6KCV300PDPB1

Profibus - DP Bus
These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to GE Motors & Industrial Systems.

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This manual describes the optional 6KCV300PDPB1 card for connecting of inverters and converters to Profibus-DP networks.

This manual is intended for design engineers and technicians responsible for the maintenance, commissioning and operation of Profibus-DP systems. A basic knowledge of Profibus-DP is assumed and may be found in the “Draft Standard DIN 19245 Part 3” manual.

1.1. OVERVIEW OF PROFIBUS-DP

Profibus-DP is a field Bus designed for a fast data exchange relating to sensors/actuators; the communication is established between a Master central unit (PLC or PC) and Slave units, i.e. sensors, actuators, drives, etc.

The data exchange is cyclic; the Master unit reads the Slaves input data and writes the Slaves output data. The Bus cycle time is shorter than the cycle time of the central unit; the Baud Rates for the GE Profibus-DP interface card are from 9,6 kbit/s to 12 kbit/s according to Profibus-DP standard part 3.

The total cycle time depends on the number of Slaves connected; the 1.5-Mbit/s Baud Rate allows 8 GE drives to be polled in 6 milliseconds. The realtionship between polling (cycle) time and the number of drives in the network is propotional to the number of drops and the number of words sent.

For example, at 1,5 Mbit/s, the cycle time for a network with 24 drives is

\[
\frac{6\text{ms}}{8\text{ drives}} \cdot 24\text{ drives} = 18\text{ms}
\]

The physical support is the RS485 serial line; the max. number of Slaves connected to the Bus is 125.

There only one Profibus-DP interface card for the AV-300 and DV-300 drives:
- 6KCV300PDPB1

Example of Mono-Master Profibus-DP system.

```
MASTER

SLAVE SLAVE SLAVE
```

Profibus-DP allows a Multi-Master system as well. For further information please refer to chapters 6 and 7 of the “Draft Standard DIN 19245 Part 3” manual.
2. HARDWARE DESCRIPTION

2.1. DIMENSIONS, WEIGHT, DEGREE OF PROTECTION

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>157mm</td>
</tr>
<tr>
<td>Weight</td>
<td>200 g</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP00</td>
</tr>
</tbody>
</table>
2.2. MOUNTING

The Profibus-DP interface card is supplied with a kit including 4 stand-offs, 4 screws, washers and a 40-pole flat cable provided with connectors.

1. Switch the drive off.
2. Fasten the Profibus-DP interface card to the drive regulation board by means of screws and stand-offs.
   As an example, please find here below the drive regulation cards.
   The Bus connectors have the same direction of the regulation card terminals.
3. The flat cable is connected to the XO connector existing on the cards.
4. The BUS terminating resistances are connected or disconnected through the S2 dip switch.
   The last physical card in network shall have such resistances connected in case the connector in use should not contain terminating resistances itself.
   ON = connected
   OFF = disconnected.
5. The S1 dip switch determines the Slave address.
   The addresses "0" and "1" are reserved to the Master and cannot be used. The switch S1-8 is not significant for the address and must always be set to OFF. The address is only detected when the card is switched on.
   If the address has been modified, the Profibus-DP interface card has first to be switched off and then on in order assume the new address.

6. Connect the Bus cable to XS1 or XS2 connectors.
7. Switch on the drive.
8. The LEDs +5V and +5VE light.
9. The LED DEA lights up when the communication enters in the Data Exchange Phase.
2.3. POWER SUPPLY

The Power supply is provided by the XO connector, which is also used to link data between the Profibus-DP interface card and the drive regulation card.

The PDP card requires 24Vdc at 350mA.

2.4. CONNECTORS

Connector PEG: It allows to connect set point of External Digital Supply (GNDE) to the ground (PE).
Connector PES: It allows to connect the ground (PE) at the Profibus cables shield.

