Voltage regulator TAPCON® 260
Supplement 2531964/00
Protocol description for IEC 60870-5-101
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</tr>
</tbody>
</table>
1 General notes

1.1 About this document

This document describes implementation of the interface protocol IEC60870-5-101 for the TAPCON® 260.

Read this description along with the technical file for the TAPCON® 260.

1.2 Information about the standard

The voltage regulator provides a selection of commands and messages from the IEC60870-5-101 interface protocol for communication.

Commands are transmitted directly and there is no scope for selecting and executing commands.

1.3 Abbreviations used

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASDU</td>
<td>Application Service Data Unit</td>
</tr>
<tr>
<td>BCD</td>
<td>Binary Coded Decimal</td>
</tr>
<tr>
<td>CIC</td>
<td>Communication Interface Card</td>
</tr>
<tr>
<td>GQ</td>
<td>General query</td>
</tr>
<tr>
<td>GPI</td>
<td>General Purpose Input</td>
</tr>
<tr>
<td>GPO</td>
<td>General Purpose Output</td>
</tr>
<tr>
<td>Fiber-optic cable</td>
<td>Fiber-optic cable</td>
</tr>
<tr>
<td>MR</td>
<td>Maschinenfabrik Reinhausen</td>
</tr>
<tr>
<td>RTC</td>
<td>Real Time Clock</td>
</tr>
<tr>
<td>TAPCON® trol</td>
<td>PC software for displaying regulator data</td>
</tr>
</tbody>
</table>

Table 1 Abbreviations
2 Voltage regulator connections

The physical interfaces RS232, RS485 and optional fiber-optic cables are provided on the voltage regulator for data transfer via the IEC60870-5-101 protocol.

![Diagram of CIC card with labels](image)

**Figure 1 CIC card**

<table>
<thead>
<tr>
<th>1</th>
<th>RS232 (9 pin female SUB-D connector)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>RS485</td>
</tr>
<tr>
<td>3</td>
<td>Ethernet RJ45 (optional)</td>
</tr>
<tr>
<td>4</td>
<td>FH-ST or F-SMA fiber-optic cable in 850 nm or 660 nm (optional)</td>
</tr>
<tr>
<td>5</td>
<td>Reset key</td>
</tr>
<tr>
<td>6</td>
<td>TxD LED for transmit signal</td>
</tr>
<tr>
<td>7</td>
<td>RxD LED for receive signal</td>
</tr>
<tr>
<td>8</td>
<td>Clk LED for operating mode (flashes for 2 seconds)</td>
</tr>
<tr>
<td>9</td>
<td>Clip for connecting cable shield with functional ground</td>
</tr>
</tbody>
</table>
## Voltage regulator connections

### RS232
- 9 pin female SUB-D connector
- Pin 2: TxD
- Pin 3: RxD
- Pin 5: GND

### RS485
- 3 pin connector from Phoenix (MC1.5/3 GF 3.5)
- Pin 1: GND (100 Ω ground resistance)
- Pin 2: B (inverted)
- Pin 3: A (not inverted)
- Polarity:
  - A > B by 200 mV corresponds to 1.
  - A < B by 200 mV corresponds to 0.
- An interrupted communication line corresponds to 1.
- The start bit has the designation 0.
- Recommended terminating resistor 120 Ω.

### Fiber-optic cable (optional)
- FH-ST (850 nm or 660 nm)
- F-SMA (850 nm or 660 nm)

### Table 2: Interfaces available

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232</td>
<td>9 pin female SUB-D connector</td>
</tr>
<tr>
<td>RS485</td>
<td>3 pin connector from Phoenix (MC1.5/3 GF 3.5)</td>
</tr>
<tr>
<td>Fiber-optic cable</td>
<td>FH-ST (850 nm or 660 nm)</td>
</tr>
<tr>
<td></td>
<td>F-SMA (850 nm or 660 nm)</td>
</tr>
</tbody>
</table>

Transfer on physical plane:
Asynchronous with 8 data bits, even parity, 1 stop bit (8E1)
3 Settings on the voltage regulator

The following chapters describe how to set the parameters for communication at the relevant interface on the TAPCON® 260.

