

# Option for U-Drive

# **Profibus-DP**

Operating Manual and Set-up Instructions

Valid only for item No.: 78345-0601-0F

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## 1. Safety Information

### 1.1 Info

The Profibus communication is an accessory unit for the U-Drive unit series. It is therefore subject to the same safety conditions. When commissioning a control unit, it is absolutely mandatory that the relevant Operating Instructions be used. These Profibus Operating Instructions are no replacement for the proper one.

#### Relevant Operating Instructions:

- [1] „U-Drive series TA-U...“ Commissioning and Set-up Instructions from TAE
- [2] PC user software “U-Drivemanager”
- [3] Profibus, Profibus profile, profile for speed-variable drives, PROFIDRIVE Order No. from Profibus user organisation.

In principle, electronic devices are not failure-proof. The user is responsible for ensuring that the drive unit is maintained in a safe condition in the event of a device failure.

### 1.2 Specifications and regulations

Please observe the general installation information for electrical installations:

- VDE0100 Specification for the installation of power systems with a nominal voltage of up to 1000V.
- VDE0113 Specification for electrical equipment on machining and processing systems.
- VDE0160 Equipping power systems with electronic devices.

If the control unit is used in special areas of application, then the required Accident Prevention Guidelines and standards must be observed.

## 2. General

Following production, all units undergo a full functional test as well as a 200 hour endurance test. These units are subjected to another complete functional test prior to delivery.

These measures are used to ensure that only perfect units are shipped out to customers.

Under normal circumstances no malfunctions are expected, provided the drive dimensioning is correct and the information contained in the Operating Instructions are followed. However, if a defect should be discovered, please contact one of our representatives or get in touch with us directly.

### 2.1 Target group

These Operating Instructions are directed at the user with the appropriate qualification to ensure this unit is handled properly and professionally.

## **2.2 Liability**

The user should not attempt to rectify any faults within the unit. Non-authorised interventions will lead to all guarantee claims against TAE becoming null and void.

User intervention, e.g. for repair purposes, lead to an exclusion of all liability on behalf of TAE.

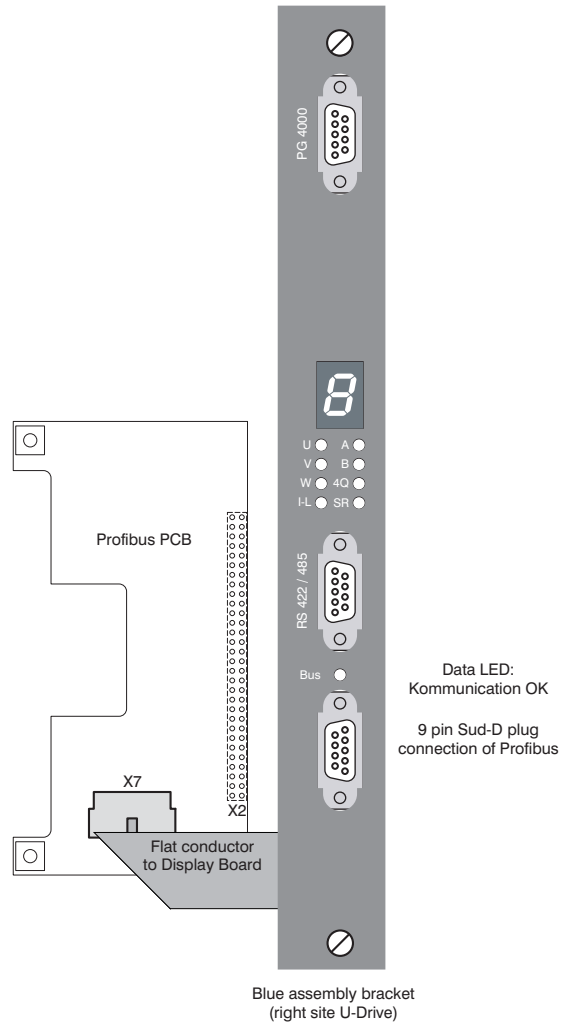
If you have any doubts concerning the cause of the fault or its rectification, please notify TAE, to avoid further damages.

## 2.3 Identification

The Profibus board is an expansion board which is used for U-Drives TA-U...

Item number of the Profibus optional board:

78345-0601-0F Profibus



## 3. Product description

### 3.1 Introduction

The PROFIBUS field bus standard, EN 50170, covers a wide range of applications within automation technology, and ranges from the control and command level to the field level. For use with the speed-variable U-Drives, only one subset is required, namely the special profile for speed-variable drives. This special Profibus profile was approved by Expert Committee 5 (Profidrive) of the Profibus Nutzerorganisation e.V. (Profibus User Organisation) in September 1997 and is based on the Profibus-DP protocol.

