37487A

Option K28
Data Mapping CAN Bus To Profibus

Brief Manual
MFR 300

Manual 37487A

WARNING

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

The engine, turbine, or other type of prime mover should be equipped with an overspeed (overtemperature, or overpressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

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Important definitions

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in damage to equipment.

NOTE

Provides other helpful information that does not fall under the warning or caution categories.

Revision History

Rev.	Date	Editor	Changes
NEW	10-03-25	TE	Release
A	10-07-01	TE	Minor changes (new parameter default values added)

Content

Figures and Tables

Figures

Tables

Chapter 1.
Introduction

The MFR 300 Option K28 includes following function:

- **Data mapping CAN bus to Profibus**

To establish an easy conversion from CAN bus to Profibus via an external converter, a special protocol was implemented

The MFR 300 Option K28 replaces the following points compared to a standard MFR 300:

- The described CAN messages (MFR 300 Manual 37396 – Appendix A. Interface – CAN bus MFR 300) will be no longer supported.
- They are replaced by 20 cyclical CAN messages on the CAN IDs 385 to 404.
- Some parameter default values are different compared to the standard MFR 300.

This CAN arrangement was developed for every CAN layer 2 converters, but was especially tested with Helmholz DP/CAN Coupler (Profibus DP to CAN-Bus Coupler - 700-651-CAN01). All following descriptions relate to the Helmholz DP/CAN Coupler.

The CAN default settings of the MFR 300 is already adapted to the Helmholz converter.

Chapter 2.
Data Mapping CAN Bus To Profibus

The following figure shows an example of a basic application which can be established with the MFR 300 Option K28.

Figure 2-1: Example of basic application

The MFR 300 Option K28 sends out the data on 20 different IDs. Each ID contains 8 byte data and has a cycle time of 100 ms. The description of the sent data can be found in the MFR 300 manual.

Profibus Data Telegram 4650

The content of the CAN messages are described in the following table. This data will be mirrored on the Profibus memory space by the Helmholz converter.

Offset in Profibus (bytes)	Data Type	Description	Multiplier (to multiply the received value with)	Unit
0	UINT16	Protocol-ID, always 4650	1	
2	UINT16	Voltage L1-N This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1% of the PT primary Voltage (delta) have to be considered as zero.	PT Primary Voltage(delta) / 4000	V
4	UINT16	Voltage L2-N This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1% of the PT primary Voltage (delta) have to be considered as zero.	PT Primary Voltage(delta) / 4000	V
6	UINT16	Voltage L3-N This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1% of the PT primary Voltage (delta) have to be considered as zero.	PT Primary Voltage(delta) / 4000	V
8	INT16	Total Power This value is calculated new after every Voltage cycle of each phase. It is not filtered. If the Voltage (delta) is lower than 1.5% of the PT primary Voltage, the Power value has to be considered as zero.	PT Primary Voltage * CT primary / 1616.58	W
10	INT16	Total Reactive Power This value is calculated new after every Voltage cycle of each phase. It is not filtered. If the Voltage (delta) is lower than 1.5% of the PT primary Voltage, the Reactive Power value has to be considered as zero.	PT Primary Voltage * CT primary / 1616.58	var
12	UINT16	Voltage L1-L2 This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1.5% of the PT primary Voltage have to be considered as zero.	PT Primary Voltage / 4000	V

