

Connection to TE M5600

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1. About this document

This document describes the coupling of TE M5600 sensors to a DATAEAGLE 7050 / 2730 Compact device.

2. Basic settings

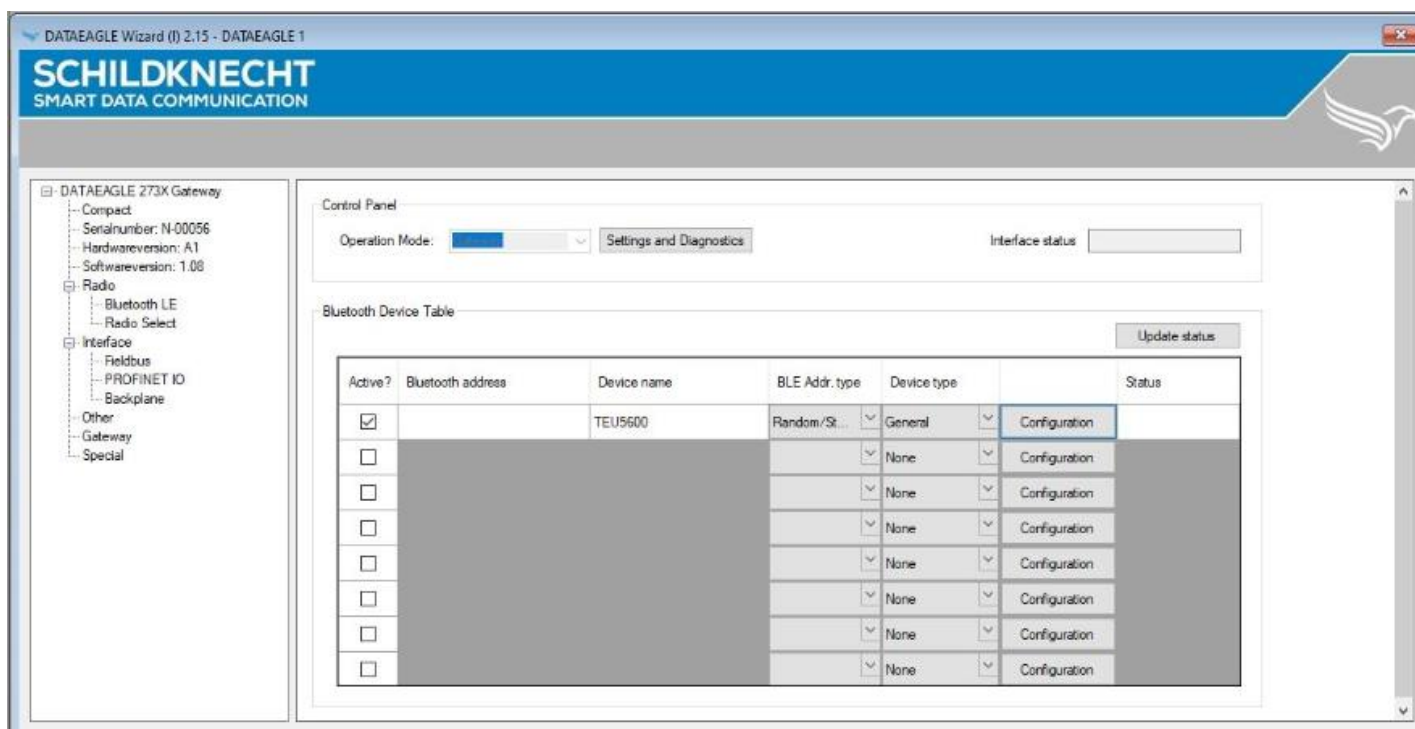


Figure 1: Connection settings from CISS sensor (See Table 1)

The connection settings of the TE M5600 are configured via the DATAEAGLE Wizard Software tool on the DATAEAGLE Compact 2730 / 7050.

Table 1: Connection settings of the CISS sensor

Active ?	BLE device active / not active
Bluetooth Address	Bluetooth MAC address of the BLE device
Device name	Name of the BLE device. Only required if the connection is established via a scan operation.
BLE Addr. Type	Address type of the BLE device. For TE M5600 sensors, "Random / Static" must be selected.
Device type	Device type of the BLE device as preconfiguration (template) of the data settings of the BLE device. For the TE M5600 sensor, please select "General".

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The BLE characteristics for the TE M5600 sensor needs to be configured via the Configuration button according to this picture (see Figure 2).

