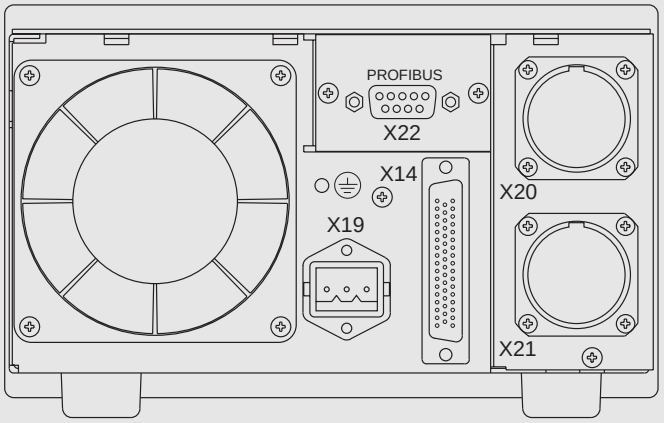
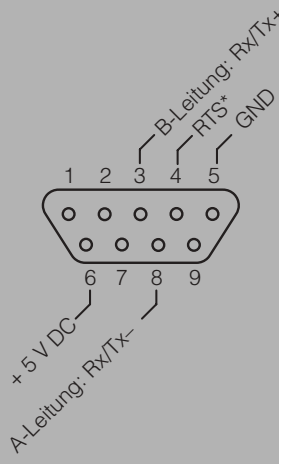
OPERATING INSTRUCTIONS

GA05273_0102





Profibus for MAG.DRIVE*digital*

Part Number

400035V0013

Leybold vacuum

Contents

Installation and operation of the MAG.DRIVE*digital* is described in the Operating Instructions for the pump system, for example GA05141 for the MAG*digital*. Described in these Operating Instructions is only the Profibus interface of the MAG.DRIVE*digital*.

1 Profibus DP

In a Profibus DP system, a difference is made between master and slave units. Here the master units control all traffic. They transmit data to the related slaves and request data from these. It is possible to run one or several masters in a system.

The frequency converter MAG.DRIVE*digital* is a slave unit and thus responds to requests from the master, and supplies data exclusively after having received a request to do so from the master.

For more information on the Profibus system:

"The Rapid Way to Profibus",
Manfred Popp, Profibus Nutzerorganisation e.V.
Heid-und-Neu-Str. 7
D-76131 Karlsruhe, Germany
P/N 4.072

1.1 Description of the Interface

At both ends of the bus a terminating resistor is required. Such a terminator must be incorporated in an external plug. The connections for this plug are provided through the interface connector. For this also see the standards.

Standards

Profibus DP V0 corresponding to IEC 61158-2 and IEC 61784 Type 3

Protocol

In accordance with Profibus profile for variable fast revolving drive units Profile No.3; Version 2.0

Transmission rates and cable lengths

(see also the standards)

Transmission rate (kBit/s)	max. segment length (m)
9.6 –93.75	1200
187.5	1000
500	400
1500	200
3000 - 12000	100

The baud rate is set automatically. The following baud rates are supported:

9.6 k Baud	19.2 k Baud	45.45 k Baud	
93.75 k Baud	187.5 k Baud	500 k Baud	
1.5 M Baud	3 M Baud	6 M Baud	12 M Baud

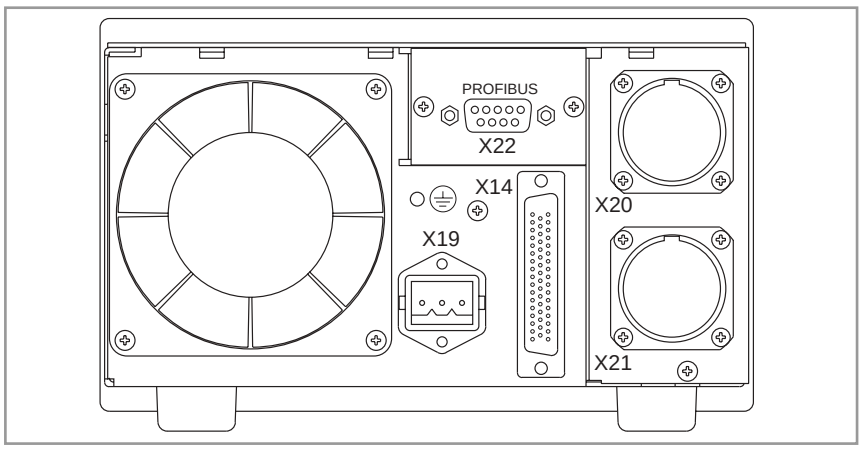


Fig. 1 MAG.DRIVE*digital* with Profibus interface

Address range	Hex $01 ... $7D (selectable via switch);
corresponding to	decimal 1 ... 126
Voltage level	see standards
Interface connection	Sub-D 9-way socket on the side of the instrument (female)
Thread	UNC4-40

The Profibus watchdog function has been implemented.

