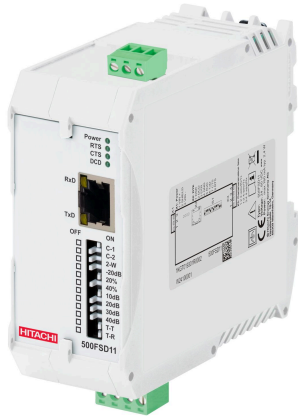


Data sheet

Modem 9600 baud 500FSD11 EDS500 series - FSK modems



- Voice frequency telegraphy device (VFT)
- Transparent up to 9600 baud
- Can be connected to 23WT24
- DIN rail mounted
- 24...60 V DC supply voltage

Application

The 500FSD11 is a modem for transmitting serial data at rates up to 9600 baud. It operates on the frequency shift keying principle (FSK).

Two- or four-wire operation mode is selectable by DIP-switch. The line output is capable to drive up to 10 remote stations connected in a multi-drop line. It can be connected to the 23WT24 modem for rack mounting and can be used as a self-contained counterpart of it.

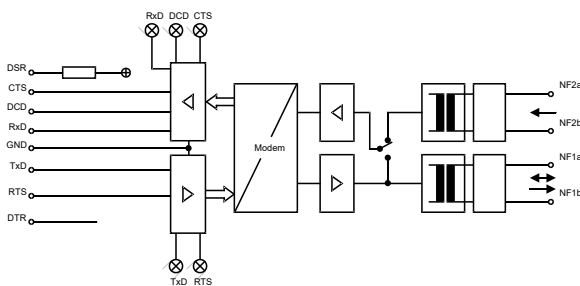


Figure 1: Block diagram of 500FSD11

Characteristics

The 500FSD11 is designed for snap-in DIN-rail mounting. All necessary configuration like two or four-wire operation, receiver sensitivity, line termination or pre-conditioning of the transmit signal is done by DIP-switch.

The interface to the data terminal equipment (DTE) operates according to the RS-232D standard and is carried out as a RJ45 jack. It supplies the following signals:

- Tx/D Transmit data

- RxD Receive data
- RTS Request to send
- DCD Data carrier detected
- CTS Clear to send
- DSR Data set ready
- DTR Data terminal ready

The DTR signal is not interpreted. DSR is always kept active. The state of the rest of RS-232 signals is shown by LEDs on the front plate. Fig. 1 shows a block diagram of the modem.

The 500FSD11 has a built-in overvoltage protection (OVP) against transient voltages. The isolation level of the communication line is 3 kV. Additional low frequency (LF) signal transformers have to be used if higher isolation voltages are required.

Fig. 2 and Fig. 3 show the connection of these transformers in the case of a two-wire and a four-wire connection.

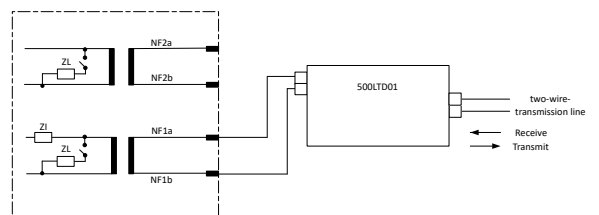


Figure 2: Communication line connection by LF transformer (two-wire connection)

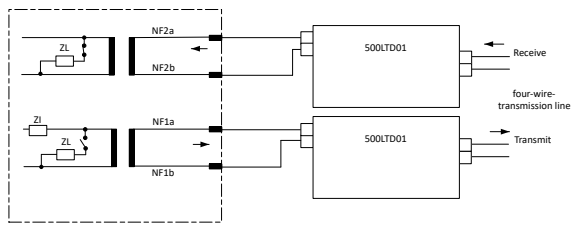


Figure 3: Communication line connection by LF transformer (four-wire connection)

Technical data

In addition to the EDS500 series general technical data, the following applies:

General Data	
Type of modulation	Frequency shift keying (FSK) with carrier switch-off for multi-drop network
Type of communication	Point-to-point or multi-drop network
Operation modes	Full- or half-duplex via four-wire links Half-duplex via two-wire links
Channel assignment	private definition
General standards	
Safety tested according to	<ul style="list-style-type: none">IEC 62368-1
Environmental conditions tested according to	<ul style="list-style-type: none">ETSI EN 300 019-1-3 class 3.4IEC 60255-21-1 class 1IEC 60255-21-2 class 1IEC 60255-21-3 class 1EN 50125-3 class T1 and T2
Electromagnetic compatibility (EMC) tested according to	<ul style="list-style-type: none">IEC 61000-6-1IEC 61000-6-2IEC 61000-6-3IEC 61000-6-4ETSI EN 300 386EN 50121-4
Insulation classification according to	IEC 60664-1 <ul style="list-style-type: none">Pollution degree 2Overvoltage category IIAltitude: $\leq 3,000$ m
Environmental conditions - climatic	
Operating temperature EN 60068-2-1, EN 60068-2-2, EN 60068-2-14	-40 °C ... 80 °C
Relative humidity EN 60068-2-30	5 ... 95 % (non condensing)
Railway applications EN 50125-3	climatic class T1 and T2

Environmental conditions - mechanical

Vibration sinusoidal, Test Fc, IEC 60068-2-6	3 mm (3 ... 9 Hz) 10 m/s ² (9 ... 200 Hz) 1 octave/min, 10 cycles per axis ETSI EN 300 019-1-3 class 3.4 IEC 60721-3-3 class 3M5
	3.5 mm (3 ... 9 Hz) 10 m/s ² (9 ... 35 Hz) 1 octave/min, 1 cycle per axis IEC 60255-21-3 class 1
	3 mm (3 ... 9 Hz) 10 m/s ² (9 ... 200 Hz) 15 m/s ² (200 ... 500 Hz) 1 octave/min, 10 cycles per axis IEC 60870-2-2 class Bm
	0.035 mm (10 ... 60 Hz) 5 m/s ² (60 ... 150 Hz) 1 octave/min, 1 cycle per axis IEC 60255-21-1 class 1
Shock and Bump, Test Ea, IEC 60068-2-27	50 m/s ² , 30 ms 3 shocks per direction
	250 m/s ² , 10 ms 4 shocks per direction IEC 60721-3-3 class 3M5
	150 m/s ² , 11 ms 3 shocks per direction IEC 60255-21-2 class 1 IEC 60870-2-2 class Bm
	100 m/s ² , 16 ms 1000 shocks per direction IEC 60255-21-2 class 1

Emission test

Radiated emissions - enclosure ports (30 Mhz to 1 GHz), CISPR 16-2-3/ EN 55016-2-3	EN 55022/ CISPR 22 class B
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Immunity test

Electrostatic discharge, IEC 61000-4-2	8 kV air / 6 kV contact (level 3), criterion A
Radiated radio-frequency electromagnetic field, IEC 61000-4-3	80 MHz to 1 GHz: 20 V/m (level x), criterion A 1 GHz to 2.7 GHz: 10 V/m (level 3), criterion A 2.7 GHz to 6 GHz: 10 V/m (level 3), criterion A
Power frequency magnetic field, IEC 61000-4-8	100 A/m (level 5), criterion A
Impulse magnetic field, IEC 61000-4-9	300 A/m (level 4), criterion A

Mechanical layout	
Dimensions	99 x 45 x 115 mm (H x W x D)
Housing type	Plastic housing
Mounting	DIN rail mounting (EN 50022 TS35: 35 mm x 15 mm or 35 mm x 7.5 mm)
Cooling	thermal convection (no moving parts)
Enclosure protection class	IP20
Weight	150 g

Power supply input (X1)	
Operating voltage	24-60 V DC -15%/ +20%
Power consumption (typical)	2.4 W
Current demand (peak)	160 mA
Circuit classification	ES2 (acc. IEC 62368-1)
Plug type	Phoenix Contact MSTBT 2,5/3-ST
Galvanic isolation	1.5 kV isolation voltage
Reverse polarity protection	yes
Overvoltage protection	line to earth ± 4 kV, line to line ± 2 kV
Electrical fast transient / Burst, IEC 61000-4-4	4 kV (level 4), criterion A
Surge 1.2/50 μ s, IEC 61000-4-5	4 kV line to earth, 2 kV line to line (level 4), criterion A
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	10 V (level 3), criterion A
Conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz, IEC 61000-4-16	30 V continuous disturbance/ 300 V short duration disturbance (level 4), criterion A
Conducted emissions - asymmetrical DC ports, common mode (0.15 MHz to 30 MHz), CISPR 16-2-1/ EN 55016-2-1	EN 55022 / CISPR 22 class B