The screenshot shows the configuration window for a TEU5600 device. At the top, there are fields for 'Active' (checked), 'BL MAC', 'Name' (TEU5600), 'Addr. Type' (Random/Static), and 'Pairing Code' (0). Below this is a 'Startup Commands' table with columns for Command, Attribute, and Value Text. The first row is 'Write characteristic' with attribute 36 and value 6400. Below that are four rows with 'None' as the command and attribute 0. The 'BLE Input' section contains a table with columns: A?, Char. Handle, Input Mode, Desc. Handle, Data Format, Data Type, DataCount, and Delimiter. The first row is checked and has Char. Handle 32, Input Mode Notify, Desc. Handle 34, Data Format Hex, Data Type Byte, DataCount 14, and Delimiter None. The second row is also checked with Char. Handle 27, Input Mode Read, Desc. Handle 0, Data Format Hex, Data Type UInt16, DataCount 1, and Delimiter None. The remaining six rows are unchecked and have Char. Handle 0, Input Mode Notify, Desc. Handle 0, Data Format None, Data Type None, DataCount 0, and Delimiter None. The 'BLE Output' section contains a table with columns: A?, Source, Char. Handle, Output Mode, Output trigger, Data Format, Data Type, Data Count, and Delimiter. The first row is checked and has Source PLC, Char. Handle 0, Output Mode None, Output trigger Command, Data Format None, Data Type None, Data Count 0, and Delimiter None. The remaining seven rows are unchecked and have Source PLC, Char. Handle 0, Output Mode None, Output trigger Command, Data Format None, Data Type None, Data Count 0, and Delimiter None.

Figure 2: TE M5600 configuration

!!! ATTENTION !!!

- ➔ A maximum of eight BLE devices or X-treme IO modules can be configured in the DATAEAGLE Compact 7050 / 2730 gateway.
- ➔ After completing the configuration, the DATAEAGLE Compact 2730 / 7050 device must be restarted to apply the settings.

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3. Data processing

After successful configuration, the DATAEAGLE Compact 2730 / 7050 gateway will establish the Bluetooth connection to the TE M5600 sensor(s) and read out the sensor signals. This data is then exchanged with the PLC via the field bus interface and/or transferred to the DATAEAGLE Cloud Portal, depending on the device variant ordered. These two variants are described in more detail below.

3.1. Data coupling via field bus

!!! ATTENTION!!!

- Depending on the PLC and fieldbus system, different data structures are created for the data exchange via the fieldbus interface. This can result in memory gaps. It must be ensured that the transmitted data is transferred without gaps on the fieldbus interface.
- Depending on the PLC and fieldbus system, data structures are transferred in a different byte order. It must be ensured that the byte sequence corresponds to this document.

3.1.1. Basic data structure

The basic structure for the send and receive data that is exchanged with the PLC via the fieldbus interface is independent of which Bluetooth station has been configured.

3.1.1.1. Send data structure

Table 3 describes the structure of the data transmitted from the PLC to the DATAEAGLE Compact 7050 / 2730. The format of the "SEND DATA" depends on the Bluetooth device (e.g. DATAEAGLE X-treme IO variant, CISS sensor, TE M5600, ...).

Table 3: Basic structure of send data from PLC

Name	Datatype	Description
ORDER_NUMBER	BYTE	Order counter
TARGET_ADDRESS	BYTE	Destination address of the BLE device
REQUESTED_BYTES	BYTE	Number of requested bytes
SENT_BYTES	BYTE	Number of bytes sent
MAIN_COMMAND	BYTE	Main Command
SPECIAL_COMMAND	BYTE	Special command (not used for TE M5600)
SEND DATA	-----	BLE device data

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Via "MAIN_COMMAND" different functions/commands can be triggered between the DATAEAGLE Compact 2730 / 7050 and the connected Bluetooth device. These functions are described in table 4.

!!! ATTENTION !!!

Functions that are triggered via "MAIN_COMMAND" and "SPECIAL_COMMAND" are only accepted by DATAEAGLE Compact 2730 / 7050 as a new function if the job counter also increases.

Table 4: Possible commands to the DATAEAGLE

Name	Coding	Description
Empty Command	0x08	Empty command - useful to trigger data exchange between PLC and DATAEAGLE.
Read Command	0x06	Reads all configured read characteristics from the BLE device
Write Command	0x05	Writes all configured write characteristics to the BLE device

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3.1.1.2. Receive data structure

Table 5 describes the structure for the receive data that is read from the DATAEAGLE Compact 2730 / 7050 by the PLC via the fieldbus interface. The format of the "RECEIVE DATA" depends on the Bluetooth participant (e.g. DATAEAGLE X-treme IO variant, CISS, TE M5600, ...).

Table 5: Basic structure received data in PLC

Name	Data type	Description
ORDER_NUMBER	BYTE	Order counter
SOURCE_ADDRESS	BYTE	Destination address of the BLE device
RECEIVED_BYTES	BYTE	Number of requested bytes
SEND_BYTES	BYTE	Number of bytes sent
DEVICE_IDX	BYTE	Device Index (same as SOURCE_ADDRESS)
BLE_STATUS	BYTE	Status of the BLE device
BLE_RSSI	DINT	RSSI value of the existing BLE connection.
RECEIVE DATA	-----	Data of the BLE device

The byte "BLE_STATUS" reports the current state of the BLE connection. Table 6 describes the possible BLE states.

