RS-232 / 20mA Interface Converter

ELO E00Q

Characteristics

Galvanic isolation of interfaces
TxD, RxD transferring
Maximum data rate 115.2 kbps
Asymmetric current loop 20 mA
External supply is not necessary

Introduction

The RS-232 interface (V.24) is a common equipment of the devices in the computer technology and automation. The interface is designed for the point-to-point connection at the distance of the order of units of meters. To use the current loop interface for the longer distances, transmission is one of the options.
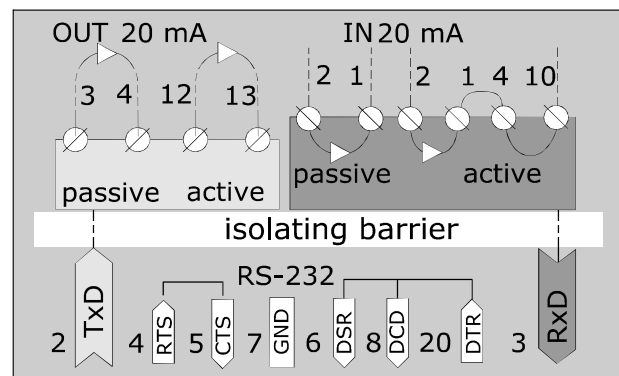
Use of the converter

Historically, the current loop is linked with the teletype technology that is why the TTY abbreviation (TeleTYpe) is often used to mark it. 50 bps was a typical rate of the teletype transmitted data at the distance of the order of kilometers. Now it is used to the data transmission at the range of hundreds of meters at the rates of the order of kilobits per second.

Operation principles

TxD signal of the terminal equipment is isolated and emitted to the transmitting current loop. The rated current via the current loop conforms the TxD idle state (negative polarity), 0 mA current conforms the reversed TxD state. The 20mA current from the receiving loop is converted to the RxD signal. There is also the galvanic isolation between the loop and the RxD. The rated current via the receiving loop of 20mA equates the idle RxD state (negative polarity). Both loops are two-state and asymmetric.

Both transmitting and receiving current loop can be set to the active or passive mode. When in the active mode, the converter supplies the loop with the current, when in the passive mode the current is supplied via the opposite part. If both transmitter and receiver are in passive mode the external power supply is not necessary.

Block diagram

Specifications
Parameters

Transmitted signále   TxD and RxD
Control signals are not transmitted, RTS-CTS
                 DTR-DSR-DCD are interconnected locally
RS-232 interface type and connection   DB25F, DCE
Transmission mode   duplex, four-wire line
                                     simplex, two-wire line
Power supply   works without the power supply
Minimum RS-232 signals of DTE
          for duplex   TxD, RxD, GND
Minimum RS-232 signals of DTE
          for simplex   TxD and GND or RxD
                              and GND and DTR or RTS
Maximum data rate   115 200 bps
Maximum link resistance to be spanned
                              400 Ω with 24V supply
Supply   external DC supply of 9-24V/50mA
                  (necessary for the transmitter or
                      receiver active mode only)

Isolation voltage between interfaces
                              max. 3kV for 1 sec
Power take-off from TxD, DTR,
          RTS signals   max. 10mA summarily
                                      5mA typically
Transmitting loop current (log.0 / log.1)
                              20±3mA / 0-1mA
Current via receiver (log.0 / log.1)
                              4-25mA / 0-4mA
Permissible over-voltage on the line   the line must
          not be exposed to the atmospheric discharge
                  influences (II to III category)
                  under the ČSN 33 0420 standard
                  impulses of 1ms width and input
                              of up to 600VA
Stocking temperatures   - 10° to +50° C
Working temperatures   + 5° to +50° C