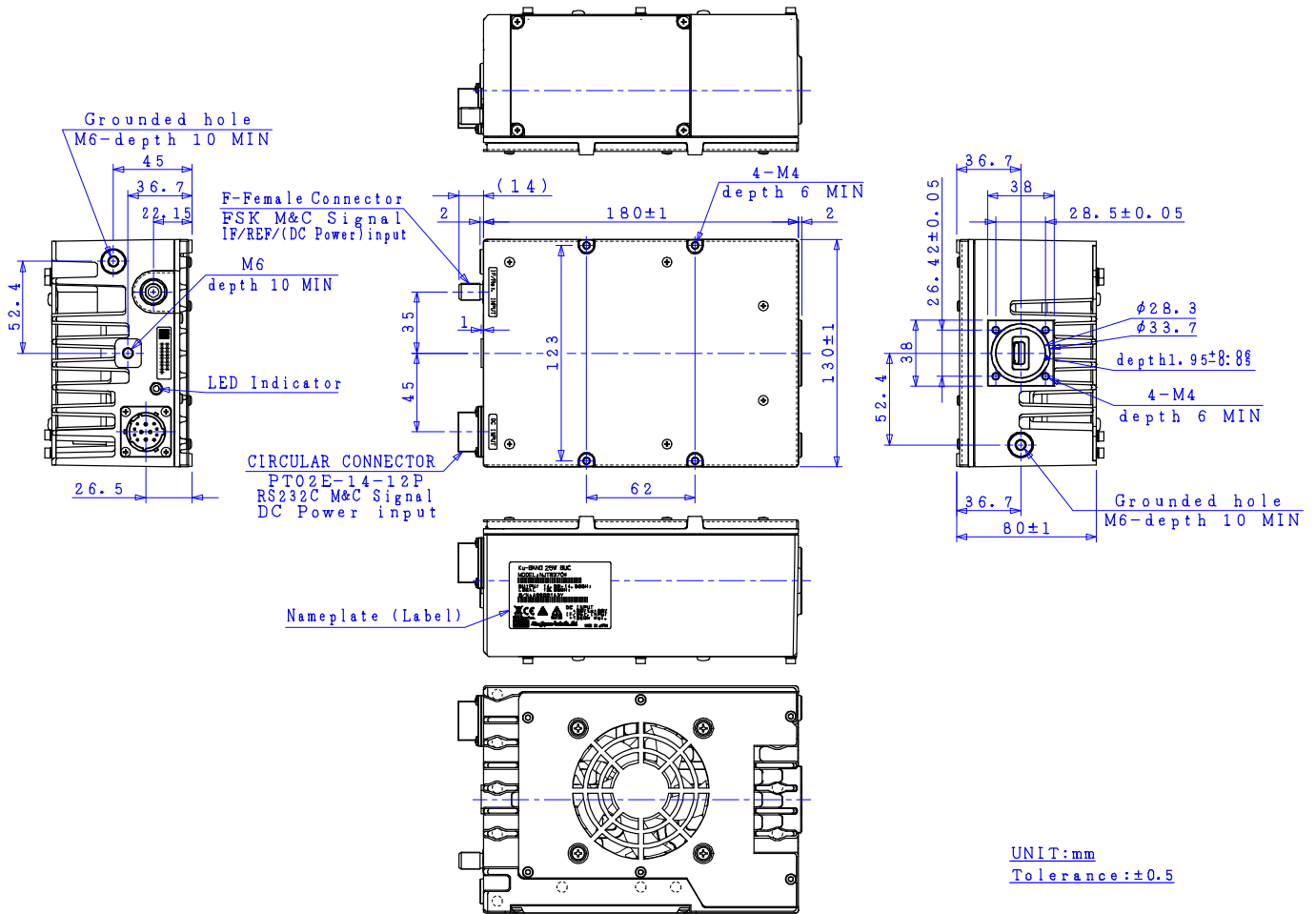


Accessories

- O-ring, Qty (1), for waveguide flange
- Wrench Key, Qty (1), M4, Hexagon
- Bolts, Qty (4), M4 x 10, Hexagon socket head with spring washer and flat washer, SUS, for waveguide flange
- Screws, Qty (2), M6 x 10, Phillips head with spring washer and flat washer, SUS, for grounded hole
- Connector, Qty (1), MS Mating connector: PT06E-14-12S (470)

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- IF / Ref. Input: F-type Female Connector
- DC Input: MS Connector



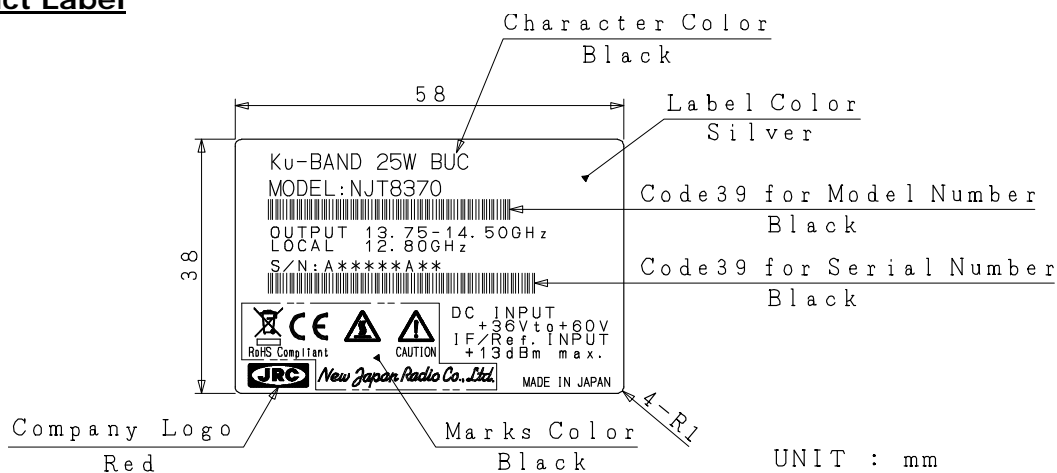
Accessories

- O-ring, Qty (1), for waveguide flange
- Wrench Key, Qty (1), M4, Hexagon
- Bolts, Qty (4), M4 x 10, Hexagon socket head with spring washer and flat washer, SUS, for waveguide flange
- Screws, Qty (2), M6 x 10, Phillips head with spring washer and flat washer, SUS, for grounded hole
- Connector, Qty (1), MS Mating connector: PT06E-14-12S (470)

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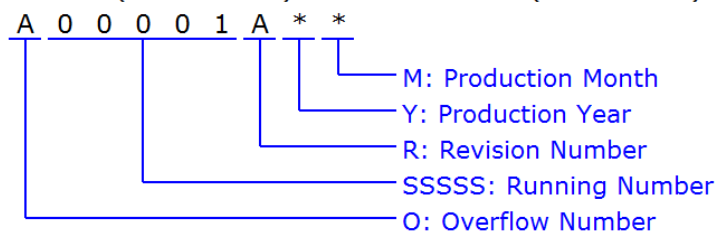
5. Label

Product Label



Definition of Serial Number

Serial Number (OSSSSRYM) - ALPHANUMERIC (9 characters)



O: Overflow Number - ALPHABET (1 character)

"A" to "Z", e.g.: A99999 ⇒ B00001

SSSS: Running Number - NUMBER (5 digits)

"00001" to "99999"

R: Revision Number - ALPHABET (1 character)

"A" to "Z"

Y: Production Year - NUMBER (1 digit)

