

# JRN-130K

## 3G/GSM IT Controller

### User Manual

Doc# : AN-1490012-2 Ver.1.02

Date: Oct 15, 2014

@Copyright  
Japan Radio Co., Ltd.  
Mobile Communication Group  
Engineering Department  
Communication Products Division

## History

| Date         | Number | The contents of change |
|--------------|--------|------------------------|
| Sep 16, 2014 | 1.00   | DRAFT                  |
| Oct 16, 2014 | 1.01   |                        |
| Oct 16, 2014 | 1.02   |                        |

## Index

|   |                                                       |    |
|---|-------------------------------------------------------|----|
| 1 | Introduction.....                                     | 4  |
| 2 | Composition .....                                     | 5  |
| 3 | Function .....                                        | 6  |
| 4 | Product specification .....                           | 7  |
| 5 | Block Diagram .....                                   | 11 |
| 6 | External Interface .....                              | 12 |
| 7 | Outline .....                                         | 14 |
| 8 | Option.....                                           | 15 |
| 9 | Compliance with FCC and IC Rules and Regulations..... | 18 |

## 1 Introduction

3G/GSM IT Controller (JRN-130K) is a vehicle small terminal to have the GPS measurement function and the 3G/GSM communication function, and to use it for management and positional information track / theft pursuit etc. of the vehicle.

As a communications protocol TCP/IP are mounted.

The terminal made by the Gemalto's PHS8-P is installed.

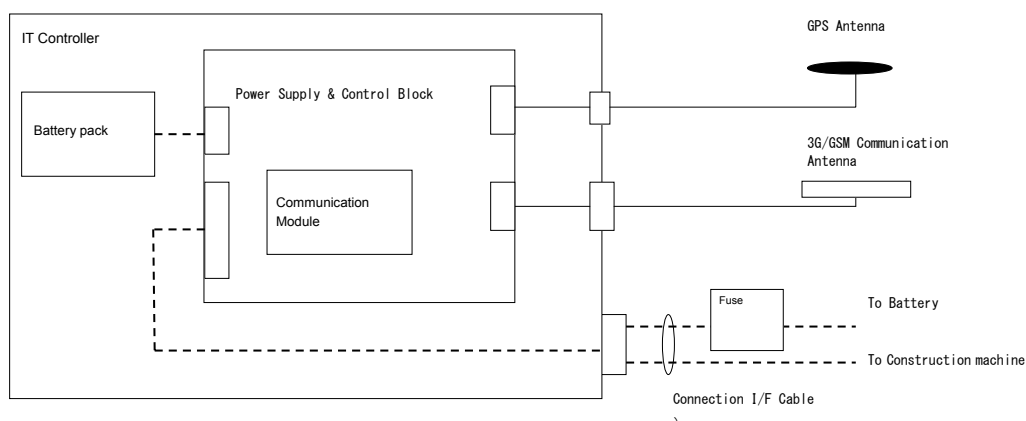
### 1.1 Overview

The main specification is presented as follows.

| No. | Items                 | Specification                                                                                                                                                                                              | Remarks                  |
|-----|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1   | Communication module  | 3G/GSM Communication module<br>(PHS8-P Gemalto)<br>UMTS 800/850 Band VI<br>UMTS 800/850 Band V*<br>UMTS 900 Band VIII*<br>UMTS 1900 Band II*<br>UMTS 2100 Band I<br>GSM850<br>GSM900<br>GSM1800<br>GSM1900 | *:Only compatible module |
| 2   | Data transfer         | GPRS: Multislot Class 12<br>EGPRS: Multislot Class 12<br>CSD: V.110, RLP, non-transparent                                                                                                                  |                          |
| 3   | Communication Antenna | DP-BR0-DSC(BNC)<br>NIPPON ANTENNA                                                                                                                                                                          |                          |
| 4   | GPS Antenna           | NAY-3930G                                                                                                                                                                                                  |                          |
| 5   | Internal Battery      | NBB-1300 (1300mAh/6.0V)                                                                                                                                                                                    |                          |
| 6   | Current and Voltage   | DC+20V~+32V 400mA max<br>Power-saving : 7.5mAmax                                                                                                                                                           |                          |

## 2 Composition

| NO. | Equipment                    | Model                             | Quantity |
|-----|------------------------------|-----------------------------------|----------|
| 1   | 3G/GSM Controller            | JRN-130K                          | 1        |
| (1) | Communication Module         | PHS8-P Gemalto                    | 1        |
| (2) | Battery pack                 | NBB-1300                          | 1        |
| 2   | GPS Antenna                  | NAY-3930G                         | 1        |
| 3   | 3G/GSM Communication antenna | DP-BR0-DSC(BNC)<br>NIPPON ANTENNA | 1        |



**(Note#1)**

Please prepare IF cable by the visitor side.