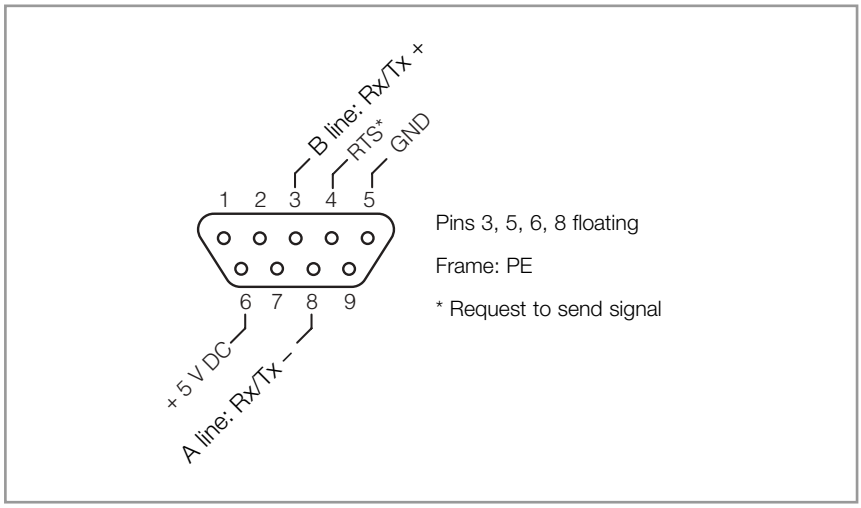


Fig. 2 Pin assignment for the socket

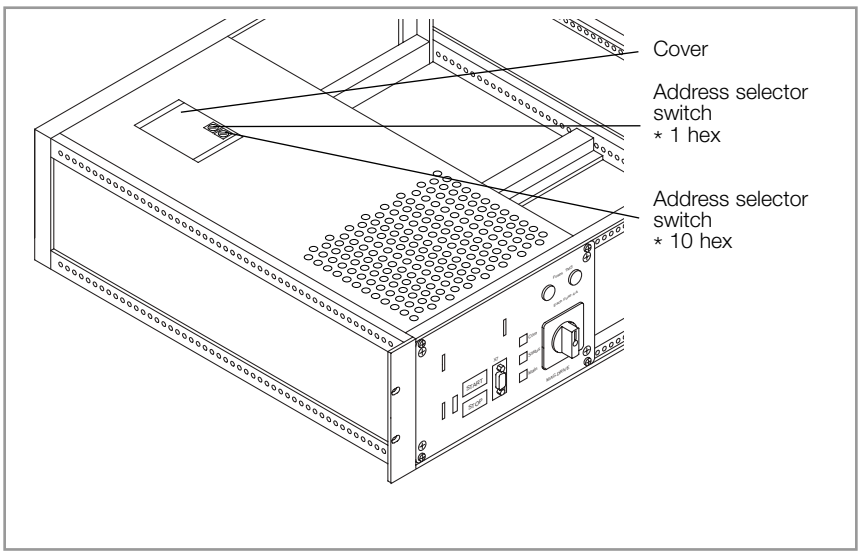


Fig. 3 Address selector switch on the MAG.DRIVE*digital*

2 Connection

Warning

Disconnect the MAG.DRIVE*digital* from the mains and wait until the pump no longer rotates before making any connections. Since dangerous voltages may nonetheless be encountered, the housing must be opened only by a qualified electrician.

Connect the Profibus to the Profibus interface connector on the rear of the frequency converter. Both bus ends must be terminated. This must be done externally using a special plug. The connections required for this are provided in the interface connector.

Line type: SIEMENS-SINEC-L2- bus line;

P/N 6XV1830-0AH10

Address

A new address setting is enabled when the power is switched on again.

Example: Address 43dez. = 2Bhex.

3 Description of the Telegram

Two types of protocol (PPO types) have been implemented. In the following only the payload data are described. Data which serve communication purposes (data link layer, layer 2 acc. to OSI, for example, start byte and addressing etc.) are processed automatically in the background by the Profibus.

3.1 PPO Type 1

Length of the payload data block: 6 words = 12 bytes
Designator = 0xF3, 0xF1 (see 3.3 GSD File)

Byte No.	Abbreviation	Description	Read access	Write access	Response from the frequency converter
0-1	PKE	Parameter number and type of access	Value (s. 4.1)		
2	IND	Parameter index	Value (s. 4.3)		
3	–	reserved	0		
4-7	PWE	Parameter value	0	Value	Value
8-9	PZD1: ZSW STW	Status and control bits and pump address	Value (s. 4.2)		
10-11	PZD2: HIW HSW	Main actual value and setpoint Actual speed / Setpoint speed	0	0	Value (Hz)

3.2 PPO Typ 6 (Leybold-specific)

Length of the payload data block: 1 word = 2 byte identifier = 0x00, 0xF0 (see 3.3 GSD file)

Byte No.	Abbreviation	Description	Read access	Write access	Response from the frequency converter
0-1	PZD1: ZSW STW	Status and control bits and pump address		Value (s. 4.2)	

