

Technical Description
REOVIB MFS 268 –DP-12M Baud

Profibus -DP Programming

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REOVIB

Steuergeräte für die Vibrationszführtechnik

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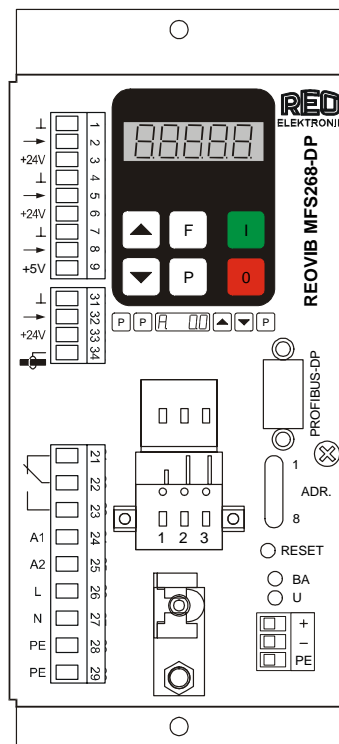
1.0 General

The REOVIB MFS 268 range of frequency inverters for vibratory feeders can operate with a PROFIBUS_DP interface as a PROFIBUS-DP slave.

In normal operation the set point, for the feeder throughput, can be sent from a PLC to the controller and the unit ready/fault status signals are fed back. In an additional, parameter mode the unit can be configured over the PROFIBUS. An external power supply of 24 VDC is required for the interface

The units are available as housed or panel mounted versions.

The required GSD File is provided at the time of delivery.



The interface enables communication with the frequency inverter, using 3 data words (i.e. 16 Bits). The three 16 Bit words are transmitted and acknowledged every bus cycle.

! Important – Data consistence is required to operate with Profibus Master !

Note: Data consistence is defined in a Siemens S7 PLC with SFC14 and SFC15, for example

Units are factory set prior to delivery and so are configured for bus operation.

Should the unit be required for manual control then the parameter S.I.F. in menu C 017 should be set = "0". This must be reset back to S.I.F. = "1" for bus operation.

2.0 Technical Data for Profibus Interface

Bus Power Supply	24 V, DC (20..30 V), 200 mA
Bus connector for Panel mounting version	DB 9
Supported baud rates	9,6 / 19,2 / 93,7 / 187,5 / 500 / 1,5 / 3 / 6 /12 Mbaud (REOX6662.GSD)
Communication	Data consistence
Protocol	DP
Bus Power Supply	24 V, DC (20..30 V), 200 mA

3.0 GSD-File

The following GSD file is required for Profibus interfacing

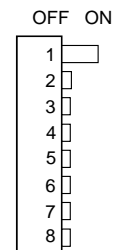
GSD File Name	REOX6662.GSD
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The GSD file is supplied on 3.5" Floppy disk with each unit or alternatively, visit www.reo.de to download the file from the REO website

4.0 Addressing

The bus address setting is made using the DIP switches in the front panel. Addresses are in HEX	1	Address bit 0
	2	Address bit 1
	3	Address bit 2
	4	Address bit 3
	5	Address bit 4
	6	Address bit 5
	7	Address bit 6
	8	Reserved

Address-switch



5.0 Bus Operating Mode

Two fundamental operating modes can be chosen for bus communication.

Normal Operation: Control of the frequency controller in production, in which case the Set point and ON/OFF control signals are transmitted

Parameter Operation: Adjustment of the frequency controller for the desired operation mode and limits. In a special mode the parameter and parameter addresses are transmitted and acknowledged.
 In parameter operation, the unit's specific values, such as frequency, soft start time, timers and switching etc, are set.

5.1 Programming for Bus operation

In normal operation the set points for output voltage and current limit and the digital control signals, such as enable are set across the interface. The actual voltage/current values and unit status (ready or fault) are fed back.