2.5. DIP SWITCHES

S3: Selection of interrupt source (INT1 / INT2) from S5 jumper to the 8032 microcontroller or the Dual Port Ram interrupt input (INTR). Default position A (interrupt from the Dual Port Ram).
S4: Synchronization connection of the 6KCV300PDPB1 card reset signal to the drive regulation card reset signal. Default position ON.
S5: It is used to connect the INT_OPZ signal to the INT1 signal (S5 A) or to the INT2 signal (S5 B). At the moment only the setting (default setting) of the interface card as Option 1 is allowed, therefore INT_OPZ is connected to the INT1 signal (default position A).
S6: It is used to connect the OUT_OPZ signal to the OUT1 (S6.A) or OUT2 (S6.B) signal. Default position A.
S7: It is used to connect the CEM_OPZ signal to the OPZ1 (S7.A) or OPZ2 (S7.B) signal. The default setting of the 6KCV300PDPB1 card is Option 1, therefore the CEM_OPZ signal is connected to the OPZ1 signal. (Default position A).
S8: Connection of the Dual Port Ram BUSY signal to RDY_EXT signal. Default position ON.
S9: It is used for hybrid connection for communication. It allows to connect the capacitor C3 (10nF 2kV) in case the connection is too long.
S10: It is used for hybrid connection of the ground. It allows to connect the capacitor C4 (10nF 2kV) in case the connection is too long.

2.6. LEDS

+5V: +5V power supply.
RST: Reset active.
DEA: Data Exchange Phase active.
+5VE: +5V power supply on the RS 485 driver side galvanic isolated.
2.7. TECHNICAL SPECIFICATION

Storage temperature: -20/...+70/
Operating temperature: 0/...+55/

2.8. INTERFACE

The card shall be installed on the regulation card, so that the Profibus-DP interface card X0 connector and the regulation card X0 connector are near to each other always keeping connectors to the Profibus-DP line directed downwards.

For the mechanical connection please use the kit supplied with the card.
For the electrical connection please use a 40-pin flat cable, also supplied.
For the connection to the Bus please use a shielded duplex cable.

The pinout of the Bus connectors are the following:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>+5V</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>100 ohm to 0V</td>
<td>3 (XS1 - XS2)</td>
</tr>
<tr>
<td>4</td>
<td>RX/TX-B</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>RX/TX-A</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>N.C.</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>N.C.</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>0V</td>
<td>9</td>
</tr>
</tbody>
</table>

*Figure 2.8.1.: Bus Connector Pinout*
The connection among the single cards is implemented by a shielded cable as shown in the following diagrams:

**Figure 2.8.2: Two-Drive Network**

**Figure 2.8.3: Multiple-Drive Network**
3. BYTES ASSIGNMENT FOR DATA EXCHANGE

The Profibus-DP interface card uses a 16-byte frame. The first 8 bytes represent the configuration channel for the non-cyclic data exchange, the other 8 are the process data channel for the cyclic exchange.

The bytes assignment is as follows:

<table>
<thead>
<tr>
<th>Configuration channel</th>
<th>Process data channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 WORD 0</td>
<td>WORD 1 WORD 2 WORD 3</td>
</tr>
</tbody>
</table>

- Data/Error
- Subindex/Type/Word PDC
- Index
- Control byte

As to the Data/Error and Index fields, the data format is arranged from the least to the most significant byte. The meaning of the fields is the following:

A) Data frame from Master to Slave:

1) Data/Error. The content of this field depends on the kind of service carried out: in case of writing it contains the parameter value, in case of reading it has no meaning.

2) Subindex/Type/Word PDC. It contains the parameter subindex, if any. If the parameter has no subindexes it has to be set to 0. For parameters with subindex, this has to be set from 1 to the max. number of parameter elements; the value 0 is not accepted and rejected. It is not possible to read the whole object, but only its single elements. In case of service carried out towards the DGFC option, this field should contain the data type. In case of Process Data Channel configuration (see chapter 4), this field contains the number of the PDC Word involved in the operation. In case of virtual digital input/output configuration (see chapter 8), this field contains the number of the digital channel involved in the operation.

3) Index. Index of the parameter involved in the operation with format low byte - high byte.

4) Control byte. The meaning of this byte is described in 3.1.
### 3.1. CONTROL BYTE SETTING

<table>
<thead>
<tr>
<th>Bit</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No request communications</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Drive parameter reading</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Drive parameter writing</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DGFC option parameter reading</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>DGFC option parameter writing</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1 Byte Data/Error</td>
</tr>
<tr>
<td>0</td>
<td>2 Byte Data/Error</td>
</tr>
<tr>
<td>1</td>
<td>3 Byte Data/Error</td>
</tr>
<tr>
<td>1</td>
<td>4 Byte Data/Error</td>
</tr>
</tbody>
</table>

The status bit is only used by the Slave, therefore it has a meaning only during the transmission from Slave to Master; in the transmission from Master to Slave it has always to be set to 0.
3.2. MEANING OF HANDSHAKE BIT

The Handshake bit avoids that the same service request is carried out more than once and its function is the same both in the direction from Master to Slave and from Slave to Master. The explanation here below refers to the direction Master to Slave, but the same considerations may be applied for the opposite direction.