3.3 GSD File (Example)

Documented in the GSD file are the parameters of the Profibus DP interface. The file format has been defined in the standard so that project tools from different manufacturers can be used. The current GSD file is available from Leybold upon request. In addition the contents of the GSD file have been documented in the following.

```
;=======================================
GSD-Datei fuer LEYBOLD SS18135
Stand : 24.09.98 - Harald Fleischmann Sync_mode_supp
Freeze_mode_supp
;=======================================

#Profibus_DP
Vendor_Name = "Leybold AG
Model_Name = "NT 1600C
Revision = "Ausgabestand 1"
Ident_Number = 0x00F1
Protocol_Ident = 0
Station_Type = 0 FMS_supp = 0
Hardware_Release = "A01"
Software_Release = "A01"
9.6_supp = 1
19.2_supp = 1 93.75_supp = 1
187.5_supp = 1 500_supp = 1
1.5M_supp = 1 3M_supp = 1
6M_supp = 1 12M_supp = 1
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 450
MaxTsdr_12M = 800
Redundancy = 0
Repeater_Ctrl_Sig = 2
24V_Pins = 0

Slave spezifische Werte

Freeze_Mode_supp = 1
Sync_Mode_supp = 1
Auto_Baud_supp = 1
Set_Slave_Add_supp = 0
Min_Slave_Intervall = 1
Modular_Station = 1
Max_Module = 1
Max_Input_Len = 20
Max_Output_Len = 20
Max_Data_Len = 40
Max_Diag_Data_Len = 6


Module = "PPO 1" 0xF3, 0xF1 EndModule
Module = "PPO 6" 0x00, 0xF0 EndModule
Module = "PPO 7" 0x00, 0xB0 EndModule
```

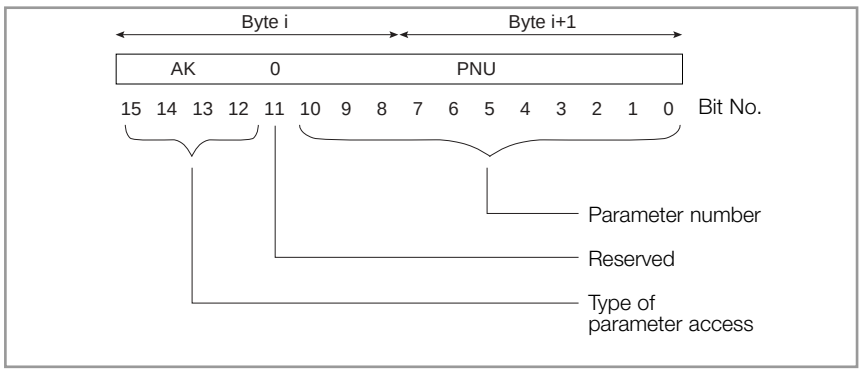


Fig.. 4 Structure of the parameter section

4 Description of PKE, IND, Control and Status Bits

4.1 PKE: Parameter Number and Type of Access

The parameter number is sent when accessing the MAG.DRIVE*digital* and also in the response of the MAG.DRIVE*digital*.

The receiver is provided with information on the parameter value PWE: size, field value or individual value, read or write.

to **Type of Parameter Access to the MAG.DRIVE*digital* (Query Designator)**					**Type of Parameter Response from the MAG.DRIVE*digital* (Reply Designator)**				
Bit number					**Bit number**				
15	**14**	**13**	**12**		**15**	**14**	**13**	**12**	
0	0	0	0	No access	0	0	0	0	No response
0	0	0	1	Parameter value requested	0	0	0	1	16 bit value is sent
					0	0	1	0	32 bit value is sent
0	0	1	0	Write a 16 bit value	0	0	0	1	16 bit value is sent
0	0	1	1	Write a 32 bit value	0	0	1	0	32 bit value is sent
0	1	1	0	Field value requested*	0	1	0	0	16 bit field value is sent
					0	1	0	1	32 bit field value is sent
0	1	1	1	Write a 16 bit field value*	0	1	0	0	16 bit field value is sent
1	0	0	0	Write a 32 bit field value*	0	1	0	1	32 bit field value is sent
1	0	0	1	Number of field elements of a field requested	0	1	1	0	Number of field elements of a field is sent
					Further responses				
					0	1	1	1	The frequency converter can not run the command
					1	0	0	0	During a write access: no permission to write

Depending on the query designator, only certain reply designators are possible. If the reply designator has the value 7 (query cannot be run) then in parameter value 2 (PWE2) an error number is provided.

Parameter Index IND (2nd word)

* The desired element of the index parameter is provided in IND (second word).

4.2 Status and Control Bits (Status and Control Word) Profibus PPO-Type 1 and 6

The status and control bits are only temporarily available, i.e. after interrupting the power supply the bits revert to the default status.

4.2.1 Control Word (PZD1, STW) = 16 Control Bits

Is sent to the pump for each access.

Bit	Description
0	Start pump
1 to 6	Reserved, must always be set to 0
7	Acknowledge fault
8	Standby speed
9	Reserved, must always be set to 0
10	Enable process data; enables bit 0, 6, 7, 8, 11, 12
11	Purge gas ON*
12	Venting ON
13 to 15	Reserved, must always be set to 0

* Bit 11 and 12 are only operative provided the purge/vent function has been set through parameter 22 to remote control (control connector X14). This is the default setting

The system has 2 speed setpoints:
- Parameter 24: Nominal speed for normal operation
- Parameter 150: Standby speed

By means of bit 8 it is possible to select between the 2 values. A bit which has been set enables the standby speed. Changing of the two parameter values is possible through the plug-on controller of the frequency converter. Through the bus interface the values can only be read.