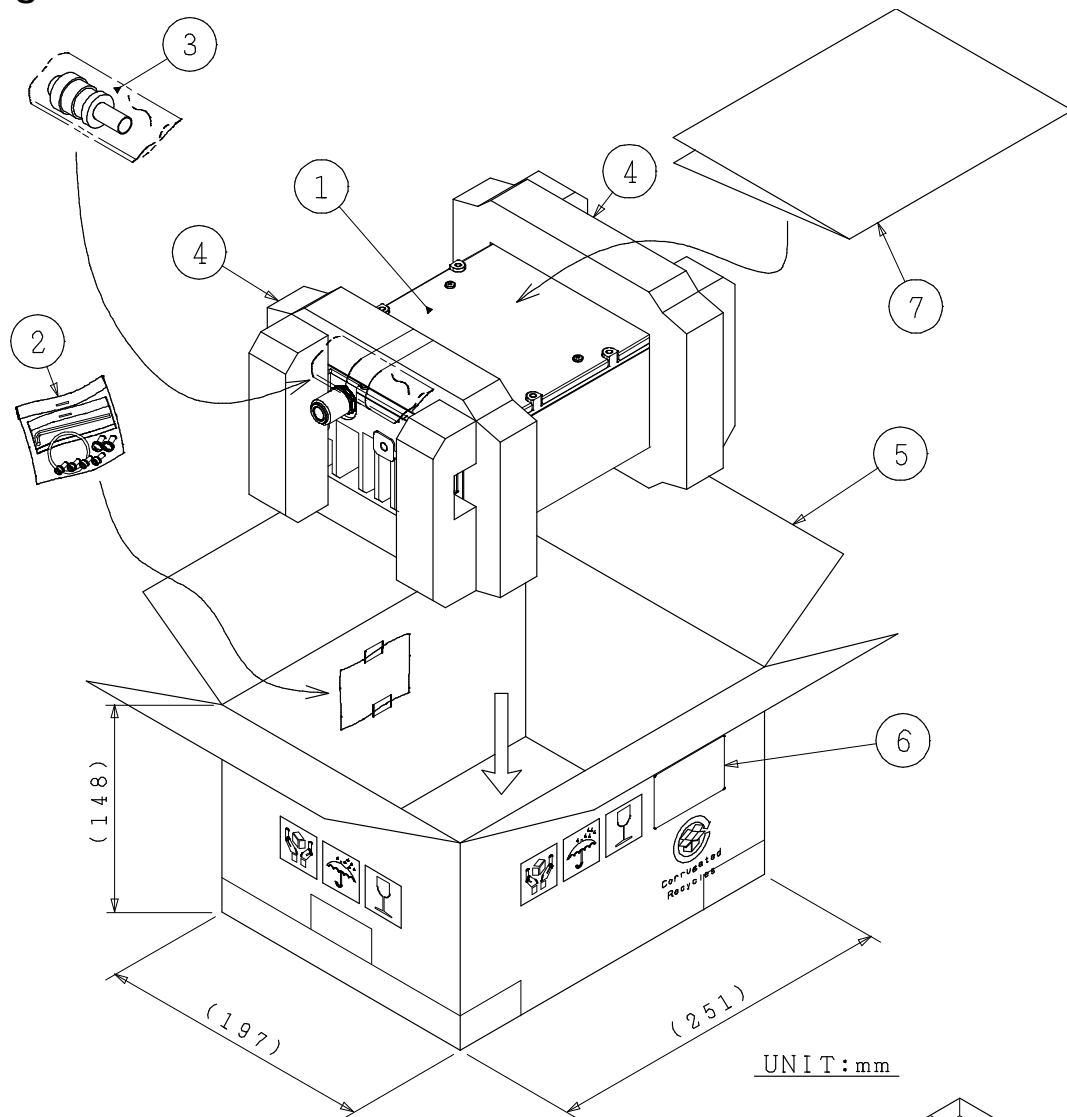
Calendar Number, e.g.: 2009:9, 2010:0, 2011:1, 2012:2 ····

M: Production Month - ALPHANUMERIC (1character)

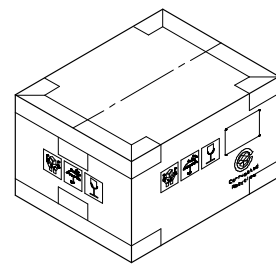
"1" to "9", "X" as October, "Y" as November, "Z" as December

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6. Package



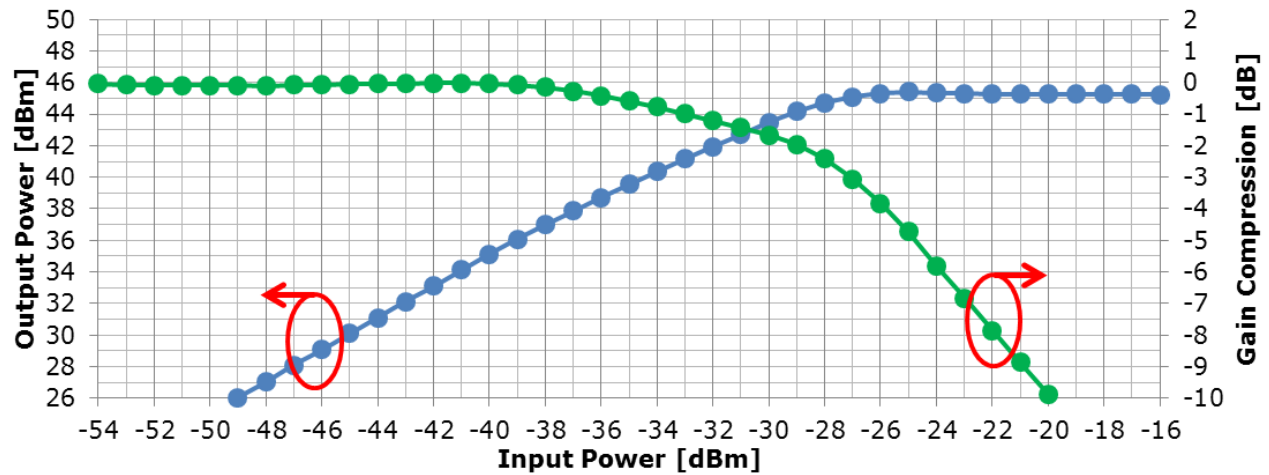
- ①: BUC
- ②: Accessories
 - O-RING
 - Hexagon Socket Head Bolts
M4×10 4 Pieces (SUS, SW and W)
 - Hexagon Wrench Keys (M4 Type)
 - Cross Recessed Head Machine Screw
M6×10 2 Pieces (SUS, SW)
- ③: Accessory
 - MS mating connector
- ④: Polyethylene foam for package cushioning
- ⑤: Double-faced corrugated fiberboard
- ⑥: Label
- ⑦: Test Data



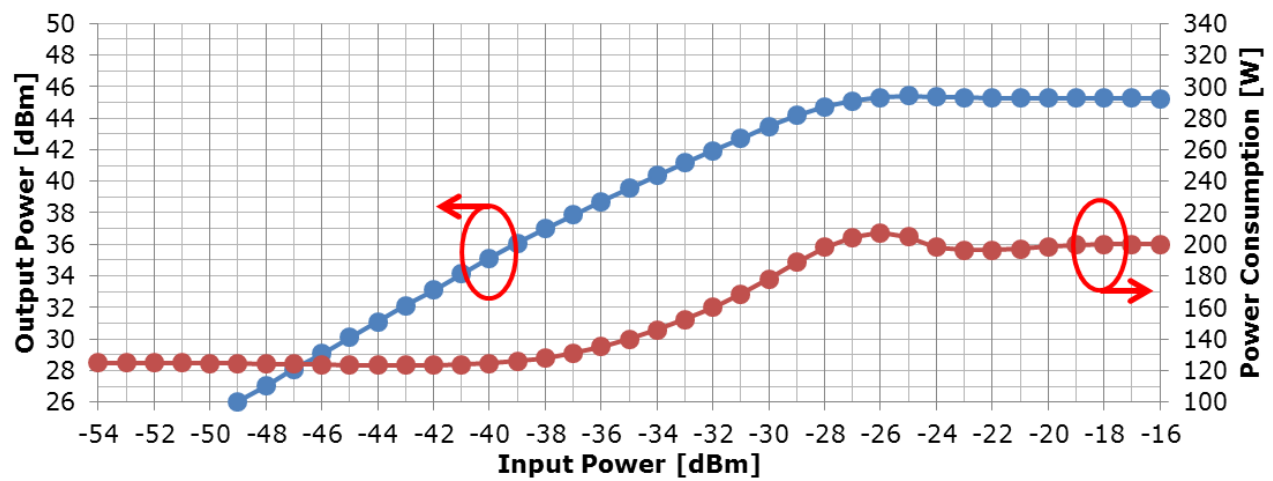
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7. Reference Performance

