STANDARD FSK MODEM FSM104 FSM204

User manual

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Content

1. INTRODUCTION

FSM104 is a multistandard modem for asynchronous or transparent data transmission in 300-3400 Hz voice band. For lower baud rates it uses binary frequency modulation techniques (FSK), which make it highly immune to interference and noise and permits extensive voice-band communication link utilization.

The modem supports CCITT V.23 and Cegelec 600Bd communication standards. Table of programmable channels (Figure 1.) depicts possible utilization of audio band in FSK mode. In FSK mode the modem can operate in half or full-duplex, point-to-point or point-to-multipoint mode.

Standards	FSK	Transmission Rate (Bd)	Frequency Deviation (Hz)	Channel spacing (bandwidth) Hz	-F (Hz)	F0 (Hz)	+F (Hz)
	ITU V.23 /2	1200	± 400	1600	1300	1700	2100
	Cegelec 60x	600	±240	960	2520	2760	3000

Figure 1. Table of programmable channels in FSK mode

Modem configuration is performed via dip switches setting available at the front panel.

FSM104 is designed for using in SCADA systems mainly based upon power utility communication networks. Depending on the selected mode, it can communicate through specialized, private or leased lines, radio links and power lines (PLC).

2. INTERFACES

2.1. FRONT PANEL

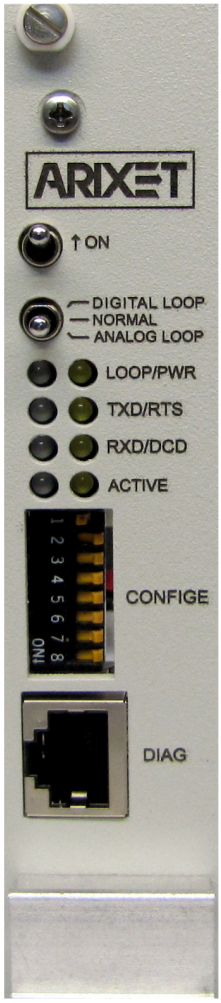


Figure 2 FSM104 Front panel view (Rack mount version)

2.1.1. POWER KEY

Is accessible on the front panel and switched input power on and off .

2.1.2. LOOP KEY

This key has 3 modes:

Digital loop back

In this mod data input from serial port loop back to itself.

Normal operation

In this condition, there is no internal loop and the operation is normal.

Analog loop back

In this mod data input from analog port loop back to itself.

2.1.3. LED INDICATORS

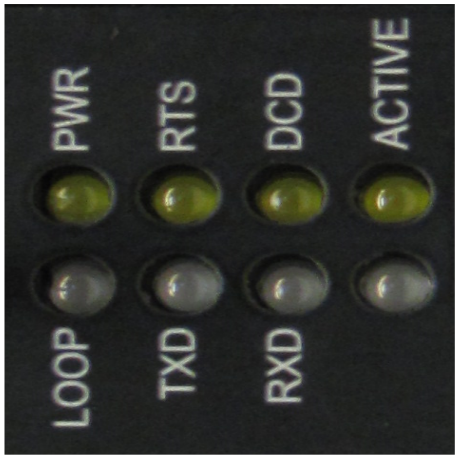


Figure 3 FSM104/FSM204 LED Indicators on front panel

PWR	PWR LED is ON when modem is power supplied;
LOOP	LOOP LED is ON when LOOP KEY is in digital or analog loop mode;
TXD	Transmit LED indicates data transmitted on TXD pin of RS-232 interface.
RTS	Request to Send LED indicates state of RTS pin of RS-232 interface.
RXD LED	Receive LED indicates data received on RXD pin of RS-232 interface.
DCD LED	Data Carrier Detect LED indicates the presence of in-channel carrier with level higher than predefined receive level.
ACTIVE LED A	Live indicators
LED B	reserve

2.1.4. CONFIGURATION DIP SWITCHES

Figure 4 FSM104/FSM204 DIP Switches on front panel

These configuration switches provide baud rate, inverse bit, output level and UART setting as following positions:

Dip switch 1	BAUD RATE
OFF	600 bps
ON	1200 bps

Dip switch 2	BIT INVERSE
OFF	NORMAL
ON	INVERS

Dip switches 3,4,5			OUTPUT LEVEL OVER 600 Ω		
3	4	5	PEAK	RMS	dBV
OFF	OFF	OFF	0.50 V	0.35 Vrms	-6 dBV
OFF	OFF	**ON**	1.41 V	1 Vrms	3 dBV
OFF	**ON**	OFF	1.0 V	0.71 Vrms	0 dBV
OFF	**ON**	**ON**	0.63 V	0.45 Vrms	-4 dBV
ON	OFF	OFF	0.56 V	0.40 Vrms	-5 dBV
ON	OFF	**ON**	0.50 V	0.35 Vrms	-6 dBV
ON	**ON**	OFF	0.36 V	0.25 Vrms	-9 dBV
ON	**ON**	**ON**	0.25 V	0.18 Vrms	-12 dBV

Dip switches 6,7,8			UART SETTING		
6	7	8	LENGTH	PARITY	STOP BIT
OFF	OFF	OFF	**Transparent**	**Transparent**	**Transparent**
OFF	OFF	**ON**	8 BIT	NON	1 OR 2
OFF	**ON**	OFF	7 BIT	NON	1 OR 2
OFF	**ON**	**ON**	6 BIT	NON	1 OR 2
ON	OFF	OFF	**Transparent**	**Transparent**	**Transparent**
ON	OFF	**ON**	8 BIT	O | E	1 OR 2
ON	**ON**	OFF	7 BIT	O | E	1 OR 2
ON	**ON**	**ON**	6 BIT	O | E	1 OR 2

2.1.5. DIAG PORT

Figure 5 FSM104/FSM204 Diag port on front panel

The RJ45 port for manufacture diagnostics and maintenance and its not applicable for user.

2.2. REAR PANEL

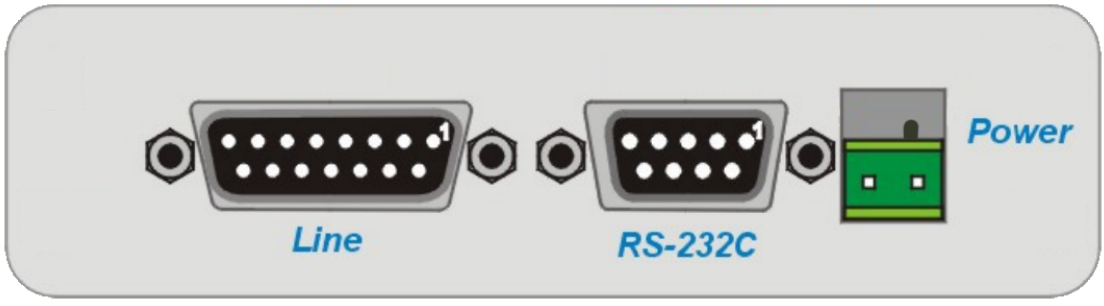


Figure 6 FSM104/FSM204 Rear panel

2.2.1. Line / Analog interface

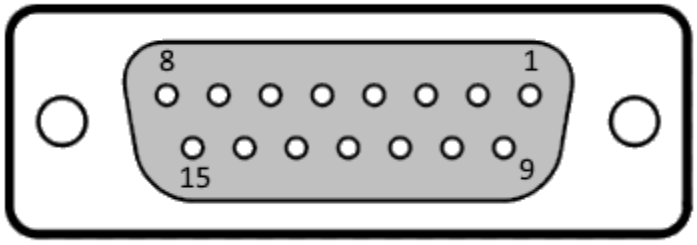


Figure 7 Pin configuration on line connector

This connector is a SUB D 15 pin female type connector with screw locking, which provides:

