

*Operating Instructions*

# **TIC 251/252**

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## ***Profibus DP-Gateway***



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# 1. Safety Precautions

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- ☞ Read and follow all the instructions in this manual.
- ☞ Inform yourself regarding:
  - Hazards which can be caused by the unit,
  - Hazards which can arise in your system,
- ☞ Comply with all safety and accident prevention regulations.
- ☞ Check regularly that all safety requirements are being complied with.
- ☞ Take account of the ambient conditions when installing the TIC 251/252. The protection type is IP20.

The unit is protected against the ingress of foreign bodies  $\geq \varnothing 12$  mm. Because water protection is not provided the unit must be fitted into a suitable housing.
- ☞ Do not carry out any unauthorised conversions or modifications on the unit.
- ☞ Do not open the housing cover when the unit is connected to the mains nor during pumping operation.
- ☞ Take account of the prescribed voltage when connecting the cable to the various plugs.
- ☞ When returning the unit to us please note the shipping instructions.

## Pictogram Definitions



### Warning!

Danger of personal injury.



### Caution!

Danger of damage to the unit or system.



### Please Note.

Important information on the product, its usage or part of the documentation which requires particular attention.

## 2. Understanding The TIC 251/252

### 2.1. To Your Orientation

#### Abbreviations Used

TIC = Gateway

#### Operating instructions In The Text

➔ Here, you have to do something.

### Delivery Consignment

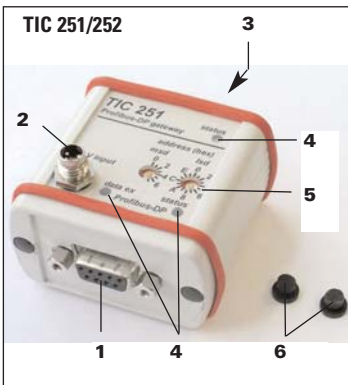
The following positions are included on the TIC 251/252 delivery:

- TIC 251 respectively TIC 252
- A plug connector for the voltage supply
- A CD with the GSD file.

### 2.2. Product Description

The TIC 251 / TIC 252 is a gateway which enables the connection of vacuum transmitters to the Profibus DP. For this, each a TIC 251 / TIC 252 is necessary per transmitter.

Gateway	TIC 251	TIC 252
Transmitter, applicable	PPT100, CPT100, RPT100	HPT100, MPT 100



- 1 Connection to Profibus-DP
- 2 Connection to voltage supply TIC 251/252 and transmitter
- 3 Connection to transmitter (rear side)
- 4 Illuminating displays
- 5 Address selector switches
- 6 Rubber stoppers for address selector switches

### Connecting Options

The TIC 251/252 is prepared for the following connections:

- Voltage supply
- Profibus-DP
- Transmitter

## Proper Use

The TIC 251 serves exclusively for the connection of a Vacuum Transmitter CPT 100, PPT 100 and RPT 100, the TIC 252 of the Vacuum Transmitter HPT 100 and MPT 100 to the Profibus DP.

## Improper Use

Improper is:

- Uses not covered above, and, in particular,
  - Connection to units which is not permitted in their operating instructions.
  - Connection to units which contain touchable and voltage carrying parts.

Improper use will cause any rights regarding liability and guarantees to be forfeited.

## 3. Installation

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### 3.1. Preparations For Installation



Unauthorised modifications or alterations to the unit are not allowed.

<b>Installation location:</b>	Protected against the weather.
<b>Temperature:</b>	+5 °C - +40 °C.
<b>Relative humidity:</b>	max. 80 %, at $T \leq 31$ °C
<b>Atmospheric pressure:</b>	86 kPa - 106 kPa
<b>Installation height:</b>	max. 2000 m
<b>Pollution level:</b>	2

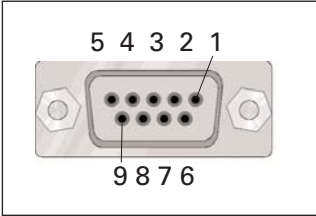
- ➔ To fit, plug the TIC 251/252 onto the transmitter and screw tight the two hexagonal bolts.
- ➔ Set the serial interface address of the transmitter to "RS232".
- ➔ Connect the Profibus DP in accordance with the regulations.

The TIC 251/252 and the transmitter are supplied with voltage as soon as adequate voltage is made available (please refer to Section. 3.4.).

### 3.2. Serial Interface To The Transmitter

Voltage supply for the transmitter and the communication is effected with the fitting of the TIC 251/252 via the D-Sub socket.