Depending on the product version and software, you will need to press "Next" a varying number of times to reach the "Comm. interface" menu.

You will find more information on how to set the parameters in the technical file for TAPCON® 260.

3.1 Communication interface RS232

<table>
<thead>
<tr>
<th>Communication interface</th>
<th>RS232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate communication</td>
<td>9.6/19.2/38.4/57.6 kBaud</td>
</tr>
<tr>
<td>Fiber-optic cable light ON/OFF</td>
<td>not used</td>
</tr>
<tr>
<td>Local SCADA address</td>
<td>1...255 (0 = broadcast message)</td>
</tr>
<tr>
<td>Send delay time</td>
<td>0...254 ms (e.g. 2 ms, in order to compensate for the response time of an external converter RS485/RS232 when switching between transmit and receive operation)</td>
</tr>
</tbody>
</table>

Table 3 Interface settings RS232
3.2 Communication interface RS485

<table>
<thead>
<tr>
<th>Communication interface</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate communication</td>
<td>9.6/19.2/38.4/57.6 kBaud</td>
</tr>
<tr>
<td>Fiber-optic cable light</td>
<td>not used</td>
</tr>
<tr>
<td>ON/OFF</td>
<td></td>
</tr>
<tr>
<td>Local SCADA address</td>
<td>1...255 (0 = Broadcast-Meldung)</td>
</tr>
<tr>
<td>Send delay time</td>
<td>0...254 ms (e.g. 2 ms, in order to compensate for the response time of an external converter RS485/RS232 when switching between transmit and receive operation)</td>
</tr>
</tbody>
</table>

Table 4 Interface settings RS485

3.3 Fiber-optic cable (optional)

<table>
<thead>
<tr>
<th>Communication interface</th>
<th>FOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate communication</td>
<td>9.6/19.2/38.4/57.6 kBaud</td>
</tr>
<tr>
<td>Fiber-optic cable light</td>
<td>ON (1 corresponds to light On) or OFF (1 corresponds to light Off)</td>
</tr>
<tr>
<td>ON/OFF</td>
<td></td>
</tr>
<tr>
<td>Local SCADA address</td>
<td>1...255 (0 = Broadcast-Meldung)</td>
</tr>
<tr>
<td>Send delay time</td>
<td>not used</td>
</tr>
</tbody>
</table>

Table 5 Interface settings FOC
4 Data points

4.1 Message structure

The function types, type codes and data types which are listed in the data tables are explained below.

<table>
<thead>
<tr>
<th>ASDU field</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type code</td>
<td>1 byte</td>
<td></td>
</tr>
<tr>
<td>Variable structure code</td>
<td>1 byte</td>
<td>Is 1 in all TAPCON® 260 messages</td>
</tr>
<tr>
<td>Reason for transmission</td>
<td>1 byte</td>
<td>• 20 if the message is transmitted due to a general query (GQ).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7 when confirming commands, GQ and time synchronization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10 after end of GQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 for other messages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit 7 (P/N) is set if the order has been rejected (e.g. voltage regulator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is not set to Remote but Local).</td>
</tr>
<tr>
<td>ASDU address</td>
<td>1 byte</td>
<td>can be set on device</td>
</tr>
<tr>
<td>Information object address</td>
<td>2 bytes</td>
<td>1st byte = info number for 1st octet (corresponds to function type)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2nd byte = info number for 2nd octet</td>
</tr>
<tr>
<td>Information element</td>
<td>n bytes</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 Message structure
4.1.1 Type codes

3 = double message
4 = double message with time stamp
5 = tap position message
13 = measured value, shortened floating-point number
14 = measured value, shortened floating-point number with time stamp
46 = double command
47 = step-by-step adjustment command
50 = desired value adjustment command, shortened floating-point number
100 = general query command
103 = time synchronization command
112 = parameter for measured values, shortened floating-point number

4.1.2 Function types

3 = spontaneous
7 = confirmation of activation
10 = end of activation
20 = queried by general query
4 Data points

4.2 Monitoring direction

All spontaneous messages (in the event of changes) are transmitted with a time stamp. The time stamp always relates to when the message is sent. A message caused by a general query is sent without a time stamp.