Offset in Profibus (bytes)	Data Type	Description	Multiplier (to multiply the received value with)	Unit
14	UINT16	Voltage L2-L3 This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1.5% of the PT primary Voltage have to be considered as zero.	PT Primary Voltage / 4000	V
16	UINT16	Voltage L3-L1 This value is calculated new after every Voltage cycle. It is not filtered. Values smaller than 1.5% of the PT primary Voltage have to be considered as zero.	PT Primary Voltage / 4000	V
18	UINT16	Current L1 This value is calculated new after every Voltage cycle. It is not filtered.	CT primary Current / 5000	A
20	UINT16	Current L2 This value is calculated new after every Voltage cycle. It is not filtered.	CT primary Current / 5000	A
22	UINT16	Current L3 This value is calculated new after every Voltage cycle. It is not filtered.	CT primary Current / 5000	A
24	INT16	Angle Wye Voltage L1-L2	0.1	°
26	INT16	Angle Wye Voltage L2-L3	0.1	°
28	INT16	Angle Wye Voltage L3-L1	0.1	°
30	INT16	Total Power Factor. Positive:lagging; Negative leading	0.001	
32	INT16	Power Factor L1. Positive:lagging; Negative leading	0.001	
34	INT16	Power Factor L2. Positive:lagging; Negative leading	0.001	
36	INT16	Power Factor L3. Positive:lagging; Negative leading	0.001	
38	INT16	Frequency	0.01	Hz
40	UINT16	Overfreq. 1 latched	Mask: 8000h	Bit
		Overfreq. 2 latched	Mask: 4000h	Bit
		Underfreq. 1 latched	Mask: 2000h	Bit
		Underfreq. 2 latched	Mask: 1000h	Bit
		Overvolt. 1 latched	Mask: 0800h	Bit
		Overvolt. 2 latched	Mask: 0400h	Bit
		Undervolt. 1 latched	Mask: 0200h	Bit
		Undervolt. 2 latched	Mask: 0100h	Bit
		Reserved	Mask: 0080h	Bit
		Reserved	Mask: 0040h	Bit
		Reserved	Mask: 0020h	Bit
		Load Underrun 1 latched	Mask: 0010h	Bit
		Load Underrun 2 latched	Mask: 0008h	Bit
		Load Overrun 1 latched	Mask: 0004h	Bit
		Load Overrun 2 latched	Mask: 0002h	Bit
		Reserved	Mask: 0001h	Bit
42	UINT16	Unbalanced Load 1 latched	Mask: 8000h	Bit
		Unbalanced Load 2 latched	Mask: 4000h	Bit
		Asymmetry latched	Mask: 2000h	Bit
		Reserved	Mask: 1000h	Bit
		Reserved	Mask: 0800h	Bit
		Reserved	Mask: 0400h	Bit
		Reserved	Mask: 0200h	Bit
		Reserved	Mask: 0100h	Bit
		Reserved	Mask: 0080h	Bit
		Reserved	Mask: 0040h	Bit
		Reserved	Mask: 0020h	Bit
		Reserved	Mask: 0010h	Bit
		Reserved	Mask: 0008h	Bit
		Reserved	Mask: 0004h	Bit

Offset in Profibus (bytes)	Data Type	Description	Multiplier (to multiply the received value with)	Unit
		Reserved	Mask: 0002h	Bit
		Reserved	Mask: 0001h	Bit
44	UINT16	Reserved	Mask: 8000h	Bit
		Reserved	Mask: 4000h	Bit
		Reserved	Mask: 2000h	Bit
		Reserved	Mask: 1000h	Bit
		Reserved	Mask: 0800h	Bit
		Reserved	Mask: 0400h	Bit
		Reserved	Mask: 0200h	Bit
		Reserved	Mask: 0100h	Bit
		Phase-Shift latched	Mask: 0080h	Bit
		Reserved	Mask: 0040h	Bit
		Reserved	Mask: 0020h	Bit
		Reserved	Mask: 0010h	Bit
		Reserved	Mask: 0008h	Bit
		Reserved	Mask: 0004h	Bit
		Reserved	Mask: 0002h	Bit
		Reserved	Mask: 0001h	Bit
46	UINT16	Reserved	Mask: 8000h	Bit
		Reserved	Mask: 4000h	Bit
		Reserved	Mask: 2000h	Bit
		Reserved	Mask: 1000h	Bit
		Reserved	Mask: 0800h	Bit
		Reserved	Mask: 0400h	Bit
		Reserved	Mask: 0200h	Bit
		Reserved	Mask: 0100h	Bit
		df/dt latched	Mask: 0080h	Bit
		Reserved	Mask: 0040h	Bit
		Time Dependant Undervoltage 1	Mask: 0020h	Bit
		Time Dependant Undervoltage 2	Mask: 0010h	Bit
		Reserved	Mask: 0008h	Bit
		Reserved	Mask: 0004h	Bit
		Reserved	Mask: 0002h	Bit
		Reserved	Mask: 0001h	Bit
48	INT32	Average Wye-Voltage	0.1	V
52	INT32	Average Delta-Voltage	0.1	V
56	INT32	Total Power	1	W
60	INT32	Total Reactive Power	1	var
64	INT32	Total Apparent Power	1	VA
68	INT32	Voltage L1-L2	0.1	V
72	INT32	Voltage L2-L3	0.1	V
76	INT32	Voltage L3-L1	0.1	V
80	INT32	Voltage L1-N	0.1	V
84	INT32	Voltage L2-N	0.1	V
88	INT32	Voltage L3-N	0.1	V
92	INT32	Current L1	0.001	A
96	INT32	Current L2	0.001	A
100	INT32	Current L3	0.001	A
104	INT32	Positive Energy	0,1	kWh
108	INT32	Negative Energy	-0,1	kWh
112	INT32	Positive Reactive Energy	0.1	kvarh
116	INT32	Negative Reactive Energy	-0.1	kvarh
120	INT32	Power L1	1	W
124	INT32	Power L2	1	W
128	INT32	Power L3	1	W
132	INT32	Reactive Power L1	1	var