Output Power/Gain Compression vs. Input Power



Output Power/Power Consumption vs. Input Power



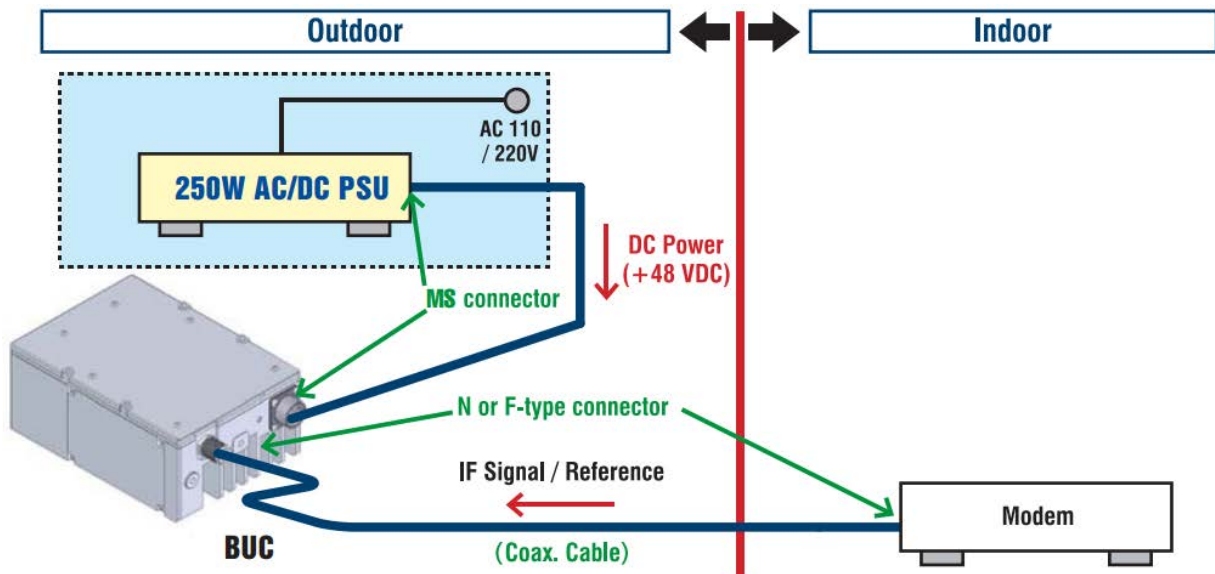
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AC Power Operating Option

1. Overview

The features of Outdoor 250W AC/DC Power Supply Unit (PSU) are to provide the stable +48V DC power to operate BUCs, even if power supply of the equipment is not capable enough to operate the BUC. This unit employs the aluminum housing with corrosion-proof treatment on the surface and has waterproof and dust-proof constructor in order to use perfectly as the outdoor unit.

In addition, the outdoor AC/DC PSU complies with EC DIRECTIVE.



2. Electrical Specifications

#	Items	Specifications
2-1.	Input AC Voltage Range [Rated Range] [Absolute Maximum Rating]	100 to 240 VAC 90 to 264 VAC
2-2.	Input AC Frequency Range	50/60 Hz
2-3.	Input AC Current	3.6 A max.
2-4.	Output Voltage	+48 VDC nom. * Note 3
2-5.	Output Current	5.5 A max.
2-6.	Efficiency	90 % typ. * Note 4
2-7.	Maximum Output Power	250 W
2-8.	Power Factor	0.94 typ. * Note 4

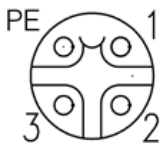
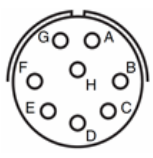

*Note3: Voltage ripple corresponding to output power arises.

*Note4: The condition is 100 VAC as AC voltage input and 200 W as output power load .

* Above Specifications are subject to change without notice.

AC Power Operating Option

3. Mechanical Specifications

#	Items	Specifications
3-1.	Input Interface [AC Input] [Option Port]	AC Connector: C016 20C003 200 12 Mating Connector: C016 20D003 210 12 (Amphenol eco mate connector) Assignment:  <ul style="list-style-type: none"> Pin 1: Live AC input Pin 2: Neutral AC input Pin 3: N.C. Pin PE: Frame Ground (GND) MS Connector: PT02E-12-8P(025) Mating Connector: PT06E-12-8S(470) (Amphenol connector) Assignment:  <ul style="list-style-type: none"> Pin A: Through Pin A in Output MS connector Pin B: Through Pin B in Output MS connector Pin C: Through Pin C in Output MS connector Pin D: Through Pin D in Output MS connector Pin E: Through Pin E in Output MS connector Pin F: Through Pin F in Output MS connector Pin G: Through Pin G in Output MS connector Pin H: Through Pin H in Output MS connector
3-2.	Output Interface [DC & Option Output]	MS Connector: PT02E-14-12S(025) Mating Connector: PT06E-14-12P(470) (Amphenol connector) Assignment:  <ul style="list-style-type: none"> Pin A: Through Pin A in Input MS connector Pin B: Through Pin B in Input MS connector Pin C: Through Pin C in Input MS connector Pin D: Through Pin D in Input MS connector Pin E: Through Pin E in Input MS connector Pin F: Through Pin F in Input MS connector Pin G: Through Pin G in Input MS connector Pin H: Through Pin H in Input MS connector Pin J: DC Output (+) / Prime Pin K: DC Output (-) / Return Pin L: N.C. Pin M: N.C.
3-3.	Dimension & Housing	186(L) x 133(W) x 60(H) mm [7.33" (L) x 5.24" (W) x 2.36" (H)] without interface connectors
3-4.	Weight	1.6 kg [3.5 lbs.]
3-5.	Surface Finish [Protective & Conformal Coating] [Finish Paint]	Trivalent Chromate Treatment Acrylic Paint, Ivory Color
3-6.	Cooling	Convection air cooling

* Above Specifications are subject to change without notice.



AC Power Operating Option

4. Environmental Specifications

#	Items	Specifications
4-1.	Temperature Range (ambient) [Operating] [Storage]	-40 to +55 °C -40 to +75 °C
4-2.	Humidity	0 to 100 % Rh
4-3.	Dust/Waterproof	IP67 * Note 5
4-4.	Vibration	5 G [49.03 m/s ²] (3 axis, 50 Hz to 2 kHz) 1 mm p-p (3 axis, 5 to 50 Hz)
4-5.	Shock	30 G [294.20 m/s ²] (3 axis)
4-6.	Regulations	EU Directive (CE Marking) EMC (2014/30/EC) Low Voltage (2006/95/EC)
4-7.	Standard [Safety] [EMC]	IEC60950-1:2005 (2 nd Edition) EN60950-1:2006 EN61000-3-2 (Harmonic Current Emission Test) EN61000-3-3 (Voltage Fluctuations and Flicker Test) EN61000-4-2 (ESD Test) EN61000-4-3 (Radio-Frequency Electromagnetic Field Test) EN61000-4-4 (Electrical Fast Transient/Burst Test) EN61000-4-5 (Surge Test) EN61000-4-6 (Conducted Disturbance Radio-Frequency Test) EN61000-4-8 (Power Frequency Magnetic Field Test) EN61000-4-11 (Voltage Dips and Interruptions Test)
4-8.	Comply with RoHS (Restricting the use of Hazardous Substances) directives	

*Note5: Conditioned on connection with all of enclosed mating connectors.

