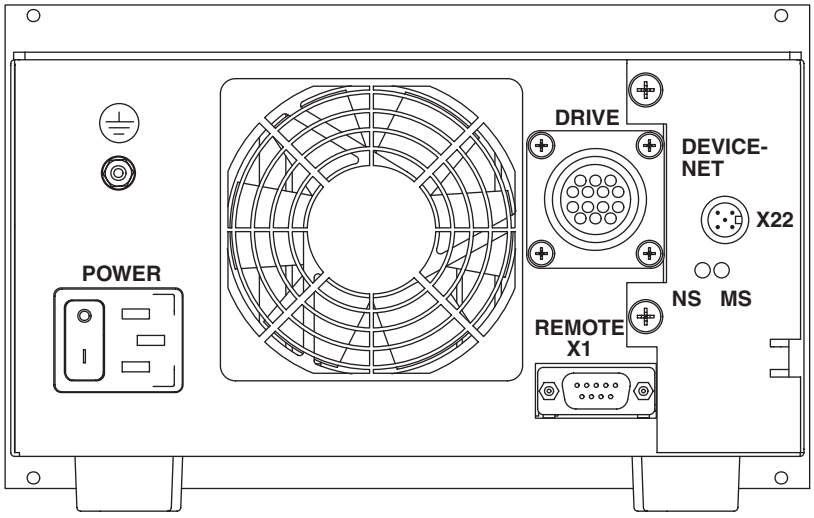
oerlikon
leybold vacuum

DeviceNet Interface for Turbo.Drive TD20 *classic*

Operating Instructions 17200055_002_00

Part No.

800075V0006



Contents

Installation and operation of the TurboDrive TD20 *classic* frequency converter is described in Operating Instructions GA05228. Described in these Operating Instructions is only the DeviceNet interface of the Turbo.Drive TD20 *classic*.

Important Safety Information

The Oerlikon Leybold Vacuum Turbo.Drive TD20 *classic* frequency converter with DeviceNet interface has been designed for safe and efficient operation when used properly and in accordance with these Operating Instructions. It is the responsibility of the user to carefully read and strictly observe all safety precautions described in this section and throughout the Operating Instructions. The Interface **must only be operated in the proper condition and under the conditions described in the Operating Instructions.** It must be operated and maintained by trained personnel only. Consult local, state, and national agencies regarding specific requirements and regulations. Address any further safety, operation and/or maintenance questions to our nearest office.

Warning

Before making any connections, deenergise the frequency converter and wait until the pump no longer turns. Since in spite of this dangerous voltages can remain present, the equipment must only be opened by a trained electrician.

We reserve the right to alter the design or any data given in these Operating Instructions. The illustrations are not binding.

Description

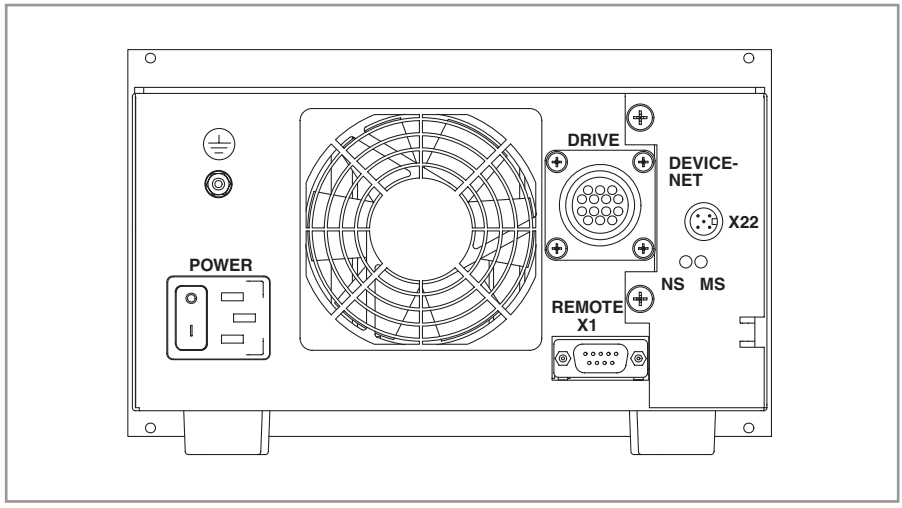


Fig. 1 Turbo.Drive TD20 *classic* with DeviceNet interface

1 Description

1.1 Technical Data

Baud Rates	125 k, 250 k, 500 k Baud

This manual describes the functionality of a DeviceNet Group 2 Only Slave and supports Explicit Messaging and I/O Polling.