4.2.2 Status Word (PZD1, ZSW) = 16 Status Bits

Is sent together with each response from the frequency converter.

Bit	Description	Remark
0	Ready for switch on	
1		ignore
2	Operation enabled	frequency converter is active
3	Fault condition is active	
4	Pump speed is increasing	
5	Pump speed is dropping	
6	Switch on lock	
7	Warning temperature	
8	Cooling water temperature failure	
9	Frequency converter accepts parameter	
10	Normal operation	
11	Pump is revolving	Frequency > 3 Hz
12		Ignore
13	Warning high load	
14	Warning purge not active	
15	Remote has been activated	life sign, bit toggles at 1 … 2 Hz

4.3 Parameter List

No.	Designation	Min. value	Max. value	Unit	Default	Type	Access
1	Converter identification	103	103		103	u16	r
2	Software version	10101	65535	0.00.00	3.03.05	u16	r
3	Frequency - actual value	0	1000	Hz		u16	r
4	Intermediate circuit voltage Uzk	0	150	0.1V		u16	r
5	Motor current - actual value	0	200	0.1A		u16	r
6	Power	0	65535	0.1W		u16	r
7	Motor temperature - actual value	0	150	°C		s16	r
11	Converter temperature - actual value	0	1000	°C		s16	r
12	Operating mode 0 = Keyboard or control connector 1 = Serial interface 2 = Serial interface and stop key	0	2	-	0	u16	r/w
13	Remote/Local 0 = Local (keyboard) 1 = Remote (control connector)	0	1	-	0	u16	r
16	Motor warning temperature	0	P133	°C	130	u16	r
17	Motor nominal current	0	250	0.1A	200	u16	r
18	Nominal frequency	0	1050	Hz	490	u16	r
19	Minimum frequency			Hz	200	u16	r
22	Function Purge/Venting: 0 = Purge Off 1 = Purge On 2 = Vent 3 = Function select through X14	0	3	-	3	u16	r/w
24	Nominal frequency	P19	P18	Hz		u16 Write access only possible with pump at standstill	r/w
25	Normal operation factor of nominal frequency P24 but >P20	35	99	%		u16	r/w
26	Indicating relay bearing temperature threshold	0	200	°C		u16	r/w
27	Indicating relay motor current threshold	0	P17	0,1A		u16	r/w
28	Indicating relay frequency threshold	0	P18	Hz		u16	r/w
29	Indicating relay function (conditional) 0 = Bearing temperature 1 = Motor current 2 = Frequency 3 = No cooling water 4 = No purge gas 5 = Temperature TMS OK 6 = Venting 7 = Pump standstill 8 = Start command 9 = Power supply OK 10 = Mains failure 11 = Standby	0	11	-		u16	r/w
32	max. run-up time; max. overload time	P500	P501	s		u16	r/w
35	Display language 0 = German 1 = English	0	1	-	0	u16	r/w

No.	Designation	Min. value	Max. value	Unit	Default	Type	Access
38	Number of start commands	0	65535	-	-	u16	r
54	Production date	0	2147483647	0.00.00	-	u32	r
56	Service date	0	2147483647	0.00.00	-	u32	r
60	Operating hours count since last maintenance	0	2147483647	0.01h	0	u32	r
62	Repair date	0	2147483647	0.00.00	0	u32	r
64	Repair identification	0	2147483647	-	0	u32	r
66	Operating hours count since last repair	0	2147483647	0.01h	0	u32	r
122	TMS setpoint temperature	P503	P504	°C		u16	r/w
123	Actual value TMS temperature	0	140	°C	-	u16	r
125	Actual value magnetic bearing temperature	0	140	°C	-	u16	r
126	Bearing warning temperature	0	P131	°C		u16	r
127	Actual cooling water temperature	0	140	°C	-	u16	r
128	Cooling water warning temperature	0	P132	°C		u16	r
131	Bearing shutdown temperature	0	140	°C		u16	r
132	Cooling water shutdown temperature	0	140	°C		u16	r
133	Motor shutdown temperature	0	150	°C		u16	r
144	Number of start cycles warning limit	0	200000	-		u16	r
145	Shutdown limit for number of start cycles during operation	0	300000	-		u16	r
146	Actual value for number of standby cycles	0	65535	-	-	u16	r
147	Number of operating cycles (start cycles + standby cycles) actual value	0	2147483647	-	-	u32	r
150	Standby speed	P19 + 20	P18 * P25 - 20	Hz	350 Write access is only possible with the pump at standstill	u16	r/w
151	Enabling standby 0 = Normal operation 1 = Standby speed			-	0	u16	r/w
154	Operating hours warning limit	0	2147483647	0.01h	3700000	u32	r
155	Operating hours during operation error limit	0	2147483647	0.01h	4000000	u32	r
156	Cycle counter upon start limit	0	300000	-	4700	u16	r
157	Operating hours upon start error limit	0	2147483647	0.01h	3900000	u32	r
158	Enabling Warning/Alarm for limits Parameter 145,155,156,157 0 = Warning 1 = Alarm	0	1	-	0	u16	r/w
167	Realtime time	0	2359	hh.mm	-	u16	r
168	Realtime date	0		yy.mm.dd	-	u32	r
171	Failure number (0..19) see section 5	0	255	-	-	u16	r
172	Failure date (0..19)	0		dd.mm.yy	-	u32	r
173	Failure time (0..19)	0	2359	hh.mm	-	u16	r
174	Failure frequency (0..19)	0	P18	Hz	-	u16	r

