

ZS 16 Micro telecontrol system

Bi-directional two-wire transmission up to 15 km

Performance characteristics:

- Transmission of commands, messages, measuring and set values
- Modular system configuration up to 16 binary and 4 analogue values in both directions
- Short-circuit proof transistor outputs, intrinsically safe unit status adjustable
- High interference immunity of transmission
- Signalling of transmission disturbance by means of error contact
- DIN rail mounting

Functional description

In large water treatment or industrial plants, railway depots and in building service management systems it is required to transmit only a few messages or commands using the existing cable networks and saving wires. In these cable networks power lines often run in parallel or control lines at different voltage levels in the same cable. Despite interference by for example 50Hz and 16 2/3Hz frequencies or switching pulses, the transmission must be carried out reliably; that means no special demands may be made on the quality of the cable.

The basic variant of the bi-directional serial transmission system ZS16 is designed for the transmission of 8 messages or commands and consists of 2 ZS 16-8M master modules with 8 digital inputs/outputs each. A DIP switch is installed on the underside of the housing to assign one device the priority "1" and the other device priority "2". A ribbon cable can be installed to extend the system for 16 messages using the expansion module ZS 16-8E/A. In addition it is also possible to transmit 4 measured values each in the ranges of 0 ... 10V and 0 ...20mA with the analogue input or output module (ZS 16-4AE or ZS 16-4AA) either in one or both directions. The degree of the configuration of the system is also set by switch. Each module is housed in a plastic housing and can be snapped onto DIN rails. Red LEDs for status indication of the messages are provided on the front panel, and a green LED is provided as a watchdog to monitor the 2-wire traffic. This display goes out in case of a wire break or short circuit. At the same time the permanently excited error signalling relay (in good state) drops out. The outputs are provided with 8 short-circuit proof PNP transistors with free-wheeling diodes so that lamps or solenoid valves and contactors can be controlled directly.

To achieve a high degree of transmission reliability, each data message is secured using a 32 bit CRC code in accordance with ANSI X3 66 protocol. In case of a transmission disturbance the outputs will be restored to their intrinsically safe state. This can be defined using the DIP switch accessible on the underside. The digital input circuits are electrically isolated from the supply voltage and the two-wire circuit. In this way the formation of possible leakage current loops is prevented. The connections for the supply voltage, inputs and two-wire are protected against polarity reversal.

It is often desirable to read the parallel signals from the external station in the central station serially into a PLC, a telecontrol interface module or a computer. Therefore a ZS 16-232M is offered as an alternative to the standard master module with an RS 232 interface and the protocol 3964R/RK 512. For the first start-up there is a disk with which a clear visualisation of the system status and also desired status and measured value changes are possible.

Any standard signal cable is suitable as transmission cable. In the event of severe interference impact on the two-wire line, an effective rejection can be achieved by connecting a resistor in parallel to the two-wire (terminals 1 and 2). Therefore for each delivery two 1 kohm, 470 ohm and 220 ohm resistors are supplied. The data transmission rate can be set by means of a DIP switch. In order that a signal is securely transmitted, it has to be kept switched on for as long as a transmission cycle lasts.

DIP switch setting



DIP switches	Significance for the basic modules	
	ZS 16-8M	ZS 16-232M
1	Selection of priority (1 or 2)	No function
2	Intrinsically safe condition	No function
3, 4	Degree of configuration	Degree of configuration
5, 6, 7	Baud rate	Baud rate
8	No function	No function