- Interface between 4 wire analog line and the modem
- The fail relay output

TRANSMISSION	PIN 1, 2
RECEPTION	PIN 4, 5
FAULT RELAY	PIN 10, 11

2.2.2. RS-232C / Serial data interface

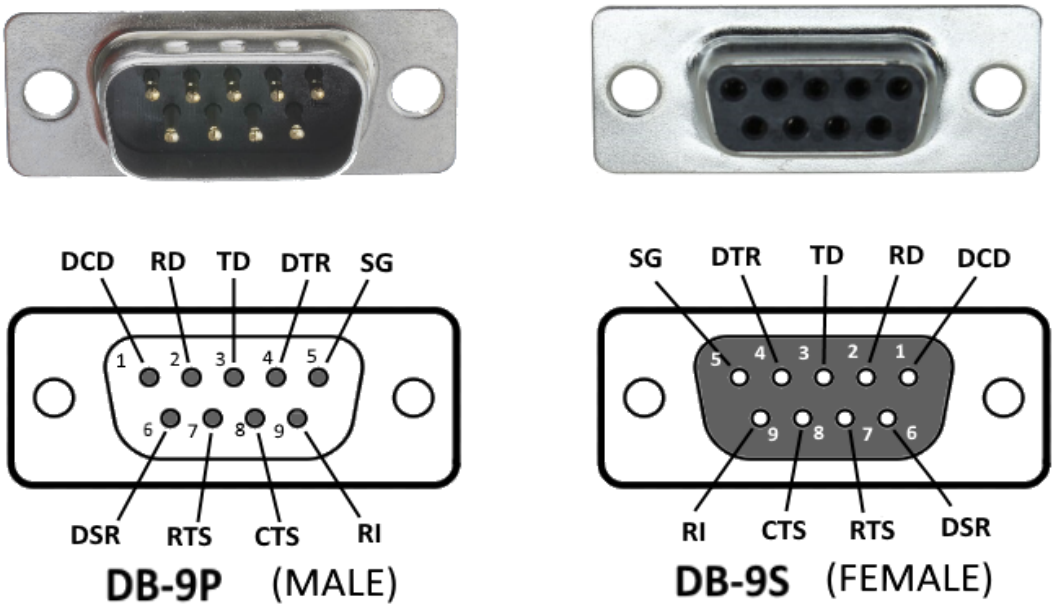
The RS-232 serial data interface connector is a D-SUB 9 pin female type connector with screw locking. It provides the interface between the modem and remote terminal unit or data processing equipment in data mode. The following table gives the allocation and function of each pin.

Modem Cable - Straight Cable DB9 to DB9

DTE Device (Computer) **DB9** — **DTE to DCE** Connections — DCE Device (Modem) **DB9**

Pin# DB9	RS-232 Signal Names		Signal Direction	Pin# DB9	RS-232 Signal Names	
#1	Carrier Detector (DCD)	CD	←	#1	Carrier Detector (DCD)	CD
#2	Receive Data (Rx)	RD	←	#2	Receive Data (Rx)	RD
#3	Transmit Data (Tx)	TD	→	#3	Transmit Data (Tx)	TD
#4	Data Terminal Ready	DTR	→	#4	Data Terminal Ready	DTR
#5	Signal Ground/Common (SG)	GND	—	#5	Signal Ground/Common (SG)	GND
#6	Data Set Ready	DSR	←	#6	Data Set Ready	DSR
#7	Request to Send	RTS	→	#7	Request to Send	RTS
#8	Clear to Send	CTS	←	#8	Clear to Send	CTS
#9	Ring Indicator	RI	←	#9	Ring Indicator	RI
Soldered to DB9 Metal - Shield		FGND	—	Soldered to DB9 Metal - Shield		FGND

Figure 8 Pin configuration on data connector



2.2.3. Power supply

Power supply connector is a 2-position screw plug type (for 2-2.5 mm 2 wire) used for connecting the modem to a DC power supply
certified to IEC 60950-1:2005 + A1:2009 + A2:2013.
For security reasons power supply input includes series 1A fuse and reverse polarity protection.
So polarity is irrelevant and maximum consumption is 3VA.

Nominal input voltage is 48 VDC and the range is 36 to 60 VDC.