The default value of this Bit is 0. Every time that a transition of this Bit occurs, both from 0 to 1 (positive edge) and from 1 to 0 (negative edge), the Slave carries out the service requested by the Master through the data frame previously set. Therefore, this Bit acts as a Trigger, through which the Master indicates the Slave that the data for the requested service are ready.

The Slave responds to the Master in the same way, by causing a Handshake Bit transition (both positive or negative).

Consequently, the Master is able to send a service on the Bus only if its Handshake Bit is equal to the one received by the Slave.

During the initialization and in case the Master does not receive the Slave response within a Timeout of 500mSec, the Master shall send a no-request service (all Bits are set to 0), thus allowing the Slave to perform a communication Reset. This causes the reset of the Slave Handshake Bit.

The Timeout for the service towards the DGFC option shall be longer (1,5 sec). The Master should therefore have two different Timeouts: one for the services towards the drive and one for those towards the DGFC option.
4. PROCESS DATA CHANNEL CONTROL

This function allows the assignment of the drive parameter to the Process Data Channel Words.

The Profibus-DP interface card uses four words (WORD) for the Process Data Channel (abbr. PDC Process Data Channel).

The Process Data Channel for the 6KCV300PDPB1 card has the following configuration:

<table>
<thead>
<tr>
<th>WORD 0</th>
<th>WORD 1</th>
<th>WORD 2</th>
<th>WORD 3</th>
</tr>
</thead>
</table>

The Slave can both read and write Process Data Channel data. The data read from Profibus-DP by the Slave are referred to as output data; the data written in Profibus-DP by the Slave are referred to as input data.

The Slave parameters are cyclically read by the Master by assigning drive parameters to the "PDC input data descriptor" communication object.

The Master cyclically transmits drive parameters to the Slave by assigning drive parameters to the "PDC output data descriptor" communication object.

The process data assignment to specific drive parameters must be set. The "PDC input data descriptor" and "PDC output data descriptor" communication objects are used for this aim.
Operating modes:

The "PDC input data descriptor" communication object (input data for the Master) sets the drive parameters assigned to the Process Data Channel Words. The "PDC output data descriptor" communication object (output data for the Master) sets the Process Data Channel Word assigned to the drive parameters.

The drive parameters assignment to the Process Data Channel Words is carried out by means of the index and the subindex of the parameter itself.

Only drive parameters with a 16-Bit width (1 Word) may be assigned to the Process Data Channel.
**NOTE:** When using the AV-300 inverter, the assigned parameter number is the same indicated on the drive parameter list.

When using a DV-300 or AV-300 drive, the offset 2000h (8192 dec) must be added to the drive parameter index in order to obtain the number of the parameter to be assigned via fieldbus.

Output data descriptor of the Process Data Channel:

<table>
<thead>
<tr>
<th>WORD 0</th>
<th>WORD 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed ref 1</td>
<td>Ramp ref 1</td>
</tr>
<tr>
<td>[42]</td>
<td>[44]</td>
</tr>
</tbody>
</table>

**NOTE:** Example referred to DV-300 or AV-300 drives.

Parameters with index 0000 mean that the Word is not assigned to any drive parameter.
Example of drive parameters assignment to the "PDC output data descriptor" and "PDC input data descriptor" objects in case of Profibus-DP interface card with two 16-Bit drive parameters.

1 - Drive Parameter A  Data type: Unsigned16
2 - Not used
3 - Drive Parameter B  Data type: Unsigned16
4 - Not used

<table>
<thead>
<tr>
<th>Subindex of the &quot;PDC input data descriptor&quot; object</th>
<th>Meaning of the object element</th>
<th>Process data channel word number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Index of the drive parameter A (16 Bits)</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>Subindex of the drive parameter A</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>Not used. Index = 0000</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>Not used. Subindex = 00</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Index of the drive parameter B (16 Bits)</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Subindex of the drive parameter B</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Not used. Index = 0000</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Not used. Subindex = 00</td>
<td>3</td>
</tr>
</tbody>
</table>

4.1. EXAMPLE OF PDC CONFIGURATION DATA FRAME SETTING

Example No. 1:

The Ramp Ref 1 parameter of the GE DV-300 drive must be assigned to the Word No. 1 of the PDC output data. Being such parameter an Unsigned 16, it has a 16-Bit width and can be therefore assigned to a Process Data Channel.