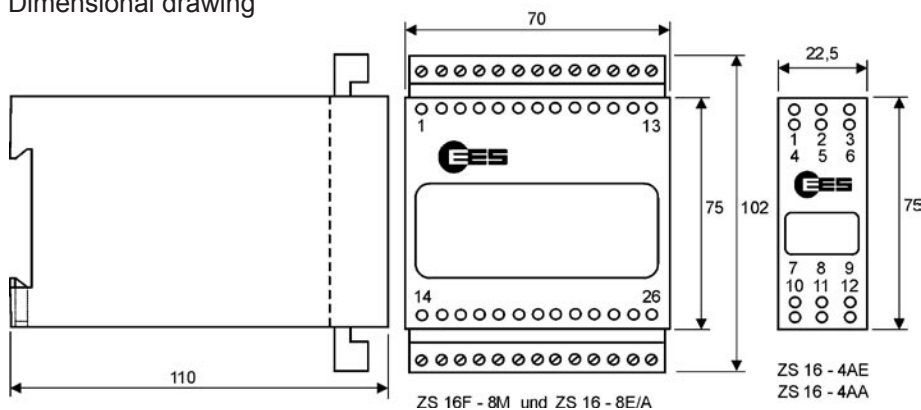
Degree of configuration		
1	2	Meaning
Off	On	only 8 x digital
On	Off	only 16 x digital
Off	Off	Complete configuration

Intrinsically safe condition	
DIP switch 2	Meaning
On	digital outputs on logic „0“ Analogue outputs on „0“
Off	digital outputs on logic „1“ analogue outputs on last valid value

Baud rate						
DIP switch setting			Baud rate	Duration of transmission depending on degree of configuration		
5	6	7		8 digitale	16 digitale	digitale + analogue
Off	Off	Off	600	152 ms	304 ms	912 ms
On	Off	Off	1200	76 ms	152 ms	456 ms
Off	On	Off	4800	20 ms	40 ms	120 ms
On	Off	On	9600	10 ms	20 ms	60 ms

The ribbon cable required for extension is included when a whole unit is ordered. When upgrading existing units, the ribbon cable has to be ordered separately, dependent on the unit's degree of configuration.

