

## **INTERFACE CONVERTER ZET 7176**

### **USER MANUAL**

***LLC “ETMS”***

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# 1 Designation and technical specifications

## 1.1. Designation of interface converters

Interface converters ZET 7176 are intended for connection of measuring networks based on digital transducers with CAN interface to PC via Ethernet network. The throughput capacity of Ethernet network allows to send commands and large data volumes without delay.

ZETLAB package includes drivers for ZET 7176 modules. ZETLAB data server automatically detects devices in CAN line, reads the name of the measurement channel, the measurement unit, top and bottom range of the admissible parameters values, processes the data of measurement channel, and produces constant synchronized data stream in ZETLAB environment.

## 1.2. Operational environment

Depending on designation and intended use, interface converters ZET 7176 have two product versions available:

1. Laboratory version – for use of the digital transducers in mild operational environment.
2. Industrial version – for use of the digital transducers in adverse operational environment.

Operational environment conditions of the digital transducers are specified in Table 1.1.

*Table 1.1 Operational environment of ZET 7176*

Parameter	Laboratory version	Industrial version
Ambient air temperature, °C	5...40	-40...80
Relative air humidity, %	Max 90 <sup>1</sup>	Max 98 <sup>2</sup>
Atmospheric pressure, mmHg	630-800	495-800

<sup>1</sup> at the ambient temperature of 25 °C without condensation of moisture.

<sup>2</sup> at the ambient temperature of 35 °C.

### 1.3. Technical specifications

General technical specifications of the interface converter ZET 7176 are specified in Table 1.2.

*Table 1.2 Technical specifications of ZET 7176*

Parameter	Value
Interface converter	CAN 2.0 ↔ Ethernet
Interface of connection to digital transducers	CAN 2.0
Interface of PC connection	Ethernet 100 Mbps
Max. number of the simultaneously connected transducers	32
Baud rate, kbps	100
	300
	1000
Power supply voltage, V	9...24
Consumed power, W	1,5
Power supply of the connected digital transducers	External

## 2 External view and contacts designation

### 2.1. External view of interface converters

Figure 2.1 displays external view of interface converters ZET 7176 (laboratory version). Inside of the transducer (at its bottom surface), there is a magnet, which allows to mount the transducer at steel surface.



*Figure 2.1 External view of the interface converter (laboratory version)*

Figure 2.2 displays external view of interface converter ZET 7176 (laboratory version).



*Figure 2.2 External view of the interface converter (laboratory version)*

## 2.2. Interface converters: contacts labelling

Interface converters ZET 7176 (laboratory product version) have 4 contacts for the connection of digital transducers and connector RJ-45, which is used for connection of the interface converters to PC via Ethernet interface.

Figure 2.3 shows contacts labelling of interface converter ZET 7176.



*Figure 2.3 Contacts labelling of ZET 7176 (laboratory version)*

Table 2.1 ZET 7176: contacts designation for connection of digital transducers

*Table 2.1 ZET 7176: contacts designation for connection of digital transducers*

Contact #	Designation	Labelling
1	(9...24) V	Orange
2	CAN 2.0 line «H»	Blue
3	CAN 2.0 line «L»	White-blue
4	GND	White-orange

### 2.3. Establishing measuring network: connection diagram

In the course of measuring network deployment, digital transducers with CAN 2.0 interface are connected sequentially. The resulting measuring network consisting of digital transducers is connected to the PC by means of interface converter ZET 7176. Figure 2.4 shows a measuring network with interface converter ZET 7176.

