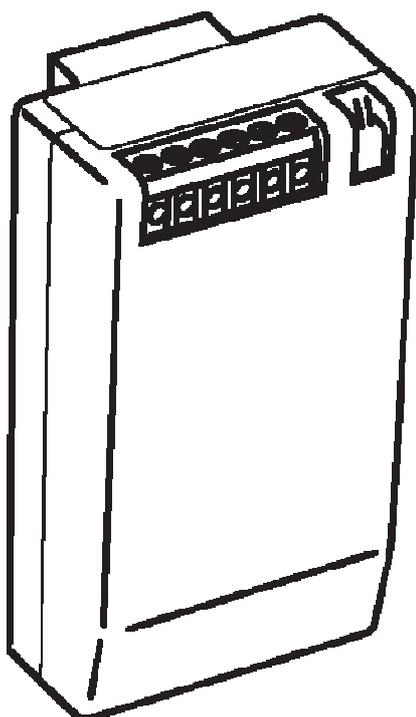


Pioneering for You

IF-Modul Modbus Stratos (2097808)



en Installation and operation instructions with functional description

1 General

1.1 About this document

The language of the original operating instructions is German. All other languages of these instructions are translations of the original operating instructions.

These installation and operating instructions are an integral part of the product. They must be kept readily available at the place where the product is installed. Strict adherence to these instructions is a precondition for the proper use and correct operation of the product.

These installation and operating instructions correspond to the relevant version of the product and the underlying safety standards valid at the time of going to print.

2 Safety

These operating instructions contain basic information which must be adhered to during installation and/or operation. For this reason, these operating instructions must, without fail, be read by the service technician and the responsible operator before installation and commissioning.

It is not only the general safety instructions listed under the main point "safety" that must be adhered to but also the special safety instructions with danger symbols included under the following main points.

2.1 Indication of instructions in the operating instructions

Symbols:



General danger symbol



Danger due to electrical voltage



NOTE

Signal words:

DANGER!

Acutely dangerous situation.

Non-observance results in death or the most serious of injuries.

WARNING!

The user can suffer (serious) injuries.

'Warning' implies that (serious) injury to persons is probable if this information is disregarded.

CAUTION!

There is a risk of damage to the product/unit.

'Caution' implies that damage to the product is likely if this information is disregarded.

NOTE: Useful information on handling the product.
It draws attention to possible problems.

2.2 Personnel qualifications

The installation, maintenance and repair personnel must have the necessary qualifications for this work.

2.3 Danger in the event of non-observance of the safety instructions

Non-observance of the safety instructions can result in risk of injury to persons and damage to product/unit. Non-observance of the safety instructions can result in the loss of any claims to damages.

In detail, non-observance can, for example, result in the following risks:

- Failure of important product/unit functions
- Failure of required maintenance and repair procedures
- Danger to persons from electrical, mechanical and bacteriological influences
- Property damage

2.4 Safety instructions for the operator

The existing directives for accident prevention must be adhered to. Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and those of local power supply companies must be adhered to.

This device is not intended to be operated by persons (including children) with impaired physical, sensory or mental capacities or lack of experience and/or lack of knowledge, except in cases where they are supervised by a person responsible for their safety or where they receive instructions from such a person as to how the device is to be operated. Children must be kept under supervision in order to ensure that they do not play with the device.

2.5 Safety instructions for inspection and installation work

The operator must ensure that all inspection and installation work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions.

Work on the product/unit should only be carried out when it has been brought to a standstill. It is mandatory that the procedure described in the installation and operating instructions for shutting down the product/unit be complied with.

2.6 Unauthorised modification and manufacture of spare parts

Modifications to the product are only permissible after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts can nullify the liability from the results of their usage.

2.7 Improper use

The operating reliability of the supplied product is only guaranteed if the product/unit is used as intended in accordance with Section 4 of the operating instructions. The limit values must on no account fall under or exceed those specified in the catalogue/data sheet.

3 Transport and interim storage

Immediately check the IF-Module for any transit damage on arrival. If damage is found, the necessary procedure involving the forwarding agent must be taken within the specified period.



CAUTION! Danger of damage to the IF-Module!

Danger of damage due to incorrect handling during transportation and storage.

The unit must be protected from moisture, frost and mechanical damage during transport and interim storage.

4 Intended Use

The IF-Modules are designed for external control and operating status signalling of Wilo pumps. The IF-Modules are not designed for safe deactivation of the pump.



DANGER! Risk of injury and material damage!

Using the control inputs for safety functions can lead to serious damage and injury.

4.1 Compatibility of pump firmware

To ensure the functionality of the module the following (or higher) firmware versions are necessary:

Pump	Version	Remark
WILO Stratos	5.09	

Fig. 4.1.1: pump types

N.B.: firmware version (SW) is on a sticker close to mains terminal.

5 Product information

5.1 Type key

Example: IF-Module Modbus

Key	Description
IF-Module	=Interface Module
IF-Module	=Interface Module
Modbus	Model/function identifier: Modbus = RS485 interface, Modbus RTU protocol BACnet = RS485 interface, BACnet MS/TP protocol

5.2 Technical Specifications

Technical Specifications

General data	
Terminal cross-section (finely stranded)	1.5 mm ²
Electric circuit	SELV, galvanically isolated
Interface in accordance with	EIA/TIA (RS) 485-A
Load (unit load)	1/8
Input voltage	Max. 12 V (differential A-B)
Termination resistor	120 Ω (integrated, switchable)
Double pump interface	
Interface type	Wilo specific, short circuit proof, polarity independent
Voltage	Max. 10 V _{SS}
Frequency	ca. 150 kHz
Cable length	max. 3 m

5.3 Scope of delivery

- IF-Module
- Installation and operating instructions
- CD with documentation
- EMC cable glands (1 x Pg 7, 1x Pg 9)

5.4 Standards

6 Description and function

The Stratos IF-Modules expand the pump to include communication interfaces in accordance with the RS485 standard and protocols as indicated by the type key. The modules also provide the connections for the double pump interface.

6.1 Description of the objects

6.2 Function



NOTE: All register addresses are raw addresses as they are transferred over the trunk. Sometimes an offset of 1 applies.

6.2.3 Holding Registers

Address	Name	Unit	Scale
1	Set Value	%	0.5
40	Pump Command		
42	Operation Mode		
44	Tmin for $\Delta p-c=f(T)$	K	0.1
45	Tmax for $\Delta p-c=f(T)$	K	0.1
46	pmin for $\Delta p-c=f(T)$	m H ₂ O	0.1
47	pmax for $\Delta p-c=f(T)$	m H ₂ O	0.1
300	Bus Command Timer		
408	PID Kp		0.01
409	PID Ti	s	0.01
410	PID Td	s	0.01

6.2.3.1 Set Value

property	value
Address	1
Unit	%
scale	0.5
Range low	0
Range high	200
Error value	65535

The set value sets the wanted Speed or Pressure (depending on Operation mode) in percent. The value for 100 % is given by the max values for speed or pressure. Everything below the minimum value (speed or pressure, Xmin) of the pump is ignored, and the pump runs at the minimum value. It is not possible to turn the pump off with this parameter.

6.2.3.40 Pump Command

property	value
Address	40
Error value	65535

Bit #	Name	Description
0	Pump on	pump is running
1	Min Speed	pump is running at minimum speed
2	Max Speed	pump is running at maximum speed
3	reserved (always 1)	do not use

This register controls the pump. It can be switched on or off. furthermore, the on/off command can be overridden with min or max values.

6.2.3.42 Operation Mode

property	value
Address	42
Range low	0
Range high	140
Error value	65535

Value	Name	Description
0	Unknown	do not use
1	CONST_SPEED (n-c)	Control mode constant speed (rotational speed of the impeller)
2	Reserved	do not use
3	CONST_DIFFPRESS ($\Delta p-c$)	Control mode constant differential pressure.
4	VAR_DIFFPRESS ($\Delta p-v$)	Control mode variable differential pressure (effective setpoint depends on current volume flow)
5	Reserved	do not use
6	TEMP_VARIABLE ($\Delta p-c=f(T)$)	Control mode where the constant differential pressure is a function of the fluid temperature (Stratos only)
140	CONST_CONTROL (PID)	Control mode Proportional Integral Differential for general purpose closed loop control

This register controls the operation mode of the pump. If a pump type does not support the current selected mode it will not follow the command. The current operation mode can be read back from [Input Register 10 \(#id62410\)](#).

6.2.3.44 Tmin for $\Delta p-c=f(T)$

property	value
Address	44
Unit	K
scale	0.1
Range low	0
Range high	65534
Error value	65535

This register sets a parameter for the operation mode $\Delta p-c=f(T)$. This value must be lower than the value for Tmax.

6.2.3.45 Tmax for $\Delta p-c=f(T)$

property	value
Address	45
Unit	K
scale	0.1
Range low	0
Range high	65534
Error value	65535

This register sets a parameter for the operation mode $\Delta p-c=f(T)$. This value must be higher than the value for Tmin.

6.2.3.46 pmin for $\Delta p-c=f(T)$

property	value
Address	46
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Holding register sets the minimum pressure for the operation mode $\Delta p-c=f(T)$. This value can be lower or higher than the value for p_{max} .

6.2.3.47 pmax for $\Delta p-c=f(T)$

property	value
Address	47
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Holding register sets the maximum pressure for the temperature regulation $\Delta p-c=f(T)$. This value can be lower or higher than the value for p_{min} .

6.2.3.300 Bus Command Timer

property	value
Address	300
Range low	1
Range high	5
Error value	65535

Value	Name	Description
1	OFF	factory setting, local pump menu is blocked permanently
2	SET	locks the local pump menu for fixed (300 s) or adjustable time (depending on version/bus system)
3	ACTIVE	timer is active (menu locked)
4	RESET	lock time is over and the local menu is open (write from fieldbus is blocked)
5	MANUAL	local menu open (write from fieldbus possible)

When using the Modbus IF-Module the local menu and the control input IN2 are disabled by factory setting. The local menu can be enabled permanently by writing the value MANUAL. The input IN2 can be enabled at the menu <5.4.1.0.>. To use the local menu only when the BAS system fails, write the value SET at least every 5 minutes. The activation is stored and survives a power on reset. When the mechanism is no longer needed, write OFF to reset to factory setting. If the BAS fails (does not rewrite SET within 5 minutes) the E54 is displayed at the pump. Then the menu can be entered to adjust the settings. When bus command timer state is RESET, writes from Modbus to the Setvalue, Pump command and Operation mode (holding registers 1, 40, 42) have no effect.

Normally, the settings made during BAS fail do not survive power fail. After power on, the last values of Setvalue, Pump command and Operation mode from Modbus are taken as default. To start with the values set manually before power fail, write RESET to bus command timer to disable write to the values and mirror the following input registers to holding registers by reading the input registers and writing the values to the according holding register: 400->1 402->40 10->42

6.2.3.408 PID Kp

property	value
Address	408
scale	0.01
Range low	-3000
Range high	3000
Error value	32767

This Holding register sets the gain factor when using the Operation Mode PID control.

6.2.3.409 PID Ti

property	value
Address	409
Unit	s
scale	0.01
Range low	0
Range high	30000
Error value	32767

This register sets the integration time when using the Operation Mode PID control.

6.2.3.410 PID Td

property	value
Address	410
Unit	s
scale	0.01
Range low	0
Range high	30000
Error value	32767

This register sets the derivate time when using the Operation Mode PID control.

6.2.4 Input Registers

Address	Name	Unit	Scale
1	Actual Differential Pressure	m H ₂ O	0.1
2	Flow Rate	m H ₂ O	0.1
3	Power Consumption	kWh	1
4	Power Rating	W	1
5	Operation Hours	h	10
6	Mains Current	A	0.1
7	Speed	min ⁻¹	1
8	Medium Temperature	K	0.1
9	Operating Hours DP	h	10
10	Current Operation Mode		
16	Pump Module		
17	Pump Type		
18	Max Speed	min ⁻¹	1
19	Min Speed	min ⁻¹	1
20	Max Pressure dp-c	m H ₂ O	0.1
21	Min Pressure dp-c	m H ₂ O	0.1
22	Max Pressure dp-v	m H ₂ O	0.1
23	Min Pressure dp-v	m H ₂ O	0.1
24	Max Flow Rate	m ³ /h	0.1
25	Min Flow Rate	m ³ /h	0.1
26	Supported Errors		
27	Supported Service Messages		
28	Max Power Rating	W	1
35	Service Message		
36	Error Type		
37	Error Message		
38	Pump Status		
39	State Diagnostics		
65	Actual Differential Pressure (Slave)	m H ₂ O	0.1
66	Flow Rate (Slave)	m ³ /h	0.1
67	Power Consumption (Slave)	kWh	1
69	Operating Hours (Slave)	h	10
70	Mains Current (Slave)	A	0.1
71	Speed (Slave)	min ⁻¹	1
80	Pump Module (Slave)		
100	Error Type (Slave)		
102	Pump Status (Slave)		
400	Effective Set Value	%	0.5
402	Effective Pump Command		
404	Operation Status		
500	Heartbeat Count		
700	Application Version		
740	Pump Type Extended		
750	Pump Type Extended (Slave)		
940	Current Warning/Error		
950	Current Warning / Error (Slave)		

6.2.4.1 Actual Differential Pressure

property	value
Address	1
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	9998
Error value	9999

This register returns the actual (differential) pressure. The value is zero if only the slave pump is running.

6.2.4.2 Flow Rate

property	value
Address	2
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	9998
Error value	9999

This register returns the current flow rate. The value is zero, if only the slave pump is running.

6.2.4.3 Power Consumption

property	value
Address	3
Unit	kWh
scale	1
Range low	0
Range high	65534
Error value	65535

This register returns the total energy consumption.

6.2.4.4 Power Rating

property	value
Address	4
Unit	W
scale	1
Range low	0
Range high	65534
Error value	65535

This register returns the current electrical input power.

6.2.4.5 Operation Hours

property	value
Address	5
Unit	h
scale	10
Range low	0
Range high	65534
Error value	65535

This register returns the total operation hours.

6.2.4.6 Mains Current

property	value
Address	6
Unit	A
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Input register returns the electrical mains current.

6.2.4.7 Speed

property	value
Address	7
Unit	min ⁻¹
scale	1
Range low	0
Range high	65534
Error value	65535

This Input register returns the current rotational speed.

6.2.4.8 Medium Temperature

property	value
Address	8
Unit	K
scale	0.1
Range low	0
Range high	65534
Error value	65535

This register returns the fluid temperature. This value is only supported if the pump has a temperature sensor (STRATOS). All other pumps return the error value.

6.2.4.9 Operating Hours DP

property	value
Address	9
Unit	h
scale	10
Range low	0
Range high	65534
Error value	65535

This Input register returns the operating time of the double pump system.

6.2.4.10 Current Operation Mode

property	value
Address	10
Range low	0
Range high	140
Error value	255

Value	Name	Description
0	Unknown	do not use
1	CONST_SPEED (n-c)	Control mode constant speed (rotational speed of the impeller)
2	Reserved	do not use
3	CONST_DIFFPRESS (Δp-c)	Control mode constant differential pressure.
4	VAR_DIFFPRESS (Δp-v)	Control mode variable differential pressure (effective setpoint depends on current volume flow)
5	Reserved	do not use
6	TEMP_VARIABLE (Δp-c=f(T))	Control mode where the constant differential pressure is a function of the fluid temperature (Stratos only)
140	CONST_CONTROL (PID)	Control mode Proportional Integral Differential for general purpose closed loop control

This register returns the current operation mode.

6.2.4.16 Pump Module

property	value
Address	16
Error value	0

Bit #	Name	Description
0	inverter controlled	indicates if pump has variable speed

This register returns if the pump module is controlled by a frequency converter or not.

6.2.4.17 Pump Type

property	value
Address	17
Range low	1
Range high	254
Error value	255

This Input register returns the pump type which is identical to the PLR pump type.

Note: This register is available for compatibility reasons. Use register 740/750 for new development.

6.2.4.18 Max Speed

property	value
Address	18
Unit	min ⁻¹
scale	1
Range low	0
Range high	65534
Error value	65535

This register returns the max possible rotational speed of the pump. It is the speed that is set when operation mode is set to "fixed speed" and the set value is set to 100 %.

6.2.4.19 Min Speed

property	value
Address	19
Unit	min ⁻¹
scale	1
Range low	0
Range high	65534
Error value	65535

This register returns the min possible speed. It is the speed that is set when the operation mode is set to "fixed speed" and the set value is below the corresponding percentage for min speed.

6.2.4.20 Max Pressure dp-c

property	value
Address	20
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This register returns the max possible pressure. It is the pressure that is set when operation mode is set to "Δp-c regulation" and the set value is set to 100%.

6.2.4.21 Min Pressure dp-c

property	value
Address	21
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Input register returns the min possible pressure. It is the pressure that is set when the operation mode is set to "Δp-c regulation" and the set value is below the corresponding percentage for min pressure.

6.2.4.22 Max Pressure dp-v

property	value
Address	22
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Input register returns the max possible pressure. It is the pressure that is set when operation mode is set to "Δp-v regulation" and the set value is set to 100%.

6.2.4.23 Min Pressure dp-v

property	value
Address	23
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	65534
Error value	65535

This Input register returns the min possible pressure. It is the pressure that is set when the operation mode is set to "Δp-v regulation" and the set value is below the corresponding percentage for min pressure.

6.2.4.24 Max Flow Rate

property	value
Address	24
Unit	m ³ /h
scale	0.1
Range low	0
Range high	9998
Error value	9999

This Input register returns the max possible volume flow rate.

6.2.4.25 Min Flow Rate

property	value
Address	25
Unit	m ³ /h
scale	0.1
Range low	0
Range high	9998
Error value	9999

This Input register returns the min allowable flow rate. If the pump does not support this datapoint, the error value is returned.

6.2.4.26 Supported Errors

property	value
Address	26

Bit #	Name	Description
0	Undervoltage	Mains voltage is too low (E004)
1	Overvoltage	Mains voltage too high (E005)
2	One phase missing	One or more line conductor do not supply energy (E006)
3	Idle running	low load on pump due to e.g missing fluid (E011)
4	System pressure too high	The pressure of the pumped fluid is too high (E060)
5	System pressure too low	The pressure of the pumped fluid is too low (E061)
8	Motor overheated	The temperature of the motor is too high (E020)
9	Motor error	Error in the motor (E016, E021, E023, E024, E025, E026)
10	Pump blocked	pump does not rotate (E010, E012)
11	Module overheated	temperature of the inverter module is too high (E030)
12	Module warning	e.g. over temperature of the inverter module (E031, E034, E052)
13	Module Error	defective inverter module (E036, E037, E050)
14	Sensor malfunction	speed sensor (E027), fluid temperature (E038), pressure sensor (E040), vibration sensor (E041)

This register returns the supported errors that can be read in the [Input Register 37 \(#id62437\)](#). It is a bit set value, and a "1" means that the specified error is supported and a "0" means that it is not supported.

6.2.4.27 Supported Service Messages

property	value
Address	27

Bit #	Name	Description
0	Service needed	indicates that service action is required
1	Exchange bearing	bearing weired out
2	Oil bearing	lubrication of bearing necessary
3	Change sealing	sealing hat to be replaced

This Input register returns the supported service messages that can be read in the Input register address 35 (Service Message). It is a bit set value, and a "1" means that the specified error is supported and a "0" means that it is not supported.

6.2.4.28 Max Power Rating

property	value
Address	28
Unit	W
scale	1
Range low	0
Range high	65534
Error value	65535

This input register returns the rated input power of the pump.

6.2.4.35 Service Message

property	value
Address	35

Bit #	Name	Description
0	Service needed	indicates that service action is required
1	Exchange bearing	bearing weired out
2	Oil bearing	lubrication of bearing necessary
3	Change sealing	sealing hat to be replaced

This Input register returns the current service actions needed.

6.2.4.36 Error Type

property	value
Address	36

Bit #	Name	Description
0	Module Error	inverter module has error
1	Motor Error	motor has an error
2	Reserved	do not use
3	Pump error	pump has an error
4	Supply voltage error	mains fault

This Input register returns the pump error. If one bit is active an error is present. A possible list of errors is located in the pump manual.

6.2.4.37 Error Message

property	value
Address	37

Bit #	Name	Description
0	Undervoltage	Mains voltage is too low (E004)
1	Overvoltage	Mains voltage too high (E005)
2	One phase missing	One or more line conductor do not supply energy (E006)
3	Idle running	low load on pump due to e.g missing fluid (E011)
4	System pressure too high	The pressure of the pumped fluid is too high (E060)
5	System pressure too low	The pressure of the pumped fluid is too low (E061)
8	Motor overheated	The temperature of the motor is too high (E020)
9	Motor error	Error in the motor (E016, E021, E023, E024, E025, E026)
10	Pump blocked	pump does not rotate (E010, E012)
11	Module overheated	temperature of the inverter module is too high (E030)
12	Module warning	e.g. over temperature of the inverter module (E031, E034, E052)
13	Module Error	defective inverter module (E036, E037, E050)
14	Sensor malfunction	speed sensor (E027), fluid temperature (E038), pressure sensor (E040), vibration sensor (E041)

This Input register returns the error as a bitset . No warnings are transmitted over the bus, only Errors (when the SSM relay becomes active in the Pump).

6.2.4.38 Pump Status

property	value
Address	38

Bit #	Name	Description
0	Pump turned on	pump runs
1	Rotation left	set if rotational direcction is counter clockwise (CCW)
2	setpoint deviation > 10 %	set if current value differs from setpoint by more than 10%
3	External off active	set if external override "off" is active
4	Double pump	set if the system is a double pump
5	Manual override	set if IR-Stick or IR-Monitor overrides the fieldbus
6	Q/H values invalid	volume flow (and head nmeter) are calculated values which are not available under certain conditions
7	External min active	set if override min input is active
13	Wink/Service mode	set for some seconds if the menue item "ID" is activated at the pump (identification)

This Input register returns the current pump status. It contains detailed information about the controller.

6.2.4.39 State Diagnostics

property	value
Address	39

Bit #	Name	Description
0	Pump or module error	activated on all errors
1	supply error	activated on errors mains voltage too low (E004), mains voltage too high (E005), phase fault (E006)
3	Lower Regulation Limit	the pump cannot follow the setpoint downwards
4	Upper Regulation Limit	the pump cannot follow the setpoint upwards
6	Setpoint out of Range	the pump cannot follow the setpoint
8	Manual override	set if an IR-Stick or IR-Monitor overrides the fieldbus
10	Pump is Operating	set if pump is running

This Input register returns some status information about the pump.

6.2.4.65 Actual Differential Pressure (Slave)

property	value
Address	65
Unit	m H ₂ O
scale	0.1
Range low	0
Range high	9998
Error value	9999

This Input register returns the current differential pressure of the slave in a double pump.

6.2.4.66 Flow Rate (Slave)

property	value
Address	66
Unit	m ³ /h
scale	0.1
Range low	0
Range high	9998
Error value	9999

This Input register returns the actual flow rate of the slave in a double pump.

6.2.4.67 Power Consumption (Slave)

property	value
Address	67
Unit	kWh
scale	1
Range low	0
Range high	65534
Error value	9999

This Input register returns the total energy consumption of the Slave in a double pump.

6.2.4.69 Operating Hours (Slave)

property	value
Address	69
Unit	h
scale	10
Range low	0
Range high	65534
Error value	65535

This Input register returns the operation time of the Slave in a double pump.

6.2.4.70 Mains Current (Slave)

property	value
Address	70
Unit	A
scale	0.1
Range low	0
Range high	65534

This Input register returns the electrical mains current of the Slave in a double pump.

6.2.4.71 Speed (Slave)

property	value
Address	71
Unit	min ⁻¹
scale	1
Range low	0
Range high	65534

This Input register returns the current speed of the Slave in a double pump.

6.2.4.80 Pump Module (Slave)

property	value
Address	80
Error value	0

Bit #	Name	Description
0	inverter controlled	indicates if pump has variable speed

This Input register returns the module type of the Slave in a double pump.

6.2.4.100 Error Type (Slave)

property	value
Address	100

Bit #	Name	Description
0	Module Error	inverter module has error
1	Motor Error	motor has an error
2	Reserved	do not use
3	Pump error	pump has an error
4	Supply voltage error	mains fault

This Input register returns the error type of the Slave in a double pump.

6.2.4.102 Pump Status (Slave)

property	value
Address	102

Bit #	Name	Description
0	Pump turned on	pump runs
1	Rotation left	set if rotational direction is counter clockwise (CCW)
2	setpoint deviation > 10 %	set if current value differs from setpoint by more than 10%
3	External off active	set if external override "off" is active
4	Double pump	set if the system is a double pump
5	Manual override	set if IR-Stick or IR-Monitor overrides the fieldbus
6	Q/H values invalid	volume flow (and head nmeter) are calculated values which are not available under certain conditions
7	External min active	set if override min input is active
13	Wink/Service mode	set for some seconds if the menu item "ID" is activated at the pump (identification)

This Input register returns the pump status of the Slave in a double pump.

6.2.4.400 Effective Set Value

property	value
Address	400
Unit	%
scale	0.5
Range low	0
Range high	200
Error value	65535

The effective set value reports the set value currently active in the pump. The scaling is identical to holding register 1.

6.2.4.402 Effective Pump Command

property	value
Address	402
Range low	0
Range high	255
Error value	65535

Bit #	Name	Description
0	Pump on	pump is running
1	Min Speed	pump is running at minimum speed
2	Max Speed	pump is running at maximum speed
3	reserved (always 1)	do not use

This input Registers returns the currently effective Pump Command. Formatting is identical to holding register 40.

6.2.4.404 Operation Status

property	value
Address	404
Range low	0
Range high	255
Error value	65535

Bit #	Name	Description
0	Ready for Operation	If at least one pump is ready for operation (power ok, no error no override with "off")
1	Pump is operating	set if pump is running
2	Service Required	indicates that service action is required
3	Warning Present	set if one ore more pumps of the system have a warning (but still able to run); restrictions may apply
4	Error Present	set if one ore more pumps of the system have an error (currently not able to run); restart will follow
5	Final Error	set if one or more pumps have a final error (stopped, no restart will follow)

This input register reports some status information from the pump.

6.2.4.500 Heartbeat Count

property	value
Address	500
Range low	0
Range high	4294967294
Error value	4294967295

This register counts up the Heartbeats sent by the pump to the IF-Module. The counter is reset by a restart of the pump communication controller and power on of the pump. The typical count rate is 1 tick per second. The value is a DWORD where the most significant WORD is stored in the register 500 and the least significant WORD is stored in the register 501.

6.2.4.700 Application Version

property	value
Address	700
Range low	0
Range high	65534
Error value	65535

This register contains the version of the IF-Module firmware where the main version (to the left of the dot) is coded into the high byte.

6.2.4.740 Pump Type Extended

property	value
Address	740
Range low	0
Range high	65534
Error value	65535

This register contains the extended pump type which is identical to the CAN pump type. The detailed table can be found at [WILO automation](http://www.wilo.com/automation) (<http://www.wilo.com/automation>)

6.2.4.750 Pump Type Extended (Slave)

property	value
Address	750
Range low	0
Range high	65534
Error value	65535

This register contains the extended pump type which is identical to the CAN pump type. The detailed table can be found at [WILO Automation](http://www.wilo.com/automation) (<http://www.wilo.com/automation>)

6.2.4.940 Current Warning/Error

property	value
Address	940
Range low	0
Range high	0
Error value	0

This register contains the Error Code displayed at the pump display. For details please refer to the pump operating manual.
 Note: all other registers beside this and (5.2.30 Operation Status) only report final errors.

6.2.4.950 Current Warning / Error (Slave)

property	value
Address	950
Range low	0
Range high	254
Error value	255

This register contains the Error number displayed at the pump display of the Slave. For details please refer to the pump operating manual.

7 Installation and electrical connection

Installation and electrical connection must be carried out in accordance with local regulations and only by qualified personnel.



Warning! Risk of personal injury! The existing directives for accident prevention must be adhered to.



Warning! Risk of fatal electrical shock!

Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and those of local power supply companies must be adhered to.

7.1 Installation

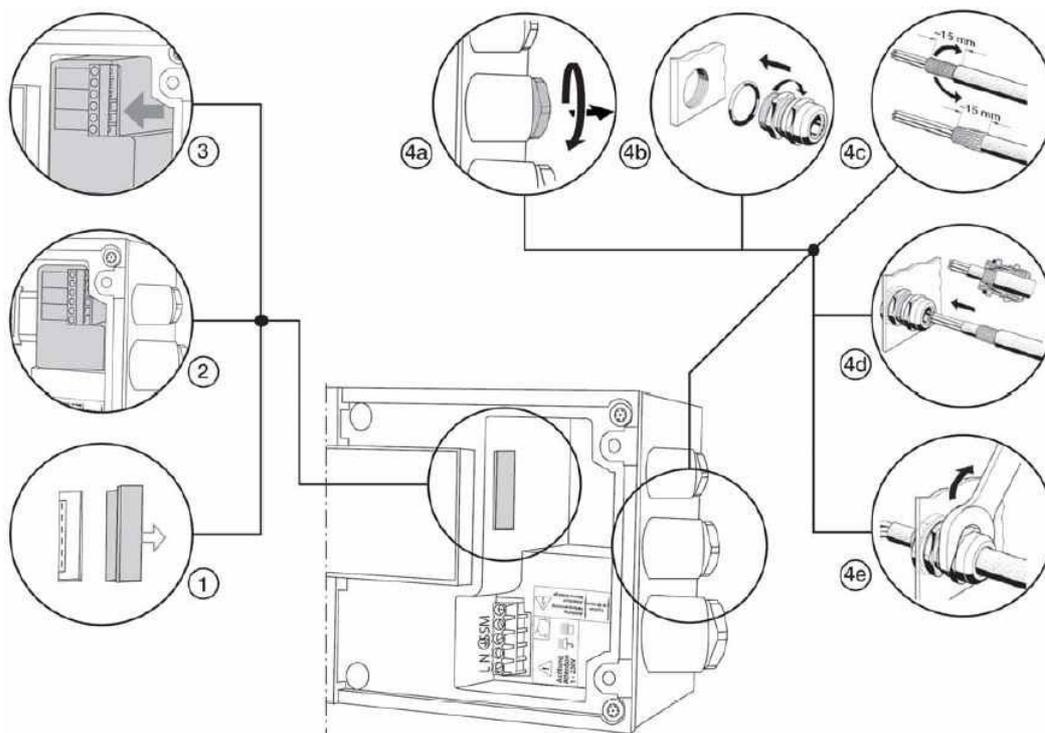


Figure 7.1.1 Mounting of IF-Module

To ensure immunity in industrial environments (EN 61000-6-2) the data cables must be shielded cables and must be used with an EMC-compliant cable gland (included with the module).

For optimal transmission, the data cable pair should be twisted and have a characteristic impedance of 120 Ω.



Warning! Risk of fatal electrical shock!

The pump should be electrically isolated and secured against unauthorised switch-on before beginning installation of the IF-Module.

Installation steps in accordance with Fig. 7.1.1:

- Remove the lid of the pump's terminal box
- Remove the cover (1)

- Install the module (2)
- Push the connection plug in all the way (3)
- Remove the existing Pg 9 and Pg 7 screwed connections (4a)
- Install the accompanying metal EMC cable glands (4b)
- Double pump: install DP module in the slave pump and insert the accompanying cable here
- Strip and prepare the shield and the core wires (4c)
- Insert the cable(s) (4d)
- Screw the cable gland(s) into place (4e)

Electrical connection follows (see section below).

7.2 Electrical connection



Warning! Risk of fatal electrical shock!

Electrical connection must be carried out by an electrician authorised by the local electricity supply company and in accordance with the applicable local regulations [e.g. VDE regulations].



CAUTION! The maximum torque for the terminal screws is 0.2 Nm. Exceeding this torque can damage the module.

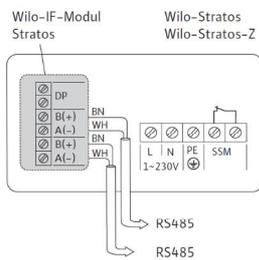


Figure 7.2.1 wiring single pump

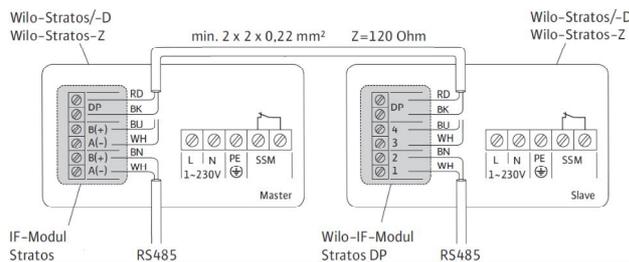


Figure 7.2.2 wiring double pump

- Carry out installation as described in the previous section
- Carry out electrical installation of the pump as specified in the relevant installation and operating instructions
- Check the technical specifications of the electric circuits being connected to ensure they are compatible with the electrical specifications of the IF-Module.
- single pump (fig. 7.2.1):
 - Connect the incoming BUS line A/B to outer terminals A(-)/B(+)
 - Connect the outgoing BUS line A/B to middle terminals A(-)/B(+)
- double pump (fig. 7.2.2)
 - Connect the incoming BUS line A/B to outer terminals A(-)/B(+)
 - Connect the outgoing BUS line A/B to outer terminals A(-)/B(+)
 - Connect the middle terminals A(-)/B(+) (WH/BU) between master and slave with the cable included with the IF-Module Stratos DP for the slave
 - Connect the DP wires (RD/BK) between master and slave with the cable included with the IF-Module Stratos DP for the slave
 - Connect the terminals DP (RD/BK) between master and slave pump
 - N.B. termination switches at slave pump are non functional
- Set BUS terminating resistors, if there is no outgoing line
- Check the terminal box seal for any visible damage
- Close the terminal box lid with the screws provided so that the seal is tight all around
- Carry out commissioning / functional test in accordance with the following main section

The terminals of the IF-module are marked with A(-) and B(+). The marking complies with the RS485 standard. Nevertheless some manufacturers of automation equipment are using the opposite marking of a and b. This may cause communication issues.

Wiring shall be done with twisted pair cable with braided shield to get reasonable EMC. Shield shall be connected to chassis ground on both ends of the cable as a standard. Characteristic impedance of the pair shall be 120 Ω.

All devices shall be daisy chained. RS485 does not allow any loops, star connections or stub lines. The termination resistors shall be activated on both ends of the line. For the IF-Module the resistors are activated by setting both switches (located close to connection terminals) in the position marked with a non crossed thru resistor symbol. All other devices shall have no termination set (i.e. set the switches in the position with the crossed thru resistor symbol).

8 Commissioning/functional test

The following sections describe testing the functioning of the inputs/outputs. It is recommended to test together with the connected system. The pump's installation and operating instructions are needed for some settings.

8.1 DP interface

For dual pump operation, only one IF-module of the type above shall be present in the master pump.

The slave pump shall be connected to the master pump via the DP terminals.

The slave should be equipped with one of the following modules:

- IF Modul DP Stratos (2105254)
- IF-Modul PLR Stratos (2030465)

8.1.1 Y-pipe installation

Please note for Y-pipe installations (pump heads not in common housing):

- Die Doppelpumpenfunktion ist auf das Doppelpumpengehäuse abgestimmt. Bei Hosenrohrinstallation sind Abweichungen bei Druckregelfunktion und energieoptimierter Spitzenlastzuschaltung möglich.

8.2 Settings

8.2.1 General

When a valid set of parameters (address, A and further) is chosen and the pump menu is left, the IF-module will start up and shows the ability to communicate with the "I" symbol in the pump. The symbol does not indicate the exchange of data.

After setting up the IF module according subsequent sections, the setpoint , the control mode <2.0.0.0> and the on/off state <3.0.0.0> do no longer follow the local settings previously made, but they follow the values stored in the IF-module. If the building automation system is not available, you may set the address (menu with I, to OFF. In this state, local control is active.

8.2.2 Bus Address

Set the bus address in the pump menu I

8.2.3 Parameter A - transmission speed

Set baud rate with parameter A in the pump menu in accordance with the following table:

Parameter A	Speed Bit/s
0	300
1	600
2	1200
3	2400
4	4800
5	9600
6	19200
7	38400
8	57600
9	115200
10	76800

fig. 8.2.3.1: transmission speed

8.2.4 Parameter C - data frame

Modbus RTU defines a frame with 8 data bytes, a parity bit and one stop bit. The parity bit can be either even (E), odd (O) or no parity (N). In case of no parity, two stop bits are used.

Set the data format with the parameter C (Menu <5.2.5.0>) in accordance to the following table:

Value	Format	Comment
2	8,N,1	for non standard environment
3	8,N,2	
6	8,E,1	default value
10	8,O,1	

fig. 8.2.4.1: data frame

All other values are reserved shall not be used.

8.3 Funtional test / basic Example

The following setup sequence shows a basic setting for the IF-Modbus. the <a.b.c.d.e> indicate the menu numbers (not Stratos). For Stratos the menu is described in the text.

- Setup your Modbus Master to RTU, 9600 Baud, 8/N/1 frame, our slave address will be 1
- Set <5.2.3.0> to 1 (this is the Modbus address; Stratos shows <->, all other show #)
- Set <5.2.4.0> to 5 (this a code for 9600 baud and is the parameter A)

- Set <5.2.5.0> to 2 (this is a code for 8/N/1 frame and is the parameter C)
- Read the *input register 700 (30701)* with your Modbus master: read shall be successful (you do not have an offset issue). if not ok, try 699/701 to detect potential register offset between the systems (has to be respected subsequently).
- Write value 1 to *holding register 300 (40301)* (bus command timer OFF)
- Write value 1 to *holding register 42 (40043)* (operation mode fixed speed)
- Write value 200 to *holding register 1 (40002)* (setvalue 100 %)
- Write value 9 to *holding register 40 (40041)* (pump command ON)
- The pump shall start and run at nominal speed

Below please find a snapshot for this communication example (M- Modbus Master S- Slave (the pump)):

```

01 04 02 BC 00 01 F1 96      M: 04-Rd_InputReg ID#2 Rd 30701, 1
01 04 02 02 00 B8 50      S: 04-Rd_InputReg ID#2 cnt=2, Rd 30701=512 (0x0200) // software version 2.00
01 06 01 2C 00 01 88 3F      M: 06-Wr_SHoldReg ID#3 Wr 40301=1 (0x0001)
01 06 01 2C 00 01 88 3F      s: 06-Wr_SHoldReg ID#3 Wr 40301=1 (0x0001)
01 06 00 2A 00 01 69 C2      M: 06-Wr_SHoldReg ID#4 Wr 40043=1 (0x0001)
01 06 00 2A 00 01 69 C2      s: 06-Wr_SHoldReg ID#4 Wr 40043=1 (0x0001)
01 06 00 01 00 C8 D9 9C      M: 06-Wr_SHoldReg ID#5 Wr 40002=200 (0x00C8)
01 06 00 01 00 C8 D9 9C      s: 06-Wr_SHoldReg ID#5 Wr 40002=200 (0x00C8)
01 06 00 28 00 09 C9 C4      M: 06-Wr_SHoldReg ID#6 Wr 40041=9 (0x0009)
01 06 00 28 00 09 C9 C4      s: 06-Wr_SHoldReg ID#6 Wr 40041=9 (0x0009)
    
```

9 Maintenance

The modules described in these instructions are maintenance-free.

10 Faults, causes and remedies

Have repairs done by qualified skilled personnel only!



Warning! Danger of electric shock!

Any danger from electrical current should be ruled out.

- The pump should be electrically isolated and secured against unauthorised switch-on prior to any repair work.
- Damage to the mains connection cables shall always be repaired by a qualified electrician only.



Warning! Risk of scalding!

At high fluid temperatures and system pressures, allow the pump to cool down first and then depressurise the system.

Faults	Causes	Remedy
Communication with external control is disrupted	Wrong communication parameter(s)	Check, and adjust if necessary (see Commissioning)
	Damaged wiring	Check whether other bus nodes are affected in order to find position of missing connection; check wiring
Flow value not available	R1 version of pump (w/o pressure sensor)	install pressure sensor
	Multistage pump (Helix et. al.)	not possible with those pumps
Flow value inaccurate	Single stage glanded pump (IL-E et. al) in n-c mode (CONST_SPEED)	change control mode to dp-c/dp-v
	Viscosity of fluid changed by additives	
Setpoint is not reached	Pumpe is at power or speed limit	Reduce setpoint
	Multistage pump (Helix et. al.): maximum value is sensor range, not max. head of the pump	Reduce setpoint
Parameter A not available	Firmware incompatible (see 4.1 (#id41))	change pump electronics

11 Spare Parts

Spare parts may be ordered via a local specialist retailer and/or Wilo customer service.

To avoid queries and incorrect orders, all data on the name plate should be submitted with each order.

12 Disposal

Proper disposal and recycling of this product prevents damage to the environment and risks to personal health.

1. Use public or private disposal organisations when disposing of all or part of the product.
2. For more information on proper disposal, please contact your local council or waste disposal office or the supplier from whom you obtained the product.

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