All data words are within the range 0...FFFF H

The following communication words are given in bit form

5.1.1 Send to Controller

H-Byte								L-Byte								Word 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Sollwert 1, 16-Bit 100 % = FFFF H
H-Byte								L-Byte								Word 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Reserviert
H-Byte								L-Byte								Word 3
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Control - word
Mode bit																Bit = „1“ = Function ON
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	All unused bits MUST be set to `0`
	Control information (unit specific)															

0 = Normal operation
 1 = Parameter operation

Enable - bit

5.1.2 Reply from Controller

H-Byte								L-Byte								Word 1 (only in regulation mode)
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Feed back actual acceleration 16 Bit 100% = 8000H
H-Byte								L-Byte								Word 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Feed back actual output current, 16 Bit 100% = 8000H (in % von I-nom.)
H-Byte								L-Byte								Word 3
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status - Word
Status – code ERROR code																X = Not defined
								×	×	×	OFF	×	×	×	×	Bit = „1“ = Function ON
								Status information Unit specific								

- 00 Unit not responding
- A5 (H) Unit Ready
- 57 (H) ERROR Peak
- 58 (H) ERROR OC
- 02 (H) ERROR OL
- 0C (H) ERROR ACC
- 05 (H) ERROR OU
- C0 (H) Acknowledge
Parameter mode

OFF - Bit
 Acknowledge

Status, actual acceleration and actual output current are received.

5.2 Parameter Operation

In parameter operation, the specific unit parameters can be monitored and adjusted. A `write` enable must be transmitted before parameters can be altered. On closing, the `write` enable must be cancelled.

A `read` request must be sent before data can be read.

Word 3 in the acknowledge is always `CODE H`. This indicates that the controller is in parameter mode.

5.2.1 Creating parameter address's and values

In parameter operation the most significant bit (msb) in Word 1 is defined as a read or write bit (R/W), where 1 = write and 0 = read, this should be accompanied by the corresponding parameter address.

The mode bit (msb in Word 3) is used to select normal or parameter operation, 0 = Normal or 1 = Parameter operation.

Word 1:	R / W – Bit + Address	e.g. 8000 H + 1009 H => 9009 H
Word 2:	Value of the parameters.	e.g. 7FFF H
Word 3:	Mode bit = 1 + Control bit's	e.g. 8000 H + 0004 H => 9004 H

For bit orientated parameters, ONLY those bits relating to the required function may be changed, all other bits MUST remain unaltered, otherwise factory specific settings may be inadvertently altered!

Procedure for changing bit parameters:-

1. Select parameter value
2. Change only the required bit (s) in the selected parameter
3. Send `write` enable
4. Send the changed parameters back to the same address
5. Close the `write` enable

5.2.2 Send Write Enable

H-Byte								L-Byte								Word 1 Write Enable Address =C0DE H
C0								DE								
H-Byte								L-Byte								Word 2 Write Enable =B5E7 H
B5								E7								
H-Byte								L-Byte								Word 3 Control - Word + 8000 H
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1 Mode bit																Mode Bit must be set to 1 !! All unused bits must be set to "0" Bit = „1“ = Function ON
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
Control Information unit specific																

5.2.3 Receive, Acknowledge Write Enable

H-Byte								L-Byte								Word 1 C0DE H
C0								DE								
H-Byte								L-Byte								Word 2 B5E7 H
B5								E7								
H-Byte								L-Byte								Word 3 C0DE H
C0								DE								

The parameters can be send after receipt of the acknowledge

5.2.4 Send Parameter

H-Byte								L-Byte								Word 1 Parameter address + R / W – Bit (16-Bit) = 0...FFFF H
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
R / W	<i>Parameter address</i>															
	H-Byte								L-Byte							
XX								XX								
H-Byte								L-Byte								Word 3 Control - Word + 8000H
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1 Mode bit																Mode must be set to `1`! All unused bits must be set to `0` Bit = „1“ = Function ON
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
Control Information (unit specific)																

Received acknowledge

H-Byte								L-Byte								Word 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
R / W	<i>Parameter address</i>															
	H-Byte								L-Byte							
xx								xx								Acknowledge the Parameter value
H-Byte								L-Byte								Word 3
C0								DE								Acknowledge the Parameter mode (always „CODE“ H)

5.2.5 Close write enable

H-Byte								L-Byte								Word 1
C0								DE								Write Enable Address = CODE H
H-Byte								L-Byte								Word 2
00								00								Enable Value 0000
H-Byte								L-Byte								Word 3
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Control Word + 8000 H Mode must be set to `1`! All unused bits must be set to `0` Bit = „1“ = Function ON
Mode bit																
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Steuerinformation (gerätespezifisch)																

5.2.6 Parameter read (send)

H-Byte								L-Byte								Word 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
R / W	<i>Parameter address</i>															
	H-Byte								L-Byte							
00								00								Read Enable Value = 0000
H-Byte								L-Byte								Word 3
80								00								Mode bit = 1 + Control bits

Received parameter

H-Byte								L-Byte								Word 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
R / W	<i>Parameter address</i>															
	H-Byte								L-Byte							
XX								XX								Parameter value
H-Byte								L-Byte								Word 3
C0								DE								Acknowledge Parameter mode

5.2.7 Bit oriented Parameter

Bit information.