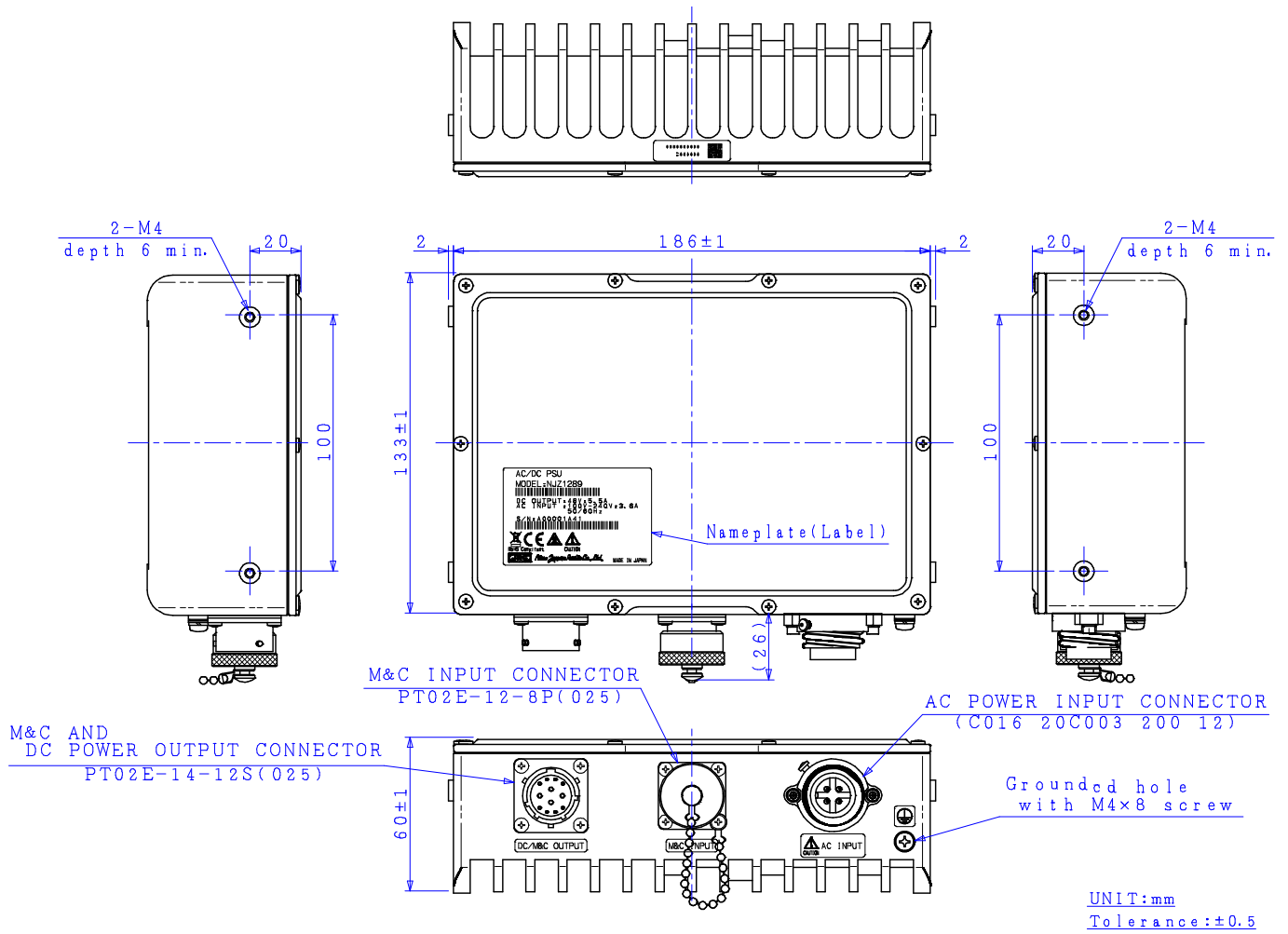
5. Accessories

- AC Connector (Plug socket) , Qty (1), Mating connector:
C016 20D003 210 12 (Amphenol)
- MS Connector (Plug pin) , Qty (1), Mating connector: PT06E-14-12P (470) (Amphenol)

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AC Power Operating Option

6. Outline Drawing

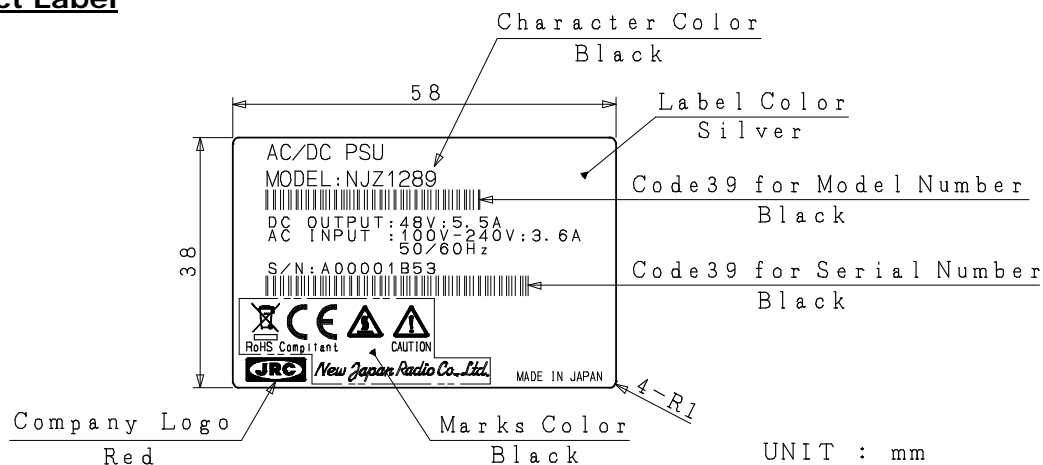


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AC Power Operating Option

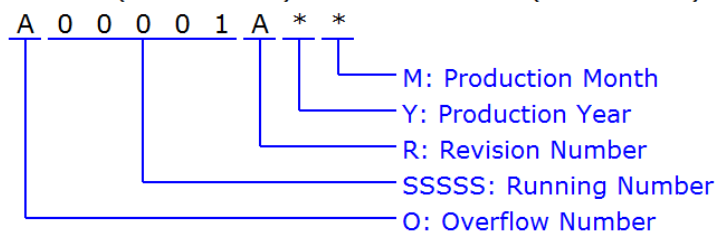
7. Label

Product Label



Definition of Serial Number

Serial Number (OSSSSRYM) - ALPHANUMERIC (9 characters)



O: Overflow Number - ALPHABET (1 character)

"A" to "Z", e.g.: A99999 ⇒ B00001

SSSSS: Running Number - NUMBER (5 digits)

"00001" to "99999"

R: Revision Number - ALPHABET (1 character)

"A" to "Z"

Y: Production Year - NUMBER (1 digit)

Calendar Number, e.g.: 2009:9, 2010:0, 2011:1, 2012:2 ...