3. MOUNTING

3.1. Mounting FSM104 in rack 3U

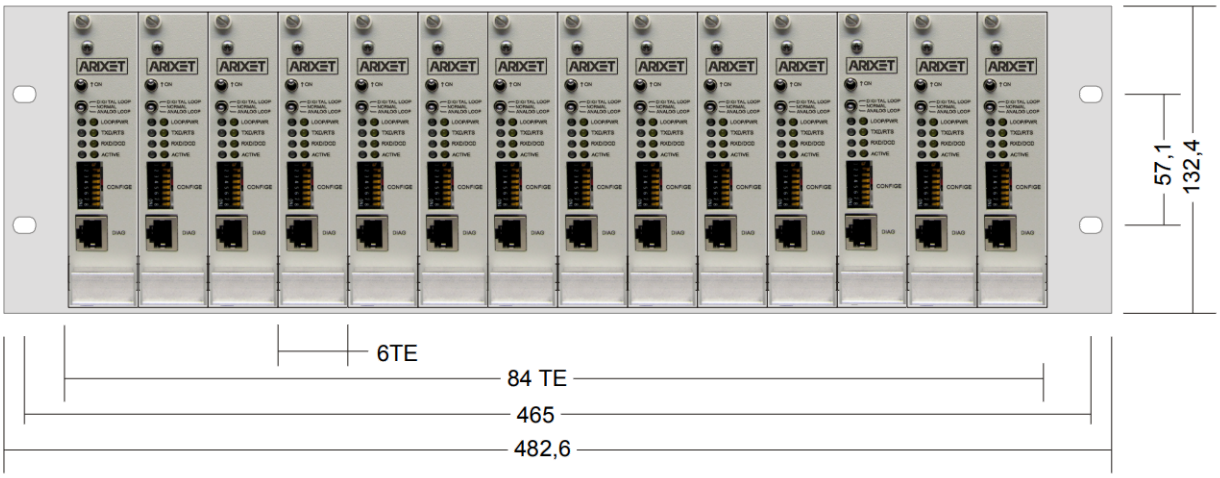


Figure 8 Rack frame 3U/84TE/19” Front view

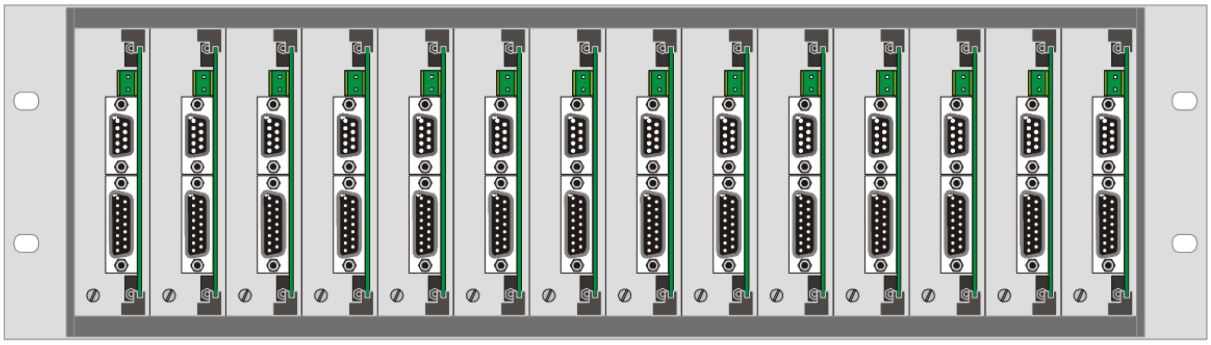


Figure 9 Rack frame 3U/84TE/19” Rear view

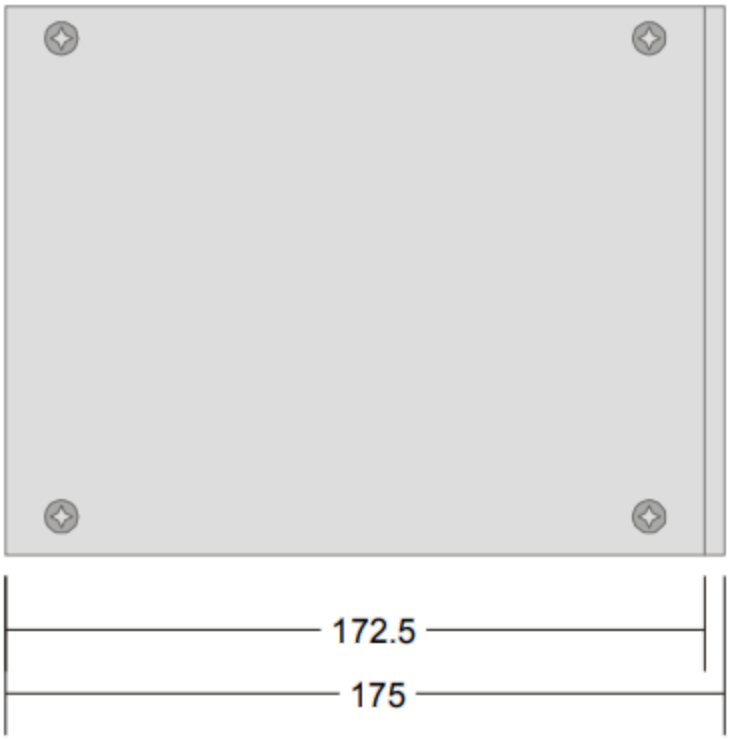


Figure 10 Rack frame 3U/84TE/19” Side view

Figure 11 FSM104 Card front view

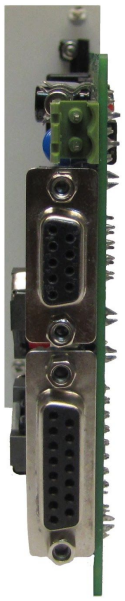


Figure 12 FSM104 Card rear view

3.2. FSM204 Desktop / Din rail mountable