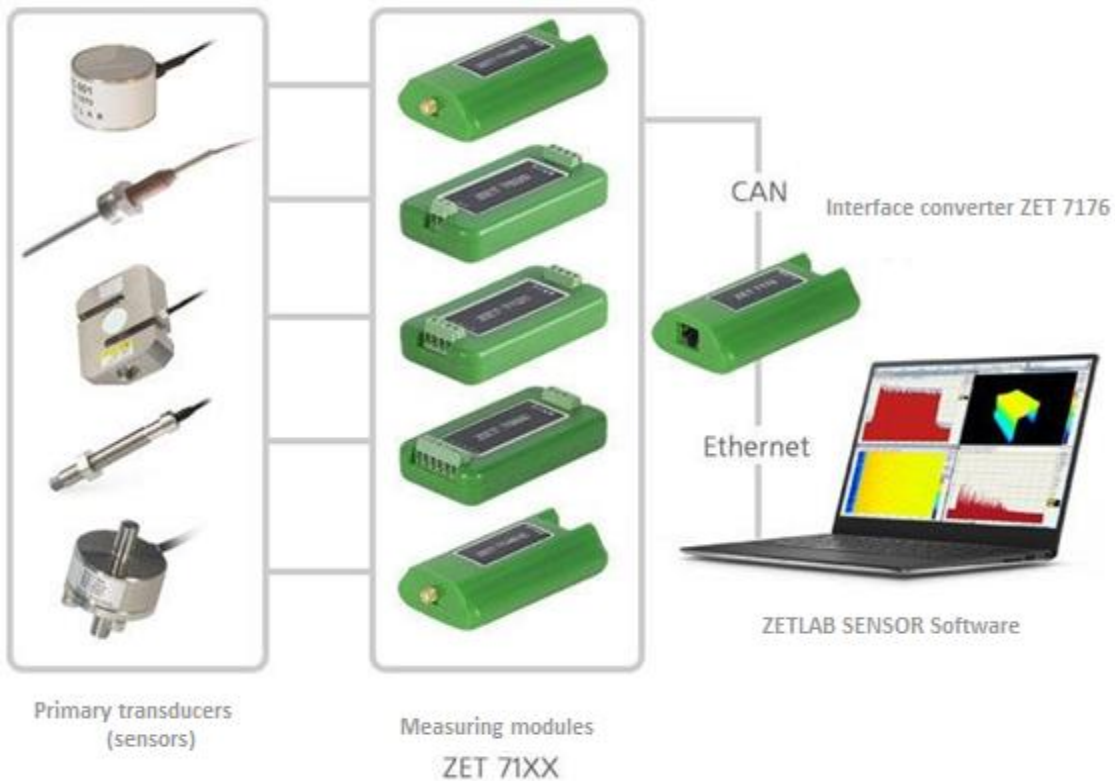


Figure 2.4 Connection diagram

***Note!** The addresses (nodes) of the transducers within a measuring network should be different from each other. Identical addresses of digital transducers in a measuring network may negatively affect the validity of data received from the digital transducers.*

### 3 Parameters configuration: preparation

#### 3.1. Connection of interface converters

Prior to use of the interface converters ZET, connect them to Ethernet network or to PC. It is also necessary to provide power supply voltage 9... 24 V.

The PC to be used for configuration of interface converters should have Windows OS and ZETLAB software installed. Also, it is necessary to connect ZETKEY to the USB port of the PC (ZETKEY is included into delivery scope of interface converters).

The IP-address of network card (which is used for connection of ZET 7176) should be in the same subnet with the IP-address of the interface converter. Switches and routers of the local network should be configured in such a way, so that they would not block the group packages UDP (multicast).

*Note: by default, the interface converters have IP-address 192.168.1.76 with subnet mask 255.255.255.0.*

#### 3.2. The program “Device manager”

The program “ZET Device manager” available in the “Service” menu of ZETLAB panel (Figure 3.1) is used for configuration of the interface converters.

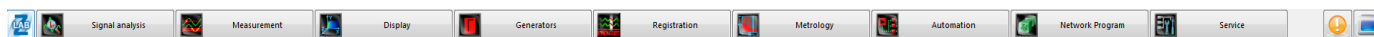


Figure 3.1 ZETLAB panel

The program “ZET Deice manager” is used for search of the devices available in local network and displays them in the list of the devices (Figure 3.2).

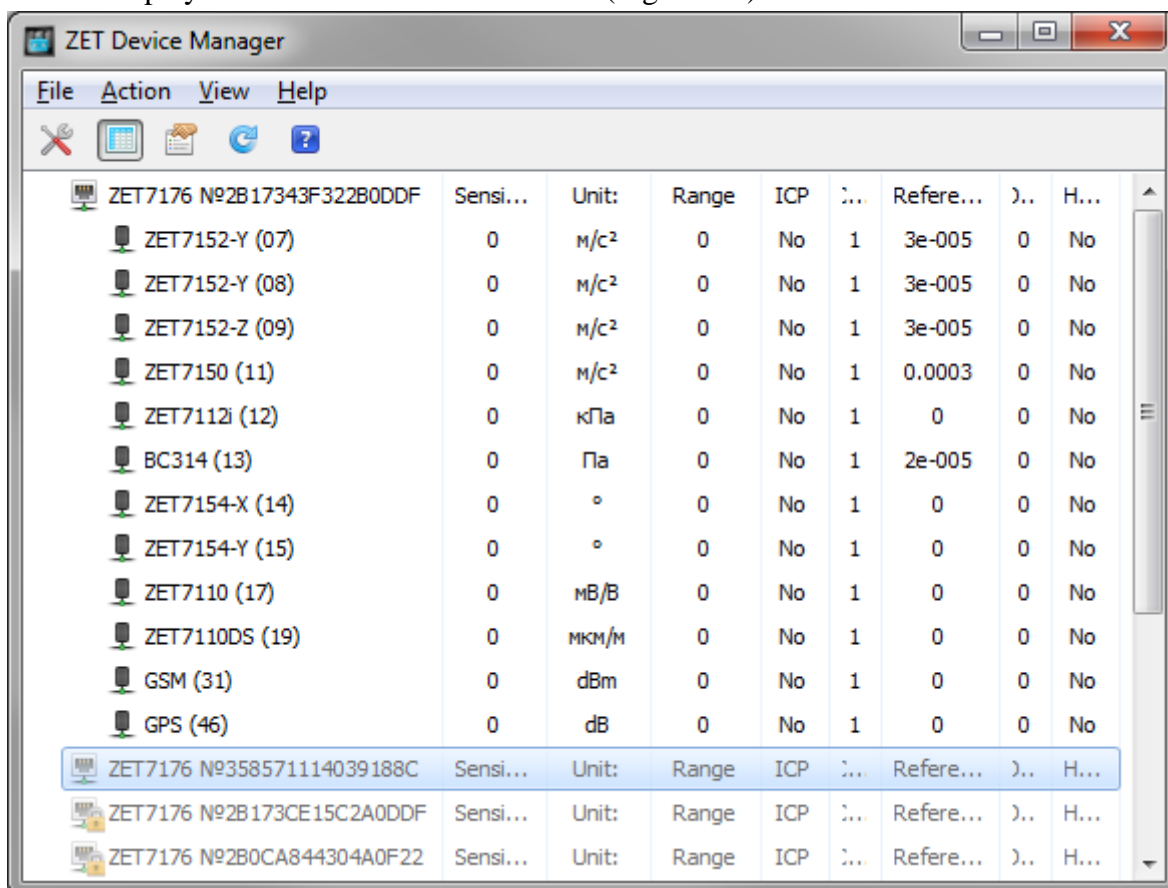


Figure 3.2 List of the devices available in the program “ZET Device manager”



The devices in the list are marked with grey color (which means that they are available, but not active). To establish connection to the interface converter, activate it using the context menu (right-click the serial number of the corresponding interface converter – see Figure 3.3).