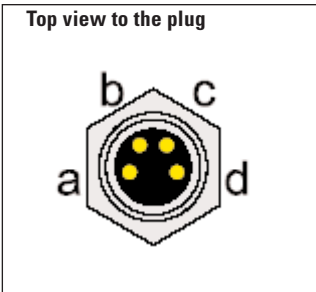
### 3.3. Profibus-DP-Connection



pin	Function
1	Shield
2	not connected
3	RxD/TxD-P
4	CNTR-P
5	DGND
6	VP
7	not connected
8	RxD/TxD-N
9	not connected

### 3.4. Voltage Supply

The plug for the supply of voltage on the transmitter should be arranged as follows:



a	b	c	d
+24V	not connected	not connected	gnd

## 4. Operation

### 4.1. Setting The Profibus Serial Interface Address

The Profibus address is set up with the address selector switch using hexadecimal coding. For conversion of decimal to hexadecimal addresses please refer to the table below.

Afterwards fit the rubber stoppers to the address selector switches so as to attain the type of protection stated.

**Profibus-DP address (hexadecimal): Conversion to decimal data, ①: address msd, ②: address lsd**

①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.	①② hex.	Adr. dez.
00	0	10	16	20	32	30	48	40	64	50	80	60	96	70	112
01	1	11	17	21	33	31	49	41	65	51	81	61	97	71	113
02	2	12	18	22	34	32	50	42	66	52	82	62	98	72	114
03	3	13	19	23	35	33	51	43	67	53	83	63	99	73	115
04	4	14	20	24	36	34	52	44	68	54	84	64	100	74	116
05	5	15	21	25	37	35	53	45	69	55	85	65	101	75	117
06	6	16	22	26	38	36	54	46	70	56	86	66	102	76	118
07	7	17	23	27	39	37	55	47	71	57	87	67	103	77	119
08	8	18	24	28	40	38	56	48	72	58	88	68	104	78	120
09	9	19	25	29	41	39	57	49	73	59	89	69	105	79	121
0A	10	1A	26	2A	42	3A	58	4A	74	5A	90	6A	106	7A	122
0B	11	1B	27	2B	43	3B	59	4B	75	5B	91	6B	107	7B	123
0C	12	1C	28	2C	44	3C	60	4C	76	5C	92	6C	108	7C	124
0D	13	1D	29	2D	45	3D	61	4D	77	5D	93	6D	109	7D	125
0E	14	1E	30	2E	46	3E	62	4E	78	5E	94	6E	110	7E	125
0F	15	1F	31	2F	47	3F	63	4F	79	5F	95	6F	111	7F	125

## 4.2. Illuminating Displays

### LED "TIC 251/252" status

Status	Definition
Off	Unit is not supplied with adequate voltage
Green illuminating	Communication with the transmitter running
Red flashing	Communication with the transmitter is defective
Red illuminating	TIC 251/252 defective
Red 1 x short, 1 x long flashing	Unknown transmitter connected

### LED "Profibus-DP status"

Status	Definition
Off	Unit is not supplied with adequate voltage
Green illuminating	Unit is correctly parametered and configured
Green flashing	Unit is not yet parametered and configured
Red illuminating	The set address is invalid
Red flashing	No bus traffic detected
Red 1 x short, 1 x long flashing	Current parameter data are erroneous

### LED "data ex"

Status	Definition
Off	The unit is not in the "data exchange" mode
Green illuminating	The unit is in the "data exchange" mode



### 4.3. Data Transfer

The TIC 251/252 delivers six bytes of input data and anticipates nine bytes of output data grouped as follows:

#### Input data (Transmitter -> Profibus Master)

byte	0	1	2	3	4						5		
	a	b	c	d	e	f	g	h	i	j	k	l	m
bit					7	6	5	4	3	2	1	0	

- a-d: Actual pressure value in the format IEEE 754
- e: Value range undershooting at actual pressure value (0=no, 1=yes)
- f: Value range exceeded at actual pressure value (0=no, 1=yes)
- g: Invalid command (0=no, 1=yes)
- h: Value range violation with a correction factor BA (only HPT 100, 0=no, 1=yes)
- i: Value range violation with a correction factor Pi (not on the CPT 100, 0=no, 1=yes)
- j: 0=required command not supported, 1=command is supported
- k: Value range violation in data field for the output data (n-q) (0=no, 1=yes)
- l: 0=DeGas mode inactive and filament switched on, 1=DeGas mode active or filament switched off (DeGas mode only for HPT 100, filament off only for HPT 100 and MPT 100)
- m: Confirmation of the command

#### Output data (Profibus Master -> Transmitter)

byte	0	1	2	3	4	5	6	7	8
	n	o	p	q	r	s	t	u	v

- n-q: Data for pressure adjustment value in the format IEEE 754
- r: Command:
  - 0: no command
  - 1: activate DeGas (only HPT 100)
  - 2: adjust low pressure, data (n-q) contains actual pressure value
  - 3: adjust high pressure, data (n-q) contains actual pressure value
  - 4: transmit the correction factors
  - 5: Filament off (only for HPT 100/MPT 100)
  - 6: Filament on (only for HPT 100/MPT 100)
- s-t: Correction factor Pi (not on the CPT 100, 1-800 corresponds with 0,01-8,00), s=high byte, t=low byte (Motorola format)
- u-v: Correction factor BA/KK (only HPT 100/MPT 100, 1-800 corresponds with 0,01-800), u=high byte, v=low byte (Motorola format)