### 3.2 Purpose of application

The options board makes it possible to interlink the U-Drive control unit with a Profibus-DP network. Control units can be controlled and programmed with the help of the option board.

Interfacing to a Profibus-DP network occurs via a 9 core Sub-D jack.

The Profibus option board supports the following functions:

- Transmission speeds from 9.6 kBaud to 12 MBaud
- Changing the transmission speed via the Master (Auto-Baud funktion)
- Freeze and Sync Modes
- Repeater Control Signal

If the options board is addressed a data transfer takes place, then this is displayed by the green “Bus“ LED on the Profibus board.

### 3.3 Description of function

The Profibus options board allows the operation of U-Drive control units on a Profibus-DP communication bus. The entire data exchange between the Profibus board and an external controller is based on Profibus user organisation conventions (Profibus Nutzerorganisation).

Detailed information concerning the profile for speed-variable drives is supplied in Section 1.1, Item[3].

A total of five various PPO types (PPO = Parameter - Process data - Objects) has been defined by the Profibus user organisation. PPO types 1 to 5 are supported.

The best type for you to use depends on the available address range (e.g. the SPC), the maximum permitted cycle times, the number of stations and naturally your control concept.

With all PPO types, the control word (STW), the main rated value (HSW), the status word (STW) and the main actual value (HIW) are transmitted with every cycle. This data is also called

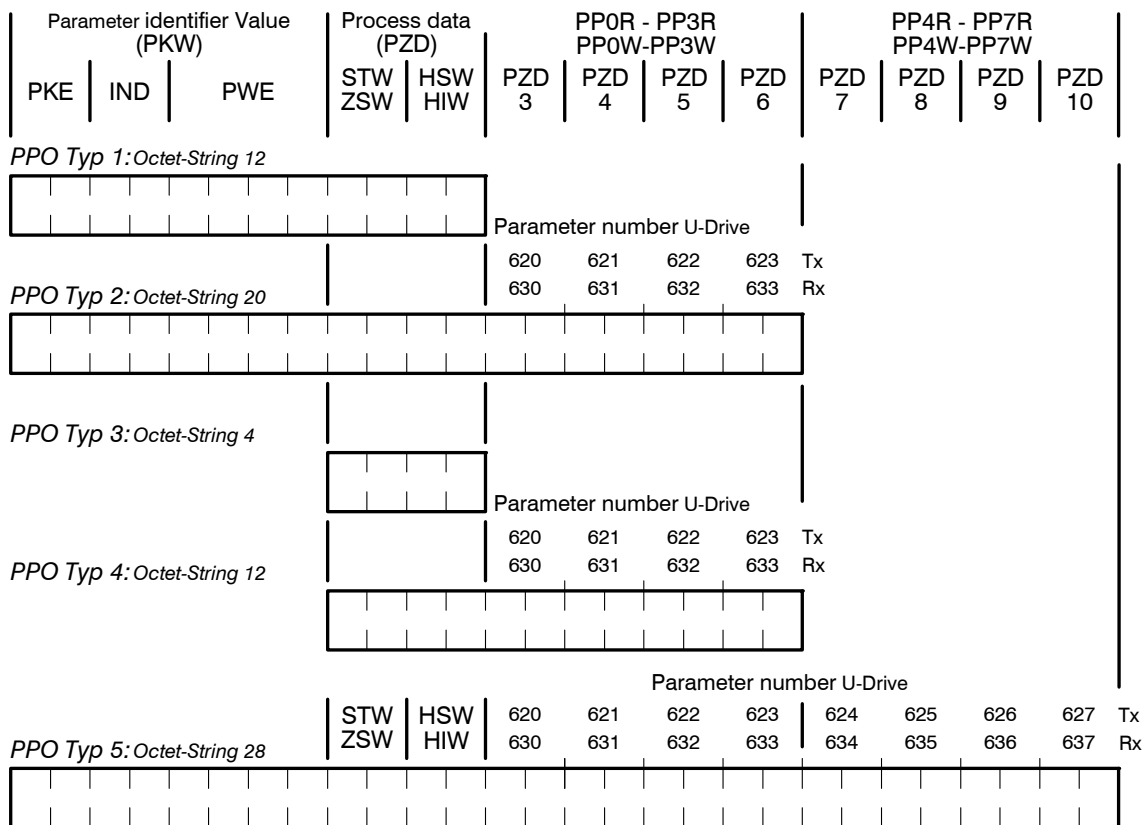
the Process Data (PZD). The process data is used to control the drive. Every word has a length of 16 bits = 2 Bytes.

In PPO types 1, 2 and 5, four additional words are also transmitted which are used for programming. These are the parameter identifier (PKE), the subindex (IND) and the parameter value (PWE). The parameter identifier (PKE) establishes which action is to be performed (z.B. read or write parameters) and which parameter (parameter number) is involved. This data is known as the Parameter Identifier Values (PKW).