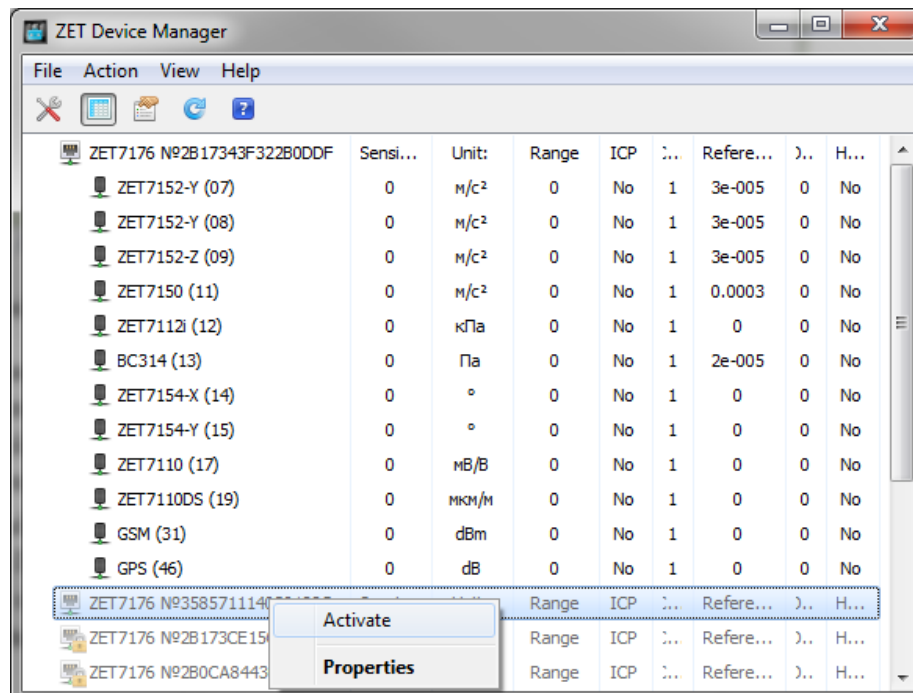


Figure 3.3 Connection to the interface converter

Note: serial number of interface converter is specified in product certificate.

During the connection process, the name of the device will be marked with bold font. Upon completion of the connection process, the name of the device will be displayed in standard black font. If the bold font is displayed for a considerable period of time, it means that there occurred connection failure. The possible reasons are as follows:

- The IP-address of the PC network card connected to ZET 7176 is not in the same subnet with the IP-address of the interface converter;
- Conflict of IP-addresses: the local network has a device with IP-address identical to that of the interface converter.

To get the current IP-address of the interface converter, open the context menu (by right-clicking the corresponding interface converter), open the “Properties” menu and enter the “Device” tab (Figure 3.4). The parameter “Address IPv4” specifies the current IP address of the interface converter.

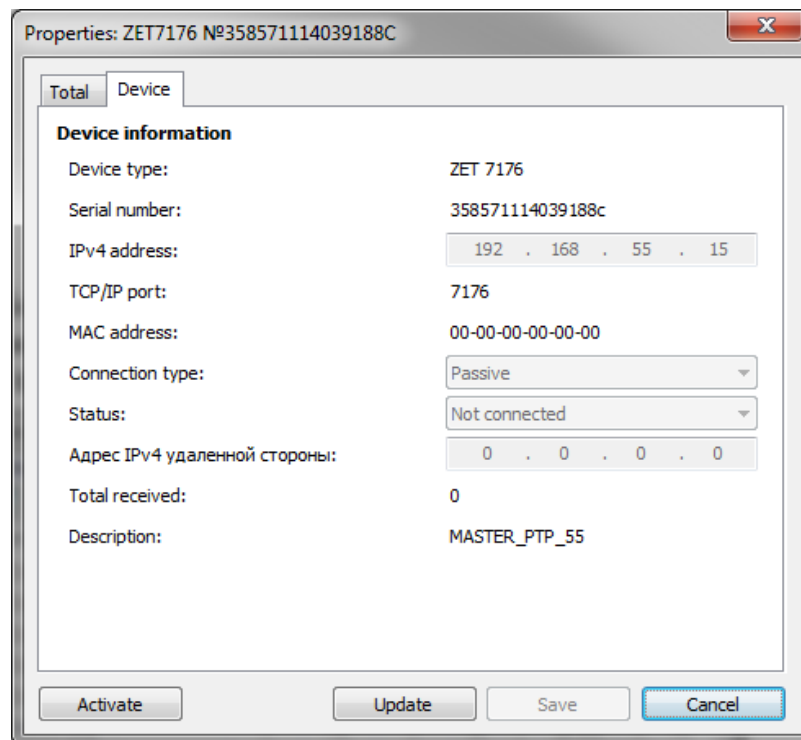


Figure 3.4 "Device" tab

As the connection is established, there is produced a list of the digital transducers connected to the interface converter (Figure 3.5).