Changing individual Bits in a control word.

Each Bit corresponds to a switch that switches a function on or off. In the user program this “Bit manipulation” must be isolated in a table. When necessary more Bits can be changed simultaneously.

Parameter address 1800

H-Byte								L-Byte								Word 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
																Control - Word Bit = „1“ = Function ON Bits not shown <u>must not be altered</u>
			S.P. 2. Setpoint	E. Time out	-SE. Invert Sensor	A.F.C. Autom. Frequency Control	ACC Regulation mode			Pot. External Setpoint	En.C. Hide Menus			4.20 Ext. Setpoint 4...20mA	E.S.P. Ext. Setpoint	

Parameter address 1801

H-Byte								L-Byte								Word 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
																Bit = „1“ = Function ON Bits not shown <u>must not be altered</u>
														-En. enable invert		

Parameter address 1803

H-Byte								L-Byte								Word 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
																Bit = „1“ = Function ON Bits not shown <u>must not be altered</u>
														Stop-Flag		

6.0 Parameter Table

Non listed addresses cannot be altered !

Parameter:	Adjustment	Display-Code	Factory Setting:	Entry Code	Parameter address HEX (.bit)	Value HEX
Vibratory feeder						
• Amplitude (throughput)	0...100 %	A.	0 %	000, 002, 008, 096	100C	0...FFFF H
• Maximum control limit (U_{max})	5...100 %	P.	90 %	096, 008	1009	0CCC...FFFF H
• Vibrating frequency	5...300 Hz	F.	100 Hz	096, 008 040	1005	01F4...7530 H 500...30000 dec. (FL.)...(FH.)
• Soft start ramp up	0...10 sec.	/.	0,1 sec.	096	1013	0...FFFF H
• Soft stop ramp down	0...10 sec..	\.	0,1 sec.	096	1012	0...FFFF H
• Switch to external set point	0 / 1	E.S.P.	0	003	1800.0	0 / 1
• Set point 0(4)...20 mA	0 / 1	4.20	0	003	1800.1	0 / 1
• Potentiometer set point (at 3 / 6 / 8 A units)	0 / 1	POT.	0	003	1800.5	0 / 1
• Coarse / Fine control	0 / 1	S.P.2.	0	003	1800.12	0 / 1
• Invert enable	0 / 1	-En.	0	003	1801.1	0 / 1
Regulation (with sensor)						
• Switch to regulation	0 / 1	ACC.	0	008	1800.15	0 / 1
• P characteristic	0...100	P.A.	40	008	100F	0...FFFF H
• I characteristic	0...100	I.A.	100	008	1014	0...FFFF H
• Automatic frequency control	0 / 1	A.F.C.	0	008	1800.9	0 / 1
• Start automatic frequency search	start	A.F.S.		008		
Track control						
• Switch on time delay	0...60 sec.	I.	1 sec.	007, 167	1003	0...FFFF H
• Switch off time delay	0...60 sec.	O.	1 sec.	007, 167	1002	0...FFFF H
• Invert sensor	PNP / PNP inverse	-SE.	0	007, 167	1800.10	0 / 1
Sensor control						
• Sensor Time-out	0 / 1	E.En	0	015, 167	1800.11	0 / 1
• Sense time delay (Sensor Time-out)	30...240 Sek.	E.	180 sec.	015, 167	1004	0...FFFF H
Interface (option)						
• Interface OFF / ON	0 / 1	S.I.F.	I	017	1801.8	0 / 1
Service						
• ERROR Reset	Reset	CLr.Er.		009	1400	C009 H
• Hide programming menus	0 / 1	Hd.C.		117	1800.4	0 / 1
• Choose user parameter menu Nr. 0...3	0...3	U.S.I.	0	143		
• Save user settings		PUSH.		143		
• Recall factory settings		FAC.		210		
• Choose user parameter menu No. 0...3	0...3	U.S.I.	0	210		
• Recall user parameter		US.PA.		210		
Service limits						
• Open service menu	0 / 1	En.S.	0	127	1803.4	0 / 1
• Show output current (0... 100 %)		i.		040	200A	0...8000 H
• Show active vibration frequency		F.		040	1005	01F4...7530 H
• Current limit	0...100 %	I.	100	040	1016	0...FFFF H
• Min frequency limit	5...150 Hz	F.L:	35	040	1020	01F4...7530 H 500...30000 dec.
• Max frequency limit	5...150 Hz	F.H.	140	040	1021	01F4...7530 H 500...30000 dec.
• Output limited (IN230V-OUT110V)	0 / 1	P.Li.	0	040	1803.5	0 / 1