Isolated Physical Layer

Input voltage range for DeviceNet option	5 volt / 24 volt

Voltage levels CAN Lines:

Transmitter Requirements

Differential Output level (nominal)	2.0 volt p-p
Differential Output level (minimum)	1.5 volt p-p
Connector, 50 Ohms load	
Minimum Recessive Bus voltage	2.0 volt[1)]
CAN H and CAN L	
Maximum Recessive Bus voltage	3.0 volt[1)]
CAN H and CAN L	
Output short circuit protection	internally limited

Receiver Requirements

Differential Input Voltage dominant	0.95 volt min
Differential Input Voltage recessive	0.45 volt max
Hysteresis	150 millivolt typically

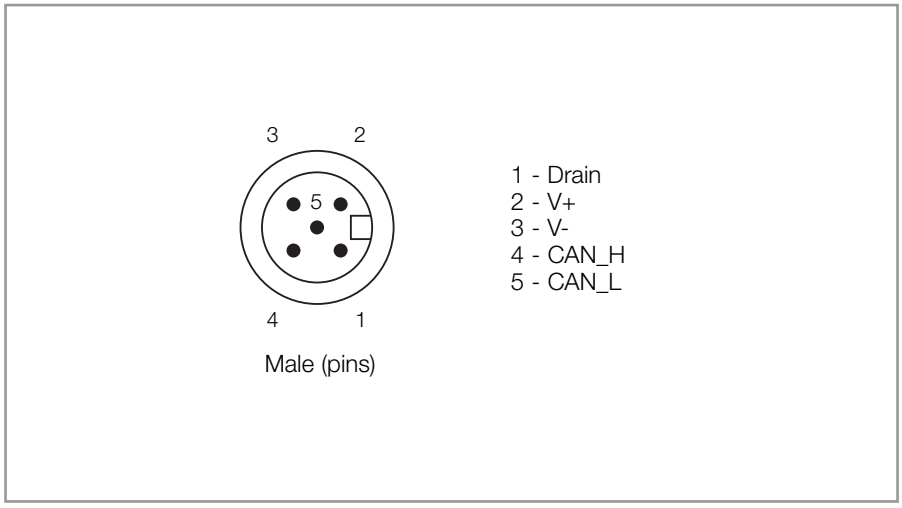


Fig. 2 DeviceNet plug at the TD20 *classic*

Address adjustment	Selectable via address switches
Baud rate selection	3 fixed baudrates via the baudrate switch
Status indication	two bi color LEDs
Operating ambient temperature	0 to 45 °C
Storage temperature	-10°C to +60°C

1) Voltages at CAN H and CAN L are referenced to the transceiver IC ground pin. This voltage (IC ground pin) is app. 0.6 Volt higher than the V-terminal.

1.2 Status Indicators

Module Status (MS) (internal) (right LED)

State / color	Indication
Off	Device not powered
Green, steady	Device operational
Red, steady	Unrecoverable fault
Red, flashing	Minor fault recoverable

Network Status (NS) (external) (left LED)

State / color	Indication
Off	Device not powered / offline
Green, steady	Link OK, online, connected
Green, flashing	Online, not connected
Red, steady	Critical link failure
Red, flashing	Connection timeout

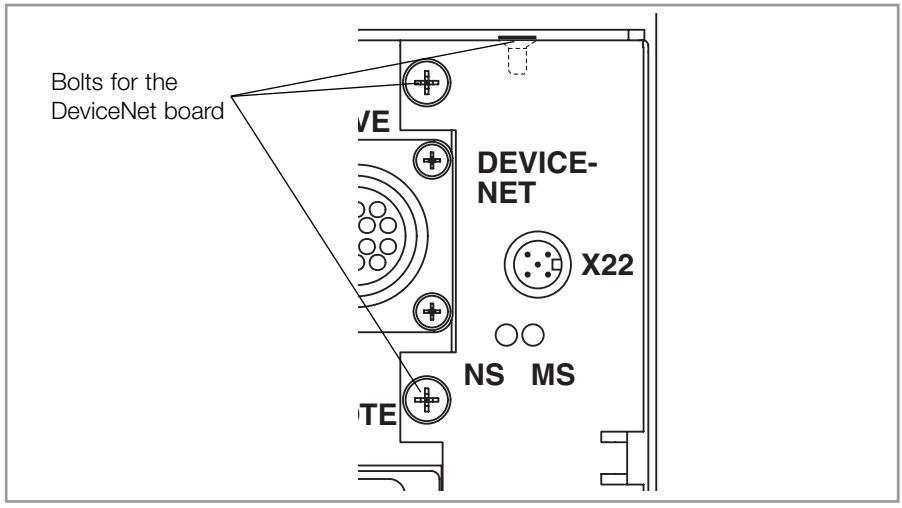


Fig. 3 Turbo.Drive TD20 *classic* with DeviceNet interface

2 Installation

Setting the Baud rate

You can install three baud rate values (125 kBaud, 250 kBaud and 500 kBaud) by using the baud rate switch (see Fig. 4).

Any other switch positions resume into 500 kBaud rate. There is no "Auto-Baud-Rate-Detection" available.

Setting the address

With the address switches can by selected the ID of the TD20 *classic* between 0 and 63. If the switches are calibrated to an impossible address (>63) this will result in the highest adjustable address setting witch is #63.

How to install a baud rate and a MAG ID:

Warning

Disconnect the TD20 *classic* from the mains and wait until the pump no longer rotates before making any connections or settings. Since dangerous voltages may nonetheless be encountered, the housing must be opened only by a qualified electrician.

- Switch off the power of the TD20 *classic* converter.
- Unscrew the bolts for the DeviceNet board and pull the board cautiously out of the housing.
- Set the baud rate switch to 0,1 or 2
- Set the MAG ID for example to 23
  (Set the tens place switch to 2 and the units place switch to 3)
- Push the board back into the housing and screw the bolts in.

