1-1 SCOPE

This document applies mobile modem system of 200 ohm feeder cable communication system for FUTABA's customer.

1-2 Communication system and equipment characteristics

1) This system is a mobile middle distance communication system which employs 200 ohm feeder cable as a communication medium.

2) Achieve communication performance that suits the regulation of Part15.209 FCC. Also it complies Japanese very weak radiation radio specification. Furthermore, it complies ETSI 300 220-3 of EU and will be trying to comply Taiwanese radio standard. Other standards are also in the future plan.

3) Feeder communication block contains Auto Repeat Request (ARQ) and Forward Error Collection, BCH (15.7) coding schemes, to improve error robustness.

2 OVERVIEW

2-1 Whole of the system

This system is a "non-mechanical-contact", kind of wireless, communication system which transfers data between mobile station and feeder cable.

Feeder cable communication part (block) of the system uses multiplexing signals to single feeder cable both downlink (base station to mobile modem station direction) and uplink (mobile modem station to base station direction). The frequencys of the uplink, 151MHz to 156MHz are used. Downlink of that is 230MHz to 235MHz.

Frequency channel of the each up and downlink is divided into 50 channels and 50 channels are assigned as a physical channel.

Communication rate is 100kbps, fixed rate. Data transmission is performed with packet data transmission scheme and both ARQ and error-collection functions are included. On the feeder cable communication part (block), it performs communications not only between base station and mobile modem station but also between mobile modems. Also broadcast communication is possible with limiting cover area using various destination address designation method.

External interface between controller and the system, RS232C, RS422 and RS485 are prepared. Communication rate of 4800bps to 115.2kbps can be set. Communication format is packet base communication that is FUTABA's locally specified standard.

Each of the modem displays receiving signal strength on the LED array, therefore, it is easy to confirm operation status and condition of the modem. It is also possible to issue a command from controller. The command requests the modem to reply receiving signal strength and other information of the modem.

2-2 Mobile Modem

The mobile modem is a communication radio equipment which is embedded to Automated Guided Vehicle (AGV), i.e. moving cart used in a factory. It is connected with coupling unit (explained below) and is communicate with the base station. External interface between controller and the modem, RS232C, RS422 and RS485 are prepared. Communication scheme between base station and mobile modem station through the feeder is 100kbps fixed speed packet transmission and employs ARQ and error collection of BCH code.

2-3 Coupling unit

The coupling unit roles receiver functions which receives signals that leaked from the feeder cable, and transmitter functions which transmits and feed the signals (the output of the mobile modem) to the feeder.

Two coupling unit can be equipped to single mobile modem. Switching of the coupling unit is performed by a command from the external controller equipment.

3 SPECIFICATIONS

3-1 Feeder line communication

Uplink frequency band	151 to 156MHz
Downlink frequency band	230 to 235MHz
Bandwidth of one channel	100KHz
Channel separation	100KHz
# of channels	50
Complies standard	Spec A: Japanese very weak radio standard
	Spec B: FCC Part15.209
Sensitivity	-85dBm(100kbps, BER=10E-4)
Address setting of mobile modem	201(hex) to 6ff(hex)
Communication rate	100kbps
Communication mode	full duplex packet transmission

3-2 Mobile modem

Connector	D-sub 9 pin
Interface	RS232C, RS422, RS485 (Pin assignment is not referred to that of the standard)
Communication rate	4800 to 115.2kbps
Communication mode	RS232C and RS422:
	full duplex packet transmission
	RS485
	half duplex packet transmission
Misc.	Open/connection setting of the signal.
	Open/Termination setting of RS422 and 485

3-3 Mobile modem, others

Power supply	DC24V +/-5%
Power dispassion	0.24W
Dimension	102(H) x 1116(W) x 35(H) mm
Weight	550g
Temp. range (Operate)	-10 to +50 C
Temp. range (Storage)	-20 to +70 C
Humidity (Operate)	35 to 95% RH
Humidity (Storage)	35 to 95% RH

3-4 Coupling unit

allocation tolerance to feeder	Vertical (X) 20mm
	Horizontal (Y) +/-15mm
Connector	BNC x 2 (for up and downlink)
Dimension	100(H) x 100(W) x 35(H) mm
Temp. range (Operate)	-10 to +50 C
Temp. range (Storage)	-20 to +70 C
Humidity (Operate)	35 to 95% RH
Humidity (Storage)	35 to 95% RH

3-5 Incremental position tolerance between the coupling unit and feeder cable, additional information

The coupling unit and feeder cable must be faced and coupled as: the surface of the coupling unit and wide side of the feeder cable is faced in opposite. It is shown in the figure below.
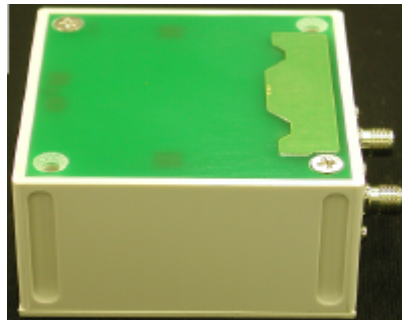

Fig.3-5 Incremental position tolerance between the coupling unit and feeder

3-6. **Distance between the coupler unit and feeder cable**

Install coupler units and feeder cables in the shadowed area in the figure 3-3, otherwise communication cannot be carried out.
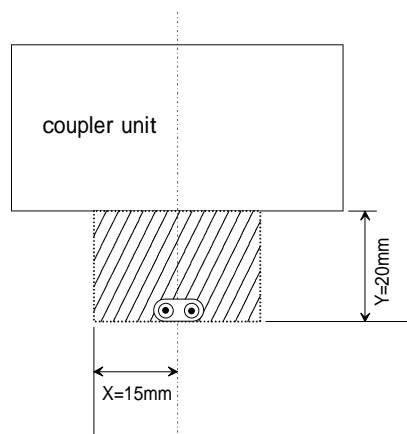

Figure 3-6

Near Field Communication System

to or from another system

RS−485／RS−422

also RS−232C is available

Main Controller

Fixed station
FDK01TU010
powered with
+DC24V

B

ferrite core

distributing unit
FZE03TJ010

S

ferrite core

200Ω balanced feeder line

V:Vehicle

within FDK02TU010

coupler
FZE02TJ010

C

C

V

up to 100 meters
between distributing unit and repeater

up to 100 meters
between distributing unit and repeater

FZE05TU010 FZE05TU010
termination   termination

T

T

ferrite core

up to 200m 200ohms baranced feeder line for one fixed station