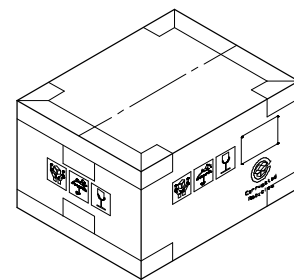
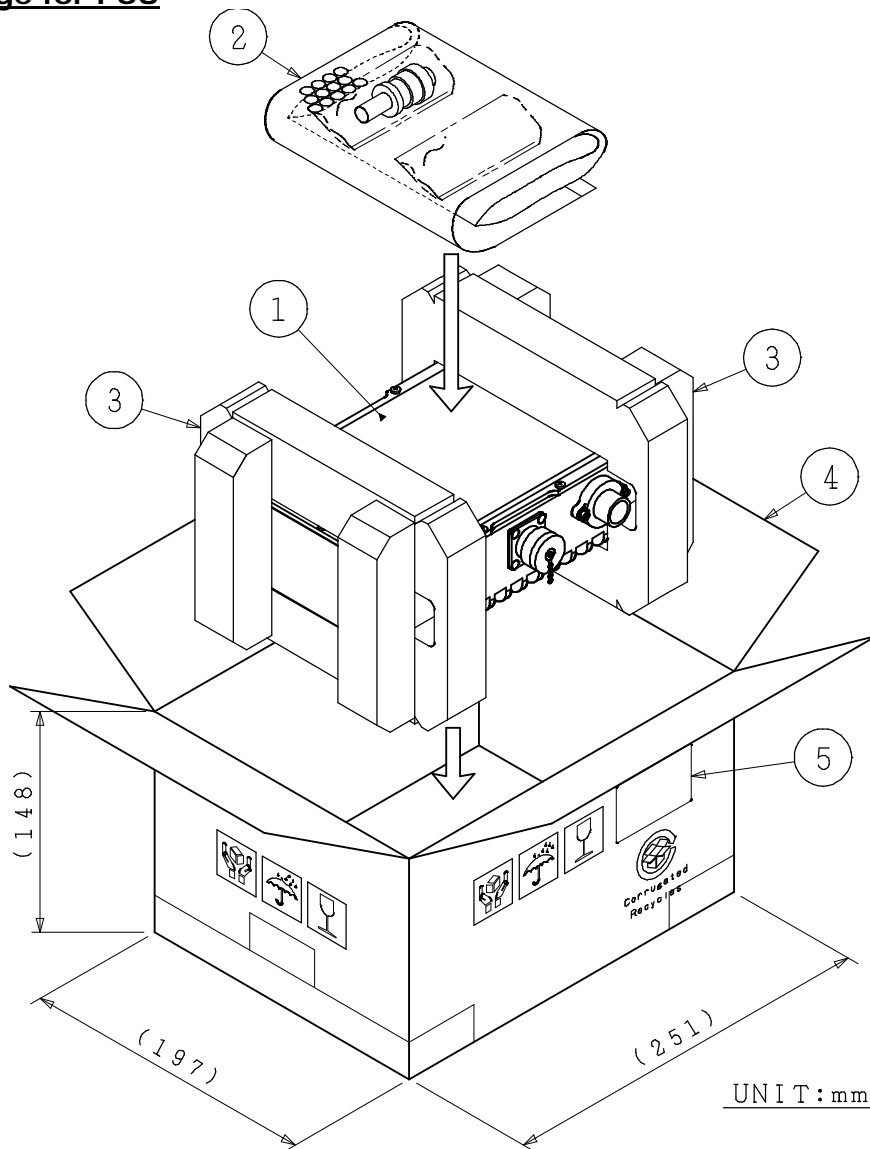
M: Production Month - ALPHANUMERIC (1character)

"1" to "9", "X" as October, "Y" as November, "Z" as December

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AC Power Operating Option

8. Package Package for PSU

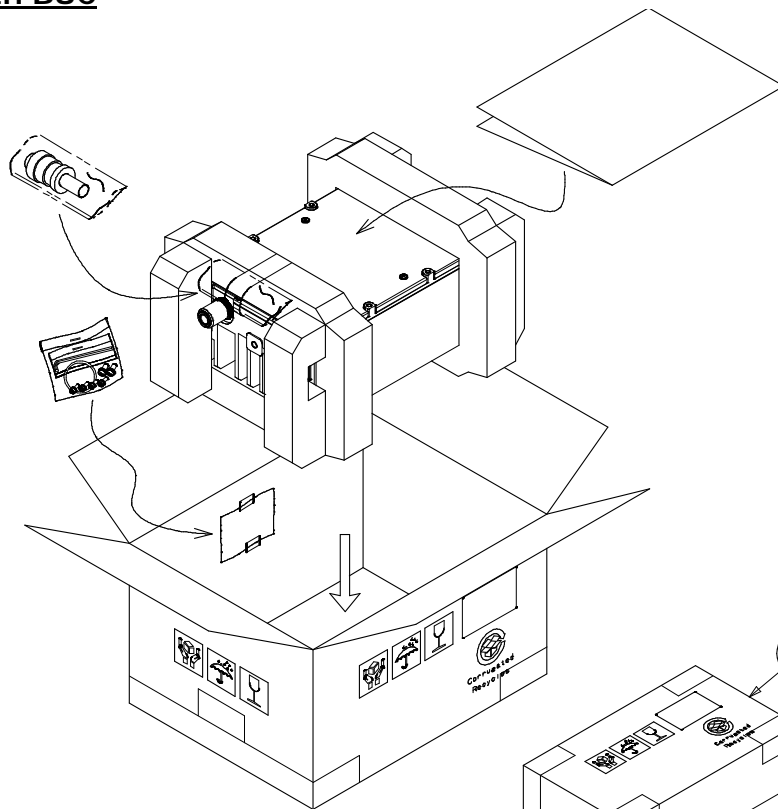


- ①: BUC
- ②: Accessories
 - MS mating connector
PT06E-14-12P-470:1 piece
 - AC mating connector
C016 20D003 210 12:1 piece
- ③: Polyethylene foam for package cushioning
- ④: Double-faced corrugated fiberboard
- ⑤: Label

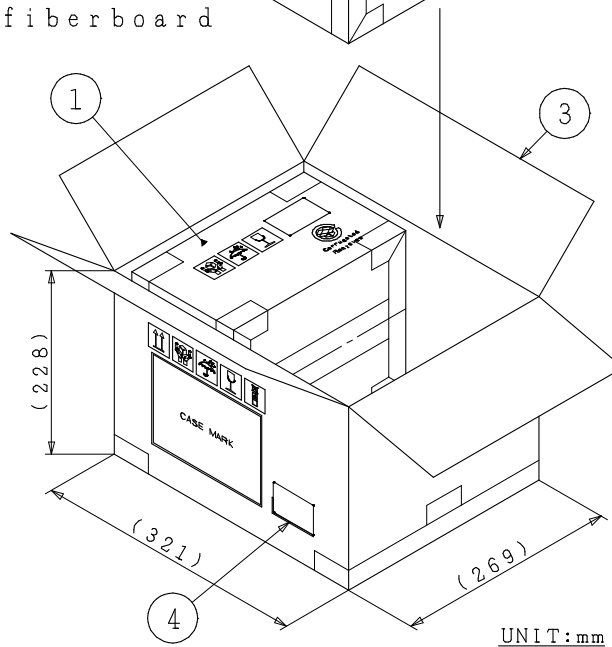
* Above Specifications are subject to change without notice.