**(Note#2)**

A connection I/F cable requires a fuse because of over-current protection.  
Please insert the fuse in three places of a battery, GND, and ACC.

**(Note#3)**

Please do not take a power supply from DC cigar.  
It becomes the cause that operation is poor, according to loose connection.

### 3 Function

- (1) Operation in ACC OFF executes the following.
  - 1. Send data in daytime and nighttime.
  - 2. Respond to calling from the server.
  - 3. Acquisition of information on the actual location by GPS, and Generation of warning outside area.
- (2) Storage of operation data
- (3) Timer  
Even if the main source of power is cut, the date and time are maintained.
- (4) Backup  
The re-charge battery is installed.  
Even if it disconnects a power supply, the operational mode and network transmission setting of IT controller are held.
- (5) Serial communication ports  
Connection I/F (CAN), 115200bps(monitor)
- (6) GPS function  
Present location is acquired.(WGS84)
- (7) 3G/GSM communication
- (8) Software rewriting function  
A software rewriting is done by using the monitor port.
- (9) Serial communications with the external equipment are done by the serial commands.
  - 1) Key ON
  - 2) Engine ON
  - 3) Key OFF
  - 4) Alarm
  - 5) Fuel residual quantity
  - 6) Engine amount of water
  - 7) Engine oil level
  - 8) Hydraulic oil level
  - 9) Engine oil pressure
  - 10) Engine water temperature
  - 11) Air cleaner
  - 12) Charge
  - 13) DS (compulsive key OFF)
  - 14) RT (the present state inquiry)
  - 15) HS (foxtail millet meter change)
  - 16) CO (command)
  - 17) Automatic key-off judging processing
- (10) Communication protocol  
It transmits to the mail server by the e-mail.
- (11) Time Zone  
Setting UTC+  $\alpha$  , and operating.

## 4 Product specification

### 4.1 Common Specification

| NO. | Items                     | Specification performance                                                                                                                                                                                                   |
|-----|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Power supply voltage      | DC+20 to +32V                                                                                                                                                                                                               |
| 2   | Battery pack              | NiMH rechargeable battery NBB-1300 (1300mAh/6.0V)                                                                                                                                                                           |
| 3   | SIM Interface             | 1.8V/3.0V                                                                                                                                                                                                                   |
| 4   | Current                   | Communication: max current Less than 400mA (+25°C)<br>Idle:7.5mAmax (When not charging the battery)                                                                                                                         |
| 5   | Circumference environment | Operation: -30 to +70 degree C<br>Preservation: -40 to +80 degree C<br>Humidity of operation: 0% to 90% (don't dew)<br><br>At use in battery,<br>Operation: -20 to +70 degree C<br>0 to 70 degree C of the charge operates. |
| 6   | Dimension                 | 136.4(W)×220.0(D)×43.6(H) mm                                                                                                                                                                                                |
| 7   | Weight                    | 1,300g or less                                                                                                                                                                                                              |
| 8   | Case material             | SPCC                                                                                                                                                                                                                        |

## 4.1 Serial Interface Specification

## (1) A. DTE CAN

| NO. | Items                 | Specification performance |
|-----|-----------------------|---------------------------|
| 1   | Data transmission     | SAE J1939                 |
| 2   | Speed                 | 250/500 kbps              |
| 3   | Communication format  | Extension 29bit           |
| 4   | Switch to the RS-232C | By the chip jumper change |

## (1) B. DTE RS-232C

| NO. | Items             | Specification performance              |
|-----|-------------------|----------------------------------------|
| 1   | Data transmission | Half duplex start-stop synchronization |
| 2   | Signal level      | RS-232C                                |
| 3   | Speed             | 4800bps                                |
| 4   | Frame length      | Variable-length                        |
| 5   | Data Length       | 8 bit                                  |
| 6   | Start bit         | 1 bit                                  |
| 7   | Parity bit        | None                                   |
| 8   | Stop bit          | 1 bit                                  |