<table>
<thead>
<tr>
<th>Type code</th>
<th>Info no. Byte 2</th>
<th>Info no. Byte 1</th>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>0</td>
<td>16</td>
<td>1</td>
<td>Auto/manual (On = auto mode; Off = manual mode)</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>19</td>
<td>1</td>
<td>Desired voltage value 1 On</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>20</td>
<td>1</td>
<td>Desired voltage value 2 On</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>21</td>
<td>1</td>
<td>Desired voltage value 3 On</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>27</td>
<td>1</td>
<td>SI command 1 active*</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>28</td>
<td>1</td>
<td>SI command 2 active*</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>29</td>
<td>1</td>
<td>SI command 3 active*</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>31</td>
<td>1</td>
<td>Motor-drive unit running</td>
</tr>
</tbody>
</table>

Messages which can be parameterized: The TAPCON® 260 has 4 messages which can be parameterized. These can be put on an input or relay. The messages are ON when there is a signal at the parameterized input or the parameterized relay is activated.

<table>
<thead>
<tr>
<th>Type code</th>
<th>Info no. Byte 2</th>
<th>Info no. Byte 1</th>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>0</td>
<td>33</td>
<td>1</td>
<td>Message no. 1</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>34</td>
<td>1</td>
<td>Message no. 2</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>43</td>
<td>1</td>
<td>Message no. 3</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>39</td>
<td>1</td>
<td>Message no. 4</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>35</td>
<td>1</td>
<td>Parallel operation On</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Parallel operation is only active when all conditions for parallel operation are met.</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>36</td>
<td>1</td>
<td>Master parallel operation method On (feedback on parallel operation method set)</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>37</td>
<td>1</td>
<td>Follower parallel operation method On (feedback on parallel operation method set)</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>38</td>
<td>1</td>
<td>Circulating reactive current parallel operation method On (feedback on parallel operation method set)</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>40</td>
<td>1</td>
<td>Failure Par.Contr.</td>
</tr>
<tr>
<td>3/4</td>
<td>0</td>
<td>42</td>
<td>1</td>
<td>Local/Remote (On = Remote; Off = Local)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TAPCON® 260 release I does not have a Local/Remote switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The local/remote operation function can however be parameterized on an input.</td>
</tr>
<tr>
<td>Type code</td>
<td>Info no. Byte 2</td>
<td>Info no. Byte 1</td>
<td>Class</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------</td>
<td>----------------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>3/4 0 44 1</td>
<td>Overvoltage V&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 0 45 1</td>
<td>Undervoltage V&lt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 0 46 1</td>
<td>Overcurrent I&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 0 49 1</td>
<td>Voltage regulator error ON when recording a parameterization error.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 0 51 1</td>
<td>Function monitoring error &quot;Control deviation present for 15-min.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 0 144 2</td>
<td>Actual voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 0 145 2</td>
<td>Control voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 0 146 2</td>
<td>Active current (percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 0 147 2</td>
<td>Reactive current (percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 0 148 2</td>
<td>Apparent current (percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 0 54 1</td>
<td>Tap position The bit for displaying the transitional stage is not used (always 0).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13/14 0 55 1</td>
<td>Desired value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 Data points in monitoring direction
4 Data points

4.3 Control direction

The remote mode must be set for commands from the control system on TAPCON® 260 to be executed on the Monitoring system.

4.3.1 System functions

<table>
<thead>
<tr>
<th>Type code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Start of general query</td>
</tr>
<tr>
<td>103</td>
<td>Clock synchronization</td>
</tr>
</tbody>
</table>

Table 8 System functions

The voltage regulator returns the command received with reason for transmission 7 if the order message has been accepted. A message indicating the end of the general query is sent after the last info message for the general query cycle. The message has reason for transmission 10.