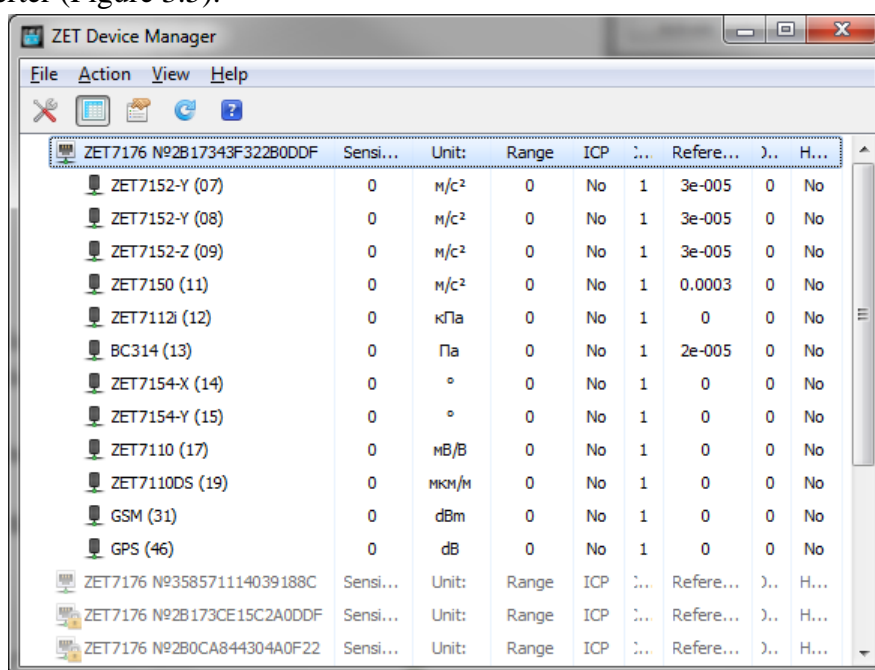


Figure 3.5 ZET 7176 and the list of digital transducers connected to it

The left section of the program interface displays a hierarchy tree of the devices connected to PC. The top level of the hierarchy is represented by interface converters and the devices connected to PC. The second hierarchy level contains the digital transducers connected to a particular interface converter.

If the detailed view mode is selected, the right part of the program will display a table with basic parameters of the measuring channels.

To configure the parameters of interface converter, right-click it and select the “Properties” menu (Figure 3.6). (Additional information is available in the document “ZETLAB Software. User manual”).

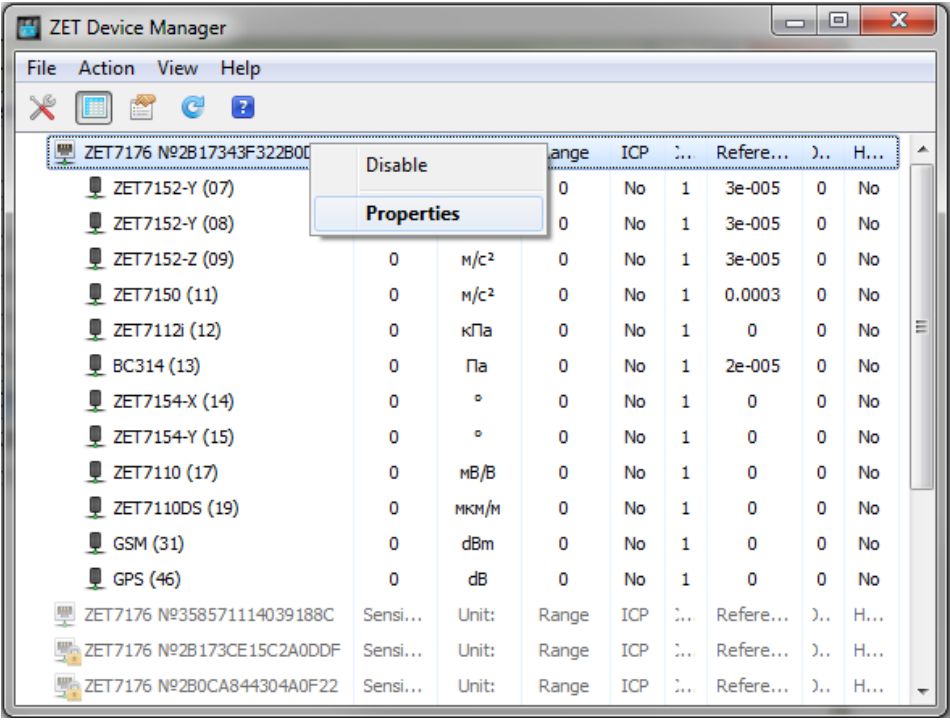


Figure 3.6 “Properties” menu of interface converter ZET 7176

## 4 Configuration of interface converters

*Note! The Manufacturer reserves the right to change the version of digital transducer's software. The sequence of digital transducer updates up to the current version is specified in the document "Software\_Service work with ZET7xxx.pdf".*

### 4.1. Configuration of interface converters: "Properties" menu

To configure parameters of the interface converters, right-click its name and enter the "Properties" menu – you will see the "General" properties tab.