## (2) Console (Debug)

| NO. | Items             | Specification performance              |
|-----|-------------------|----------------------------------------|
| 1   | Data transmission | Half duplex start-stop synchronization |
| 2   | Signal level      | RS-232C                                |
| 3   | Speed             | 115200bps                              |
| 4   | Frame length      | Variable-length                        |
| 5   | Data Length       | 8 bit                                  |
| 6   | Start bit         | 1 bit                                  |
| 7   | Parity bit        | None                                   |
| 8   | Stop bit          | 1 bit                                  |
| 9   | Character         | EUC                                    |

## 4.1 GPS Receiver Specification

| NO. | Items                                                        | Specification performance                                                                     |
|-----|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1   | Model                                                        | CCA-705JZ (JRC)                                                                               |
| 2   | Receiving system                                             | Max 16hannel (high-speed search channel)                                                      |
| 3   | Received frequency                                           | 1575.42MHz(L1)、C/A code                                                                       |
| 4   | Land survey system                                           | WGS-84 (Default)                                                                              |
| 5   | Time system                                                  | UTC                                                                                           |
| 6   | Positioning accuracy                                         | 5.3m 2DRMS                                                                                    |
|     | Position                                                     |                                                                                               |
|     | Speed                                                        | 0.04m/sec. RMS                                                                                |
|     | Direction                                                    | Less than 0.14°RMS (Speed 60km/h)                                                             |
| 7   | Speed                                                        | 1 sec                                                                                         |
| 8   | T.T.F.F<br>(Without signal<br>discontinuation)<br>Open skies | Hot start: 4s typ./15s max.<br>Warm start: 33s typ./55s max.<br>Cold start: 35s typ./60s max. |

## 4.1 3G/GSM module Specification

By PHS8-P 3G/GSM communication module specification.

## 4.1 External connector specification

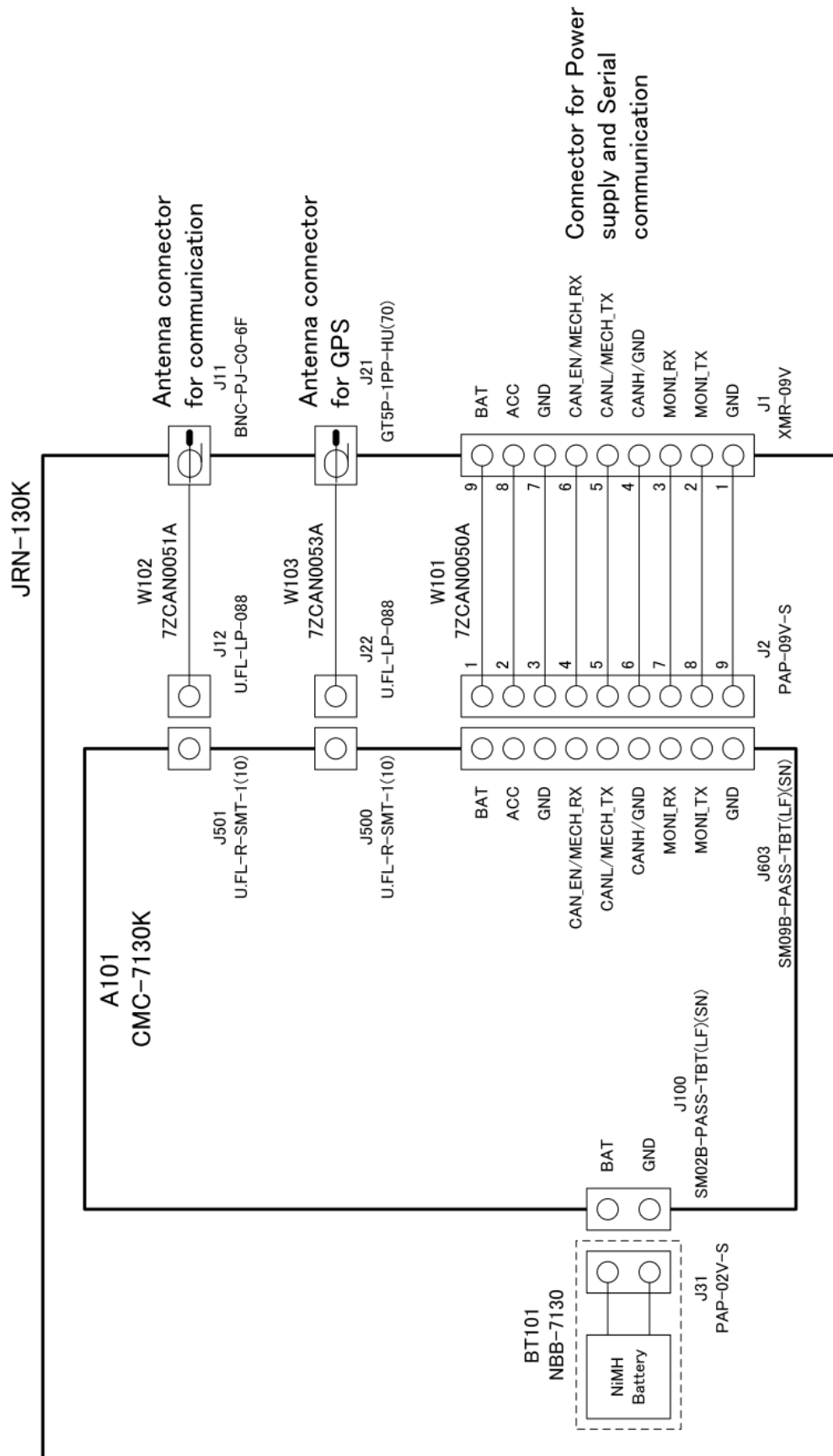
| NO. | Items                  | Specification performance                                                   |
|-----|------------------------|-----------------------------------------------------------------------------|
| 1   | Power/Serial connector | XMR (JST)<br>Model : XMR-09V<br>[Cable side connector model : XMP-09V(JST)] |
| 2   | GPS antenna connector  | GT5 (HIROSE)<br>Model : GT5P-1PP-HU(70)                                     |
| 3   | Communication antenna  | BNC (Yuetsu Seiki)<br>Model : BNC-PJ-C0-6F                                  |