AC Power Operating Option

Package with BUC



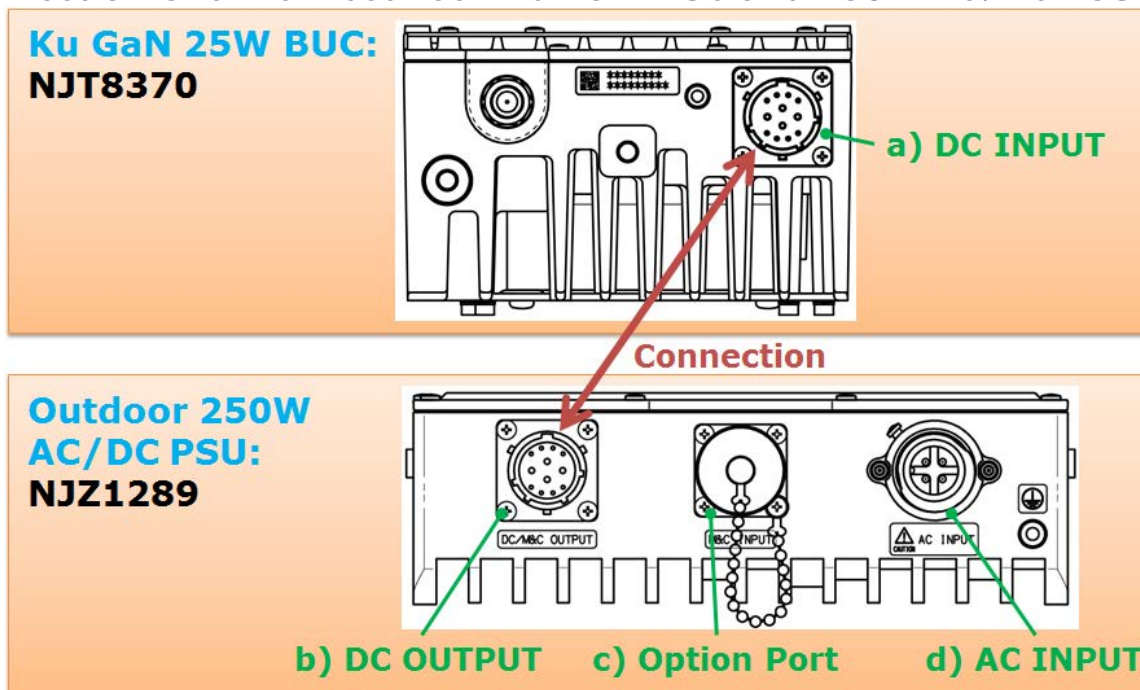
- ①: BUC
- ②: AC/DC PSU
- ③: Double-wall
corrugated fiberboard
- ④: Label



* Above Specifications are subject to change without notice.

AC Power Operating Option

9. Connection Overview between Ku 25W BUC and 250W AC/DC PSU



a) DC INPUT at NJT8370 (Ku GaN 25W BUC)

- Product connector: PT02E-14-12P(025) [Amphenol / 12 pins, male]
 - Mating connector: PT06E-14-12S(470) [Amphenol / 12 sockets, female]
- * Mating connector is enclosed in the shipping package of NJT8370*



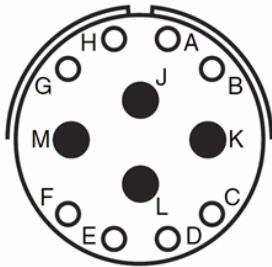
Pin No.	Item	Description
A	N.C.	-
B	N.C.	-
C	N.C.	-
D	N.C.	-
E	RS-232C GND	Available to use with RS-232C M&C option
F	N.C.	-
G	RS-232C Tx	
H	RS-232C Rx	Available to use with RS-232C M&C option
J	DC Input (+)	Prime: +36 to +60 V / DC Voltage
K	DC Input (-)	Return: GND
	RS-232C GND	Available to use with RS-232C M&C option
L	N.C.	-
M	N.C.	-

* Above Specifications are subject to change without notice.

AC Power Operating Option

b) DC OUTPUT at NJZ1289 (AC/DC PSU)

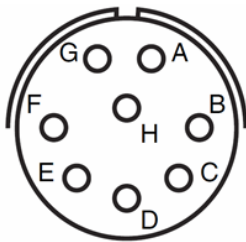
- Product connector: PT02E-14-12S(025) [Amphenol / 12 sockets, male]
 - Mating connector: PT06E-14-12P(470) [Amphenol / 12 pins, female]
- * Mating connector is enclosed in the shipping package of NJZ1289*



Pin No.	Item	Description
A	By-pass Port	Through Pin A in (c)'s MS connector
B	By-pass Port	Through Pin B in (c)'s MS connector
C	By-pass Port	Through Pin C in (c)'s MS connector
D	By-pass Port	Through Pin D in (c)'s MS connector
E	By-pass Port	Through Pin E in (c)'s MS connector
F	By-pass Port	Through Pin F in (c)'s MS connector
G	By-pass Port	Through Pin G in (c)'s MS connector
H	By-pass Port	Through Pin H in (c)'s MS connector
J	DC Output (+)	Prime: +48V typical, DC Voltage
K	DC Output (-)	Return: GND
L	N.C.	-
M	N.C.	-

c) Option Port at NJZ1289 (AC/DC PSU)

- Product connector: PT02E-12-8P(025) [Amphenol / 8 pins, male]
 - Mating connector: PT06E-12-8S(470) [Amphenol / 8 sockets , female]
- * Product connector is covered by the waterproof cap.*



Pin No.	Item	Description
A	By-pass Port	Through Pin A in (b)'s MS connector
B	By-pass Port	Through Pin B in (b)'s MS connector
C	By-pass Port	Through Pin C in (b)'s MS connector
D	By-pass Port	Through Pin D in (b)'s MS connector
E	By-pass Port	Through Pin E in (b)'s MS connector
F	By-pass Port	Through Pin F in (b)'s MS connector
G	By-pass Port	Through Pin G in (b)'s MS connector
H	By-pass Port	Through Pin H in (b)'s MS connector

d) AC INPUT at NJZ1289 (AC/DC PSU)

- Product connector: C016 20C003 200 12 [Amphenol / 3 pins + PE, male]
 - Mating connector: C016 20D003 210 12 [Amphenol / 3 sockets + PE, female]
- * Mating connector is enclosed in the shipping package of NJZ1289*



Pin No.	Item	Description
1	L (Live)	100 to 240 V, AC Voltage
2	N (Neutral)	100 to 240 V, AC Voltage
3	N.C.	-
PE	FG	GND

* Above Specifications are subject to change without notice.

AC Power Operating Option

Cable Option

- **Model No. NJZ1290A01**

Cable between NJZ1289 (250W AC/DC PSU) and AC Outlet

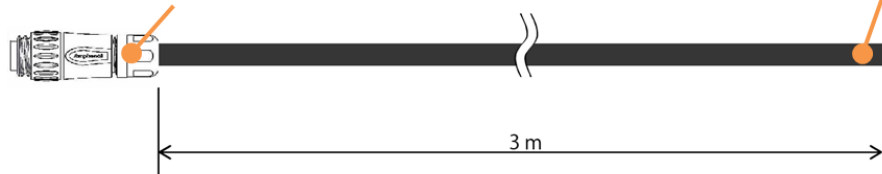
Weatherized Cable / Length: 3m / AC Mating Connector assembled

/ No assembly in AC Outlet Side

Mating Connector of "d) AC INPUT (NJZ1289)"

P/N: C016 20D003 210 12

No assembly for AC Outlet



- **Model No. NJZ1290A02**

Connection Cable between NJT8370 (Ku GaN 25W BUC) and NJZ1289 (250W AC/DC PSU)

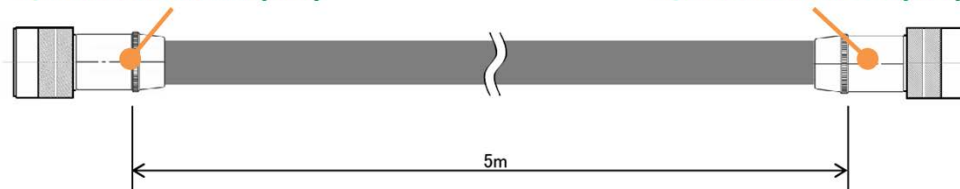
Weatherized Cable / Length: 5m / Two Mating Connectors assembled

