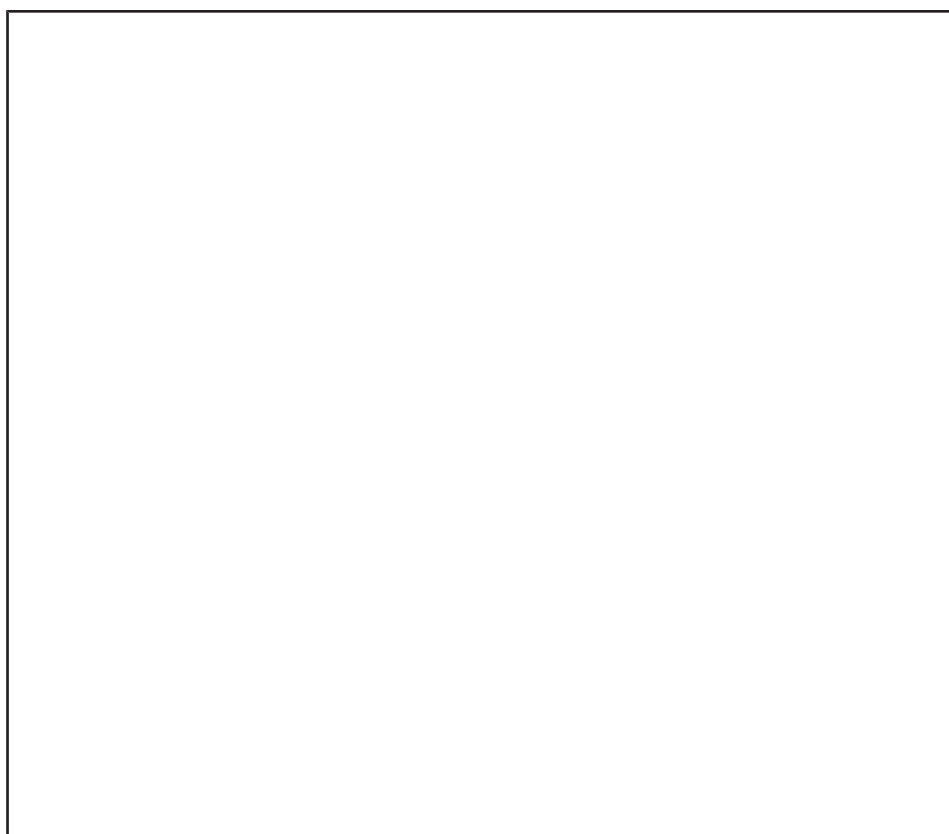


Field Bus Module

## **LON module**

PumpDrive 2

## **Supplementary Operating Manual**



## **Legal information/Copyright**

Supplementary Operating Manual LON module

Original operating manual

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## 1 Supplementary Operating Manual

### 1.1 General

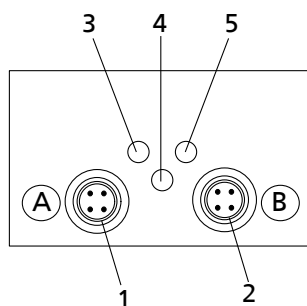
This supplementary operating manual accompanies the installation/operating manual. All information contained in the installation/operating manual must be observed.

**Table 1:** Relevant operating manuals

Type series	Reference number of the operating/installation manual
PumpDrive 2	4074.81

### 1.2 Field bus module connections

The field bus modules are plug-in modules.



**Fig. 1:** Field bus module

**Table 2:** Field bus module

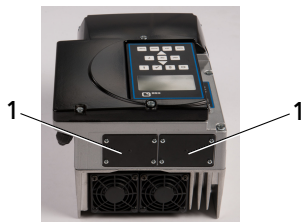
Item	Component	Description
1	M12 connector A	A-coded
2	M12 socket B	A-coded
3	Green LED signal lamp	Communication on field bus side active
4	Amber LED signal lamp	Field bus module communication OK (heartbeat detected)
5	Red LED signal lamp	Power supply connected

- Can be retrofitted
- Internal T-connector (bus looped through); uninterruptible even in the event of a frequency inverter power failure
- Connector for self assembly

### 1.3 Installing the field bus module

The field bus module can be fitted in an available slot of the frequency inverter.

**Blind cover**



**Fig. 2:** Blind cover

1	Blind cover
---	-------------

1. Unscrew the cross recessed head screws in the blind cover.
2. Remove the blind cover.

**Field bus module**

1. Carefully insert the field bus module into the open slot. The plug-in module is guided on rails until it engages in the contact.




**Fig. 3:** Inserting the field bus module



**Fig. 4:** Securing the field bus module


2. Secure the field bus module using the 4 cross recessed head screws. IP55 enclosure protection is not provided until the screws have been tightened.

	<p><b>CAUTION</b></p> <p><b>Incorrect assembly</b> Impairment of protection provided by the enclosure (protection may be compromised)!</p> <ul style="list-style-type: none"> <li>▷ Cover unused M12 connections with a cap (included in the scope of supply).</li> </ul>
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#### 1.4 Connecting the field bus module

Observe the following when connecting the field bus module:

- Before the bus connection is established among the nodes, potential equalisation must have been implemented and checked.
- For high-frequency shielding, use shielded cables and assemble according to EMC requirements.
- A minimum distance of 0.3 metres is recommended between such cables and other electric conductors.
- Do not use the bus cable to make any further connections in addition to the field bus module (for example, 230 V alert and 24 V start).
- A cable specified for the field bus module must be used as the connecting cable.

	<p><b>CAUTION</b></p> <p><b>Incorrect installation</b> Damage to the field bus module!</p> <ul style="list-style-type: none"> <li>▷ Never supply power to the field bus module via the M12 connections.</li> </ul>
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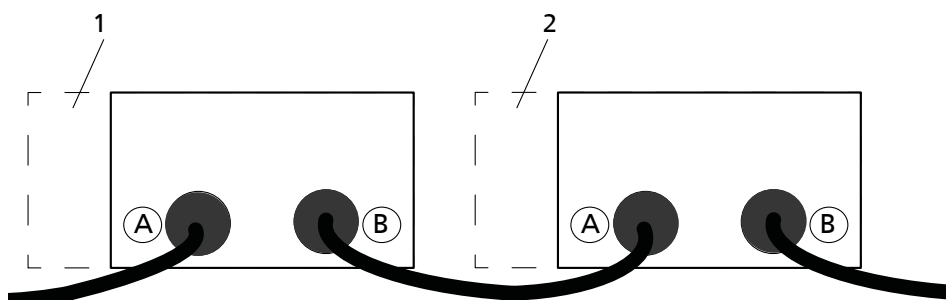


Fig. 5: Connecting the field bus module

Table 3: Connecting the field bus module

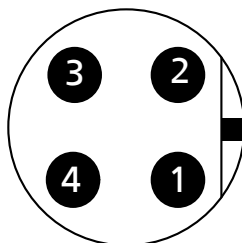
Item	Device	M12 connector
1	Frequency inverter 1	M12 connector A: Coming M12 socket B: Going
2	Frequency inverter 2	M12 connector A: Coming M12 socket B: Going

### 1.5 LON module

The LON module has a LON interface with LON protocol in accordance with the LON-Mark Pump Controller 8120 Version 1.0 specification. Configuration is done via parameters in the frequency inverter.

Functional profile:	Pump Controller 8120 Version 1.0
Bus terminator:	External
Interface:	FTT-10A
Service PIN:	Activated via parameter 3-12-3-1 on the control panel

a)



b)

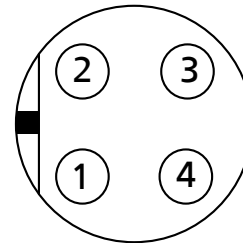


Fig. 6: Pin assignment: a) Contact arrangement of M12 connector, b) Contact arrangement of M12 socket

Table 4: Pin assignment

Pin	Conductor colour code	M12 connector/ M12 socket assignment (A coding)
1	-	-
2	Brown	LON B
3	-	-
4	White	LON A
5	-	-
Thread	Shielding	Shielding

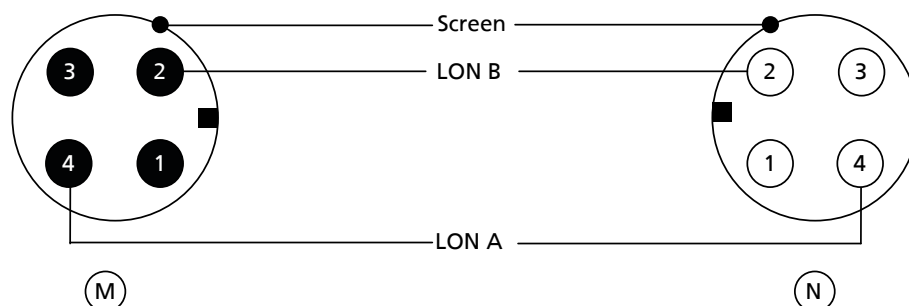


Fig. 7: User-configured cable

(M)	M12 socket	(N)	M12 connector
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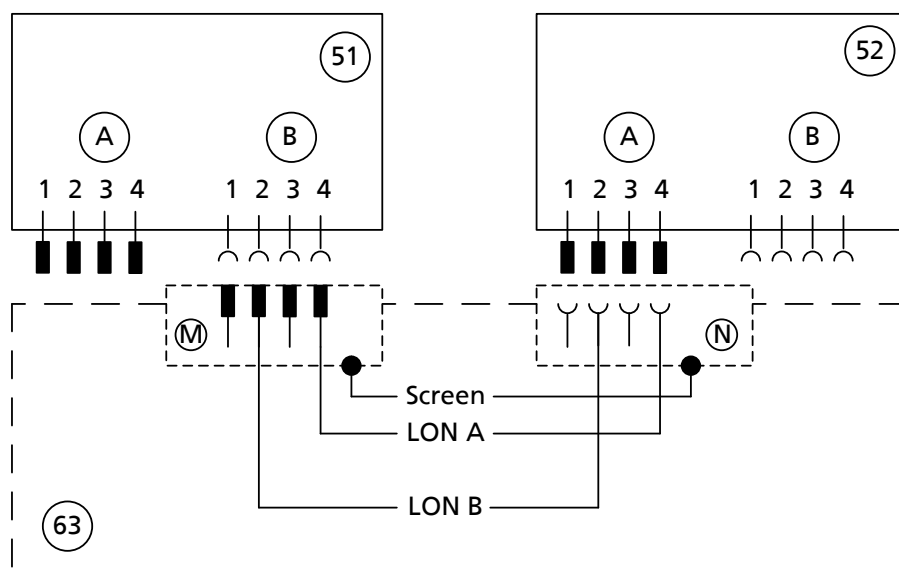


Fig. 8: Wiring diagram

**Bus terminator** The terminating resistors of the LON module conform to the following standard:  
FTT-10A-Transceiver



#### NOTE

The frequency inverter is reset when a field bus module is replaced or retrofitted. Menu 3-12 for setting the parameters of the field bus module is then enabled in the control panel.

### 1.6 Commissioning and operating the frequency inverter with a LON module



#### NOTE

If the Control Point parameter 3-6-2 is set to Field Bus, then the operating mode is automatically switched from Manual to Automatic. Only the OFF operating mode remains unchanged. This means that the motor can be switched off at any time, for example, with the OFF key.

#### Parameterising the heartbeat signal and the minimum transmission time

These configuration properties can be set by means of the LON module using the following assignments:

**Table 5:** Parameters for heartbeat signal and minimum transmission time

Parameter	Description	Field bus parameters	Unit	Factory setting
3-12-3-2	Maximum Transmission Time	nviSndHrBt	s	30
3-12-3-3	Minimum Transmission Time	nviMinOutTm	s	10
3-12-3-4	Maximum Timeout	nviRcvHrBt	s	20

#### Field bus parameter Override Stop

The Override Stop field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.

#### Field bus parameters nviOvdSpeed, nviOvdPress and nviOvdFlow

The 3 field bus parameters nviOvdSpeed, nviOvdPress and nviOvdFlow have the same priority. The active field bus parameter is always the parameter that has become active last.

**Override Speed** The Override Speed field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input. The frequency inverter is started/stopped by means of the Override Stop field bus parameter.
- The analog input function is not set to Setpoint/Control Value (Auto).

**Override Pressure** The Override Pressure field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.
- The analog input function is not set to Setpoint/Control Value (Auto).
- The Override Pressure field bus parameter requires a pressure sensor at the analog input as an actual value source.

**Override Flow** The Override Flow field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.
- The analog input function is not set to Setpoint/Control Value (Auto).
- The Override Flow field bus parameter requires a flow sensor at the analog input as an actual value source.

#### Field bus parameters nviRemotePress, nviRemoteFlow and nviRemoteTemp

ThenviRemotePress, nviRemoteFlow and nviRemoteTemp field bus parameters have the same priority. Only one of these 3 control modes can be selected for the application. The nviRemotePress field bus parameter can be used for the discharge pressure, suction pressure or differential pressure.



#### NOTE

HVAC\_AUTO must be written once to the nviPumpOpMode field bus parameter before thenviRemotePress, nviRemoteFlow or nviRemoteTemp field bus parameters are used. The default setting of this field bus parameter is HVAC\_NUL.



**nviRemotePress** The nviRemotePress field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.
- The analog input function is not set to Setpoint/Control Value (Auto).
- Parameter 3-6-3 Actual Value Source is set to Field Bus.
- No pressure sensor is connected or parameterised at the analog input of PumpDrive 2.

**nviRemoteFlow** The nviRemoteFlow field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.
- The analog input function is not set to Setpoint/Control Value (Auto).
- Parameter 3-6-3 Actual Value Source is set to Field Bus.
- No flow sensor is connected or parameterised at the analog input of PumpDrive 2.

**nviRemoteTemp** The nviRemoteTemp field bus parameter is active only in combination with the following settings:

- Parameter 3-6-2 Control Point is set to Field Bus.
- System start is not configured to take place via a digital input.
- The analog input function is not set to Setpoint/Control Value (Auto).
- Parameter 3-6-3 Actual Value Source is set to Field Bus.
- No temperature sensor is connected or parameterised at the analog input of PumpDrive 2.

## 1.7 Field bus parameters

The functions and the commissioning procedure described below for the frequency inverter are based on the PumpController 8120 V1.0 functional profile.

The assignment of the numbers of network variables to names of variables in the LON module does not conform to this profile definition and is specified in the table below.

**Table 6:** Assignment of network variable numbers to names of variables

Number of network variable	Name of variable	SNVT name	SNVT index	Description
0 (M)	nviPumpSetpoint	SNVT_switch	95	Pump setpoint for normal operation
1 (M)	nviPumpOpMode	SNVT_hvac_mode	108	Required operating mode of pump
2 (O)	nviPumpOvdStop	SNVT_switch	95	Stop command for pump override
3 (O)	nviOvdSpeed	SNVT_lev_percent	81	Override setpoint for speed
4 (O)	nviOvdPress	SNVT_press	30	Override setpoint for pressure
5 (O)	nviOvdFlow	SNVT_flow_p	161	Override setpoint for flow
6 (O)	nviRemotePress	SNVT_press	30	Remote differential pressure sensor
7 (O)	nviRemoteFlow	SNVT_flow_p	161	Remote flow sensor
8 (O)	nviRemoteTemp	SNVT_temp_p	105	Remote temperature sensor
9 <sup>1)</sup>	nviSndHrBt	SNVT_time_sec	107	Transmit heartbeat signal
10 <sup>1)</sup>	nviRcvHrBt	SNVT_time_sec	107	Receive heartbeat signal
11 <sup>1)</sup>	nviMinOutTm	SNVT_time_sec	107	Minimum transmission time
12 (M)	nvoPumpCapacity	SNVT_lev_percent	81	Pump output as a percentage of the maximum value
13 (M)	nvoEffOpMode	SNVT_hvac_mode	108	Effective operating mode

1)

Number of network variable	Name of variable	SNVT name	SNVT index	Description
14 (M)	nvoControlMode	SNVT_dev_c_mode	162	Effective device control mode
15 (O)	nvoPumpStatus	SNVT_dev_status	173	Diagnosis information about pump status
16 (O)	nvoPressure	SNVT_press	30	Pump pressure
17 (O)	nvoFlow	SNVT_flow_p	161	Pump flow
18 (O)	nvoSpeed	SNVT_rpm	102	Pump speed
19 (O)	nvoPumpOverride	SNVT_switch	95	Pump override active
20 (O)	nvoRuntime	SNVT_time_hour	124	Operating hours
21 (O)	nvoPumpFault	SNVT_dev_fault	174	Pump faults
22 (O)	nvoMaintenance	SNVT_dev_maint	175	Maintenance interval
23 (O)	nvoFluidTemp	SNVT_temp_p	105	Fluid temperature
24 (O)	nvoPower	SNVT_power	27	Electrical input power in watts
25 (O)	nvoPowerkilo	SNVT_power_kilo	28	Electrical input power in kilowatts
26 (O)	nvoEnergyConsum	SNVT_elec_kwh	13	Total energy consumption of the pump

The bits of the nvoPumpStatus and nvoPumpFault output variables are assigned to alerts and warnings as follows.

**Table 7:** Description of the nvoPumpFault field bus parameter

Byte	Bit	Name	Description	Frequency inverter message
1	0	sf_voltage_low	Motor undervoltage	A3 W52
1	1	sf_voltage_high	Motor overvoltage	A2 W51
1	2	sf_phase	Not used	-
1	3	sf_no_fluid	Dry running	A13 A14
1	4	sf_press_low	Not used	-
1	5	sf_press_high	Not used	-
1	6	sf_general_fault	General pump fault	A11 A15 A30 W50 W53 W56 W57 W58 W61 W62 W63 W71 W72 W73 W74 W30
1	7	Reserved	Not used	-
2	0	df_motor_temp	Thermal motor protection	A1
2	1	df_motor_failure	Motor alert	A4 A5 A9 A18 A19 A20
2	2	df_pump_blocked	Not used	-
2	3	df_elect_temp	Electrical system temperature alert	A7 A8 W59 W60
2	4	df_elect_failure_nf	Electrical system warning	W76 W77 W99
2	5	df_elect_failure	Electrical system alert	A6 A10 A21 A22 A98 A99
2	6	df_sensor_failure	Sensor fault	A16 W54 W55
2	7	df_general_fault	General device fault	A12

Byte 1 of the variable contains faults of the supply\_fault category, and byte 2 faults of the device\_fault category.

**Table 8:** Description of the nvoPumpStatus field bus parameter

Byte	Bit	Name	Description
1	0	device_fault	Collective alert device_fault
1	1	supply_fault	Collective alert supply_fault
1	2	speed_low	Minimum speed limit reached
1	3	speed_high	Maximum speed limit reached
1	4	-	Not used
1	5	-	Not used
1	6	setpt_out_of_range	The setpoint is outside the permissible range.

Byte	Bit	Name	Description
1	7	local_control	Actual operating mode is not the same as the operating mode requested via the LON module.
2	0	Running	Pump running
2	1	-	Not used
2	2	remote_press	Closed-loop control with external pressure sensor
2	3	remote_flow	Closed-loop control with external flow sensor
2	4	remote_temp	Closed-loop control with external temperature sensor
2	5	-	Not used
2	6	-	Not used
3	7	-	Not used



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