## 4.1 Software

JRN-130K application software external I/F specifications is prescribed about the command list and block structure about software.

Implement the software that customers have created.

## 5 Block Diagram

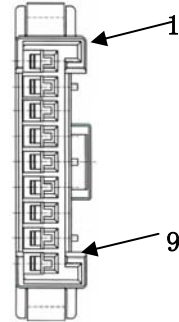


## 6 External Interface

### 6.1 External Interface Specification

Pin Assign

| NO | Name    | Remarks                    |
|----|---------|----------------------------|
| 1  | GND     | GND                        |
| 2  | Moni-Tx | Monitor→ITcontroller       |
| 3  | Moni-Rx | ITcontroller→Monitor       |
| 4  | CAN H   | CAN Low-Level Voltage I/O  |
| 5  | CAN L   | CAN High-Level Voltage I/O |
| 6  | CAN_EN  | CAN Enable                 |
| 7  | GND     | GND                        |
| 8  | ACC     | ACC signal                 |
| 9  | BAT     | Main battery               |



### 6.2 GPS Antenna Connector

Pin Assign

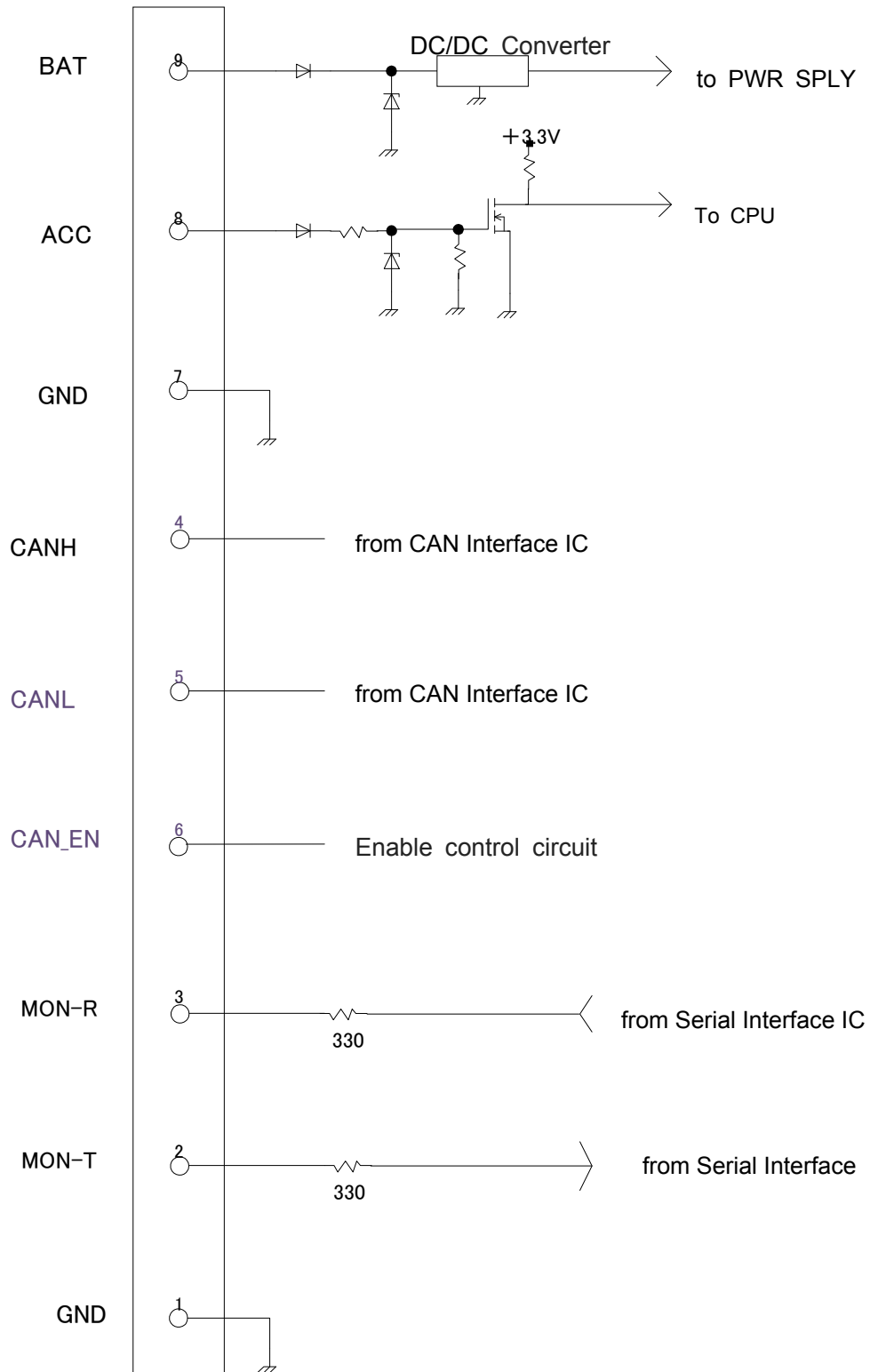
| NO. | Name | Remarks |
|-----|------|---------|
| 1   | RF   | Receive |
| 2   | GND  | GND     |