Parameters

No.	Designation	Min. value	Max. value	Unit	Default	Type	Access
176	Failure operating hours (0..19)	0	16777216	0.01h	-	u32	r
184	Converter operating hours	0	2147483647	0.01h	-	u32	r
214	Function Purge/Venting; actual value 0 = Purge Gas OFF 1 = Venting ON 2 = Purge ON	0	2	-	-	u16	r
227	Warning_Bits 1 see section 6	0	65535	-	-	u16	r
228	Warning_Bits 2 see section 6	0	65535	-	-	u16	r
229	Actual value of TMS heating current	0	1000	0.1A	-	u16	r
230	Warning_Bits 3 see section 6	0	65535	-	-	u16	r
240	Function of options relay 2 Bit 0 to 10 as P29	0	11	-		u16	r/w
241	Function for digital input X14.45 0 = Without function 1 = Standby 2 = Failure reset	0	2	-	1	u16	r/w
242	Function for digital input X14.46 0 = Without function 1 = Standby 2 = Failure reset	0	2	-	2	u16	r/w
243	Time delay SEMI F47	0	2000	0.01s	500	u16	r
244	Max. time delay SEMI F47	0	65535	0.01s	6000	u16	r
303	Pump status Bit 0 Normal operation Bit 1 Pump ready Bit 2 Speed is increasing Bit 3...Speed is dropping Bit 4...Generator operation Bit 5...Standby Bit 6...reserved Bit 7...reserved	0	65535	-	-	u16	r
312	Catalogue number (Index 0...10)	0	65535	ASCII	-	u16	r
313	Product name (Index 0...10)	0	65535	ASCII	-	u16	r
315	Converter serial number (Index 0...10)	0	65535	ASCII	-	u16	r
318	Function of options relay 3; Bit 0 to 10 as P29	0	11	-	8	u16	r/w
319	Function of options relay 4; Bit 0 to 10 as P29	0	11	-	10	u16	r/w
325	Failure memory 1 (Parameter which is to be saved)	0	1023	-	125	u16	r
326	Failure memory 2 (Parameter which is to be saved)	0	1023	-	123	u16	r
327	Failure memory 3 (Parameter which is to be saved)	0	1023	-	127	u16	r
328	Failure memory 4 (Parameter which is to be saved)	0	1023	-	7	u16	r
329	Failure memory 5 (Parameter which is to be saved)	0	1023	-	303	u16	r

No.	Designation	Min. value	Max. value	Unit	Default	Type	Access
330	Failure memory 1 parameter value (array 0..19)	0	65535	-	-	u16	r
331	Failure memory 2 parameter value (array 0..19)	0	65535	-	-	u16	r
332	Failure memory 3 parameter value (array 0..19)	0	65535	-	-	u16	r
333	Failure memory 4 parameter value (array 0..19)	0	65535	-	-	u16	r
334	Failure memory 5 parameter value (array 0..19)	0	65535	-	-	u16	r
335	Failure memory 1 saved parameter (array 0..19)	0	65535	-	-	u16	r
336	Failure memory 2 saved parameter (array 0..19)	0	65535	-	-	u16	r
337	Failure memory 3 saved parameter (array 0..19)	0	65535	-	-	u16	r
338	Failure memory 4 saved parameter (array 0..19)	0	65535	-	-	u16	r
339	Failure memory 5 saved parameter (array 0..19)	0	65535	-	-	u16	r
349	Version of the data set AMB	0	65535	z.yy	-	u16	r
350	Catalogue number of the pump (Array 0...10 of ASCII character)	0	65535	ASCII	-	u16	r
352	Software version pump identifier; states the revision status of the software: x.yy.zz	0	65535	z.yy.xx	-	u16	r
353	Hardware or version of the pump identifier z --> Layout yy --> modification index xx --> circuit diagram edition	0	65535	z.yy.xx	-	u16	r
354	Type and version of the data set of the pump identifier 0	65535	x.yy	-	u16	r	
355	Serial number of the pump (Array 0...10 ASCII characters)	0	65535	ASCII	-	u16	r
398	Pump size (e.g. 1500 for MAG 1500)	0	65535	-	-	u16	r
401	AMB software version	0	65535	z.yy.xx	-	u16	r
500	Minimum value for maximum run-up time	0	P501	s	-	u16	r
501	Maximum value for maximum run-up time	P500	10000	s	-	u16	r
503	Min. selectable TMS setpoint temperature	0	P504	°C	-	u16	r
504	Max. selectable TMS setpoint temperature	P503	140	°C		u16	r
918	Active Profibus address	0	7F (Hex)	-	-	u16	r
967	Control word (USS, Profibus)			-	-	u16	r
968	Status word (USS, Profibus)			-	-	u16	r

Access: r: read-only; r/w : read and write

Changed parameter values are reset to the default values upon switching on the power again.
Persistent changes are only possible through the plug-on controller.