Serial interface to DTE (X2)		
Electrical specification	ITU-T V.24, EIA RS-232, EIA/TIA-561	
Signal definition	V.24	V.28
Signal lines	TxD D1	103
	RxD C2	104
	RTS S2	105
	CTS M2	106
	DCD M5	109
	DTR S1	108.2
	DSR M1	107
Plug type	RJ-45 (8P8C)	
Cable	shielded RS-232 cable, up to 3 m	
Adapter cable	500CAB08 1KGT038915R0001: RJ45 to SubD9F (SWT-RS232), shielded	
Circuit classification	ES1 (acc. IEC 62368-1)	
Galvanic isolation	no	

Serial interface to DTE (X2)	
Overvoltage protection	shield to earth 4 kV
Electrical fast transient / Burst, IEC 61000-4-4	4 kV (level 4), criterion A
Surge 1.2/50 μ s, IEC 61000-4-5	4 kV (level 4), criterion A
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	10 V (level 3), criterion A
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	2.5 kV (level 3), criterion A
Ring wave, IEC 61000-4-12	
Conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz, IEC 61000-4-16	30 V continuous disturbance/ 300 V short duration disturbance (level 4), criterion A
Damped oscillatory wave, IEC 61000-4-18	2.5 kV (level 3), criterion A

Interface to transmission line (X3)	
Electrical specification	derived from ITU-T
Input- / Output impedance	150 Ω non earthed and symmetrical, or 5 k Ω at stagger operation
Transmission level at 150 Ω	-28.8... -8.8 dBm configurable by DIP switches
Transmitter pre-distortion	low-pass compensation by 20%/ 40%/ 60% increase of upper frequency level
Receiver level range	0... -47 dBm
Sensitivity	0/ 10/ 20/ 30/ 40 dB
Circuit classification	ES2 (acc. IEC 62368-1)
Plug type	Phoenix Contact MSTBT 2,5/4-ST
Galvanic isolation	3 kV isolation voltage
Overvoltage protection	line to earth ± 4 kV, line to line ± 2 kV
Electrical fast transient / Burst, IEC 61000-4-4	4 kV (level 4), criterion A
Surge 1.2/50 μ s, IEC 61000-4-5	4 kV line to earth, 2 kV line to line (level 4), criterion B
Surge 10/700 μ s, IEC 61000-4-5	2 kV line to earth, 1 kV line to line (level 3), criterion B
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	10 V (level 3), criterion A
Conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz, IEC 61000-4-16	30 V continuous disturbance/ 300 V short duration disturbance (level 4), criterion A
Conducted emissions - symmetrical network ports (0.15 MHz to 30 MHz), CISPR 16-2-1/ EN 55016-2-1	EN 55022/ CISPR 22 class B

Ordering information	
500FSD11 R0002	1KGT019301R0002

Accessories ordering information

500CAB08 Modem 9600 baud

500CAB08 R0001

1KGT038915R0001

Data table		Dim	
Data format	Serial, binary, asynchronous		
Traffic mode	Point-to-point or multi-drop		
Modulation type	Frequency shift keying (FSK) with carrier switch off for multi-drop networks		
Mid – frequency		13600	Hz
Frequency	MARK	9200	Hz
	SPACE	18000	Hz
Nominal transmission level		-5/ -25	dBm ¹
Channel delay time	Typical	1.5	ms
RTS=ON to CTS=ON			
Channel delay time ²	Minimum	1.8	ms
RTS=ON to DCD=ON	Maximum	1.86	ms
Channel delay time ²	Minimum	0.16	ms
RTS=OFF to DCD=OFF	Maximum	0.23	ms
Transmit delay time			
RTS=ON to TxD start bit	Minimum	3	ms
Upper identifier frequency		$F_A = F_C + \Delta F = \text{SPACE} = \text{TxD (D1)}$	
Lower identifier frequency		$F_Z = F_C - \Delta F = \text{MARK} = \text{TxD (D1)}$	

1. As voltage level related to 775 mV
2. Without influence of the transmission channel

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