### 6.1 Communication Antenna Connector

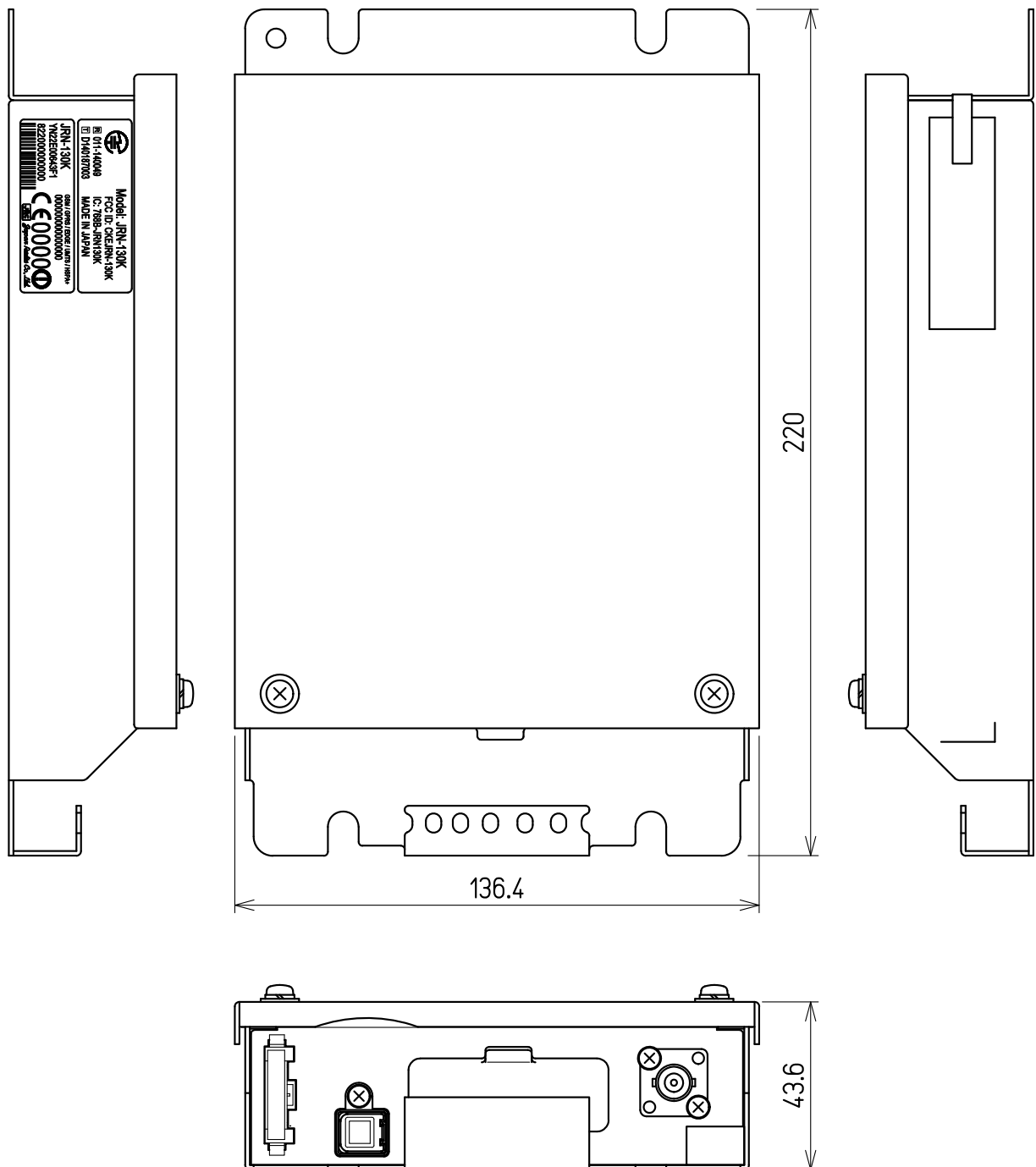
Pin Assign

| NO. | Name | Remarks |
|-----|------|---------|
| 1   | RF   | TX/RX   |
| 2   | GND  | GND     |