5 Failure Memory

Parameter 171 contains in the event of a failure the corresponding failure code. Listed in the following are the possible failure codes (No.) and their causes.

No.	Description	Run down	Active braking	Entry in failure memory	Remark/condition (P = Parameter)
0	No failure	—	—	—	
1	Overload (load limit exceeded)	no	no	yes	P3 < P25 x P24
2	Motor temperature too high	yes	yes	yes	P7 > P133
3	There has been a mains failure	yes	no	yes	Mains failure while the pump was operative
4	Converter temperature too high	yes	yes	yes	
5	An overspeed has occurred	no	no	no	P3 > (P24 + 10 Hz)
6	During overload the shutdown frequency has dropped below the limit	yes	yes	yes	
7	Max. run-up time was exceeded	yes	yes	yes	in P32 (P3 > P25 x P24) not reached
8	Pump identification communication failure	yes	yes	no	Internal electronics failure
9	Bearing temperature too high	yes	yes	yes	P125 > P131
10	Cooling water temperature too high	yes	yes	yes	P127 > P132
11	Warning TMS failure	no	no	no	
12	Warning Unbalance PVW13	no	no	no	
13	Warning Unbalance PVW24	no	no	no	
14	Warning Unbalance PZ12	no	no	no	
15	Warning magnetic bearings	no	no	no	
16	Max. overload time has been exceeded	yes	yes	yes	(P3 < P25 x P24) longer than P32
17	No motor current	yes	no	yes	
18	Pump connection converter failure	yes	yes	yes	
19	Run-up time has been exceeded	yes	yes	yes	P20 in P22 not reached
20 to 24	TMS failure	yes	yes	yes	
26	Bearing temperature sensor short-circuit failure	yes	yes	yes	
27	Cooling water temperature sensor short-circuit	yes	yes	yes	
28	Motor temperature sensor short-circuit	yes	yes	yes	
29	Bearing temperature sensor interruption failure	yes	yes	yes	
30	Cooling water temperature sensor interruption failure	yes	yes	yes	
(31, 32	Internal connection failure	no	no	no)	

No.	Description	Run down	Active braking	Entry in failure memory	Remark/condition (P = Parameter)
33	Magnetic bearing overload PZ12	yes	yes	yes	
34	Magnetic bearing overload PV13	yes	yes	yes	
35	Magnetic bearing overload PW24	yes	yes	yes	
37	Flow warning	no	no	no)	
38	Warning operation without purge gas	no	no	no	
39	Magnetic bearing failure	yes	yes	yes	
40	Magnetic bearing, purge gas OFF	yes	yes	yes	
41	Magnetic bearing, purge gas ON	yes	yes	yes	
42	Magnetic bearing code wrong	yes	yes	yes	
43 to 55	Internal failure	yes	yes	yes	If one of the failures 43 to 55 occurs, functioning of the MAG should be checked for safety reasons. For this consult us.
56	External shutdown for protection	yes	no	no	Emergency contact at the hardware interface is interrupted.
57 to 62	Internal failure	no	no	no	
63	Internal communication failure (SPI)	yes	yes	yes	
64	Magnetic bearing electronics not properly initialised (data set error)	yes	yes	yes	
(65	Internal communication timeout	yes	yes	yes)	
66	Magnetic bearing overloaded	yes	yes	yes	
67	Internal overload	yes	yes	yes	
68	Rotor not lifted	yes	yes	yes	
69	ABS inactive warning	no	no	no	
70	ABS active warning	no	no	no	
71	Failure during parameter download	—	—	no	
72	Failure during firmware download	—	—	no	
73	Operating cycles limit has been reached	yes	yes	yes	
74	Operating hours limit has been reached	yes	yes	yes	
75	Faulty configuration	—	—	no	
76	Firmware update is required	—	—	no	

6 Parameter Warning

Possibly existing current warning states can be called through the parameters 227, 228, and 230.

The parameters 227 (Warning_Bits 1)

228 (Warning_Bits 1)

230 (Warning_Bits 1)

have been assigned for this as follows:

Parameter 227

Bit	Description
0	Motor temperature
1	Converter temperature
2	Bearing temperature
3	Cooling water temperature
4	TCU temperature
5	Pump identifier communication
6	Overspeed
7	TCU collective warning
8	No flow
9	Magnetic bearing code
10	Imbalance PVW13 warning
11	Imbalance PVW24 warning
12	Imbalance PZ12 warning
13	No purge gas
14	Too much purge gas
15	Operation without purge gas

Parameter 228

Bit	Description
0	TMS heater failed
1	TMS time error
2	TMS Pt 100 defective
3	TMS heating current too high
4	TMS fuse defective
5	
6	Pump identifier read error
7	Pump identifier write error
8	Pump identifier without communication upon switch on
9	ABS inactive
10	ABS active
11	Magnetic bearing inactive
12	Magnetic bearing overloaded
13	Internal overload
14	SPI communication (AMB2SR)
15	SPI communication (SR2AMB)

Parameter 230

Bit	Description
0	Pump identifier CRC data error
1	Pump identifier CRC protocol error
2	Pump identifier timeout
3	TMS temperature incorrect
4	Unassigned
5	Number of cycles
6	Number of hours
7	EEPROM contents
8 to 15	Unassigned

EC Conformance Declaration

We, the Leybold Vacuum GmbH, declare herewith that the products listed below, in the embodiment which we have placed on the market, comply with the applicable EC guidelines.