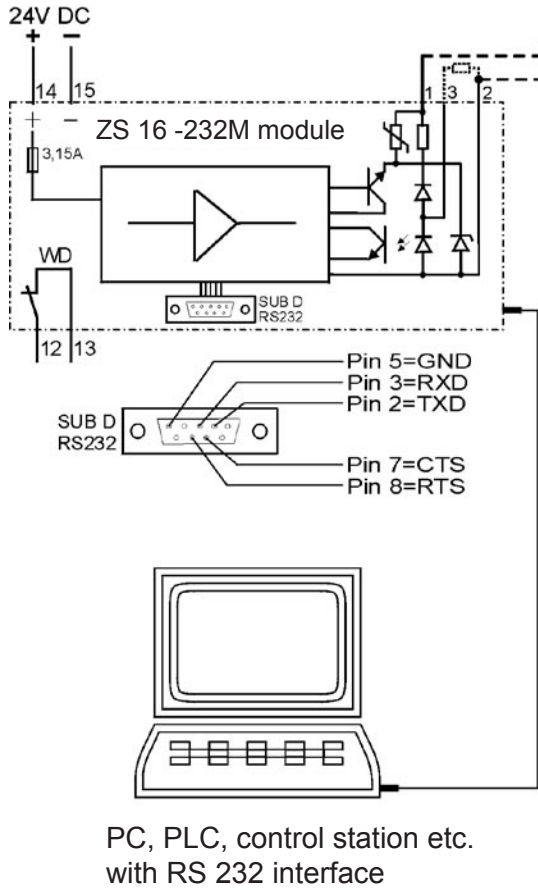
Dimensional drawing



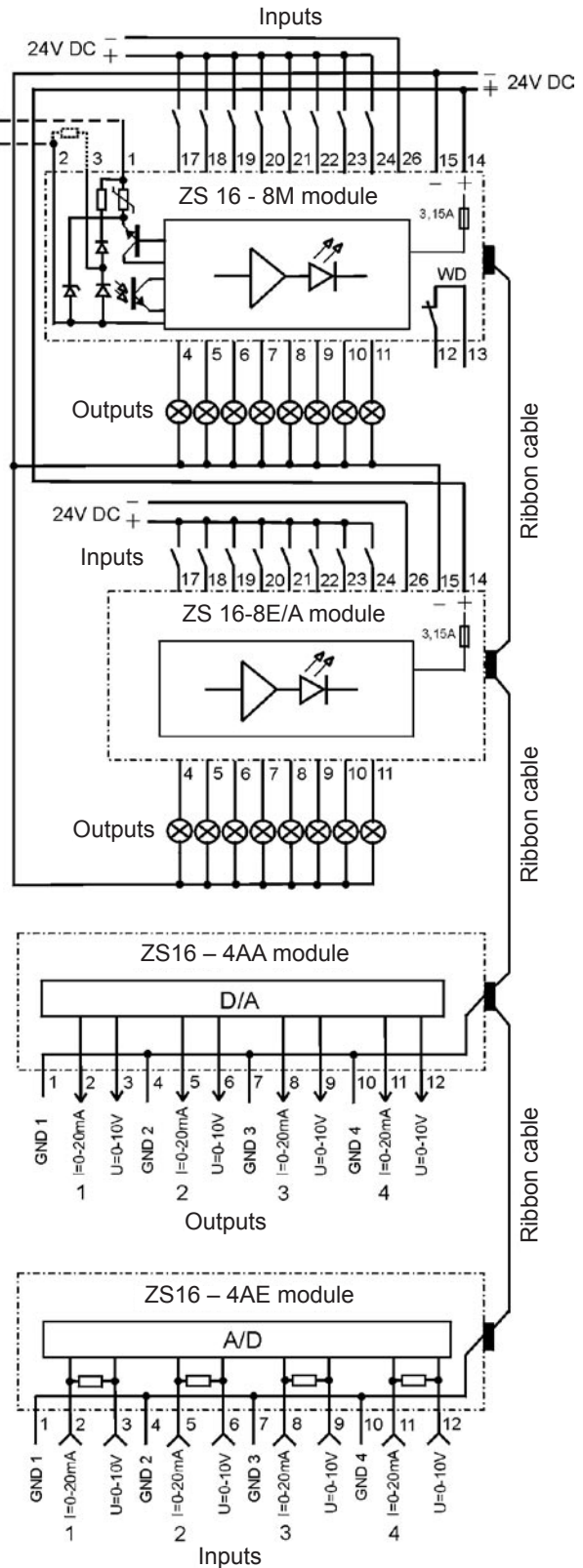
Dimensions in mm

Connection diagram of ZS16 module

Serial interface



Isolated I/Os



The right to make technical changes is reserved



... Solutions for complex tasks

from project planning through to commissioning

Technical data

Supply voltage	20 ... 33V DC rated 24V
Operating and ambient temperature	-20°C ... + 60°C without condensation
Cross-section of connecting cable	2.5 mm ²
Housing / protection class	Plastic / IP 40
Weight	0.3 kg

Power consumption

Basic module ZS 16-8M	approx. 2W + load current
Basic module ZS 16-232M	approx. 2.5W
Digital expansion module	approx. 1W + load current
Analogue expansion module	approx. 1W

Digital	input 16 ... 35V DC*
Input current	maximum 7mA each
Input switch on delays at least	10ms
Load capacity of transistor outputs	maximum 200mA
Contact loading of error signal relay	250V AC 4A; 24V DC 4A
Electrical isolation between supply voltage and two-wire circuit	4kV _{eff}

Two-wire voltage	33V / 25mA
Loop resistance max.	10 kohm
Transmission rate	600 to 9600 baud - see table Standard 4800 baud
Cycle time	10 ... 900ms see table

* Other figures on request

Devices available

ZS 16-8M	basic module with 8 digital inputs and outputs
ZS 16-232M	basic module with RS 232 interface
ZS 16-8E/A	expansion module with 8 digital inputs and outputs
ZS16-4AE	expansion module with 4 analogue inputs
ZS 16-4AA	expansion module with 4 analogue outputs

Further accessories and more detailed information may be found in the appropriate product sections in the catalogue.



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