## 6.1 Equivalent circuit



## 7 Outline



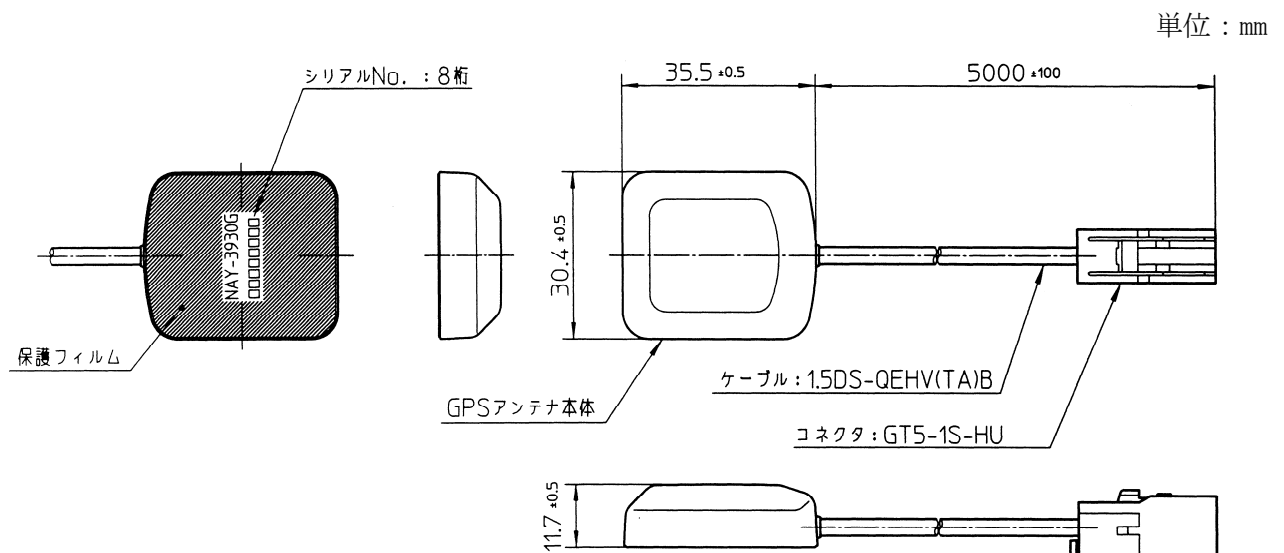
## 8 Option

### 8.1 GPS antenna

#### (1) Specification

| NO. | Items                          | Specification performance                                          |
|-----|--------------------------------|--------------------------------------------------------------------|
| 1   | Power supply voltage           | 2.7V to 3.3V                                                       |
| 2   | Consumption current            | 12mA to 30mA                                                       |
| 3   | Cable                          | 1.5D Cable and 5M (Black)                                          |
| 4   | Temperature range of operation | -30 degree C to +85 degree C                                       |
| 5   | Storage temperature range      | -40 degree C to +100 degree C                                      |
| 6   | Humidity                       | 20% to 95%<br>(relativity, however thing without dew condensation) |
| 7   | Received frequency range       | 1575.42±1.023MHz                                                   |
| 8   | Polarized wave                 | Right-handed circular polarization                                 |
| 9   | Profit                         | 25±6dBi<br>(ascending vertical angle = 90 degrees)                 |
| 10  | Output impedance               | 50 ohms                                                            |
| 11  | OUTPUT VSWR                    | 2.0, or less                                                       |
| 12  | Connector                      | GT5-1P-HU (HIROSE)                                                 |