The "General properties" tab contains information of the interface converter type and its serial number. Figure 4.1 shows an example of "General properties" tab.

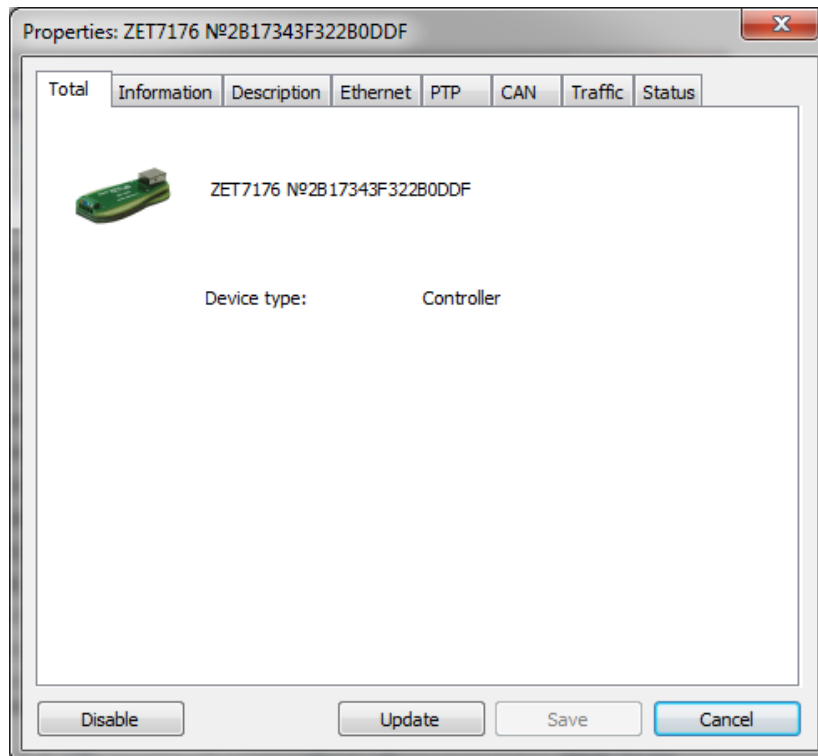


Figure 4.1 "General properties" tab

## 4.2. Designation and contents of the tabs used for configuration of interface converters

### 4.2.1. The tab “Information”

The tab “Information” contains information of the parameters specified in Table 4.1.

Table 4.1 Parameters of the “Information” tab

Parameter	Possibility of configuration	Admissible values	Description
Digital measurement module	—	ZET 7176	—
Serial number	—	—	The parameter is displayed in hexadecimal format (the serial number is assigned by manufacturer).
Date of software version	—	—	Data of interface converter’s firmware version.
Change of configuration	—	—	Date of the last change of interface converter configuration.
Address (node)	—	1	Interface converter address in the measuring network.

Figure 4.2 shows an example of “Information” tab

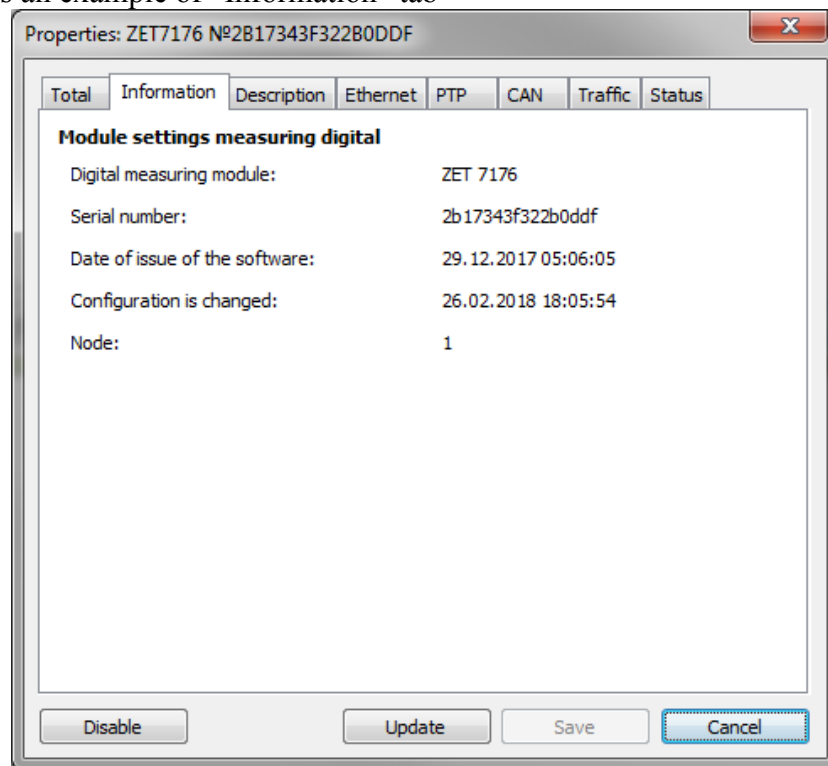


Figure 4.2 “Information” tab

#### 4.2.2. The tab «Ethernet»

The tab «Ethernet» contains information of the parameters specified in Table 4.2.