The required numerical information is:

1) Index of the PDC output data configuration parameter: 6001h.
2) Word Number involved: 1.
3) Ramp Ref 1 parameter index of the DV-300 drive: 202Ch.
4) Ramp Ref 1 parameter subindex of the DV-300 drive: 0h.
Example No. 2:

The **Actual speed** parameter of the GE DV-300 drive must be assigned to the Word No. 2 of the PDC input data. Being such parameter an Unsigned 16, it has a 16-Bit width and can be therefore assigned to a Process Data Channel.

The required numerical information is:

1) Index of the PDC input data configuration parameter: 6000h.
2) Word Number involved: 2.
3) **Actual speed** parameter index of the DV-300 drive: 207Ah.
4) **Actual speed** parameter subindex of the DV-300 drive: 0h.

### Table: Process Data Channel Control

<table>
<thead>
<tr>
<th>XX</th>
<th>01h</th>
<th>60h</th>
<th>01h</th>
<th>2Ch</th>
<th>20h</th>
<th>00h</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>No meaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subindex of drive parameter to be assigned to PDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of drive parameter to be assigned to PDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC Word Number involved in the operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of PDC output data configuration parameter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Byte (See Par. 3.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>XX</th>
<th>00h</th>
<th>60h</th>
<th>02h</th>
<th>7Ah</th>
<th>20h</th>
<th>00h</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>No meaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subindex of drive parameter to be assigned to PDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of drive parameter to be assigned to PDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC Word Number involved in the operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of PDC output data configuration parameter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Byte (See Par. 3.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2. PDC INPUT DATA DESCRIPTOR

This communication object contains the information for the assignment of the PDC input data to the drive parameters. In case of conflict between index and subindex, the assignment is not carried out and an error message is generated.

Description of the “PDC input data descriptor” communication object:

<table>
<thead>
<tr>
<th>OBJECT ATTRIBUTE</th>
<th>VALUE</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>6000h</td>
<td>PDC input data descriptor</td>
</tr>
<tr>
<td>Password</td>
<td>00</td>
<td>Non-existing</td>
</tr>
<tr>
<td>Access group</td>
<td>00</td>
<td>Non-existing</td>
</tr>
<tr>
<td>Access rights</td>
<td>--</td>
<td>Read-All, Write-All</td>
</tr>
<tr>
<td>Local address</td>
<td>XXXX</td>
<td>Manufacturer specific</td>
</tr>
</tbody>
</table>

Descriptor data type:

- Subindex 0: Unsigned16 - Unsigned8
- Subindex 1: Unsigned16 - Unsigned8
- Subindex 2: Unsigned16 - Unsigned8
- Subindex 3: Unsigned16 - Unsigned8

4.3. PDC OUTPUT DATA DESCRIPTOR

This communication object contains the information for the assignment of the drive parameters to the PDC Master output data. In case of conflict between index and subindex, the assignment is not carried out and an error message is generated.

Description of the “PDC output data descriptor” communication object:

<table>
<thead>
<tr>
<th>OBJECT ATTRIBUTE</th>
<th>VALUE</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>6001h</td>
<td>PDC output data descriptor</td>
</tr>
<tr>
<td>Password</td>
<td>00</td>
<td>Non-existing</td>
</tr>
<tr>
<td>Access group</td>
<td>00</td>
<td>Non-existing</td>
</tr>
<tr>
<td>Access rights</td>
<td>--</td>
<td>Read-All, Write-All</td>
</tr>
<tr>
<td>Local address</td>
<td>XXXX</td>
<td>Manufacturer specific</td>
</tr>
</tbody>
</table>

Descriptor data type:

- Subindex 0: Unsigned16 - Unsigned8
- Subindex 1: Unsigned16 - Unsigned8
- Subindex 2: Unsigned16 - Unsigned8
- Subindex 3: Unsigned16 - Unsigned8
5. PROFIBUS-DP ALARMS

5.1. DESCRIPTION

The alarms indicated to the drive by the Profibus-DP interface card through the Dpram are the following:

1 - Bus loss: if an accidental interruption of the connection occurs, this alarm is generated.
2 - SBI Hardware Fault: if the Profibus-DP interface card is faulted, this alarm is generated.
3 - SBI Ram Fault: this alarm is generated if there is a fault in the Dual-Port-Ram of the Profibus-DP interface card.