#### (2) Outline

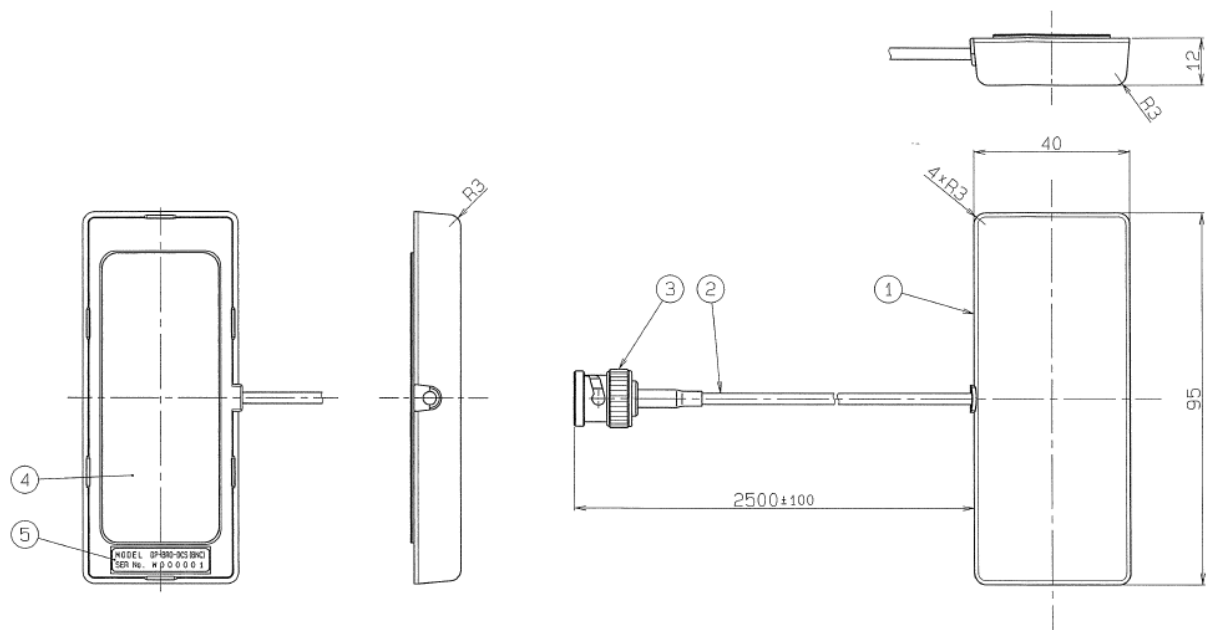


## 8.2 Communication antenna

## (1) Specification

| No. | Items                       | Specification performance                                                                                                                                                                                                                                                                                                          |
|-----|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Model                       | DP-BR0-DSC(BNC)                                                                                                                                                                                                                                                                                                                    |
| 2   | Antenna type                | $\lambda/2$ Shortened type Dipole antenna                                                                                                                                                                                                                                                                                          |
| 3   | Purpose                     | For the indoor antenna, double-sided tape attachment                                                                                                                                                                                                                                                                               |
| 4   | Weight                      | approximately 70g                                                                                                                                                                                                                                                                                                                  |
| 5   | Environmental Regulation    | RoHS and ELV                                                                                                                                                                                                                                                                                                                       |
| 6   | Frequency                   | 815MHz~2170MHz<br>A:US800/GSM850 824~849MHz/869~894MHz<br>B:GSM900 880~915MHz/925~960MHz<br>C:GSM1800 1710~1766MHz/1805~1880MHz<br>D:PCS/GSM1900 1850~1910MHz/1930~1990MHz<br>E:CDMA1X 815~925MHz<br>F:PHS 1884MHz~1920MHz<br>G:FOMA (1)830~880MHz/(2)1920~2170MHz<br>H:SBM (W-CDMA) 1960~1980MHz/2150~2170MHz<br>I:GPS 1575.42MHz |
| 7   | Nominal impedance           | 50 $\Omega$                                                                                                                                                                                                                                                                                                                        |
| 8   | VSWR                        | 2.3 at the end of the cable.<br>It is measured in free space.                                                                                                                                                                                                                                                                      |
| 9   | Peak gain                   | A,B,E,G-(1) not exceeding 1.0dBi at the end of the cable.<br>C,D,F,G-(2) not exceeding 3.5dBi at the end of the cable.                                                                                                                                                                                                             |
| 10  | Polarization                | Vertical                                                                                                                                                                                                                                                                                                                           |
| 11  | Directivity                 | Horizontal plane omni-directional                                                                                                                                                                                                                                                                                                  |