Mating Connector of "a) DC INPUT (NJT8370)"

P/N: PT06W-14-12S(470)

Mating Connector of "b) DC OUTPUT (NJZ1289)"

P/N: PT06W-14-12P(470)

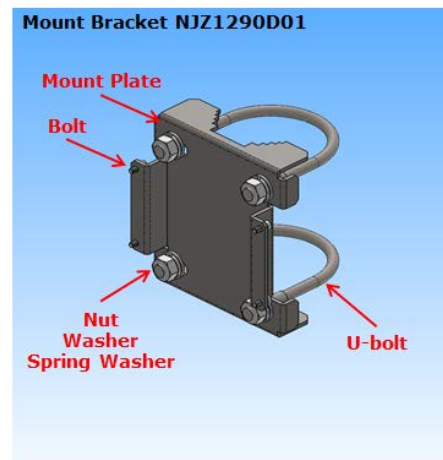
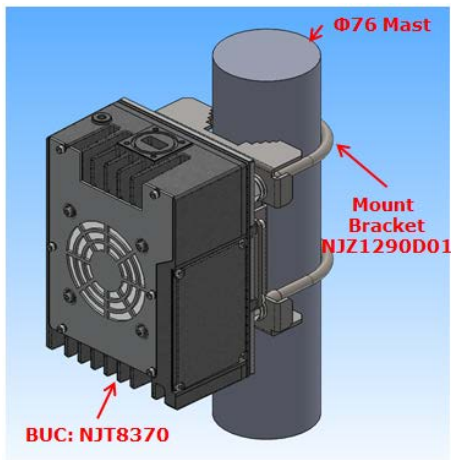


* Above Specifications are subject to change without notice.

Mounting Bracket Option

1. $\Phi 76$ Mast Mount Bracket of NJT8370 series

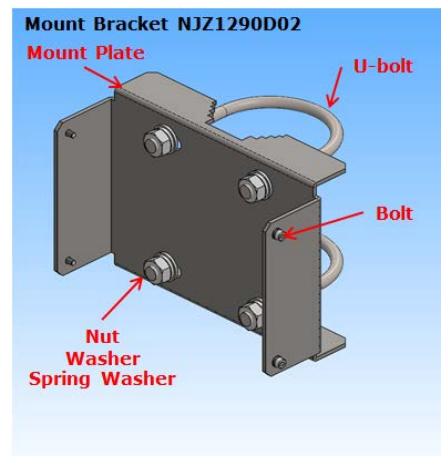
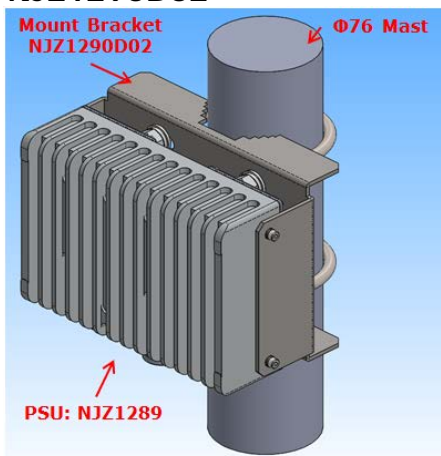
- Model No. NJZ1290D01



Item	Qty	Description
Mount Plate	1	SUS
Bolt	4	SUS, M4, with W & SW, for fixing BUC
U-bolt	2	SUS, 65A(2-1/2"), M10
Nut	4	SUS, M10
Washer	4	SUS, for M10
Spring Washer	4	SUS, for M10

2. $\Phi 76$ Mast Mount Bracket of NJZ1289

- Model No. NJZ1290D02



Item	Qty	Description
Mount Plate	1	SUS
Bolt	4	SUS, M4, with W & SW, for fixing PSU
U-bolt	2	SUS, 65A(2-1/2"), M10
Nut	4	SUS, M10
Washer	4	SUS, for M10
Spring Washer	4	SUS, for M10

* Above Specifications are subject to change without notice.

M&C Option for Ku-band GaN 25W BUC: NJT8370

Appendix) Specifications of Monitor & Control

Rev. 4.0
July 13, 2016

1. Interface Specifications

1-1. FSK Communication M&C

- (1) Physical Interface IF Connector: N-type or F-type, female
Combine with IF signal and 10MHz Reference signal
- (2) Transmitter Outputs
- a. Frequency 650 kHz $\pm 5\%$
 - b. FSK deviation ± 60 kHz nom. (+60 kHz mark)
 - c. Deviation tolerance ± 50 kHz min. / ± 70 kHz max.
 - d. Output Level -10 dBm nom.
 - e. Output impedance 50 Ω
 - f. Start Tone 710 kHz (mark) / 10ms min
- (3) Receiver Inputs
- a. Locking range ± 32.5 kHz
 - b. Input impedance 50 Ω
 - c. Input Sensitivity -15 dBm min.

1-2. RS-232C Interface M&C

- (1) Physical Interface MS Connector: P/N PT02E-14-12P (025)
Pin Assignment:



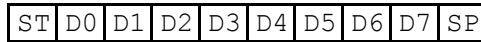
- Pin A: N.C.**
- Pin B: N.C.**
- Pin C: N.C.**
- Pin D: N.C.**
- Pin E: GND COMMON (RS-232C)**
- Pin F: N.C.**
- Pin G: RS-232C TxD***
- Pin H: RS-232C RxD***
- Pin J: DC Power (+) / Prime**
- Pin K: DC Power (-) / Return;
GND COMMON (RS-232C)**
- Pin L: N.C.**
- Pin M: N.C.**

- (2) Transmitter Outputs
- a. Output Voltage Swing ± 5 V min. / ± 5.4 V typ.
 - b. Output Resistance 300 Ω min. / 10M Ω typ.
- (3) Receiver Inputs
- a. Input Voltage Range ± 15 V
 - b. Input Threshold low +0.6 V min.
 - c. Input Threshold High +2.4 V max
 - d. Input Resistance 7 k Ω max

2. Transmission Protocol

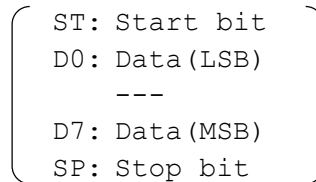
- a. Operation Mode Binary
- b. Transfer Rate 9600 bit/s
- c. Data Format 1 start bit, 8 data bits, 1 stop bit

No Parity



Transmit →

(The least significant bit (LSB) is sent first.)



- d. Maximum Response Time 50 ms
- e. Message Rate 1 every 20 ms

3. Packet Format

- a. Data Packet Length 7 Bytes
- b. Byte Configuration

Byte	Command (IDU to BUC)	Response (BUC to IDU)
1st	BUC Address (*1)	BUC Address (*2)
2nd	Command	Data Byte 1
3rd	Data Byte 1	Data Byte 2
4th	Data Byte 2	Data Byte 3
5th	Data Byte 3	Data Byte 4
6th	Data Byte 4	Data Byte 5
7th	Check Sum (*3)	Check Sum (*3)

*1: Initial setting of a BUC address is 0x01.
*2: Responder address is shifted left by 4 bits.
*3: Algebraic sum of bytes 1 through 6.
*Note: Spare bytes are always filled with 0xAA (10101010).

4. Command & Response Message Structure

The BUC status is stored to internal EEPROM.

The last BUC state is stored to internal EEPROM, so when the BUC is re-turned DC power on again, the state is reproduced last BUC condition.

4-1. Command Message Structure (IDU to BUC)

a. Request Status

This command can acquire output power level, alarm status, BUC class, and temperature etc.