This declaration becomes invalid if modifications are made to the product without consultation with us.

Maintaining the EMC guideline assumes an EMC adapted installation of component within the plant or machine.

Test were run using a typical construction in a test assembly that conforms with the standards.

Time of the CE label (year):	2005
Designation of the products:	Frequency converter
Model:	**MAG.DRIVE*digital***
Part No.	400035V0013

The products comply to the following guidelines:

- EC Low-Voltage Equipment Guidelines 73/23/EWG
- EC Directive on Electromagnetic Compatibility 89/336/EWG, 91/263/EWG, 92/31/EWG and 93/68/EWG

Related, harmonized standards:

- EN 61010 - 1 2002
- EN 61000-6-4 2001
- EN 61000-6-2 2001

Cologne, May 22, 2005

Marcus Eisenhuth
Vice-President
Head of Product Development

Cologne, May 22, 2005

Manfred Kieffer
Development Design

Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-221 347-0
Fax: +49-221 347-1250
documentation@leybold.com

www.leybold.com

Notes

Germany

Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-221-347 1234
Fax: +49-221-347 1245
sales@leybold.com

Leybold Vacuum GmbH
Sales Area North/East
Branch office Berlin
Buschkrugallee 33
1. Obergeschoss
D-12359 Berlin
Phone: +49-30-435 609 0
Fax: +49-30-435 609 10
sales.berlin@leybold.com

Leybold Vacuum GmbH
Sales Area South/Southwest
Branch office Munic
Karl-Hammerschmidt-Strasse 38
D-85609 Aschheim/Dornach
Phone: +49-89-357 33 90
Fax: +49-89-357 33 933
sales.muenchen@leybold.com
service.muenchen@leybold.com

Leybold Vacuum GmbH
Sales Area West
Branch office Cologne
Emil-Hoffmann-Straße 43
D-50996 Cologne-Suerth
Phone: +49-221-347 1270
Fax: +49-221-347 1291
sales.koeln@leybold.com

Leybold Vacuum GmbH
Service Center
Emil-Hoffmann-Straße 43
D-50996 Cologne-Suerth
Phone: +49-221-347 1439
Fax: +49-221-347 1945
service@leybold.com

Leybold Vacuum GmbH
Mobile after sales service
Emil-Hoffmann-Straße 43
D-50996 Cologne-Suerth
Phone: +49-221-347 1765
Fax: +49-221-347 1944
kundendienst@leybold.com

Leybold Vacuum
Dresden GmbH
Zur Wetterwarte 50, Haus 304
D-01109 Dresden
Service:
Phone: +49-351-88 55 00
Fax: +49-351-88 55 041
info@leybold-dresden.de
www.leybold-dresden.de

Europe

Belgium

Leybold Vacuum Nederland B.V.
Belgisch bijkantoor
Leuvensesteenweg 542-9A
B-1930 Zaventem
Sales:
Phone: +32-2-711 00 83
Fax: +32-2-720 83 38
sales.belgium@leybold.com
Service:
Phone: +32-2-711 00 82
Fax: +32-2-720 83 38
service.belgium@leybold.com

France

Leybold Vacuum France S.A.
7, Avenue du Québec
Z.A. de Courtaboeuf, B.P. 42
F-91942 Courtaboeuf Cedex
Sales and Service:
Phone: +33-1-69 82 48 00
Fax: +33-1-69 07 57 38
leybold-vacuum@leybold.fr

Leybold Vacuum France S.A.
Valence Factory
640, rue A. Bergès - B.P. 107
F-26501 Bourg-lès-Valence Cedex
Phone: +33-4-75 82 33 00
Fax: +33-4-75 82 92 69
marketing.valence@leybold.fr

Great Britain

Leybold Vacuum UK Ltd.
Waterside Way, Plough Lane
GB-London SW17 0HB
Sales:
Phone: +44-20-8971 7000
Fax: +44-20-8971 7001
sales@leybold.co.uk
Service:
Phone: +44-20-8971 7030
Fax: +44-20-8971 7003
service@leybold.co.uk

Italy

Leybold Vacuum Italia S.p.A.
8, Via Trasimeno
I-20128 Milano
Sales:
Phone: +39-02-27 22 31
Fax: +39-02-27 20 96 41
sales@leybold.it
Service:
Phone: +39-02-27 22 31
Fax: +39-02-27 20 96 41
service@leybold.it

Field Service Base
Z.I.Le Capanne
I-05021 Acquasparta (TR)
Phone: +39-0744-93 03 93
Fax: +39-0744-94 42 87
service@leybold.it

Netherlands

Leybold Vacuum Nederland B.V.
Computerweg 7
NL-3542 DP Utrecht
Sales and Service:
Phone: +31-346-58 39 99
Fax: +31-346-58 39 90
sales.netherlands@leybold.com
service.netherlands@leybold.com

Spain

Leybold Vacuum España S.A.
C/. Huelva, 7
E-08940 Cornella de Llobregat
(Barcelona)
Sales:
Phone: +34-93-666 46 16
Fax: +34-93-666 43 70
sales.spain@leybold.com
Service:
Phone: +34-93-666 49 51
Fax: +34-93-685 40 10