Type 3 and 4 PPO are strictly process data objects (PZDO) for applications that will not work without cyclic parameter editing.

The parameter identifier value (PKW) is used for parameterisation and for reading off actual parameter values. This can also take place on-line during the operation.

In type 2, 4 and 5 PPO, the process data (PZD) is also transferred to and from the drive. In PPO types 2 and 4, the process data are transmitted via Tx PDO1/ Rx PDO1 to Tx PDO4/ Rx PDO4 and via Tx PDO1/ Rx PDO1 to Tx PDO8/ Rx PDO8 in process type 5.



- PKW:* Parameter Identifier Value
- PZD:* Process data
- PKE:* Parameter identifier (1st and 2nd Octet)
- IND:* Subindex (3. Octet), 4. Octet ist reserviert
- PWE:* Parameter value (5th to 8th Octet)
- STW:* Control word
- ZSW:* Status word
- HSW:* Main rated value
- HIW:* Main actual value





The following table shows the assigned control word (STW) and the status word (ZSW), which form process data (PZD) together with the main set point (HSW) and the main actual value (HIW).

**Control word: (STW) Parameter 611**

| Bit   | Description            | Comment                           |
|-------|------------------------|-----------------------------------|
| 0     | On                     | 0: Stop                           |
| 1     | N_AUS2                 | not supported, must be 1          |
| 2     | N_AUS3                 | not supported, must be 1          |
| 3     | Enable operation       | 0: Run down as programmed         |
| 4     | restrict_N_HLG         | 0: Set ramp generator output to 0 |
| 5     | stop_N_HLG             | not supported, must be 1          |
| 6     | Approve set point      | 0: Set ramp generator output to 0 |
| 7     | Acknowledge            | Fault, reset                      |
| 8     | Inching 1              | Speed Preset 1                    |
| 9     | Inching 2              | Speed Preset 2                    |
| 10    | Controlled by Profibus | 1: Controlled by Profibus         |
| 11-15 | not in use             |                                   |

**Status word (ZSW) Parameter 612**

| Bit   | Description                                  | Comment  |
|-------|--|--|
| 0     | Unit is ready to switch on                   | Electronic voltage present                     |
| 1     | Unit is ready to operate                     | Intermediate circuit loaded                    |
| 2     | Approve operation                            | Approve final stage                            |
| 3     | Error  | 0: no fault                                    |
| 4     | No AUS2                                      | not in use                                     |
| 5     | No AUS3                                      | not in use                                     |
| 6     | Start-up lock-out                            | not in use                                     |
| 7     | Warning                                      | 0: no warning                                  |
| 8     | $n_{soll}/n_{ist}$ is within tolerance range | within tolerance range                         |
| 9     | Controlled through Profibus                  | 0: Operation via control terminals             |
| 10    | Req'd speed attained                         | 0: Actual speed does not match set point speed |
| 11-15 | not in use                                   |  |

The structure of the Parameter Identifier Value, which is used for parameterisation via the Profibus, is described below.

The parameter identifier value (PKW) is derived from the job or response identifier (AK) and the parameter number (PNU). The job identifier identifies the action to be performed, e.g. read or write parameters, and the parameter number of the Profibus parameter number for the parameter. A list of all parameter numbers can be found in the Operating Manual and Set-up Instructions of the TA-U-drive.

The following is a listing of common job identifiers and list of possible error identifiers in the event of incorrect transmission that would be indicated in the event of a fault instead of the parameter value (PWE).

**Job identifier**

| Job Identifier | Function          | Response identifier |          |
|----------------|-------------------|---------------------|----------|
|                |                   | Positive            | Negative |
| 1              | Request parameter | 1                   | 7        |
| 2              | change parameter  | 1                   | 7        |

**Response identifier in an event of a fault (Message during PWE)**

| Error no. | Cause of error   |
|-----------|--|
| 0         | unauthorised parameter number (PNU)                            |
| 12        | Access not permitted, incorrect password for access to Group 5 |
| 103       | Request not supported  |

#### 4. Commissioning of the Profibus options board

The device address for the Profibus adapter must be manually set using the “PG4000” Operator unit or the “U-Drive Manager” PC operator software within the parameter 600 (Device-ID) of the U-Drive control unit. The Master is now notified that there is a new participant on the Profibus. The GSD file must be installed to operate the Profibus board.

The GSD file is a driver file containing information about the Profibus adapter. Bei der GSD-Datei handelt es sich um ein Treiberfile mit Informationen über den Profibus-Adapter.

You can obtain the GSD file from the Internet via our Homepage

You must now decide upon one of the types of Parameter - Process data - Object (PPO) types 1 to 5 (also refer to Section 3.3, Description of function). The Master will then be able to communicate with the control unit. The green “Bus LED” will signalise a proper exchange of data.