Byte	Name	Description	Value
1	Address	BUC Address	0x01 (to 0x0F)
2	Command	Request Status	0x01
3	Data Byte 1	Not used	0xAA
4	Data Byte 2	Not used	0xAA
5	Data Byte 3	Not used	0xAA
6	Data Byte 4	Not used	0xAA
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	01	AA	AA	AA	AA	CHK
----	----	----	----	----	----	-----

b. Set Transmit On/Off State

This command can set a state of transmit on and transmit off.

Byte	Name	Description	Value
1	Address	BUC Address	0x01 (to 0x0F)
2	Command	Tx On/Off	0x02
3	Data Byte 1	Tx Control	Off:0x00/On:0x01
4	Data Byte 2	Not used	0xAA
5	Data Byte 3	Not used	0xAA
6	Data Byte 4	Not used	0xAA
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	02	01	AA	AA	AA	CHK
----	----	----	----	----	----	-----

c. Set Attenuator

This command can set the step attenuator with 0.5 dB step in the BUC.

Byte	Name	Description	Value
1	Address	BUC Address	0x01 (to 0x0F)
2	Command	Set Attenuator	0x05
3	Data Byte 1	Attenuator Selection 1 or 2	Att.1 0x01 Att.2 0x02 *1
4	Data Byte 2	Setting Att. in 10dB digit	0x00 or 0x01 *2
5	Data Byte 3	Setting Att. in 1dB digit	0x00 to 0x09 *2
6	Data Byte 4	Setting Att. bit in 0.5dB digit	0x00 or 0x05 *2
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	05	01	01	02	05	CHK
----	----	----	----	----	----	-----

*1: Att.1 is available, Att.2 is not available.

*2: Dynamic range and step size of the step attenuator: 15.5dB in 0.5dB step

ex) 12.5dB : Data byte 2 is 0x01
Data byte 3 is 0x02
Data byte 4 is 0x05

d. Get Attenuator

This command can check the step attenuator setting value in the BUC.

Byte	Name	Description	Value
1	Address	BUC Address	0x01 (to 0x0F)
2	Command	Get Attenuator	0x06
3	Data Byte 1	Attenuator Selection 1 or 2	Att.1 0x01 Att.2 0x02 *1
4	Data Byte 2	Not used	0xAA
5	Data Byte 3	Not used	0xAA
6	Data Byte 4	Not used	0xAA
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	06	01	AA	AA	AA	CHK
----	----	----	----	----	----	-----

*1: Att.1 is available, Att.2 is not available.

4-2. Response Message Structure (BUC to IDU)

a. Request Status

Byte	Name	Description	Value
1	Address	BUC Address shifted left by 4	0x10 (to 0xF0)
2	Level Byte 1	MS byte of Tx Output Power	*1
3	Level Byte 2	LS byte of Tx Output Power	*1
4	Temperature	Temperature in deg. C	*2
5	Status Byte 1	Bit 0: Temperature Out-of-Range	1:Fail , 0:Normal *3
		Bit 1: PLL Out-of-Lock	1:Fail , 0:Normal *3
		Bit 2: Checksum Error	1:Error , 0:Normal *3
		Bit 3: Tx Status	1:Tx On , 0:Tx Off *3
		Bits 4 thru 7: BUC Power Class	0x1 to 0xA *3
6	Status Byte 2	Bits 0 - 3: Not used	Fixed 0xA
		Bits 4 - 7: Software Version	0x0 to 0xF
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

10	10	FE	D8	88	1A	CHK
----	----	----	----	----	----	-----

*1: Data Field Definition for Tx Output Power

Output power is the number which changed hexadecimal data into the decimal number and was divided by 100.

ex) Output Power Data Output Power
 Level Byte 1 is 0x10
 Level Byte 2 is 0xFE } 0x10FE → +43.50 dBm

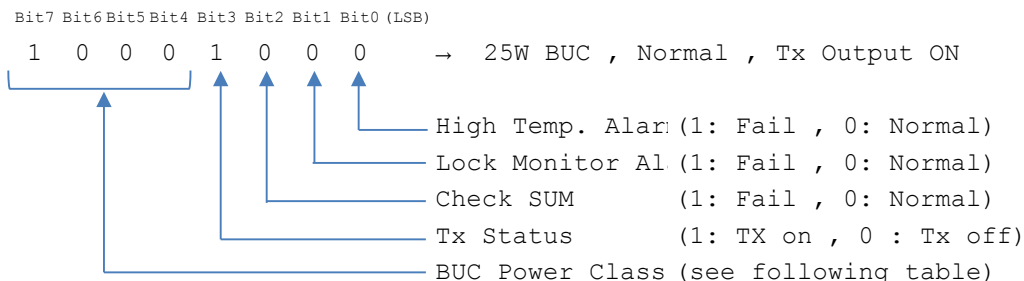
*2: Data Field Definition for Temperature

Temperature data is from -128°C to +127°C in two's complement (1°C step).

ex) Temperature Data
 Byte of Temperature is 0xD8 → 11011000 = -40 °C
 Byte of Temperature is 0xFF → 11111111 = -1 °C
 Byte of Temperature is 0x40 → 01000000 = 64 °C

*3: Data Field Definition for Status Byte 1

ex) Status Byte 1 is 0x88



BUC Power Class table

Value	0x1	0x2	0x3	0x4	0x5	0x6	0x7	0x8	0x9	0xA
Power	2W	4W	5W	8W	10W	16W	20W	25W	40W	60W

*4: Data Field Definition for Status Byte 2

ex) Status Byte 2 is 0x1A → Firmware Version Ver.1

b. Set Transmit On/Off State

i) In case of FSK Communication M&C

The BUC responds the same message as 'Request Status' after the BUC set the taransmit on/off state in accordance with the command message

ex)

10	10	FE	D8	88	1A	CHK
----	----	----	----	----	----	-----

ii) In case of RS-232C Interface M&C

Byte	Name	Description	Value
1	Address	BUC Address shifted left by 4	0x10 (to 0xF0)
2	Command	Tx On/Off	0x02
3	Data Byte 1	Tx Control	Off:0x00/On:0x01
4	Data Byte 2	Not used	0xAA
5	Data Byte 3	Not used	0xAA
6	Data Byte 4	Not used	0xAA
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

10	02	01	AA	AA	AA	CHK
----	----	----	----	----	----	-----

c. Set Attenuator

Byte	Name	Description	Value
1	Address	BUC Address shifted left by 4	0x10 (to 0xF0)
2	Command	Set Attenuator	0x05
3	Data Byte 1	Attenuator Selection 1or 2	Att.1 0x01 Att.2 0x02 *1
4	Data Byte 2	Set Att. bit in 10 dB digit	0x00 or 0x01
5	Data Byte 3	Set Att. bit in 1 dB digit	0x00 to 0x09
6	Data Byte 4	Set Att. bit in 0.5 dB digit	0x00 or 0x05
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	05	01	01	02	05	CHK
----	----	----	----	----	----	-----

*1: Att.1 is available, Att.2 is not available.

d. Get Attenuator

Byte	Name	Description	Value
1	Address	BUC Address shifted left by 4	0x10 (to 0xF0)
2	Command	Get Attenuator	0x06
3	Data Byte 1	Attenuator Selection 1or 2	Att.1 0x01 Att.2 0x02 *1
4	Data Byte 2	Set Att. bit in 10 dB digit	0x00 or 0x01
5	Data Byte 3	Set Att. bit in 1 dB digit	0x00 to 0x09
6	Data Byte 4	Set Att. bit in 0.5 dB digit	0x00 or 0x05
7	Checksum	Algebraic sum of bytes 1 - 6	

ex)

01	06	01	01	02	05	CHK
----	----	----	----	----	----	-----

*1: Att.1 is available, Att.2 is not available.