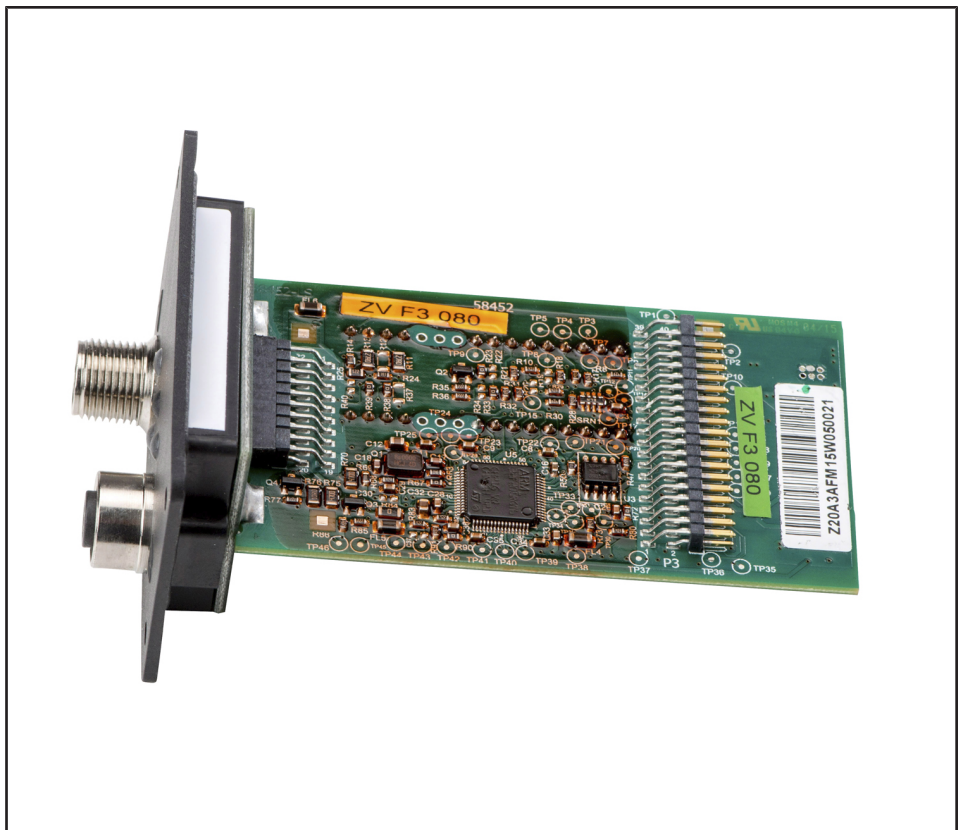# Modbus RTU Module

MyFlow Drive

# Supplementary Operating Manual



**KSB**

## Legal information/Copyright

Supplementary Operating Manual Modbus RTU Module

Original operating manual

# Contents

# 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 installation/operating manual |
|---|---|
| MyFlow Drive | 4074.83 |

## 1.2 Field bus module connections

The field bus modules are plug-in modules.
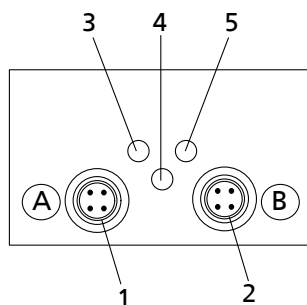


**Fig. 1:** Field bus module

**Table 2:** Field bus module

| Item | Component | Description |
|---|---|---|
| 1 | M12 connector A | B-coded |
| 2 | M12 socket B | B-coded |
| 3 | Green LED signal lamp | Communication on field bus side active/possible |
| 4 | Amber LED signal lamp | Internal bus communication OK (heartbeat detected) |
| 5 | Red LED signal lamp | Modbus malfunction or communication fault |

- 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 and connecting the field bus module

The available field bus module is a plug-in Modbus RTU module

The field bus module has the following properties:

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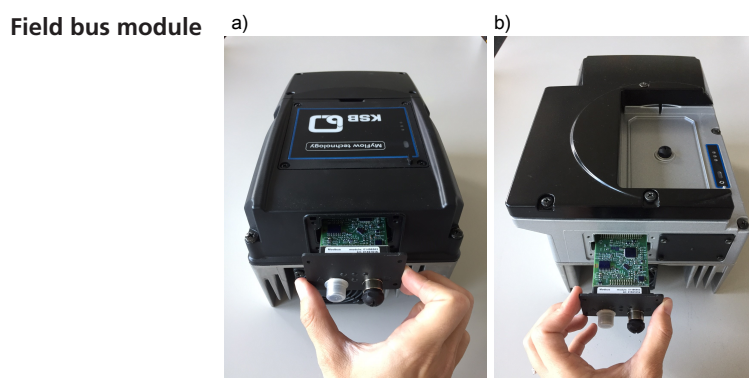- Connector for self -assembly

**Installing the field bus module**

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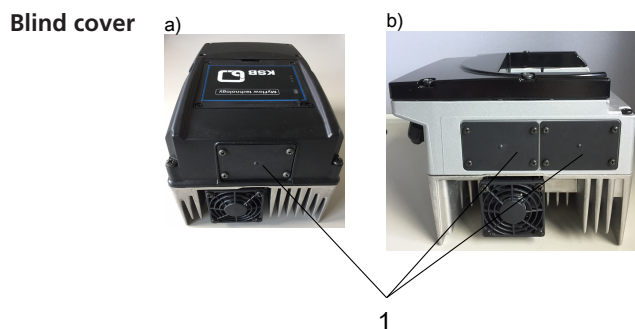
**Blind cover**



**Fig. 2:** Blind cover,
a) MyFlow Drive up to 11 kW, b) MyFlow Drive 15 kW and above

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

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

2. Remove the blind cover.

**Field bus module**



**Fig. 3:** Inserting the field bus module,
a) MyFlow Drive up to 11 kW, b) MyFlow Drive 15 kW and above

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.

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.
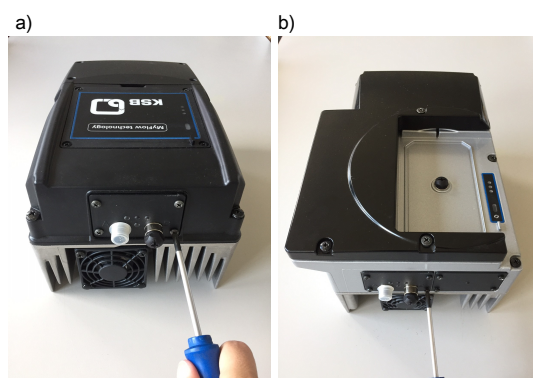


**Fig. 4:** Securing the field bus module,
a) MyFlow Drive up to 11 kW, b) MyFlow Drive 15 kW and above

| | **CAUTION** |
|---|---|
| | **Incorrect assembly** |
| | Impairment of protection provided by the enclosure (protection may be compromised)! |
| | ▷ Cover unused M12 sockets with a cap (included in the scope of supply). |

## 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.

| | **CAUTION** |
|---|---|
| | **Incorrect installation** |
| | Damage to the field bus module! |
| | ▷ Never supply power to the field bus module via the M12 connections. |
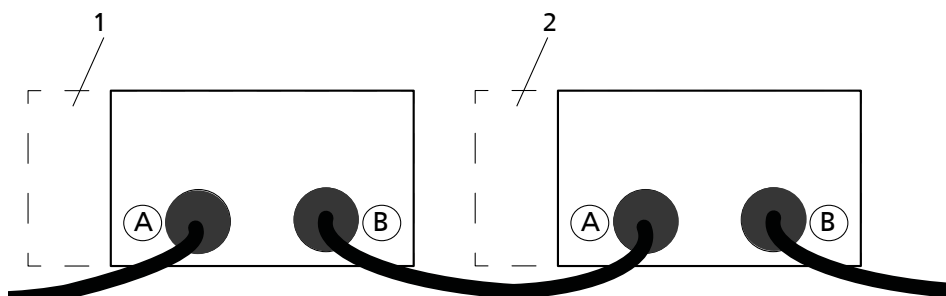


**Fig. 5:** Connecting the field bus module

**Table 3:** Connecting the field bus module

| Item | Device | M12 connector |
|---|---|---|
| 1 | Frequency inverter 1 | M12 connector A: Coming<br>M12 socket B: Going |
| 2 | Frequency inverter 2 | M12 connector A: Coming<br>M12 socket B: Going |

## 1.5 Modbus RTU module

The Modbus RTU module is equipped with an RS485 interface with the Modbus RTU protocol in accordance with specification V1.1b. Configuration takes place via frequency inverter parameters.

| | |
|---|---|
| Communication protocol | MODBUS (RTU) |
| Bus terminator | External |
| Interface | EIA-485 (RS485) |
| Transmission rate | 19,200 bit/s (variable) |
| Device type | Slave |
| Bus access | Polling between master and slave |
| Parity | ▪ Even |
| | ▪ Odd |
| | ▪ No Parity |

**Modbus RTU Module**

A cable specified for Modbus modules that has the following properties must be used as a connecting cable:

- ▪ Flexible
- ▪ Shielded
- ▪ Twisted wires for the data line (D0-D1)
- ▪ The wave impedance should be at least 100 ohms.
- ▪ Third core or second core pair for the common ground



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

**Table 4:** Pin assignment

| Pin | Core colour code | | Assignment of M12 connector/ M12 socket (B-coding) | Signal |
|---|---|---|---|---|
| | Cable (CAN open) | Cable (DIN 47100) | | |
| 1 | - | - | VP (+5V) | +5V |
| 2 | Blue | Brown | D- | RS-485 A / Data- |
| 3 | Black | Green | GND | GND |
| 4 | White | White | D+ | RS-485 B / Data + |
| 5 | Shielding | Shielding | Shielding | Shielding |
| Thread | - | - | Shielding | Shielding |
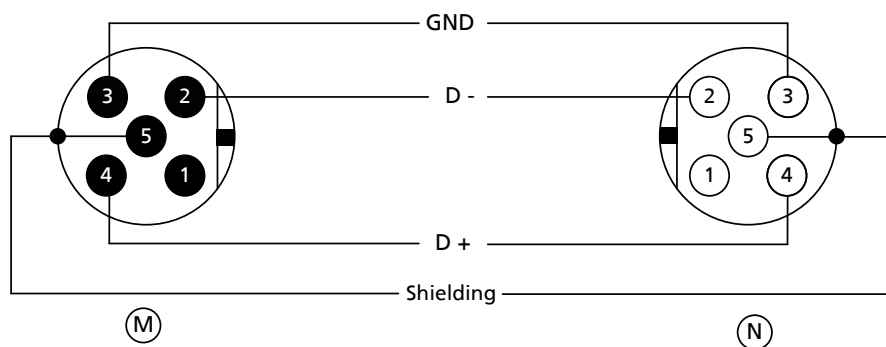


**Fig. 7:** User-configured cable

| Ⓜ | M12 connector | Ⓝ | M12 socket |
|---|---|---|---|
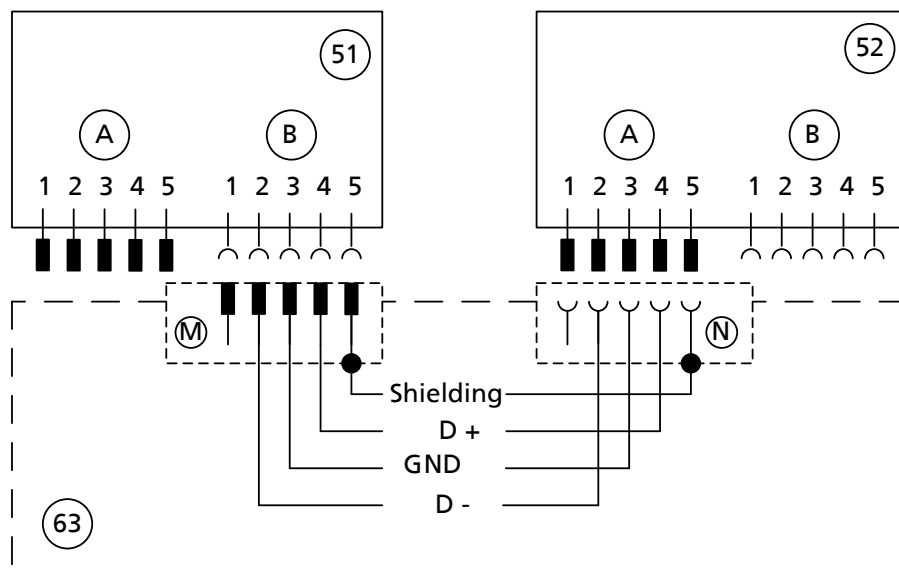
**Fig. 8:** Wiring diagram

**Bus terminator** The terminating resistors must conform to the following standard: Profibus standard DP DIN 19245, part 3, section 6.3.
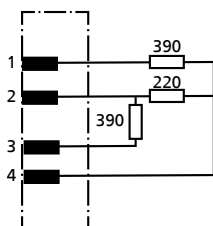


**Fig. 9:** Bus terminating resistor M12

The field bus terminating resistor can be plugged directly into the M12 socket. Bus polarisation does not take place if the field bus module is de-energised. If the bus terminator is to be independent of the field bus module power supply, it must be implemented externally using an active bus terminator.

> **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 Modbus RTU protocol

**Table 5:** Address range of system (0000 - 00FE)

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 0000 | Modbus Status | - | DWORD | 32-bit bit field | - | System Status | R | 0 | System connection OK |
| | | | | | | | | 1 | Pump online |

**Modbus RTU Module**

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 0004 - 001E | *Reserved* | - | - | - | - | - | - | - | - |
| 0020 | System Start/Stop | 1-3-1 | DWORD | Boolean | - | System Control | R/W | - | - |
| 0022 - 0028 | *Reserved* | - | - | - | - | - | - | - | - |
| 002A | Control Point | 3-6-2 | DWORD | ENUM | - | System Control | R | - | Local = 0 |
|  |  |  |  |  |  |  |  |  | Field bus = 1 |
| 002C - 00FE | *Reserved* | - | - | - | - | - | - | - | - |

**Table 6:** Address range of pump: 0x100 - 0x01FF

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 0100 | Pump Status | - | DWORD | ENUM | - | Pump Status | R | - | Pump stopped = 1 |
|  |  |  |  |  |  |  |  |  | Pump running = 2 |
|  |  |  |  |  |  |  |  |  | Pump starting = 3 |
|  |  |  |  |  |  |  |  |  | Pump stopping = 4 |
|  |  |  |  |  |  |  |  |  | Pump stopped and interlocked = 5 |
|  |  |  |  |  |  |  |  |  | Pump running and interlocked = 6 |
|  |  |  |  |  |  |  |  |  | Pump on standby = 7 |
| 0102 | Pump Alerts |  | DWORD | 32-bit bit field | - | Pump Status | R | 0 | Thermal motor protection |
|  |  |  |  |  |  |  |  | 1 | Overvoltage |
|  |  |  |  |  |  |  |  | 2 | Undervoltage |
|  |  |  |  |  |  |  |  | 3 | Phase failure (motor) |
|  |  |  |  |  |  |  |  | 4 | Short circuit |
|  |  |  |  |  |  |  |  | 5 | Hardware fault |
|  |  |  |  |  |  |  |  | 6 | Heat sink temperature high |
|  |  |  |  |  |  |  |  | 7 | PCB temperature high |
|  |  |  |  |  |  |  |  | 8 | Overcurrent |
|  |  |  |  |  |  |  |  | 9 | Braking resistor |
|  |  |  |  |  |  |  |  | 10 | Dynamic overload protection |
|  |  |  |  |  |  |  |  | 11 | Reserved |
|  |  |  |  |  |  |  |  | 12 | Dry running |

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 0102 | Pump Alerts | | DWORD | 32-bit bit field | - | Pump Status | R | 13 | Reserved |
| | | | | | | | | 14 | Hydraulic blockage |
| | | | | | | | | 15 | Reserved |
| | | | | | | | | 16 | No matching motor data available |
| | | | | | | | | 17 | No motor data available |
| | | | | | | | | 18 | AMA fault |
| | | | | | | | | 19 | Reserved |
| | | | | | | | | 20 | 24 V undervoltage |
| | | | | | | | | 21 | Reserved |
| | | | | | | | | 22 | IO hardware test not passed |
| | | | | | | | | 23 | Reserved |
| 0104 | *Reserved* | - | - | - | - | Pump Status | R | - | - |
| 0106 | Pump Warnings | | DWORD | 32-bit bit field | - | Pump Status | - | 0 | Dynamic overload protection |
| | | | | | | | | 1 | Overvoltage |
| | | | | | | | | 2 | Undervoltage |
| | | | | | | | | 3 | Reserved |
| | | | | | | | | 4 | Reserved |
| | | | | | | | | 5 | Reserved |
| | | | | | | | | 6 | Hydraulic blockage |
| | | | | | | | | 7 | Reserved |
| | | | | | | | | 8 | Reserved |
| | | | | | | | | 9 | Heat sink temperature high |
| | | | | | | | | 10 | PCB temperature high |
| | | | | | | | | 11 | Current high |
| | | | | | | | | 12 | Current low |
| | | | | | | | | 13 | Reserved |
| | | | | | | | | 14 | Reserved |
| | | | | | | | | 15 | Reserved |
| | | | | | | | | 16 | Power high |
| | | | | | | | | 17 | Power low |
| | | | | | | | | 18 | Limited stop ramp |
| | | | | | | | | 19 | 24 V overload |
| | | | | | | | | 20 | Reserved |
| | | | | | | | | 21 | General settings loaded |
| | | | | | | | | 22 | Reserved |
| 0108 | *Reserved* | - | - | - | - | - | - | - | - |
| 010A | Information on pump | - | DWORD | 32-bit bit field | - | Pump Status | R | 0 | Reserved |
| | | | | | | | | 1 | Drive disabled |

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 010A | Information on pump | - | DWORD | 32-bit bit field | - | Pump Status | R | 2 | Reserved |
| 010C - 0112 | Reserved | - | - | - | - | - | - | - | - |
| 0114 | Speed | 1-2-1-1 | DWORD | Float32 | Speed | Pump Process Variable | R | - | - |
| 0116 | Motor Input Power | 1-2-1-2 | DWORD | Float32 | Output base unit | Pump Process Variable | R | - | - |
| 0118 | Pump Input Power | 1-2-1-3 | DWORD | Float32 | Output base unit | Pump Process Variable | R | - | - |
| 011A | Pump Set Input Power | 1-2-14 | DWORD | Float32 | Output base unit | Pump Process Variable | R | - | - |
| 011C | Motor Current | 1-2-1-5 | DWORD | Float32 | Current | Pump Process Variable | R | - | - |
| 011E | Motor Voltage | 1-2-1-6 | DWORD | Float32 | Voltage | Pump Process Variable | R | - | - |
| 0120 | Output Frequency | 1-2-1-7 | DWORD | Float32 | Frequency | Pump Process Variable | R | - | - |
| 0122 | DC Link Voltage | 1-2-1-8 | DWORD | Float32 | Voltage | Pump Process Variable | R | - | - |
| 0124 | Heat Sink Temperature | 1-2-1-9 | DWORD | Float32 | Temperature base unit | Pump Process Variable | R | - | - |
| 0126 | PCB Temperature | 1-2-1-10 | DWORD | Float32 | Temperature base unit | Pump Process Variable | R | - | - |
| 0128 | Motor Torque | 1-2-1-11 | DWORD | Float32 | Torque | Pump Process Variable | R | - | - |
| 012A - 0132 | Reserved | - | - | - | - | - | - | - | - |
| 0134 | Energy Meter (kWh) | 1-4-1-1 | DWORD | UINT32 | kWh | Pump Process Variable | R | - | - |
| 0136 | Frequency Inverter Operating Hours | 1-4-2-1 | DWORD | UINT32 | Hours | Pump Process Variable | R | - | - |
| 0138 | Pump Operating Hours | 1-4-2-3 | DWORD | UINT32 | Hours | Pump Process Variable | R | - | - |
| 013A | Number of Starts | 1-4-2-5 | DWORD | UINT32 | - | Pump Process Variable | R | - | - |
| 013C | Reserved | - | - | - | - | - | - | - | - |
| 013E | Time to Motor Bearing Service | 1-6-2 | DWORD | UINT32 | Hours | Pump Process Variable | R | - | - |
| 0140 | Reserved | - | - | - | - | - | - | - | - |
| 0142 | Reset Messages | | DWORD | Boolean | - | Pump Function | W | - | - |

| Modbus address | Parameter name | Menu number | Size | Data type | Unit | Group | Access rights (R: read, W: write) | Bit | Description |
|---|---|---|---|---|---|---|---|---|---|
| 0144 - 014E | Reserved | - | - | - | - | - | - | - | - |
| 0150 | Digital Input Status | 1-2-4-6 | DWORD | 32-bit bit field | - | Pump Process Variable | R | - | - |
| 0152 - 01FE | *Reserved* | - | - | - | - | - | - | - | - |