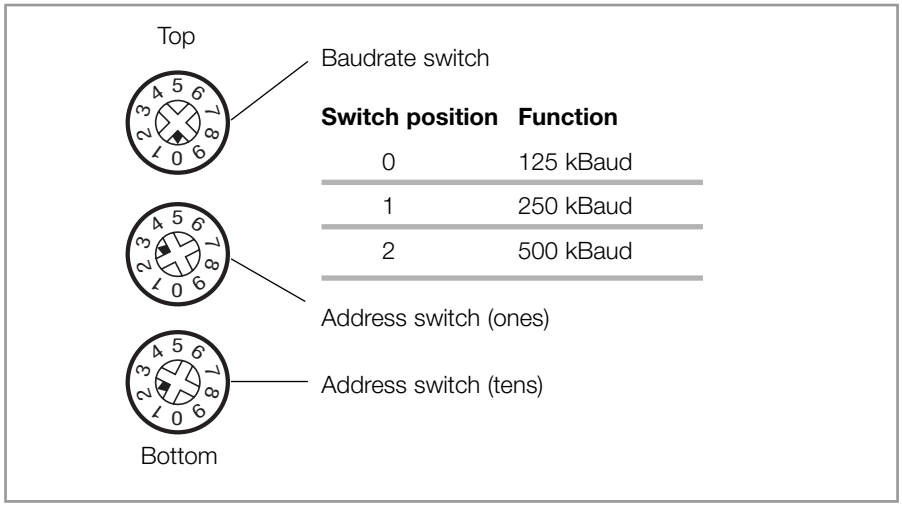


Fig. 4 Turbo.Drive TD20 *classic* with DeviceNet interface

- Switch on the power of the TD20 *classic* converter.
- The LEDs on the back side of the TD20 *classic* converter will show:
  The **MS** LED will glow green
  The **NS** LED will flash green if a communication between the TD20 *classic* and an other device takes place.

After power ON the unit must find a device to communicate with (duplicate MAG ID check) (for example a master or a monitor) otherwise the "BUS" LED will not flash green and it will be impossible to allocate the TD20 *classic*.

Objects

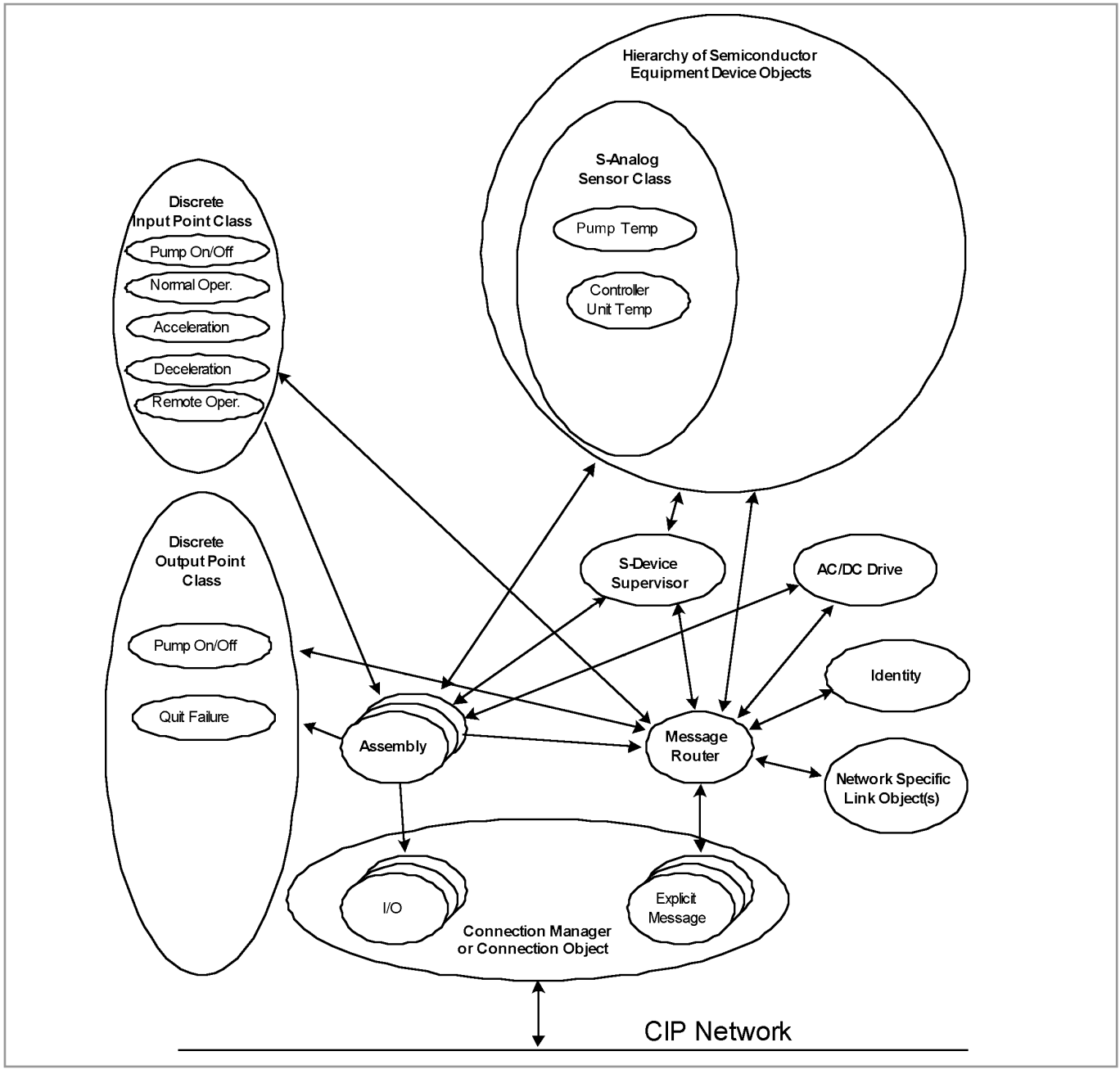


Fig. 5 Object Structure

3 Objects

The Object Structure is shown in the table below and representing a Turbo Pump Device.