7.0 Example of bus communication with Frequency controller REOVIB MFS 268

Variable values are shown in *italics*.

7.1 Normal mode

(Set set point to 70 %)

Send Setpoint	Word	Code	send	Code	Received
1		<i>B332 H</i>	Setpoint = 70 %	---	---
2					
3		<i>0004 H</i>	Enable On	<i>A5xx H</i>	Ready

Enable ON, Stop controller (with enable)

Send Setpoint	Word	Code	send	Code	Received
1		<i>B332 H</i>	Setpoint = 70 %	---	---
2					
3		<i>0000 H</i>	Enable OFF	<i>A5xx H</i>	Ready

7.2 Parameter mode

(e.g. set frequency to 50 Hz and soft start to 2 second)

Open Write enable	Word	Code	send	Code	Received
1		<i>C0DE H</i>	Write enable Address	<i>C0DE H</i>	Acknowledge
2		<i>B5E7 H</i>	Write enable value	<i>B5E7 H</i>	Acknowledge
3		<i>8000 H + Control bits</i>	Set mode bit = 1	<i>C0DE H</i>	Acknowledge

Write parameter	Word	Code	send	Code	Received
1		<i>9005 H</i>	Parameter address Vibrating frequency + R / W - Bit	<i>9005 H</i>	Acknowledge
2		<i>1388H</i>	Frequency 50 Hz	<i>1388 H</i>	Acknowledge 50 Hz
3		<i>8000 H + Control bits</i>	Set mode bit = 1	<i>C0DE H</i>	Acknowledge

Write parameter	Word	Code	send	Code	Received
1		<i>9013 H</i>	Parameter address Soft start + R / W - Bit	<i>9013 H</i>	Acknowledge
2		<i>3333 H</i>	Soft start 2 Sec.	<i>3333 H</i>	Acknowledge 2 seconds
3		<i>8000 H + Control bits</i>	Set mode bit = 1	<i>C0DE H</i>	Acknowledge

Close Write enable	Word	Code	Send	Code	Received
1		<i>C0DE H</i>	Write enable Address	<i>C0DE H</i>	Acknowledge
2		<i>0000 H</i>	Write enable Value	<i>0000 H</i>	Acknowledge
3		<i>8000 H + Control bits</i>	Set mode bit = 1	<i>C0DE H</i>	Acknowledge

(read only the Parameter)

Read	Word	Code	send	Code	Received
1		<i>1013 H</i>	Parameter address Soft start	<i>1013 H</i>	Acknowledge
2		<i>0000 H</i>	Read parameter	<i>8000 H</i>	Parameter value (=> 5 seconds)
3		<i>8000 H + Control bits</i>	Set mode bit = 1	<i>C0DE H</i>	Acknowledge Parameter mode

Example of bit parameter change

Read Parameter	Word	Code	send	Code	Received
	1	1801 H	Parameter address	1801 H	Acknowledge
	2	0000 H	Read parameter	0000 H	Parameter value
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	Acknowledge Parameter mode

**Change bit in selected parameter value
 (e.g. Set bit 2 at address 1801 H to „1“, = Enable invert).**

Open Write enable	Word	Code	send	Code	Received
	1	C0DE H	Write Enable Address	C0DE H	Acknowledge
	2	B5E7 H	Write Enable Value	B5E7 H	Acknowledge
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	Acknowledge