Offset in Profibus (bytes)	Data Type	Description	Multiplier (to multiply the received value with)	Unit
136	INT32	Reactive Power L2	1	var
140	INT32	Reactive Power L3	1	var
144	INT32	Apparent Power L1	1	VA
148	INT32	Apparent Power L2	1	VA
152	INT32	Apparent Power L3	1	VA
156	UINT16	Relay 1 active	Mask: 8000h	Bit
		Relay 2 active	Mask: 4000h	Bit
		Relay 3 active	Mask: 2000h	Bit
		Relay 4 active	Mask: 1000h	Bit
		Relay 5 active	Mask: 0800h	Bit
		Reserved	Mask: 0400h	Bit
		Reserved	Mask: 0200h	Bit
		Reserved	Mask: 0100h	Bit
		Reserved	Mask: 0080h	Bit
		Reserved	Mask: 0040h	Bit
		Reserved	Mask: 0020h	Bit
		Reserved	Mask: 0010h	Bit
		Reserved	Mask: 0008h	Bit
		Reserved	Mask: 0004h	Bit
		Reserved	Mask: 0002h	Bit
		LED 1 active	Mask: 0001h	Bit
158	UINT16	Free running cyclical counter (10msec) for connection test	1	

Table 2-1: Profibus data telegram 4650

Chapter 3.
Configuration Helmholz DP/CAN Coupler

Please consider the basic configuration of the Helmholz converter:

- Select the correct GSD file.
- Set CAN baud rate to the same baud rate like configured in the MFR 300.The default setting is 1 MBaud.
- Configure 20 receive objects for CAN IDs 385 to 404. Each should have 8 Bytes data length.