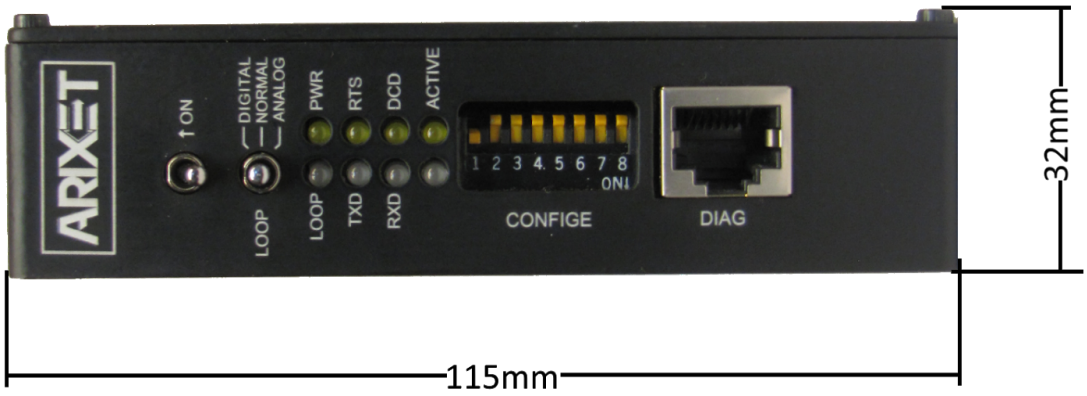


Figure 13 FSM204 Desktop front view and dimensions

Figure 14 FSM204 Desktop rear view

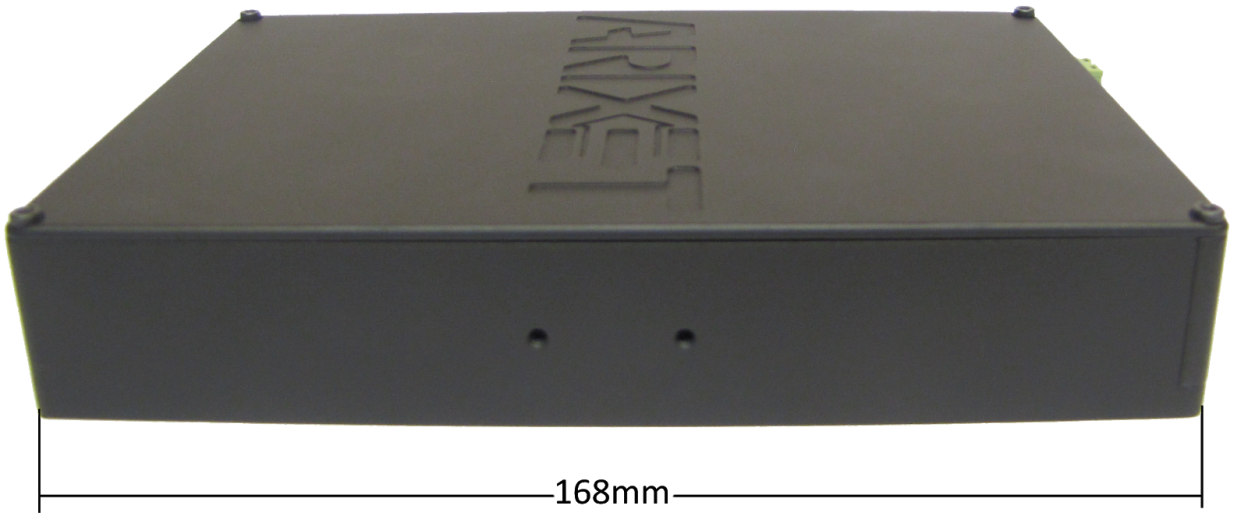


Figure 15 FSM204 Desktop side view and dimensions

Figure 16 Installing DIN RAIL mounting clamp on FSM204 Desktop (Right or Left side)

Figure 17 Installing double DIN RAIL mounting clamps on FSM204 Desktop (Back side)

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