Table 4.2 Parameters of the «Ethernet» tab

Parameter	Possibility of configuration	Admissible values	Description
Address IPv4	Yes	—	IP-address of the interface converter.
Subnet mask	Yes	—	Subnet mask of the interface converter.
Gateway by default	Yes	—	IP-address of the gateway in the local subnet.
TCP/IP port	Yes	1...64000	Number of the port used for the connection to interface converter.
Physical address of the device in Ethernet network	—	—	MAC-address of the device.

Figure 4.3 shows an example of the «Ethernet» tab.

Properties: ZET7176 №2B17343F322B0DDF

Total Information Description **Ethernet** PTP CAN Traffic Status

**Setting the Network Interface**

IPv4 address: 192 . 168 . 3 . 76

Subnet mask: 255 . 255 . 192 . 0

Default gateway: 192 . 168 . 3 . 1

TCP/IP port: 7176

MAC address: 00-BD-67-76-EC-3D

Скорость, Мбит/с: 100

Disable Update Save Cancel

Figure 4.3 «Ethernet» tab

#### 4.2.3. The tab «PTP»

The tab «PTP» contains information of the parameters specified in Table 4.3.

Table 4.3 Parameters of the «PTP» tab

Parameter	Possibility of configuration	Admissible values	Description
Network level	No	–	The parameter displays the network protocol of interface converter connection to PC.
Master clock mode	Yes	Deny / Allow	Allows the interface converter to operate as master clock for other devices.
Slave clock mode	Yes	Deny / Allow	Allows the interface converter to operate as slave clock in the case if the Ethernet network has a master clock.
Domain number 0÷127	Yes	0...127	Master clock and slave clock interact with each other only in the case if they are in the same domain.
Absolute priority 0 ÷ 255	Yes	0...255	The value is used for selection from several master clocks. The more is the value, the higher is the priority.
Relative priority 0 ÷ 255	Yes	0...255	The value is taken into consideration if it is necessary to select from several master clocks with the same absolute priority and clock parameters. The lower is the value, the higher is the priority.

Figure 4.4 shows an example of the «PTP» tab.

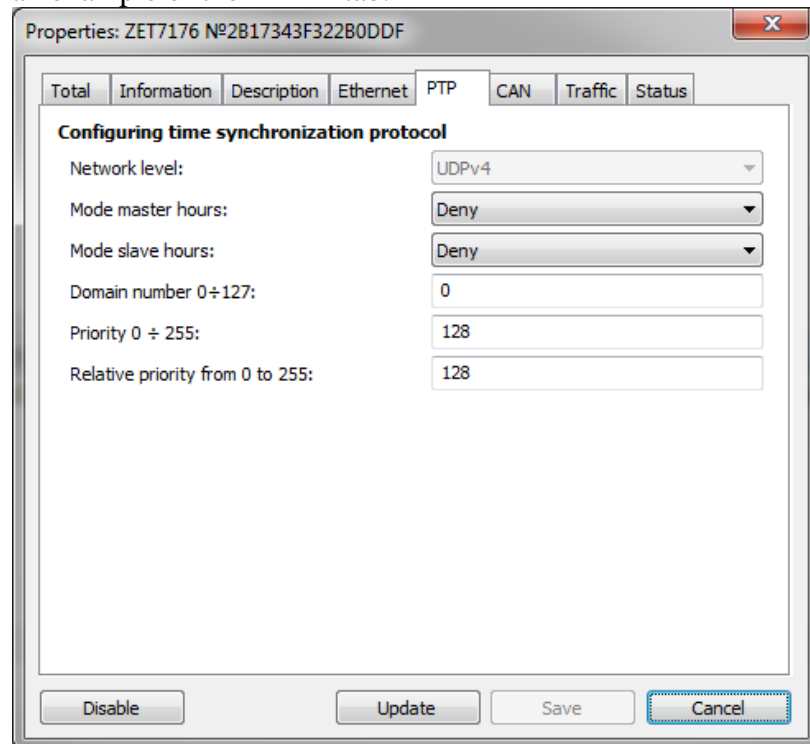


Figure 4.4 «PTP» tab

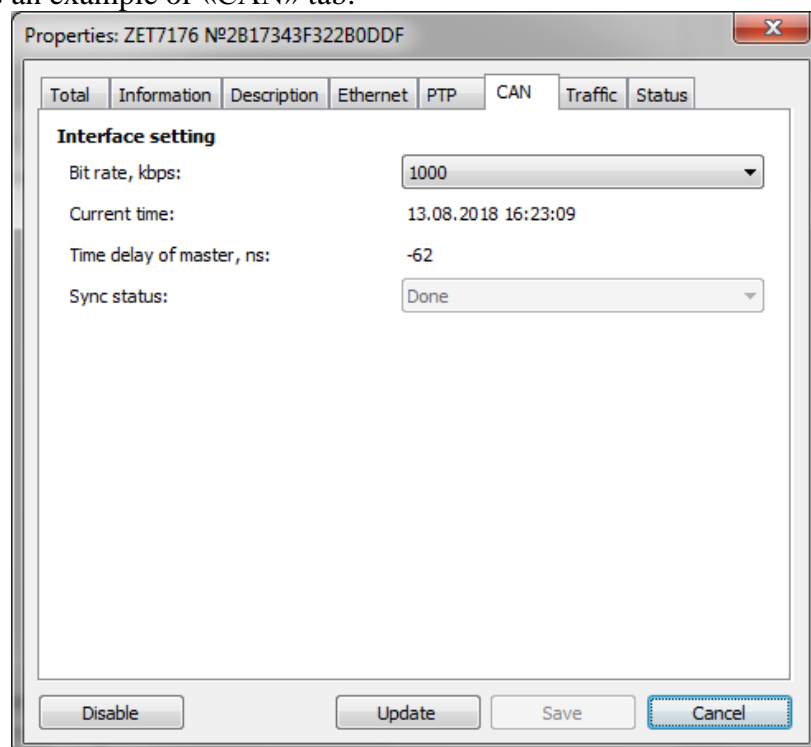
#### 4.2.4. The tab «CAN»

The tab «CAN» contains information about the parameters specified in Table 4.4.