An info message in a general query cycle is sent without a time stamp.
### 4.3.2 General data in control direction

<table>
<thead>
<tr>
<th>Type code</th>
<th>Info no. Byte 2</th>
<th>Info no. Byte 1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>0</td>
<td>16</td>
<td>Auto/manual (On = auto mode; Off = manual mode)</td>
</tr>
<tr>
<td>47</td>
<td>0</td>
<td>17</td>
<td>Raise (On = raise; Off = lower; only in manual mode)</td>
</tr>
<tr>
<td>47</td>
<td>0</td>
<td>18</td>
<td>Lower (On = lower; Off = no function; only in manual mode)</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>55</td>
<td>Set desired value</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>19</td>
<td>Raise/lower desired voltage value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Raise - On</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>This function is optional. Parameterization is undertaken by MR.</td>
</tr>
</tbody>
</table>

The desired voltage value function 1/2/3 is possible under the following conditions:
- no inputs parameterized for selecting desired voltage values 2 and 3
- raise/lower desired voltage value function not parameterized

Parameterization is undertaken by MR.

<table>
<thead>
<tr>
<th>Type code</th>
<th>Info no. Byte 2</th>
<th>Info no. Byte 1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>0</td>
<td>19</td>
<td>Desired voltage value 1</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>20</td>
<td>Desired voltage value 2</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>21</td>
<td>Desired voltage value 3</td>
</tr>
</tbody>
</table>

Each of these commands sets a flag in the TAPCON® 260. The status of the flags can be used like an input for the I/O or UC modules to activate or deactivate a TAPCON® 260 function.

Example: If the "Parallel group input" parameter is set to "SI:cmd1" for two TAPCON® 260, parallel control for these TAPCON® 260 can be activated or deactivated by setting the "SI command 1" on/off command for both TAPCON® 260.

<table>
<thead>
<tr>
<th>Type code</th>
<th>Info no. Byte 2</th>
<th>Info no. Byte 1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>0</td>
<td>27</td>
<td>SI command 1</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>28</td>
<td>SI command 2</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
<td>29</td>
<td>SI command 3</td>
</tr>
</tbody>
</table>

Table 9 Data points in control direction
5 Sequences

Once it has received a valid command, the voltage regulator returns the command message as positive confirmation. The reason for transmission is set to 7.

The message is sent as a response to the next query for class 1 data.

5.1 Time synchronization

Sample command for time synchronisation:
68 ff 68 43 01 67 1 6 1 0 0 86 d4 33 91 13 a9 f7 16

<table>
<thead>
<tr>
<th>Code (hexadecimal)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 ff 68 43 01</td>
<td>Start message</td>
</tr>
<tr>
<td>67</td>
<td>Type code = 103 (decimal) = time synchronization command</td>
</tr>
<tr>
<td>6</td>
<td>Reason for transmission = 6 = activation</td>
</tr>
<tr>
<td>0</td>
<td>Function type (or address of information object 1st octet) = 0</td>
</tr>
<tr>
<td>0</td>
<td>Info number (or address of information object 2nd octet) = 0</td>
</tr>
<tr>
<td>86 d4 33 91 13 a9</td>
<td>Time structure CP56Time2a</td>
</tr>
<tr>
<td>f7 16</td>
<td>End message</td>
</tr>
</tbody>
</table>

Table 10 Sample command for time synchronization

After time synchronization, the voltage regulator returns the time synchronization feedback as positive confirmation. The reason for transmission is set to 7.

The message is sent as a response to the next query for class 1 data.

This time specification is only used for display purposes in the TAPCON®trol visualization software, the regulator works internally with a continuous RTC.

The time stamp in the regulator's telegrams is produced by the communication card and is only set when the telegram is sent.
5.2 General query

Sample command for general query (GQ):
68 9 9 68 43 1 64 1 0 1 0 0 0 aa 16

<table>
<thead>
<tr>
<th>Code (hexadecimal)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 9 9 68 43 1</td>
<td>Start message</td>
</tr>
<tr>
<td>64</td>
<td>Type code = 100 (decimal) = general query</td>
</tr>
<tr>
<td>0</td>
<td>Reason for transmission = 0 = not used</td>
</tr>
<tr>
<td>0</td>
<td>Function type (or address of information object 1st octet) = 0</td>
</tr>
<tr>
<td>0</td>
<td>Info number (or address of information object 2nd octet) = 0</td>
</tr>
<tr>
<td>aa 16</td>
<td>End message</td>
</tr>
</tbody>
</table>

Table 11 Sample command for general query (GQ)

The first message sent by the voltage regulator in response to the general query is the "GQ start" message with 100 type code and reason for transmission 7 (confirmation of activation).