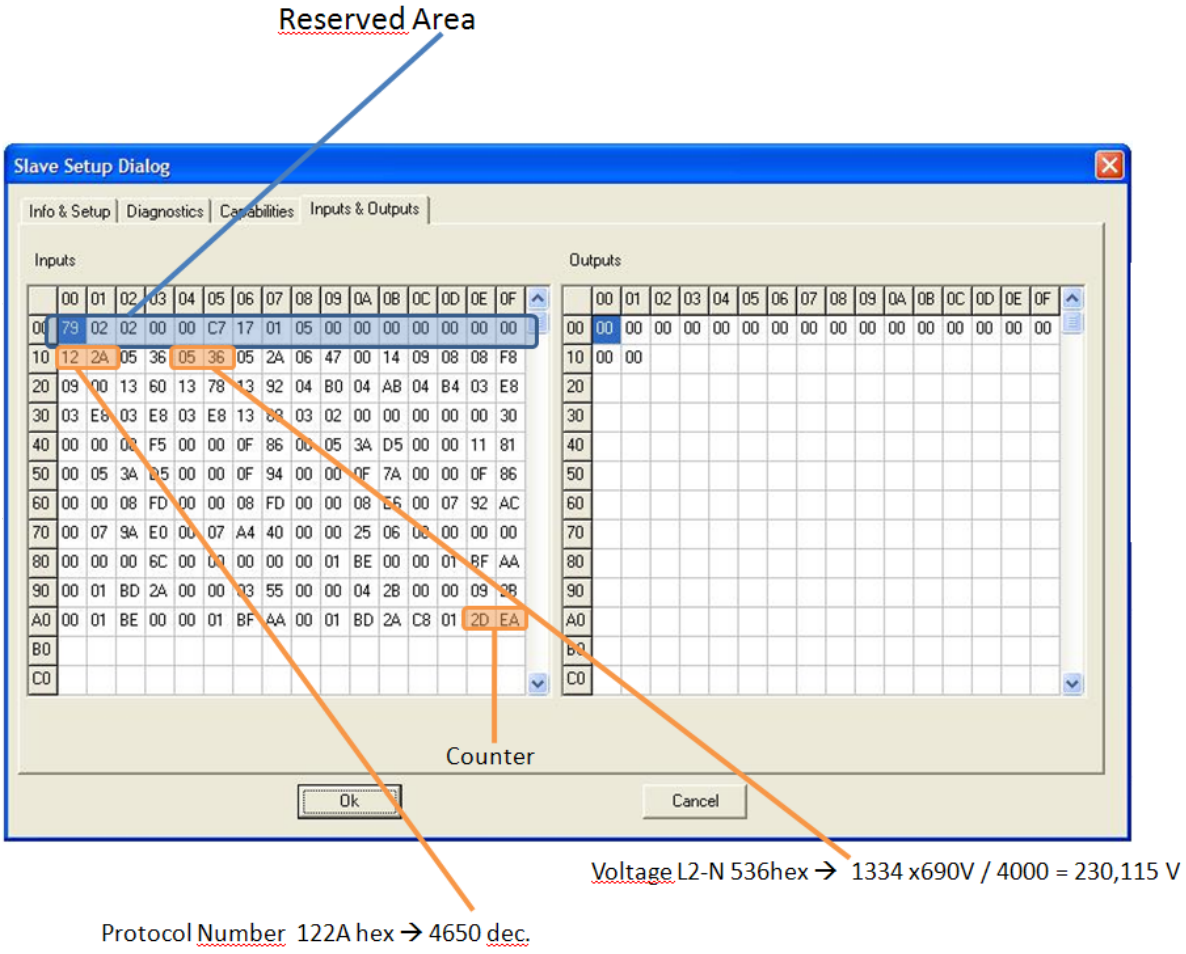

Figure 3-1: Profibus data mapping

This figure shows the Profibus mapping (Helmholz) of the MFR 300 data. The data starts at address 10 hex (16dec). The 16 bit data words are in big endian format (high byte / low byte). The first 16 bytes (starting with address 0) are for internal purposes of the Helmholz converter and can be discarded.

For further configuration please consult the Helmholz DP/CAN Coupler (Profibus DP to CAN-Bus Coupler - 700-651-CAN01) documentation which can be found on the Helmholz website (www.helmholz.de).

Chapter 4.
Parameter Default Values

The following parameter default values are different compared to the MFR 300 standard manual.

ID	Name	Default Value
1750	Rated system frequency	60 Hz
1754	Rated current	2330 A
1752	Rated active power	2500.0 kW
1806	Current transformer	2500/5 A
1808	Current transformer	2500/1 A
1904	Overfrequency threshold (limit 1)	103.0 %
1905	Overfrequency delay (limit 1)	05.00 s
1910	Overfrequency threshold (limit 2)	105.0 %
1911	Overfrequency delay (limit 2)	00.50 s
1954	Underfrequency threshold (limit 1)	97.0 %
1960	Underfrequency threshold (limit 2)	95.0 %
2004	Overvoltage threshold (limit 1)	107.0 %
2010	Overvoltage threshold (limit 2)	110.0 %
2011	Overvoltage delay (limit 2)	00.50 s
2054	Undervoltage threshold (limit 1)	93.0 %
2060	Undervoltage threshold (limit 2)	90.0 %
2061	Undervoltage delay	00.50 s
2304	Load overrun threshold (limit 1)	110.0 %
2305	Load overrun delay (limit 1)	10.00 s
2310	Load overrun threshold (limit 2)	115.0 %
2311	Load overrun delay (limit 2)	00.30 s
2307	Load overrun relay (limit 2)	Relay 4
3105	df/dt delay	0.30 s

Table 4-1: Parameter default values

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