The table below indicates:

- the object classes present in this device
- whether or not the class is required
- the number of instances present in each class

Object Class	Class Identifier	Number of Instances
Identity	1	1
Message Router	2	1
DeviceNet	3	1
I/O Assembly	4	4 Input and 4 Output
Connection	5	1 I/O and 1 Explicit
Discrete Input Point	8	5
Discrete Output Point	9	6
AC/DC Drive	42	1
S-Device Supervisor	48	1
S-Analog Sensor	49	5
S-Single Stage Controller	51	1

3.1 Identity Object

Class Code: 1 (01_{hex})
Instance ID: 1 (01_{hex})

Attribute ID	Access Rule	Name	Data/Type	Description; actual value
1 (01_{hex})	Get	Leybold	UINT	Vendor Identification 90 00 hex → Leybold
2 (02_{hex})	Get	Device type	UINT	Device Type 21 00 hex → Turbo Molekular Pump
3 (03_{hex})	Get	Product Code	UINT	64 00 hex → TD20 classic
4 (04_{hex})	Get	Revision	STRUCT of:	Revision of the item the Identity Object represents
		Major Revision	USINT	01
		Minor Revision	USINT	01
5 (05_{hex})	Get	Status	USINT	Status of the entire device; see: Volume 1: CIP Common Specification, Chapter 5: Object Library:5-2.2.1.5
6 (06_{hex})	Get	Serial Number	UDINT	Serial number of the turbo pump controller
7 (07_{hex})	Get	Product Name	SHORT_ STRING	Name of the turbo pump controller
8 (08_{hex})	Get	State	USINT	Present state of the device as represented by the state transition diagram 0 = Nonexistent 1 = Device Self Testing 2 = Standby 3 = Operational 4 = Major Recoverable Fault 5 = Major Unrecoverable Fault

3.2 I/O Assembly Object

3.2.1 Input Assembly

Class Code: 4 (04_{hex})
Attribute ID: 3 (03_{hex})

Instance ID	Type	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1 (01_{hex}) default predefined input connection set	Input	0	**Exception Status**							
		1	**Speed Status** (see the "Speed Control Attribute and Speed Status Attribute Bit Map" below)							
		2	0	0	0	0	0	0	0	Pump On Status
2 (02_{hex})	Input	0	**Exception Status** (see the " Exception Status Bit Map" below)							
		1	**Speed Status** (see the "Speed Control Attribute and Speed Status Attribute Bit Map" below)							
		2	0	0	0	0	0	0	0	Pump On Status
		3 - 4	**Pump Speed** (revolutions per second)							
3 (03_{hex})	Input	0	**Exception Status** (see the " Exception Status Bit Map" below)							
		1	**Speed Status** (see the "Speed Control Attribute and Speed Status Attribute Bit Map" below)							
		2	0	0	0	0	0	0	0	Pump On Status
		3 - 4	**Pump Speed** [revolutions per second]							
		5 - 6	ignore							
		7 - 8	**Current** [1/10 Amps] (actual motor current)							
100 (64_{hex})	Input	0	**Exception Status** (see the " Exception Status Bit Map" below)							
		1	**Speed Status** (see the "Speed Control Attribute and Speed Status Attribute Bit Map" below; implementation not completed yet)							
		2	–	–	–	–	General Alarm	General Warning	–	Pump On Status
		3 … 4	**Pump speed**; actual (revolutions per second)							
		5 … 6	ignore							
		7 … 8	**Current** [1/10 Amps] (actual motor current)							

selecting the predefined connection set; see: 3.3 Connection Object

3.2.2 Output Assembly

Class Code: 4 (04_{hex})
Attribute ID: 3 (03_{hex})

Instance	Type	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
5 (05_{hex}) default	Output	0	-	-	-	-	-	-	-	Pump on
6 (06_{hex})	Output	0	-	-	-	-	-	-	-	Pump on
		1	**Speed Control** (see the "Speed Control Attribute and Speed Status Attribute Bit Map" below)							
101 (65hex)	Output	0	Quit failure	-	-	-	-	-	-	Pump on

Selecting the predefined connection set; see: 3.3 Connection Object

Exception Status Bit Map

Bit	Function
0	ALARM / device-common
1	ALARM / device-specific
2	ALARM / manufacturer-specific
3	0 (reserved)
4	WARNING / device-common
5	WARNING / device-specific
6	WARNING / manufacturer-specific
7	1 (expanded method)