The alarm handling carried out by the drive depends on the drive itself and how the alarms are configured.

In case the Master is switched off before the Slave, the Bus-Loss alarm occurs; the drive may handle this event by avoiding to store the alarm in order not to appear when the drive will be switched on.

The communication between Master and Slave can only be carried out if the initialization of the drive and of the Profibus-DP interface card is successfully terminated, if not, through the Bus is not possible to determine the cause of the erroneous initialization.
6. DRIVE ALARMS HANDLING

The drive reports automatically its status to the Profibus-DP interface card, if an alarm condition occurs.

When the communication is established, the drive status is sent to the Master in at the moment in which the drive initialization has terminated.

Every time the Drive Status field of the Monitor structure in the Dual-Port-Ram changes its status, the Profibus-DP interface card sends the updated drive status to the Master by means of a diagnostic message (please refer to “Draft Standard DIN 19245 Part 3” sect. 8.3.1).

The information are contained in the ‘User Specific Diagnostic Data’ field of the diagnostic message. This field is made up of three Bytes. The first contains the ‘User Specific Diagnostic Data Lenght (in bytes)’ and is set to three. The second and the third contains the code of the drive status (for the code please refer to the drive manual). When a drive alarm occurs, also the ‘Ext_Diag’ bit in the first Byte of the ‘Diagnostic Data’ is set to 1.
# 7. SERVICE ERROR CODES AND OPERATION RESULT

The following table shows the different error codes that may occur during the execution of a service.

<table>
<thead>
<tr>
<th>RESULT</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK no error</td>
<td>0000H</td>
</tr>
<tr>
<td>Parameter not exist</td>
<td>0001H</td>
</tr>
<tr>
<td>Reserved</td>
<td>0002H</td>
</tr>
<tr>
<td>Control Access denied</td>
<td>0003H</td>
</tr>
<tr>
<td>Reserved</td>
<td>0004H</td>
</tr>
<tr>
<td>Attribute Access denied</td>
<td>0005H</td>
</tr>
<tr>
<td>Type value error</td>
<td>0006H</td>
</tr>
<tr>
<td>Reserved</td>
<td>0007H-000FH</td>
</tr>
<tr>
<td>Destination option not exist</td>
<td>0010H</td>
</tr>
<tr>
<td>Parameter Access Conflict</td>
<td>0011H</td>
</tr>
<tr>
<td>Value out of the maximum range</td>
<td>0012H</td>
</tr>
<tr>
<td>Value out of the minimum range</td>
<td>0013H</td>
</tr>
<tr>
<td>Value not supported</td>
<td>0014H</td>
</tr>
<tr>
<td>Parameter Configuration Conflict</td>
<td>0015H</td>
</tr>
<tr>
<td>Command Submitted</td>
<td>0016H</td>
</tr>
<tr>
<td>Reserved</td>
<td>0017H</td>
</tr>
<tr>
<td>Unknown Command</td>
<td>0018H</td>
</tr>
<tr>
<td>Read only Parameter</td>
<td>0019H</td>
</tr>
<tr>
<td>Write not allowed</td>
<td>001AH</td>
</tr>
<tr>
<td>Value out of constant limits</td>
<td>001BH</td>
</tr>
<tr>
<td>State not correct</td>
<td>001CH</td>
</tr>
<tr>
<td>Password</td>
<td>001DH</td>
</tr>
<tr>
<td>Type Unknown</td>
<td>001EH</td>
</tr>
<tr>
<td>Hardware Fail</td>
<td>0030H</td>
</tr>
<tr>
<td>Checksum Fail</td>
<td>0031H</td>
</tr>
<tr>
<td>Reserved</td>
<td>001FH-0007CH</td>
</tr>
<tr>
<td>Reserved</td>
<td>0082H-00FCH</td>
</tr>
<tr>
<td>NOK generic</td>
<td>00FFH</td>
</tr>
<tr>
<td>User defined</td>
<td>0100H-FFFFFH</td>
</tr>
</tbody>
</table>

**Explanation:**

Parameter not exist: The specified parameter does not exist

Control Access denied: The access is denied because of the control status

Attribute Access denied: The parameter attributes do not allow the access

Type value error: The specified type value is incorrect
Destination option not exist: The destination option does not exist at node.