Table 6: Possible values for the BLE state

Name	Kodierung	Description
None	0x00	
Error	0x01	Error.
Inactive	0x02	Device is not activated
First Boot	0x03	
Idle	0x04	
Test	0x05	
Init	0x06	

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Scan	0x07	Scanning process running
Reset	0x08	
Data	0x09	Interface data traffic running
Disconnected	0x0A	Device disconnected
Disconnecting	0x0B	Device disconnecting
Found	0x0C	Device found
Not found	0x0D	Device not found
Active	0x0E	Interface active
Connecting	0x0F	Connection is established
Init Pairing	0x10	Pairing is initialized
Pair Code	0x11	Pair code is transmitted
Preparing	0x12	
Configuring	0x13	Notifications are activated
Startup	0x14	Startup commands are executed
Receiving	0x15	Data is read by the participant.
Sending	0x16	Data is transferred to the device
Command/Transceiving	0x17	Connection successful and device now accepts commands

3.1.2. TE M5600 send and receive data

Send Data: PLC → DATAEAGLE Compact

Name	Data type	Description
ORDER_NUMBER	BYTE	Order counter
TARGET_ADDRESS	BYTE	Destination address of the BLE device
REQUESTED_BYTES	BYTE	Number of requested bytes

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SENT_BYTES	BYTE	Number of bytes sent
MAIN_COMMAND	BYTE	Main Command
SPECIAL_COMMAND	BYTE	Special command (not used for CISS)

Description of MAIN_COMMAND and SPECIAL_COMMAND can be found in chapter 3.1.1.1

Example with 1 TE M5600 sensors:

Name	Data type	Data
ORDER_NUMBER	BYTE	0x01
TARGET_ADDRESS	BYTE	0x01
REQUESTED_BYTES	BYTE	0x00
SENT_BYTES	BYTE	0x02
MAIN_COMMAND	BYTE	0x08
SPECIAL_COMMAND	BYTE	0x00

Receive data: DATAEAGLE Compact → PLC

Name	Data type	Description
ORDER_NUMBER	BYTE	Order counter
SOURCE_ADDRESS	BYTE	Destination address of the BLE device
RECEIVED_BYTES	BYTE	Number of requested bytes
SEND_BYTES	BYTE	Number of bytes sent
DEVICE_IDX	BYTE	Device Index (same as SOURCE_ADDRESS)
BLE_STATUS	BYTE	Status of the BLE device
BLE_RSSI	SINT32	RSSI value of the existing BLE connection.
TE M5600 - Temperature	UINT16	Temperature * 100
TE M5600 - Pressure	UINT32	Pressure * 1000

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TE M5600 – Pressure Min.	UINT32	Pressure * 1000
TE M5600 – Pressure Max.	UINT32	Pressure * 1000

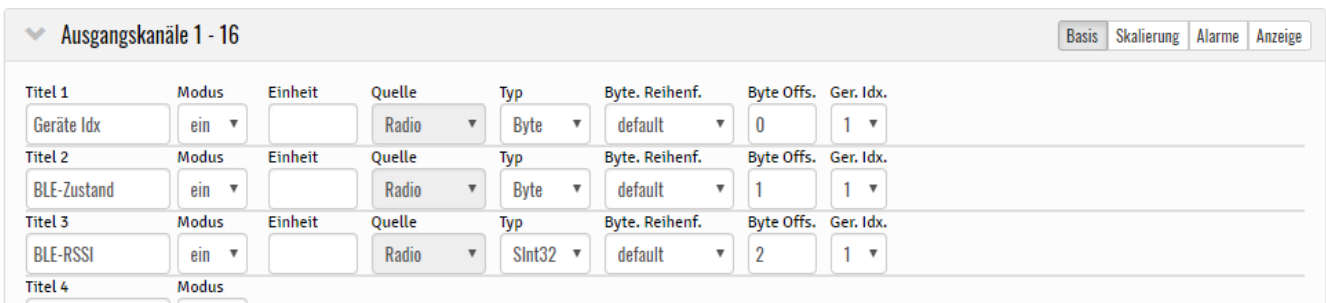
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3.2. Data connection to the cloud

If the DATAEAGLE Compact 2730 / 7050 also has a cloud interface, the data from the TE M5600 sensors can be displayed in the DATAEAGLE portal.

In the DATAEAGLE portal, this data can be configured via the output channels of the DATAEAGLE Compact 2730 / 7050. See in figure 3.



Titel	Modus	Einheit	Quelle	Typ	Byte. Reihenf.	Byte Offs.	Ger. Idx.
Titel 1 Geräte Idx	ein		Radio	Byte	default	0	1
Titel 2 BLE-Zustand	ein		Radio	Byte	default	1	1
Titel 3 BLE-RSSI	ein		Radio	Slnt32	default	2	1
Titel 4	Modus						

Figure 3: Output channels for BLE data

Name	Byteoffset	Data type	Description
DEVICE_IDX	0	BYTE	Device Index
BLE_STATUS	1	BYTE	Status of the BLE device
BLE_RSSI	2	DINT	RSSI value of the existing BLE connection.
DATA	6	-----	Data of the BLE device

The structure of the DATA block from byte offset (6) has the same structure as the TE M5600 PLC interface. To be found in this document at 3.1.2