Speed Control Attribute and Speed Status Attribute Bit Map

Bit	Speed Control	Speed Status	Status Description
0	Run Request	Running	On and SpeedActual > 0
1	Idle Request	At Idle	Zero current
2	Standby Request	At Standby Speed	SpeedActual = SpeedStandby (actual not selectable via DeviceNet)
3	-	Coasting	Zero Torque (generator mode)
4	-	Stopped	SpeedActual = 0
5	-	Accelerating	SpeedActual is increasing
6	-	At Reference	SpeedActual = SpeedRef
7	-	Decelerating	SpeedActual is decreasing

Objects

3.3 Connection Object

Class Code 5 (05_{hex})
Instance ID: 0 (0_{hex})

Attr. ID	Access Rule	Name	DeviceNet Data Type	Description of Attribute
100 = 64_{hex}	Set	Poll Produce Assembly Instance	USINT	Instance number of the assembly used to send data see also Input Assembly Connection Object and CIP documentation Connection Object 5-6
101 = 65_{hex}	Set	Poll Consume Assembly Instance	USINT	Instance number of the assembly used to receive data see also Input Assembly Connection Object and CIP documentation Connection Object 5-6

3.4 Discrete Input Point Object

Class Code: 8 (08_{hex})

Instance ID	Attrib. ID	Access Rule	Name	Data/ Type	Description
1 (01_{hex})	3	Get	Pump On / Off	BOOL	0 = Pump Off (or Pump On and Speed = 0) 1 = Pump On (pump running)
	7	Get	Off_On Cycles	UDINT	Count value of pump start to normal sequences
100 (64_{hex})	3	Get	Normal	BOOL	Normal speed reached
101 (65_{hex})	3	Get	Acceleration	BOOL	The pump increases speed
102 (66_{hex})	3	Get	Deceleration	BOOL	The pump decreases speed
103 (67_{hex})	3	Get	Generator Mode	BOOL	The pump runs in generator mode; mains voltage is missing
105 (69_{hex})	3	Get	Standstill	BOOL	0 = Pump rotates or drive is active 1= Pump stopped and drive is not active
106 ($6A_{hex}$)	3	Get	Remote Operation	BOOL	The Pump is under control of DeviceNet

Services

Service Code	Name
14 ($0E_{hex}$)	Get Attribute Single
16 (10_{hex})	Set Attribute Single

3.5 Discrete Output Point Object

Class Code: 9 (09_{hex})

If at least one of the DOP functions is set, the control of the pump is directed to the DeviceNet.

Any DOP needs its own enable if usage is intended.

Instance ID	Attribute ID	Access Rule	Data Type	Name	Description
1 (01_{hex})	3	Set	BOOL	Pump On / Off	0 = Pump Off (or Pump On and Speed = 0) 1 = Pump On AND Speed > 0
	9	Set	BOOL	Activate Pump On/Off	enables the Pump On/Off control
101 (65_{hex})	3	Set	BOOL	Quit Failure	0 = do not reset error condition 1 = Reset error condition
	9	Set	BOOL	Activate Quit Failure function	enables the Quit Failure function

Every control Instance (Attribute ID 9) has to be set individually; if one of the control instances is set, the control medium is DeviceNet.

With the present implementation, once the unit will be controlled by Device Net it will be not possible to go back to local mode (keypad or hardware interface X1).

3.6 AC/DC Drive Object

Class Code: 42 ($2A_{hex}$)
Instance ID: 1 (01_{hex})

Attr ID	Access Rule	Attribute Name	Data/ Type	Description; actual value		
3 (03_{hex})	Get	AtReference	BOOL	Normal operation status		
5 (05_{hex})	Set/Get	NetProc	BOOL	Requests process control reference to be local or from the network. 0 = Set Process not DN Control 1 = Set Process at DN Control Default value is 0 !!		
7 (07_{hex})	Get	SpeedActual	INT	Speed of the pump [RPS]		
9 (09_{hex})	Get	Current Actual	INT	Actual motor current [0.1 ampere]		
10 ($0A_{hex}$)	Get	CurrentLimit	INT	Limit of the motor current [0.1 ampere]		
16 (10_{hex})	Get	InputVoltage	INT	Actual value of the direct current link voltage		
20 (14_{hex})	Get	LowSpd Limit	UINT	Low limit of the pump speed [RPS]		
21 (15_{hex})	Get	HighSpd Limit	UINT	High limit of the pump speed [RPS]		
38 (26_{hex})	Set	Speed Control	USINT	**Bit**	**Speed Control**	**Description**
				0	Run Request	Starts the pump if set The last bit set, bit wins the race
				1	Idle Request	Stops the pump if set The last bit set, bit wins the race
39 (27_{hex})	Get	Speed Status	USINT	**Bit**	**Speed Status**	**Description**
				0	Running	On and Speed Actual > 0
				1	At Idle	Zero current
				2	At Standby Speed	Speed Actual = Speed Standby
				3	Coasting	Zero Torque (generator mode)
				4	Stopped	Speed Actual = 0
				5	Accelerating	Speed Actual is increasing
				6	At Reference	Speed Actual = Speed Reference
				7	Decelerating	Speed Actual is decreasing
40 (28_{hex})	Set	Speed Trip Time	UINT	Maximum run up time; maximum overload time. (Exceeding of this limit leads to the corresponding error message)		
41 (29_{hex})	Get	Max Rated Speed	INT	High limit of the pump speed [RPS]		
44 ($2C_{hex}$)	Get	Speed actual Data Units	UINT	Fixed value: RPS --> $1F0E_{hex}$ (rotations per second)		
45 ($2D_{hex}$)	Get	Speed Ref Data Units	UINT	Fixed value: RPS --> $1F0E_{hex}$ (rotations per second)		
101 (65hex)	Get	Converter hours	UINT	Number of converter operating hours		