Write Parameter	Word	Code	send	Code	Received
	1	9801 H	Parameter address	9801 H	Acknowledge
	2	0002 H	new Parameter	0002 H	Acknowledge
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	Acknowledge

Close Write enable	Word	Code	send	Code	Received
	1	C0DE H	Write Enable Address	C0DE H	Acknowledge
	2	0000 H	Write Enable Value	0000 H	Acknowledge
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	Acknowledge

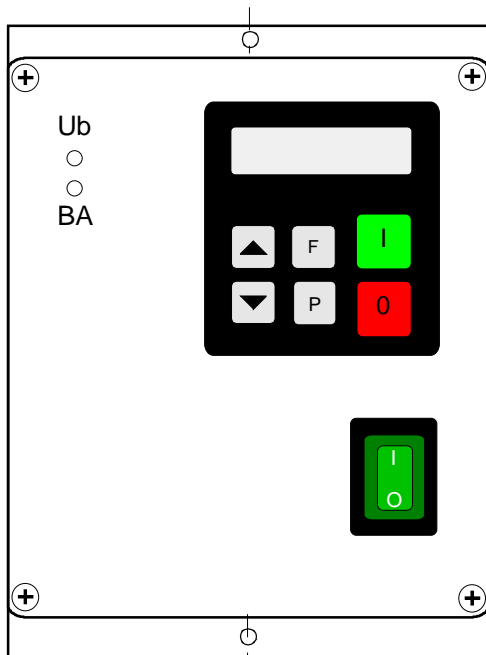
7.3 RESET Controller

Open Write enable	Word	Code	send	Code	received
	1	C0DE H	Write Enable Address	C0DE H	Acknowledge
	2	B5C9 H	Write Enable Value	BC97 H	Acknowledge
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	Acknowledge

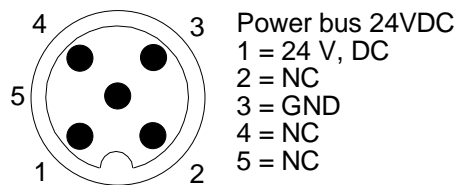
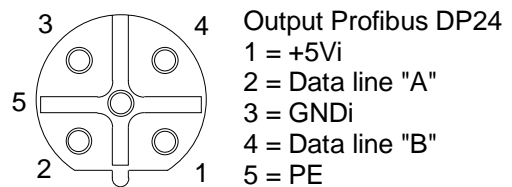
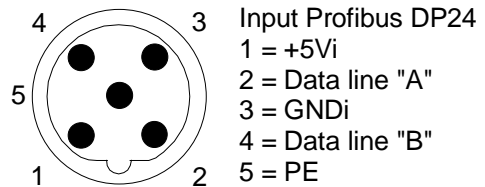
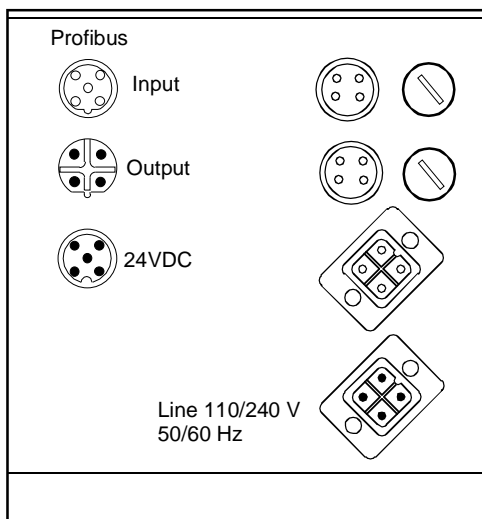
Write Parameter	Word	Code	send	Code	Received
	1	9400 H	Parameter address Reset + R / W - Bit	9400 H	Acknowledge
	2	C009 H	RESET.	C009 H	
	3	8000 H + Control bits	Set mode bit = 1	C0DE H	

Allow approximately 0.5 sec. for RESET

8.0 Connections for enclosed construction



Ub = Power 24VDC
 BA = Bus mode "Bus active"



9.0 Accessories

Component Type	Ordering code Binder	Function
Female Connector B- Code M12	715 299-0436-15-05	Input Profibus
Plug B- Code M12	715 199-0437-115-05	Output Profibus
Female Connector M12	713 299 -0436-57-05	Power 24VDC Profibus