Parameter Access Conflict: The addressed parameter cannot be accessed (for example if the command is write and parameter is connected to an external input).

Value out of the max range: Value is out of the maximum range.

Value out of the min range: Value is out of the minimum range.

Value not supported: Value is in range but not allowed.

Parameter Configuration Conflict: The addressed parameter cannot be accessed for system configuration conflict (for example the order to connect an input source to a parameter that is already connected to an input source).

Command Submitted: Command has been submitted but is not possible to know if it has been executed.

Unknown Command: The command in the order message is not known.

Read only Parameter: The parameter has read only attribute.

Write not allowed: Write operation is not allowed for the slave conditions.

Value out of constant limits: Value is out of constant fixed limits.

State not correct: The control state doesn’t allow the command execution.

Password: The command is not executed because the password is not active.

Type Unknown: The parameter type is not known.

Hardware Fail: The access is denied because of a hardware failure.

Checksum Fail: The access is aborted because of an error in checksum control.

NOK generic: The access is aborted because of an indeterminate error.
The control of the drive virtual digital I/O is carried out through configuration parameter and parameter for control sending.

Please note that in this chapter the virtual digital inputs/outputs are referred to the drive, i.e. in these cases the Master can “Write” the virtual digital inputs and “Read” the virtual digital outputs.

### 8.1. VIRTUAL DIGITAL INPUT

As to the virtual digital input the parameters involved are:

- Parameter index 5EFCh: virtual digital input configuration.
- Parameter index 5EFEh: writing of virtual digital input values.

Parameter 5EFCh: 16-element array Unsigned Int.

This array is used to configure the virtual digital input and shall therefore be written before using these inputs. It contains the drive parameter index assigned to the input. These inputs are then written through the parameter 5EFEh - type Unsigned Int - where the single Bit status indicates the command to be sent to the virtual digital input. Such command has been previously assigned by means of the configuration array.

Example:

The 0 element of the 5EFCh parameter array contains the 2159h parameter index referred to the DV-300 drive, which means **Ramp in** = 0.

The operation is the following: after configuring the 0 element of the 5EFCh parameter with the 2159h parameter index, the DV-300 drive function **Ramp in** = 0 is controlled by the Bit 0 of the 5EFEh parameter.
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8.2. VIRTUAL DIGITAL OUTPUT

As to the virtual digital output the parameters involved are:

- Parameter index 5EFDh: virtual digital output configuration.
- Parameter index 5EFFh: reading of virtual digital output values.

Parameter 5EFDh: 16-element array Unsigned Int.

This array is used to configure the virtual digital output and shall therefore be written before using these outputs. It contains the drive parameter index assigned to the output. These outputs are then controlled through the 5EFFh parameter- type Unsigned Int - where the single Bit status corresponds to the status of the virtual digital output assigned through the configuration array.

Example:

The 0 element of the 5EFDh parameter array contains the 215Ah parameter index referred to the DV-300 drive, which means Ramp+.

The operation is the following: after configuring the 0 element of the 5EFDh parameter with the 215Ah parameter index, the Ramp+ status of the DV-300 drive is read through the Bit 0 of the 5EFFh parameter.

8.2.1. Virtual digital output descriptors

The 5EFDh parameter is used for the virtual digital output configuration and can be written/read by single element.

<table>
<thead>
<tr>
<th>OBJECT ATTRIBUTE</th>
<th>VALUE</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>5EFDh</td>
<td>Virtual digital output configuration</td>
</tr>
<tr>
<td>Number of elements</td>
<td>16</td>
<td>16 virtual digital output channels</td>
</tr>
<tr>
<td>Type</td>
<td>6</td>
<td>Unsigned16</td>
</tr>
<tr>
<td>Password</td>
<td>0</td>
<td>Non-Existing</td>
</tr>
<tr>
<td>Access group</td>
<td>0</td>
<td>Non-Existing</td>
</tr>
<tr>
<td>Access rights</td>
<td>--</td>
<td>Read-All, Write-All</td>
</tr>
<tr>
<td>Local Address</td>
<td>XXXX</td>
<td>Manufacturer specific</td>
</tr>
</tbody>
</table>
The \texttt{5EFFh} parameter is used to read the virtual digital output previously configured; the single Bit status corresponds to the status of the virtual digital output assigned to the Bit during the configuration.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|l|}
\hline
\textbf{OBJECT ATTRIBUTE} & \textbf{VALUE} & \textbf{MEANING} \\
\hline
Index & 5EFFh & Value (present status) of the virtual digital output \\
\hline
Data type index & 2159 & The single Bit status corresponds to the virtual digital output status assigned to it \\
\hline
Length & 2 & 2 Bytes \\
\hline
Password & 0 & Non-Existing \\
\hline
Access group & 0 & Non-Existing \\
\hline
Access rights & -- & Read-All \\
\hline
Local address & XXXX & Manufacturer specific \\
\hline
\end{tabular}
\end{table}