*Table 4.4 Parameters of the «CAN» tab*

Parameter	Possibility of configuration	Admissible values	Description
Bit rate, kbps	Yes	100 300 1000	Data exchange rate between the digital transducer and interface converter. As the bit rate is changed, the system automatically adjusts the bit rate of the digital transducers connected to the interface converter.
Current time	—	—	Displays the current time of the device at the moment of tab activation.
Time delay of master clock, ns	—	—	The current measured value of the integrated clock delay in relation to the master clock (in the case if the interface converter operates in slave clock mode via CAN interface)
Sync status	—	Master clock	Current status of time synchronization via CAN interface.

Figure 4.5 shows an example of «CAN» tab.



*Figure 4.5 «CAN» tab*



#### 4.2.5. The tab «Traffic»

The tab “Traffic” contains information of the parameters specified in Table 4.5.

*Table 4.5 Parameters of the “Traffic” tab*

<b>Parameter</b>	<b>Possibility of configuration</b>	<b>Admissible values</b>	<b>Description</b>
CAN bus load, %	—	0 - 100	The parameter displays percentage rate of CAN line current load. For normal operation of the CAN line, the CAN bus load should not exceed 90%.
CAN packages per second	—	—	The parameter displays the number of measuring line CAN packages per second.
Total throughput, kbps	—	—	The parameter displays total speed of CAN packets transfer in the measuring line.
Data throughput, kbps	—	—	The parameter displays data stream transfer speed of the CAN line.
Active addresses on bus	—	—	The parameter displays the number of active addresses of the CAN line.
List of active addresses	—	—	The parameter displays addresses numbers (nodes) of active digital transducers in CAN line.

Figure 4.6 shows an example of “Traffic” tab

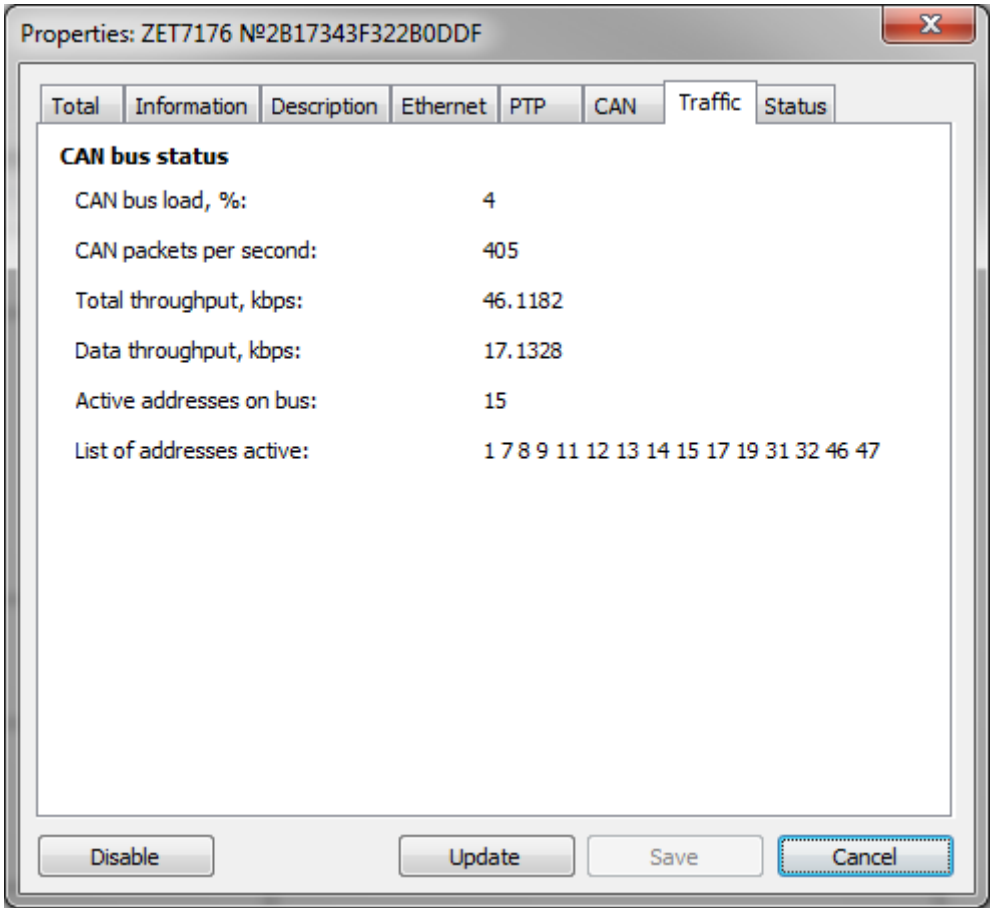


Figure 4.6 “Traffic” tab

#### 4.2.6. The tab “Status”

The “Status” tab contains information of the parameters specified in Table 4.6.