3.7 S-Device Supervisor Object

Class Code: 48 (30_{hex})
Instance ID: 1 (01_{hex})

Attr. ID	Access Rule	Name	DeviceNet Data Type	Description; actual value
3 (03_{hex})	Get	Device Type	SHORT STRING	Type of the DeviceNet Device; "Turbo Pump"
4 (04_{hex})	Get	SEMI Standard Revision Level	SHORT STRING	Revision level of the SEMI S/A Network Standard of the device; "E54-0997"
5 (05_{hex})	Get	Manufacturer's Name	SHORT STRING	Manufacturer of the device; "Leybold Vacuum GmbH"
6 (06_{hex})	Get	Manufacturer's Model Number	SHORT STRING	Part number of the turbo controller; format example: 800075V0006
7 (07_{hex})	Get	Software Revision Level	SHORT STRING	Software revision of the turbo controllers main firmware; format example: 030307
8 (08_{hex})	Get	Hardware Revision Level	SHORT STRING	Software revision of the turbo controllers main firmware; format example: 010202
9 (09_{hex})	Get	Manufacturer's Serial Number	SHORT STRING	Serial number of the turbo controller; format example: 30000187517
10 ($0A_{hex}$)	Get	Device Configuration	SHORT STRING	Reserved for future use, empty string.
11 ($0B_{hex}$)	Get	Device Status	USINT	Status of the DeviceNet Interface Gateway and the internal data exchange 0 = Undefined 1 = Self Testing 2 = Idle 3 = Self-Test Except. 4 = Executing 5 = Abort 6 = Critical Fault 100 = Internal Serial Fault (internal data communication between DeviceNet gateway and pump controller fails) 101 = Invalid Mapping Table (an error was detected in the pump controller specific parameter translation file)
12 ($0C_{hex}$)	Get	Exception Status	BYTE	"Expanded Method" of the Exception Status Bit Map: bit 0: ALARM/device-common bit 1: ALARM/device-specific bit 2: ALARM/manufacturer-specific bit 3: 0 bit 4: WARNING/device-common bit 5: WARNING/ device-specific bit 6: WARNING/ manufacturer-specific bit 7: 1 = Expanded Method
13 ($0D_{hex}$)	Get	Exception Detail Alarm	STRUCTs of in summary 14 bytes	A Structure of three Structures containing a bit mapped representation of the Alarm detail; see the table below for detailed description of the contents
14 ($0E_{hex}$)	Get	Exception Detail Warning	STRUCTs of in summary 14 bytes	A Structure of three Structures containing a bit mapped representation of the Warning detail; see the table below for detailed description of the contents

Attr. ID	Access Rule	Name	DeviceNet Data Type	Description; actual value
15 ($0F_{hex}$)	Set	Alarm Enable	BOOL	Controls setting of Alarm bits 0 = Alarms disabled 1 = Alarms enabled (default); see Section 3.7.1
16 (10_{hex})	Set	Warning Enable	BOOL	Controls setting of Warning bits 0 = Warnings disabled 1 = Warnings enabled (default)); see Section 3.7.2

3.7.1 Alarms

Data Component	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Common Exception Detail Size	0	0	0	0	0	0	1	0
Common Exception Detail Byte 0	Reserved	Real-time Fault	reserved	Data Memory	Non-Volatile Memory	Code Memory	Micro-processor	Diagnostic
Common Exception Detail Byte 1	Reserved	Reset Exception	Notify Vendor	Scheduled Maint. Due	PS Input Voltage	PS Output Voltage	Reserved	PS Over Current
Turbo Pump Device Exception Detail Size	0	0	0	0	0	0	1	0
Turbo Pump Device Exception Detail Byte 0	reserved	Startup Timeout	Speed Trip	Over-current	Over-speed	Mains Failure	reserved	reserved
Turbo Pump Device Exception Detail Byte 1	0	Inter-locked	reserved	Cable Fault	Controller Overheat	reserved	Motor Case Overheat	reserved
Manufacturer Exception Detail Size **	0	0	0	0	0	1	1	1
Turbo Pump Device Exception Detail Byte 0	Dropped to minimal frequency	Overload time exceeded	System overloaded	Motor current high	Internal Security system activated	Internal Self test failed	Frequency Error	Emergency stop circuit activated
Turbo Pump Device Exception Detail Byte 1	reserved	reserved	Converter tempera-ture too high	reserved	reserved	Cooling water tempera-ture high	Pump tempera-ture high	reserved
Turbo Pump Device Exception Detail Byte 2	Generator mode activated	Maximum frequency exceeded	Maximum power exceeded const "0"	Accele-ration time exceeded	No motor current	const "0"	Internal communi-cation failed	Communica-tion to Turbopump failed
Turbo Pump Device Exception Detail Byte 3 & 4	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved
Turbo Pump Device Exception Detail Byte 5	reserved	reserved	reserved	reserved	reserved	Internal control temperature incorrect const "0"	Internal control voltage incorrect const "0"	Main power out of tolerances const "0"
Turbo Pump Device Exception Detail Byte 6	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved

3.7.2 Warnings

Data Component	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Common Exception Detail Size	0	0	0	0	0	0	1	0
Common Exception Detail Byte 0	Reserved	Real-time Fault	reserved	Data Memory	Non-Volatile Memory	Code Memory	Micro-processor	Diagnostic
Common Exception Detail Byte 1	Reserved	Reset Exception	Notify Vendor	Scheduled Maint. Due	PS Input Voltage	PS Output Voltage	Reserved	PS Over-current
Turbo Pump Device Exception Detail Size	0	0	0	0	0	0	1	0
Turbo Pump Device Exception Detail Byte 0	reserved	Startup Timeout const "0"	Speed Trip	Over-current	Over-speed	Mains Failure	reserved	reserved
Turbo Pump Device Exception Detail Byte 1	0	Inter-locked const "0"	reserved	Cable Fault* const "0"	Controller Overheat	reserved	Motor Case Overheat	reserved
Manufacturer Exception Detail Size **	0	0	0	0	0	1	1	1
Turbo Pump Device Exception Detail Byte 0	Dropped to minimal frequency const "0"	Overload time exceeded const "0"	System over-loaded	Motor current high	Internal Security system activated	Internal Self test failed	Frequency Error const "0"	Emergency stop circuit activated const "0"
Turbo Pump Device Exception Detail Byte 1	reserved	reserved	Converter tempera-ture too high	reserved	reserved	Cooling water tempera-ture high	Pump tempera-ture high	reserved
Turbo Pump Device Exception Detail Byte 2	Generator mode activated const "0"	Maximum frequency exceeded	Maximum power exceeded const "0"	Accelera-tion time exceeded const "0"	No motor current	const "0"	Internal communi-cation failed	Communi-cation to Turbopump failed
Turbo Pump Device Exception Detail Byte 3 & 4	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved
Turbo Pump Device Exception Detail Byte 5	reserved	reserved	reserved	reserved	reserved	Internal control temperature incorrect	Internal control voltage incorrect const "0"	Main power out of tolerances const "0"
Turbo Pump Device Exception Detail Byte 6	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved

Objects

3.8 S-Analog Sensor Object

Class Code: 49 (31_{hex})

3.8.1 Pump Temperature (Instance 2)

(Cooling Water Temperature)

Attr. ID	Access Rule	Attribute Name	Data Type	Description of Attribute
5 (05_{hex})	Get	Reading Valid	BOOL	Indicates that the Value attribute contains a valid value. 0 = value invalid 1 = value valid
6 (06_{hex})	Get	Value	INT	Actual case temperature (cooling water) value [1/10 degrees Centigrade (Celsius)]
7 (07_{hex})	Get	Status	BYTE	Alarm and Warning State of the case temperature
17 (11_{hex})	Get	Alarm Trip Point High	INT	Case temperature (cooling water) Alarm limit (determines the Value above which an Alarm condition will occur) [1/10 degrees Centigrade (Celsius)]
21 (15_{hex})	Get	Warning Trip Point High	INT	Case temperature (cooling water) Warning limit (determines the Value above which an Warning condition will occur) [1/10 degrees Centigrade (Celsius)]

3.8.2 Converter Unit Temperature (Instance 4)

Attr. ID	Access Rule	Attribute Name	Data Type	Description of Attribute
5 (05_{hex})	Get	Reading Valid	BOOL	Not supported; value always = 1
6 (06_{hex})	Get	Value	INT	Actual controller unit temperature value [1/10 degrees Centigrade (Celsius)]
7 (07_{hex})	Get	Status	BYTE	Alarm and Warning State of the controller unit temperature
17 (11_{hex})	Get	Alarm Trip Point High	INT	Not supported; value always = 0
21 (15_{hex})	Get	Warning Trip Point High	INT	Not supported; value always = 0

Notes

Sales and Service

Germany

Oerlikon
Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 1234
Fax: +49-(0)221-347 1245
sales.vacuum@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area North/East
Branch Office Berlin
Buschkrugallee 33
1. Obergeschoss
D-12359 Berlin
Phone: +49-(0)30-435 609 0
Fax: +49-(0)30-435 609 10
sales.vacuum.bn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area South/Southwest
Branch Office Munic
Sendlinger Strasse 7
D-80331 Munic
Phone: +49-(0)89-357 33 9-10
Fax: +49-(0)89-357 33 9-33
sales.vacuum.mn@oerlikon.com
service.vacuum.mn
@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area West & Benelux
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 1270
Fax: +49-(0)221-347 1291
sales.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Service Competence Center
Emil-Hoffmann-Strasse 43
D-50996 Cologne-Suerth
Phone: +49-(0)221-347 1439
Fax: +49-(0)221-347 1945
service.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Mobil Customer Service
Emil-Hoffmann-Strasse 43
D-50996 Cologne-Suerth
Phone: +49-(0)221-347 1765
Fax: +49-(0)221-347 1944
service.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH,
Dresden
Zur Wetterwarte 50, Haus 304
D-01109 Dresden
Service:
Phone: +49-(0)351-88 55 00
Fax: +49-(0)351-88 55 041
info.vacuum.dr@oerlikon.com

Europe

Belgium

Oerlikon
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.vacuum.zv@oerlikon.com
Service:
Phone: +32-2-711 00 82
Fax: +32-2-720 83 38
service.vacuum.zv@oerlikon.com

France

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

Oerlikon
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
info.vacuum.vc@oerlikon.com

Great Britain

Oerlikon
Leybold Vacuum UK LTD.
Unit 2
Silverglade Business Park
Leatherhead Road
UK-Chessington, Surrey KT9 2QL
Sales:
Phone: +44-13-7273 7300
Fax: +44-13-7273 7301
sales.vacuum.ln@oerlikon.com
Service:
Phone: +44-20-8971 7030
Fax: +44-20-8971 7003
service.vacuum.ln@oerlikon.com

Italy

Oerlikon
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.vacuum.mi@oerlikon.com
Service:
Phone: +39-02-27 22 31
Fax: +39-02-27 22 32 17
service.vacuum.mi@oerlikon.com

Oerlikon
Leybold Vacuum Italia S.p.A.
Field Service Base
Z.I. Le Capanne
I-05021 Acquasparta (TR)
Phone: +39-0744-93 03 93
Fax: +39-0744-94 42 87
service.vacuum.mi@oerlikon.com

Netherlands

Oerlikon
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.vacuum.ut@oerlikon.com
service.vacuum.ut@oerlikon.com

Spain

Oerlikon
Leybold Vacuum Spain, S.A.
C/ Huelva, 7
E-08940 Cornellà de Llobregat
(Barcelona)
Sales:
Phone: +34-93-666 46 16
Fax: +34-93-666 43 70
sales.vacuum.ba@oerlikon.com
Service:
Phone: +34-93-666 49 51
Fax: +34-93-685 40 10

Sweden

Oerlikon
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.vacuum.gt@oerlikon.com
Visiting/delivery address:
Datavägen 57B
SE-43632 Askim

Switzerland

Oerlikon
Leybold Vacuum Schweiz AG
Leutschenbachstrasse 55
CH-8050 Zürich
Sales:
Phone: +41-044-308 40 50
Fax: +41-044-302 43 73
sales.vacuum.zh@oerlikon.com
Service:
Phone: +41-044-308 40 62
Fax: +41-044-308 40 60

America

USA

Oerlikon
Leybold Vacuum USA Inc.
5700 Mellon Road
Export, PA 15632
Phone: +1-724-327-5700
Fax: +1-724-325-3577
info.vacuum.ex@oerlikon.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

Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co., Ltd.
Beichen Economic
Development Area (BEDA),
Shanghai Road
Tianjin 300400
China
Sales and Service:
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
Fax: +86-22-2697 2017
sales.vacuum.tj@oerlikon.com

Oerlikon
Leybold Vacuum
(Tianjin) Co., Ltd.
Beichen Economic
Development Area (BEDA),
Shanghai Road
Tianjin 300400
China
Sales and Service:
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
Fax: +86-22-2697 2017
info.vacuum.tj@oerlikon.com

Oerlikon
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
info.vacuum.sh@oerlikon.com

Oerlikon
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
info.vacuum.gz@oerlikon.com

Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co., Ltd.
Beijing Branch:
1-908, Beijing Landmark Towers
8 North Dongsanhuan Road
Chaoyang District
Beijing 100004
China
Sales:
Phone: +86-10-6590-7622
Fax: +86-10-6590-7607

India

Oerlikon
Leybold Vacuum India Pvt Ltd.
EL-22, J Block
MIDC Bhosari
Pune 411026
India
Sales:
Phone: +91-20-3061 60000
Fax: +91-20-2712 1571
sales.vacuum.pu@oerlikon.com

Japan

Oerlikon
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: +81-45-471-3330
Fax: +81-45-471-3323

Oerlikon
Leybold Vacuum
Japan Co., Ltd.
Osaka Sales Office
5-13, Kawagishi-cho
Suita-chi
Osaka-fu
Phone: +81-6-4860-2212
Fax: +81-45-471-3323

Oerlikon
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: +81-29-889-2841
Fax: +81-29-889-2838

Korea

Oerlikon
Leybold Vacuum Korea Ltd.
#761-4, Yulkeum-ri
SungHwan-eup, Cheonan-City
Choongchung-Namdo
330-807 Korea
Sales:
Phone: +82-41-580-4420
Fax: +82-41-588-3737
Service:
Phone: +82-41-580-4415
Fax: +82-41-588-3737

Singapore

Oerlikon
Leybold Vacuum
Singapore Pte Ltd.
No. 1, International
Business Park,
B1-20B, The Synergy
Singapore 609917
Sales and Service:
Phone: +65-6665 2910
Fax: +65-6566 8202
sales.vacuum.sg@oerlikon.com

Taiwan

Oerlikon
Leybold Vacuum Taiwan Ltd.
No 416-1, Sec. 3
Chung-Hsin Rd., Chu-Tung
Hsin-Chu, Taiwan, R.O.C.
Sales and Service:
Phone: +886-3-500 1688
Fax: +886-3-583 3999
sales.vacuum.hc@loerlikon.com

LV_08619_2006 08.06

Oerlikon
Leybold Vacuum USA Inc.
5700 Mellon Road
Export, PA 15632
Phone: +1-724-327-5700
Fax: +1-724-325-3577
info.vacuum.ex@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 0
Fax: +49-(0)221-347 1250
info.vacuum@oerlikon.com

oerlikon
leybold vacuum

www.oerlikon.com