Sweden

Leybold Vacuum Scandinavia AB
Box 9084
SE-40092 Göteborg
Sales and Service:
Phone: +46-31-68 84 70
Fax: +46-31-68 39 39
info@leybold.se
Visiting/delivery address:
Datavägen 57B
SE-43632 Askim

Switzerland

Leybold Vacuum Schweiz AG
Leutschenbachstrasse 55
CH-8050 Zürich
Sales:
Phone: +41-1-308 40 50
Fax: +41-1-302 43 73
sales@leybold.ch
Service:
Phone: +41-1-308 40 62
Fax: +41-1-308 40 60

America

USA

Leybold Vacuum USA Inc.
5700 Mellon Road
Export, PA 15632
info@leyboldvacuum.com
Sales:
Eastern & Central time zones
Phone: +1-724-327-5700
Fax: +1-724-733-1217
Pacific, Mountain,
Alaskan & Hawaiian time zones
Phone: +1-480-752-9191
Fax: +1-480-752-9494
Service:
Phone: +1-724-327-5700
Fax: +1-724-733-3799

Asia

P.R. China

Leybold Vacuum (Tianjin)
International Trade Co., Ltd.
Beichen Economic Development
Area (BEDA), Shuanghai Road
Tianjin 300400, China
Sales and Service:
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
Fax: +86-22-2697 2017
leybold@leybold.com.cn

Leybold Vacuum (Tianjin)
Equipment Manufacturing Co., Ltd.
Beichen Economic Development
Area (BEDA), Shuanghai Road
Tianjin 300400, China
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
Fax: +86-22-2697 2017
leybold@leybold.com.cn

Leybold Vacuum (Tianjin)
International Trade Co., Ltd.
Beijing Branch:
1-908, Beijing Landmark Towers
8 North Dongsanhuan Road
Chaoyang District
Beijing 100004, China
Sales and Service:
Phone: +86-21-5064-4666
Fax: +86-21-5064-4668
leybold_sh@leybold.com.cn

Leybold Vacuum (Tianjin)
International Trade Co., Ltd.
Shanghai Branch:
Add: No. 33, 76 Futedong San
Rd., Waigaoqiao FTZ ,
Shanghai 200131, China
Sales and Service:
Phone: +86-21-5064-4666
Fax: +86-21-5064-4668
leybold_sh@leybold.com.cn

Leybold Vacuum (Tianjin)
Guangzhou Branch:
Add: G/F,#301 Building,
110 Dongguangzhuang Rd.
Tianhe District,
Guangzhou 510610, China
Sales:
Phone: +86-20-8723-7873
Phone: +86-20-8723-7597
Fax: +86-20-8723-7875
leybold_gz@leybold.com.cn

India

Leybold Vacuum India Pte Ltd.
A-125 Road No. 30
MIDC Wagle Industrial Estate
Thane(W) - 400 604 Maharashtra
India
Sales and Service:
Phone: +91-22-2581 2929
Fax: +91-22-2581 2626
ivt2004@yahoo.com

Japan

Leybold Vacuum
Japan Co., Ltd.
Head Office
Tobu A.K. Bldg. 4th Floor
23-3, Shin-Yokohama
3-chome
Kohoku-ku, Yokohama-shi
Kanagawa-ken 222-0033
Sales:
Phone: +81-45-4713330
Fax: +81-45-4713323

Leybold Vacuum
Japan Co., Ltd.
Osaka Branch Office
MURATA Bldg. 7F
2-7-53, Nihi-Miyahara
Yodogawa-ku
Osaka-shi 532-0004
Sales:
Phone: +81-6-6393-5211
Fax: +81-6-6393-5215

Leybold Vacuum
Japan Co., Ltd.
Tsukuba Technical S.C.
Tsukuba Minami Daiichi
Kogyo Danchi
21, Kasumi-no-Sato,
Ami-machi, Inashiki-gun
Ibaraki-ken, 300-0315
Service:
Phone: +81-298-89-2841
Fax: +81-298-89-2838

Korea

Leybold Vacuum Korea Ltd.
#761-4, Yulkeum-ri,
SungHwan-eup, Chonan
Choongchung-Namdo,
330-807, Korea
Sales:
Phone: +82-41-580-4421
Fax: +82-41-588-3737
Service:
Phone: +82-41-580-4419
Fax: +82-41-588-0166

Singapore

Leybold Vacuum
Singapore Pte Ltd.
No.1, International
Business Park,
B1-20B, The Synergy
Singapore 609917
Sales and Service:
Phone: +65-66652910
Fax: +65-65668202
vacuum@leyboldvac.com.sg

Taiwan

Leybold Vacuum Taiwan Ltd.
No 416-1, Sec. 3
Chung-Hsin Rd., Chu-Tung
Hsin-Chu, Taiwan, R.O.C.
Sales and Service:
Phone: +886-3-5833988
Fax: +886-3-5833999

Hotline

Sales: +49-221-347 1234
Service: +49-221-347 1765
sales@leybold.com
service@leybold.com

LV_07428_2005 02.05

Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-221 347-0
Fax: +49-221 347-1250
info@leybold.com

Leybold vacuum

www.leybold.com