After the last data message from the general query cycle, the "GQ complete" message is issued with type code 8 and reason for transmission 10.

The message is sent as a response to the next query for class 1 data.
5.3 Double command (direct)

Double command (direct) example:
68 ff 68 43 1 2e 1 6 1 14 0 2 90 16

<table>
<thead>
<tr>
<th>Code (hexadecimal)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 9 68 43 1</td>
<td>Start message</td>
</tr>
<tr>
<td>2e</td>
<td>Type code = 46 (decimal) = double command</td>
</tr>
<tr>
<td>6</td>
<td>Reason for transmission = 6 activation</td>
</tr>
<tr>
<td>14</td>
<td>Function type (or address of information object 1st octet) = 20 (decimal) = desired value 2</td>
</tr>
<tr>
<td>0</td>
<td>Info number (or address of information object 2nd octet) = 0</td>
</tr>
<tr>
<td>2 90 16</td>
<td>Value = ON</td>
</tr>
<tr>
<td></td>
<td>End message</td>
</tr>
</tbody>
</table>

Table 12 Double command (direct) example

Once it has received a valid command, the voltage regulator returns the command message as positive confirmation. The reason for transmission is set to 8.

If the command cannot be performed, the P/N bit in the reason for transmission byte is transmitted.

The message is sent as a response to the next query for class 1 data.
5.4 Step-by-step adjustment command (direct)

Step-by-step adjusting command (direct) example:
68 9 9 69 43 1 2f 1 6 1 11 0 2 8e 16

<table>
<thead>
<tr>
<th>Code (hexadecimal)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 9 9 69 43 1</td>
<td>Start message</td>
</tr>
<tr>
<td>2f</td>
<td>Type code = 47 (decimal) step-by-step adjusting command</td>
</tr>
<tr>
<td>6 11</td>
<td>Reason for transmission = 6 activation Function type (or address of information object 1st octet) = 17 (decimal) = raise</td>
</tr>
<tr>
<td>0</td>
<td>Info number (or address of information object 2nd octet) = 0</td>
</tr>
<tr>
<td>2 8e 16</td>
<td>Value = ON End message</td>
</tr>
</tbody>
</table>

Table 13 Step-by-step adjusting command (direct) example

Once it has received a valid command, the voltage regulator returns the command message as positive confirmation. The reason for transmission is set to 8.

If the command cannot be performed, the P/N bit in the reason for transmission byte is transmitted.

The message is sent as a response to the next query for class 1 data.
5.5 Desired value adjustment command, shortened floating-point number (direct)

Example of desired value adjustment command:
68 d d 68 43 1 32 1 6 1 38 0 0 0 e1 42 0 d9 16

<table>
<thead>
<tr>
<th>Code (hexadecimal)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 d d 68 43 1</td>
<td>Start message</td>
</tr>
<tr>
<td>32</td>
<td>Type code  = 50 (decimal) = desired value adjusting command, reduced floating-point number</td>
</tr>
<tr>
<td>6</td>
<td>Reason for transmission = 6 = activation</td>
</tr>
<tr>
<td>38</td>
<td>Function type (or address of information object 1st octet) = 56 (decimal) = desired value 2</td>
</tr>
<tr>
<td>0</td>
<td>Info number (or address of information object 2nd octet) = 0</td>
</tr>
<tr>
<td>0 0 e1 42 0</td>
<td>Value (short real)</td>
</tr>
<tr>
<td>d9 16</td>
<td>End message</td>
</tr>
</tbody>
</table>

Table 14 Example of desired value adjustment command

Once it has received a valid command, the voltage regulator returns the command message as positive confirmation. The reason for transmission is set to 8.

If the command cannot be performed, the P/N bit in the reason for transmission byte is transmitted.

The message is sent as a response to the next query for class 1 data.