8.3. EXAMPLE OF SETTING FOR VIRTUAL DIGITAL I/O CONFIGURATION DATA FRAME

Example No. 1:

The \texttt{Ramp in = 0} parameter of the GE DV-300 drive must be assign to the channel No. 0 of the virtual digital input; such parameter has the index 2159h.

The initial conditions are the following:
1) Parameter index of virtual digital input configuration: \texttt{SEFCh}.
2) Virtual digital input channel to be configured: 2.
3) DV-300 drive parameter index corresponding to \texttt{Ramp in = 0}: 2159h.

\begin{center}
\begin{tabular}{cccccccc}
XX & FCh & 5Eh & 02h & 59h & 21h & XX & XX \\
\end{tabular}
\end{center}

\begin{align*}
\text{No meaning} & \\
\text{Drive parameter index to be assigned to the digital Input} & \\
\text{Digital input channel involved in the operation} & \\
\text{Parameter index of digital input configuration} & \\
\text{Control Byte} & \\
& (\text{See Par. 3 1})
\end{align*}
Example No. 2:

The **Ramp+** parameter of the GE DV-300 drive must be assigned to the channel No. 0 of the virtual digital output; such parameter has the index 215Ah.

The initial conditions are the following:
1. Parameter index of virtual digital output configuration: 5EFDh.
2. Virtual digital output channel to be configured: 0.
3. DV-300 drive parameter index corresponding to **Ramp+**: 215Ah.

<table>
<thead>
<tr>
<th>XX</th>
<th>FDh</th>
<th>5Eh</th>
<th>00h</th>
<th>5Ah</th>
<th>21h</th>
<th>XX</th>
<th>XX</th>
</tr>
</thead>
</table>

| No meaning |
| Drive parameter index to be assigned to the digital output |
| Digital output channel involved in the operation |
| Parameter index of digital output configuration |
| Control Byte (See Par. 3.1) |
9. GLOSSARY

Master. PLC or PC device controlling the Profibus-DP; it has the right to access the Bus.

Slave. Drive or Input/Output modules without rights to access the Bus.

Process Data Channel. Channel for the fast, cyclic and high-priority data transfer of parameters previously configured.

Configuration Channel. Channel for the non-cyclic and low-priority data transfer used, for instance, for the drive configuration.
10. IDENTIFICATION CODES

10.1. DRIVE IDENTIFICATION NUMBER

The PROFIBUS-DP protocol requires an identification number for every kind of devices that can be connected to the Bus.

The identification number assigned to the GE drives by the Profibus Nutzerorganisation is the following:

\[
\begin{array}{l}
009Ah \text{ hexadecimal corresponding to } 154 \text{ decimal}
\end{array}
\]

10.2. CARD CONFIGURATION CODES

The Profibus-DP interface card does not require user parameter data.

The configuration data consist of 2 Bytes made up as follows:

<table>
<thead>
<tr>
<th>BYTE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>183 - B7</td>
</tr>
<tr>
<td>2</td>
<td>183 - B7</td>
</tr>
</tbody>
</table>

For the meaning of these bytes please refer to the paragraph 8.3.5 of the “Draft Standard PROFIBUS -DP DIN 19245 Part 3” manual.

10.3. DATA TYPE DISKETTE

This diskette contains the type files suitable for the Profibus-DP network configurator.

The files contained in the TYPEFILE directory have to be copied in the directory where the configurator program is installed.

The file contained in the WINCOM directory has to be copied in the directory where the configurator for WINDOWSTM environment is installed.
11. ABBREVIATIONS

- **PDC**  Process Data Channel.
- **DP**   Decentralized Peripherals.
12. REFERENCES


3 - DGFC option manuals.

4 - AV-300, DV-300.

5 - DRIPRO Profibus-DP/FMS mit DRIVECOM-Profilen. Dokumentation Ver 1.1. Issue By IAM Proj.-Nr. 045442015.