| 12  | Input power                 | Not exceeding 2W                                                                                                                                                                                                                                                                                                                   |
| 13  | Cable loss (Reference)      | 1.5D Coaxial cable<br>900MHz 1.58dB / 2.5m<br>2000MHz 2.45dB / 2.5m                                                                                                                                                                                                                                                                |
| 14  | Operating temperature range | -30 ~+80 degree C                                                                                                                                                                                                                                                                                                                  |
| 15  | Storage temperature range   | -40 ~+85 degree C                                                                                                                                                                                                                                                                                                                  |
| 16  | Operating humidity limits   | 0%~95%                                                                                                                                                                                                                                                                                                                             |
| 17  | Connector                   | BNC                                                                                                                                                                                                                                                                                                                                |

## (2) Outline



| NO. | Items                   | Specification performance |
|-----|-------------------------|---------------------------|
| 1   | Case                    | AES                       |
| 2   | 1.5D Coaxial cable      | $2.5m \pm 10cm$           |
| 3   | BNC                     | C3604・Ep-Cu/Ni            |
| 4   | Two-sided adhesive tape |                           |
| 5   | Label                   | Tetoron film              |

## 9 Compliance with FCC and IC Rules and Regulations

### • FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference, including interference that may cause undesired operation.

#### CAUTION:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### • IC

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This radio transmitter (IC: 768B-JRN130K) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

|                            |                                               |
|----------------------------|-----------------------------------------------|
| Antenna type/Model name    | : Half length dipole antenna/DP-BRO-DCS (BNC) |
| Maximum Antenna gain       | : 800MHz-1GHz -0.58dBi                        |
| (including the cable loss) | 1GHz-2.5GHz +1.05dBi                          |
| Nominal impedance          | : 50 $\Omega$                                 |

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Le présent émetteur radio (IC: 768B-JRN130K) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Type d'antenne /Nom du modèle : Antenne dipôle demi-longueur/DP-BRO-DCS (BNC)

Le gain maximal de l'antenne : 800MHz-1GHz -0.58dBi

(La perte du câble est incluse) 1GHz-2.5GHz +1.05dBi

Impédance nominale : 50  $\Omega$

• FCC/IC

RF exposure compliance

- 1) To comply with FCC/IC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
- 2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Normes d'exposition RF

- 1) Afin de se conformer aux normes FCC / IC RF exigences de conformité de l'exposition, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de l'appareil et les personnes.
- 2) Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur.