COMMUNICATION GUIDE

OMNICONTROL

Control unit

PFEIFFER *VACUUM*

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new Control Unit should support you in your individual application with full performance and without malfunctions. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. From this extensive, practical experience we have gained a large volume of information that can contribute to efficient deployment and to your personal safety.

In the knowledge that our product must avoid consuming work output, we trust that our product can offer you a solution that supports you in the effective and trouble-free implementation of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact info@pfeiffer-vacuum.de.

Further operating instructions from Pfeiffer Vacuum can be found in the Download Center on our website.

Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

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PFEIFFER VACUUM

Table of contents

1 About this manual

i	**IMPORTANT** Read carefully before use. Keep the manual for future consultation.

1.1 Applicable information

Scan the QR code or click here to see how Pfeiffer Vacuum OmniControl works.

2   Pfeiffer Vacuum protocol for RS-485 interface

## 2.1   Telegram frame

The telegram frame of the Pfeiffer Vacuum protocol contains only ASCII code characters [32; 127], the exception being the end character of the telegram C_R. Basically, a host ▭ (e.g. a PC) sends a telegram, which a device ◯ (e.g. electronic drive unit or gauge) responds to.

a2	a1	a0	*	0	n2	n1	n0	l1	l0	dn	...	d0	c2	c1	c0	C_R

a2 – a0	Device address ◯ • Individual address of the unit ["001";"255"] • Group address "9xx" for all identical units (no response) • Global address "000" for all units on the bus (no response)
*	Action according to telegram description
n2 – n0	Pfeiffer Vacuum parameter numbers
l1 – l0	Data length dn to d0
dn – d0	Data in the respective data type (see chapter "Data types", page 6).
c2 – c0	Checksum (sum of ASCII values of cells a2 to d0) modulo 256
C_R	carriage return (ASCII 13)

2.2   Features of the RS-485 interface

The interface designated "RS-485" is intended for connecting a Pfeiffer Vacuum control unit or a external PC. The connections are galvanically safe and are isolated from the maximum supply voltage for the electronic drive unit.

Designation	Value
Serial interface	RS-485
Baud rate	9600 Baud
Data word length	8 bit
Parity	none (no parity)
Start bits	1
Stop bits	1

Tbl. 1:   Features of the RS-485 interface

2.3   Telegram description

Data query ▭ --> ◯ ?

a2	a1	a0	0	0	n2	n1	n0	0	2	=	?	c2	c1	c0	c_R

Control command ▭ --> ◯ !

a2	a1	a0	1	0	n2	n1	n0	l1	l0	dn	...	d0	c2	c1	c0	c_R

Data response / Control command understood ◯ --> ▭

a2	a1	a0	1	0	n2	n1	n0	l1	l0	dn	...	d0	c2	c1	c0	c_R

Error message ◯ --> ▭

a2	a1	a0	1	0	n2	n1	n0	0	6	N	O	_	D	E	F	c2	c1	c0	c_R
											_	R	A	N	G	E			
											_	L	O	G	I	C			

	NO_DEF	Parameter number n2–n0 no longer exists
	_RANGE	Data dn–d0 outside the permissible range
	_LOGIC	Logical access error

2.4   Data types

No.	Data type	Description	Length l1 – l0	Example
0	boolean_old	Logical value (false/true)	06	000000 is equivalent to false 111111 is equivalent to true
1	u_integer	Positive whole number	06	000000 to 999999
2	u_real	Fixed point number (unsigned)	06	001571 corresponds with 15.71
4	string	Any character string with 6 characters. ASCII codes between 32 and 127	06	TC_110, TM_700
6	boolean_new	Logical value (false/true)	01	0 is equivalent to false 1 is equivalent to true
7	u_short_int	Positive whole number	03	000 to 999
10	u_expo_new	Positive exponential number. The last of both digits are the exponent with a deduction of 20.	06	100023 is equivalent to $1,0 \cdot 10^{3}$ 100000 is equivalent to $1,0 \cdot 10^{-20}$
11	string16	Any character string with 16 characters. ASCII codes between 32 and 127	16	BrezelBier&Wurst
12	string8	Any character string with 8 characters. ASCII codes between 32 and 127	08	Example

2.5   Connection options
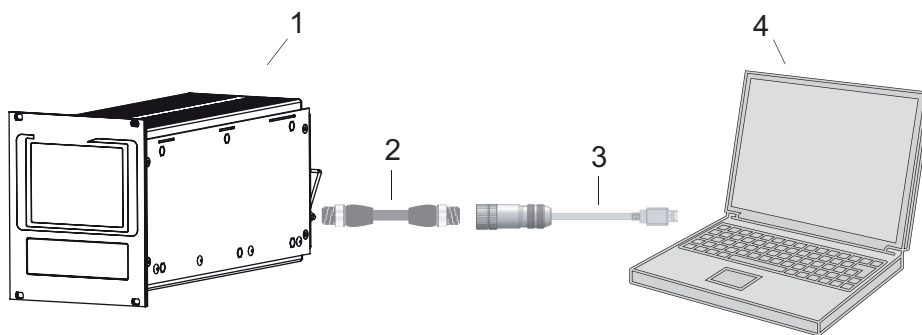
Fig. 1:   Connect OmniControl to PC

1 OmniControl (host)	3 USB/RS-485 converter
2 RS-485 interface connection	4 PC (device)

Connect OmniControl to PC

1. Use the respective connection cable from the control unit shipment or from the accessories program.
2. Connect a PC via the USB/RS-485 converter.
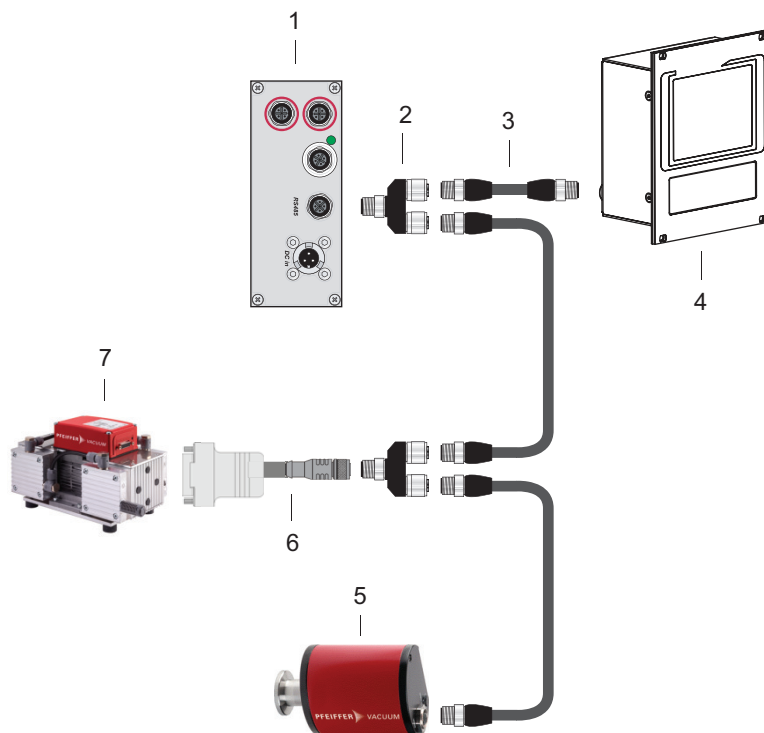
Fig. 2:   Connecting OmniControl to RS-485 bus

1   TC 400/TM 700 (device)
2   Y-connector for RS-485
3   M12 to M12 extension cable
4   OmniControl 001 (host)

5   DigiLine xPT 200 (device)
6   Connection cable with 2 accessory ports, RS-485
7   MVP 010/015/030 (device)[1]

Networking as RS-485 Bus

The group address of the electronic drive unit is 963.

1. Install the devices according to the specification for RS-485 interfaces.
2. Make sure that all devices connected to the bus have different RS-485 device addresses **[P:797]**.
3. Connect all devices to the bus with RS-485 D+ and RS-485 D-.

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1)   The example of an RS-485 bus does not represent a power supply for vacuum pumps connected.

2.6 OmniControl addresses
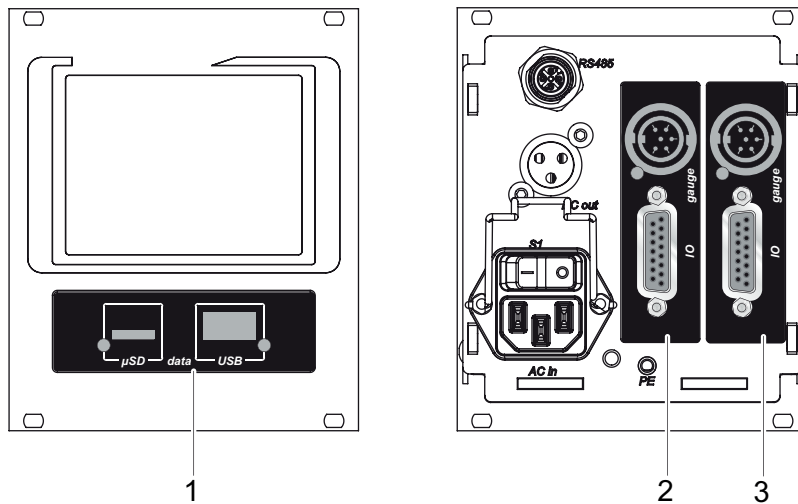
Fig. 3: OmniControl addresses, example

1 (Option 0)   Option Data 111

2 (Option 1)   Gauge/IO 131
                Parameter Gauge/IO.gauge 132
                Parameter Gauge/IO.gauge 133

3 (Option 2)   Gauge/IO 121
                Parameter Gauge/IO.gauge 122
                Parameter Gauge/IO.gauge 123
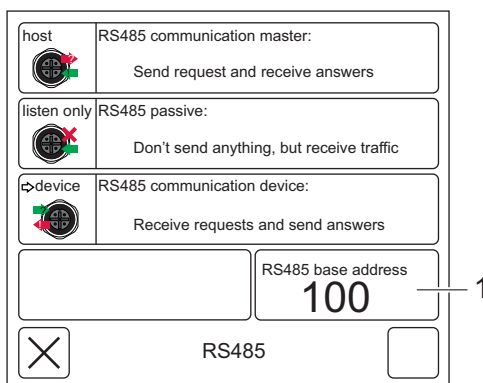
Fig. 4: Defining address offset

1   Defining address offset

Defining address offset

► Define the address offset by tapping the **[RS485 base address]** button.
  – You can set 0, 100 or 200 as the address.
► You can operate up to 3 OmniControl control units on a bus.
  – Only 1 control unit can act as the host.

3 Parameter set

3.1 General

Important settings and function-related characteristics are factory-programmed as parameters. Each parameter has a three-digit number and a description. The use of parameters is possible via the Pfeiffer Vacuum protocol.

> **i** **Non-volatile data storage**
>
> When switching off or in the event of unintentional voltage drop, the **parameters** and the operating hours stay saved in the electronics.

#	Three digit number of the parameter
Indicator	Display of parameter description
Description	Brief description of the parameters
Functions	Function description of the parameters
Data type	Type of formatting of the parameter for the use with the Pfeiffer Vacuum protocol
Access type	R (read): Read access; W (write): Write access
Unit	Physical unit of the described variable
min. / max.	Permissible limit values for the entry of a value
default	Factory default pre-setting (partially pump-specific)
🖫	The parameter can be saved persistently in the electronic drive unit

Tbl. 2: **Explanation and meaning of the parameters**

3.2 Control commands

#	Indicator	Description	Functions	Data type	Access type	Unit	min.	max.	default	🖫
040	DeGas	DeGas procedure	Cleaning measuring element	6	RW		000000	000001	000000	
041	Sens On-Off	BA/CC[2] on/off	BA/CC on/off switches BA/CC or the cold cathode on/off	7	RW		000000	000001	000000	
070	Dir DigOut	Digital outputs	reset set do not change	1	RW		000000	999999	222200	
071	Dir RelOut	Relay outputs	reset set do not change	1	RW		000000	999999	222200	

Tbl. 3: **Control commands**

3.3 Status requests

#	Indicator	Description	Functions	Data type	Access type	Unit	min.	max.	default	🖫
303	Error code	Error code		4	R					
312	FW version	Firmware Version		4	R					
349	ElecName	Designation		4	R					

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2) Bayard/Alpert and/or the cold cathode

#	Indicator	Description	Functions	Data type	Access type	Unit	min.	max.	default	💾
354	HW Version	Hardware version		4	R					
355	Serial No	Serial number		11	R					
386	Dir DigInp	Digital inputs	reset set do not change	1	R		0	999999	222200	
387	Dir AlgInp	Analog input		2	R	V	0	999999	000001	
388	Order Code	Order number		11	R					

Tbl. 4:   **Status requests**

3.4 Set value settings

#	Indicator	Description	Functions	Data type	Access type	Unit	min.	max.	default	💾
727	Dir AlgOut	Analog output		2	RW	V	000000	999999	000000	
740	Pressure	Pressure value	W corresponds to 0 = zero on W does not correspond to 0 = zero off	10	RW	hPa	000000	999999		
742	UserGasCor	Correction factor		2	RW		000000	999999	000100	✓
797	BaseAdr	Interface address		1	RW		000000	999999	000100	✓

Tbl. 5:   **Set value settings**

4 Addressing

4.1 Setting device mode

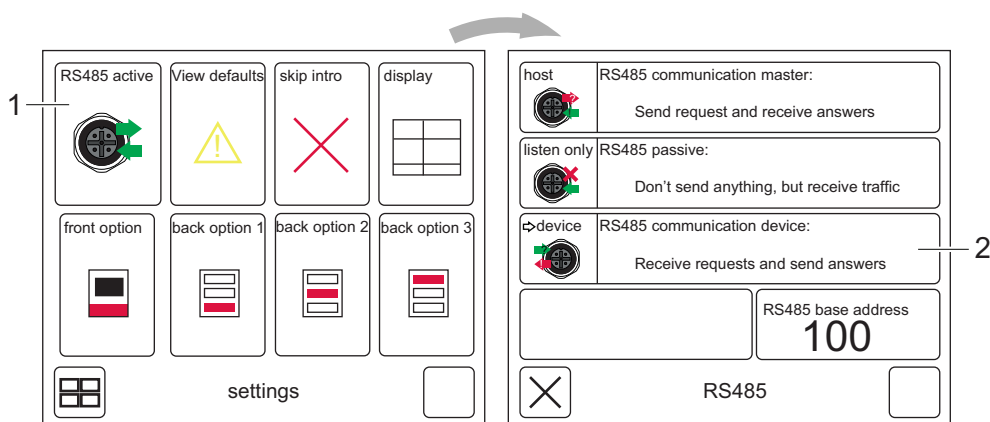**Fig. 5:** Setting device mode

1   RS-485 operating mode (RS-485)   2   device mode

Setting device mode

1. Select the **[RS485 operating mode]** tile in the device settings.
2. Select the device operating mode.

A data exchange takes place between a host and a device according to the following pattern:

- The host transmits (either a settings request or a data request)
- The device responds (acknowledgment or transmission of data/error messages)
- Listen only: The device listens to the host, but does not respond

4.2 Addressing gauge/IO

4.2.1 Addressing gauge/IO, parameter 009 - 354

		Parameter number	040	041	070	071	303	312	349	354
		Indicator	De-Gas	Sens OnOff	Dir DigOut	Dir RelOut	Error code	FW version	Name	HW version
		Unit								
		Access type	RW	RW	RW	RW	R	R	R	R
		Data type	6	7	1	1	4	4	4	4
Ad-dress		Module								
101	base device	OmniControl					✓	✓	✓	✓
111	option 0	gauge/IO					✓	✓	✓	✓
		data					✓	✓	✓	✓
112		gauge/IO.gauge	✓	✓			✓	✓	✓	✓
113		gauge/IO.IO			✓ xxxxba a = DO1 b = DO2	✓ xxxxba a = R1 b = R2	✓	✓	✓	✓

		Parameter number	040	041	070	071	303	312	349	354
121	option 1	gauge/IO					✓	✓	✓	✓
		data					✓	✓	✓	✓
122		gauge/IO.gauge	✓	✓			✓	✓	✓	✓
123		gauge/IO.IO			✓	✓	✓	✓	✓	✓
131	option 2	gauge/IO					✓	✓	✓	✓
		data					✓	✓	✓	✓
132		gauge/IO.gauge	✓	✓			✓	✓	✓	✓
133		gauge/IO.IO			✓	✓	✓	✓	✓	✓
141	option 3	gauge/IO					✓	✓	✓	✓
		data					✓	✓	✓	✓
142		gauge/IO.gauge	✓	✓			✓	✓	✓	✓
143		gauge/IO.IO			✓	✓	✓	✓	✓	✓
					0 = reset 1 = set 2 = do not change	0 = reset 1 = set 2 = do not change				

Tbl. 6:   Addressing gauge/IO, parameter 009 - 354

4.2.2   Addressing gauge/IO, parameter 355 - 797

		Parameter number	355	386	387	388	727	740	742	797
		Indicator	Serial No	Dir DigInp	Dir AlgInp	Order Code	Dir AlgOut	Pressure	User-GasCor	Base-Adr
		Unit			V		V	hPA		
		Access type	R	R	R	R	RW	RW	RW	
		Data type	11	1	2	11	2	10	2	1
Address		Module								
101	base device	OmniControl	✓			✓				✓
111	option 0	gauge/IO								
		data								
112		gauge/IO.gauge						✓	✓	
113		gauge/IO.IO		✓ xxxxba a = DI1 b = DI2	✓		✓			
121	option 1	gauge/IO								
		data								
122		gauge/IO.gauge						✓	✓	
123		gauge/IO.IO		✓	✓		✓			
131	option 2	gauge/IO								
		data								
132		gauge/IO.gauge						✓	✓	
133		gauge/IO.IO		✓	✓		✓			

		Parameter num-ber	355	386	387	388	727	740	742	797
141	option 3	gauge/IO								
		data								
142		gauge/IO.gauge						✓	✓	
143		gauge/IO.IO		✓	✓		✓			
				0 = reset 1 = set 2 = do not change				W corresponds to 0 = zero on W does not correspond to 0 = zero off		

Tbl. 7:   Addressing gauge/IO, parameter 355 - 797

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