Table 4.6 Parameters of the “Status” tab

Parameter	Possibility of configuration	Admissible values	Description
PTP sensor status	—	Initialization Disabled Waiting Master clock Passive Slave clock	Current status of PTP sensor: <ul style="list-style-type: none"> <li>• Initialization – activation of the PTP sensor;</li> <li>• Disabled –PTP is switched off in the settings;</li> <li>• Waiting –PTP is in the slave clock mode and is waiting for synchronization wizard (master clock);</li> <li>• Master clock – PTP operating in master clock mode (sets the time);</li> <li>• Passive –PTP in slave clock mode, but the network already has a synchronization wizard with higher priority;</li> <li>• Slave clock – the module operates in slave clock mode.</li> </ul>
Current time	—	—	Current time of PTP module
Time delay master-slave	—	—	Calculated time difference between the internal clock of the module and the master clock (in the case if the module operates in slave mode). If the value is more than 0, it means that the system clock are ahead of master clock, and vice versa.
Synch status	—	Missing In progress Complete Via CAN	Current status of the synchronization is displayed in slave clock mode: <ul style="list-style-type: none"> <li>• Missing – synchronization process is disabled, since the device is not operating in the slave clock mode;</li> <li>• In progress – time synchronization is in progress;</li> <li>• Complete – synchronization is complete (smooth synchronization mode);</li> <li>• Via CAN – the module is synchronized via CAN bus (e.g., with the use of GPS synchronization module ZET 7175), the PTP protocol is not used.</li> </ul>
Average network time delay, ns	—	—	Calculated time of package route from module up to synchronization wizard via Ethernet network (including all switching devices). The parameter is calculated only in slave clock mode.

Figure 4.7 shows an example of “Status” tab.

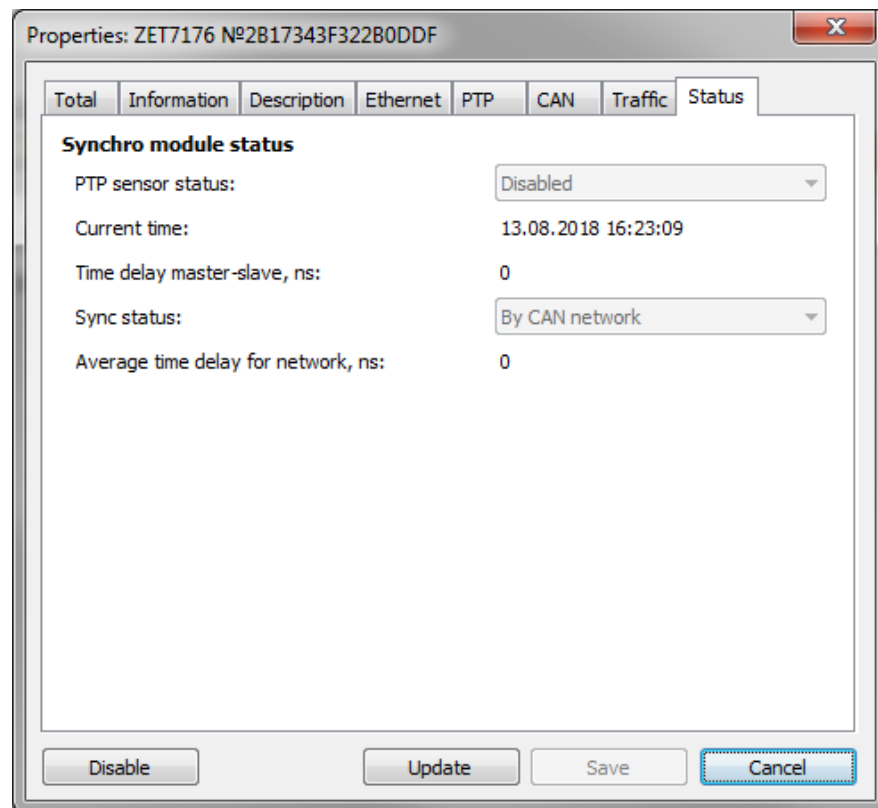
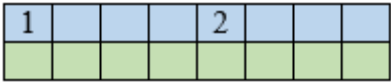
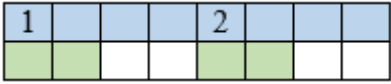

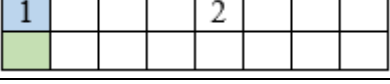


Figure 4.7 “Status” tab

## 5 LED indication: operation modes

Table 5.1 contains information of LED indication operation modes (the LED indicators are located at the top section of the digital transducer's casing). Depending on the combination of blue and green LEDs operation, it is possible to control the status of the device and to conduct its diagnostics.

*Table 5.1 LED indication status*

Indication status	Indication during 2 seconds	Description of LED indication operation mode
Selection of a device or data saving		Blue – constant indication Green – constant indication
Error (lost connection or defect of the transducer)		Blue – constant indication Green – indication 500 ms per 1 second
Settings by default (address 2)		Blue – constant indication Green – indication 100 ms per 2 seconds
Normal operation mode		Blue – indication 100 ms per 2 seconds Green – indication 100 ms per 2 seconds