#### Diagnostic data

byte	0	1	2	3	4							
	Länge+spec	status type	slot number	specifier				e	d	c	b	a
bit								4	3	2	1	0

- a: no transmitter connected
- b: Sensor defective
- c: e2prom defective
- d: wrong transmitter
- e: Version malfunction

#### **4.4. Activating DeGas (only on the HPT 100)**

- ➔ Write the command "0" in the field r (byte 4) of the output data (in the event it is not yet "0").
- ➔ Write the command "1" in the field r (byte 4) of the output data.
- > Whether DeGas is active is identifiable in the field Field l (byte 4, bit 0) of the input data.

#### **4.5. Setting The Correction Factors (not with the CPT 100)**

- ➔ Write the command "0" in the field r (byte 4) of the output data (in the event it is not yet "0").
- ➔ Enter the correction factor in the field s-t (for the PPT 100, RPT 100 and HPT 100) and u-v (only on the HPT 100).
- ➔ Write the command "4" in the field r (byte 4) of the output data.
- ➔ The command "4" appears in the field m (byte 5) of the input data.
  - > Field i (byte 4, bit 3) of the input data is 0: Value OK.
  - > Field i (byte 4, bit 3) of the input data is 1: Value is faulty.

#### **4.6. Pressure Adjustment**

- ➔ Write the command "0" in the field r (byte 4) of the output data (in the event it is not yet "0").
- ➔ Write the pressure value in IEEE754 format in the fields n-q (bytes 0-3) of the output data. Please refer to the operating instructions for the transmitter for a comparison of pressure values.
- ➔ Write the command "2" for low pressure or "3" for high pressure in the field r (byte 4) of the output data.
- ➔ The command "2" or "3" appears in the field m (byte 5) of the input data.
  - > Field k (byte 4, bit 1) of the input data is 0: Value OK.
  - > Field k (byte 4, bit 1) of the input data is 1: Value faulty.

#### **4.7. Selecting Switching Ranges (only RPT/MPT/HPT 100)**

The switching characteristics of the transmitter sensors can be specified by the Pofibus prm data in the GSD file (see operating instructions of the respective transmitter).

## 5. What To Do In The Case Of Breakdowns ?

Problem	Possible Cause	Elimination
No communication possible via the Profibus	<ul style="list-style-type: none"> <li>Faulty voltage supply or insufficient power</li> </ul>	<ul style="list-style-type: none"> <li>Check voltage supply</li> </ul>
	<ul style="list-style-type: none"> <li>Profibus cabling faulty on the plugs</li> </ul>	<ul style="list-style-type: none"> <li>Check cabling and terminal resistance</li> </ul>

## 6. Maintenance And Service

The unit requires no maintenance. A damp cloth can be used to wipe away any dirt which has collected on the front panel. Ensure that the unit is first disconnected from the mains power supply.

### Do Make Use Of Our Service Facilities.

In the event that repairs are necessary a number of options are available to you to ensure any system down time is kept to a minimum:

- Return the unit to the manufacturer for repairs;
- Replace with a new value unit.

Local PFEIFFER representatives can provide full details.



Repairs on customer side are not allowed.



Units returned to us for repair or maintenance are covered by our general conditions of sale and supply.

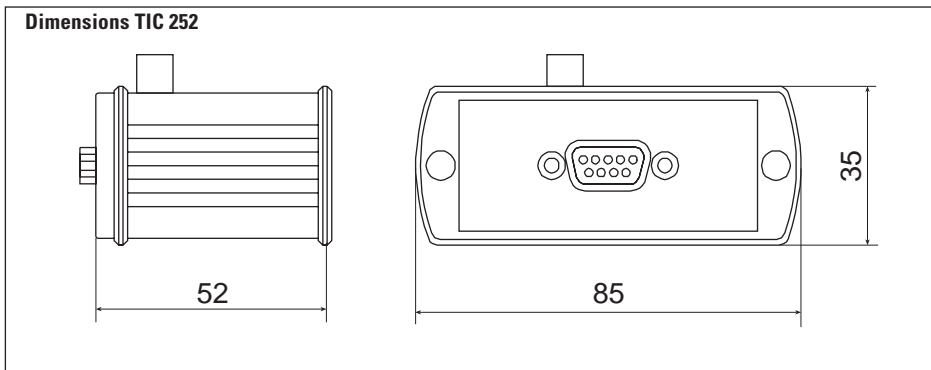
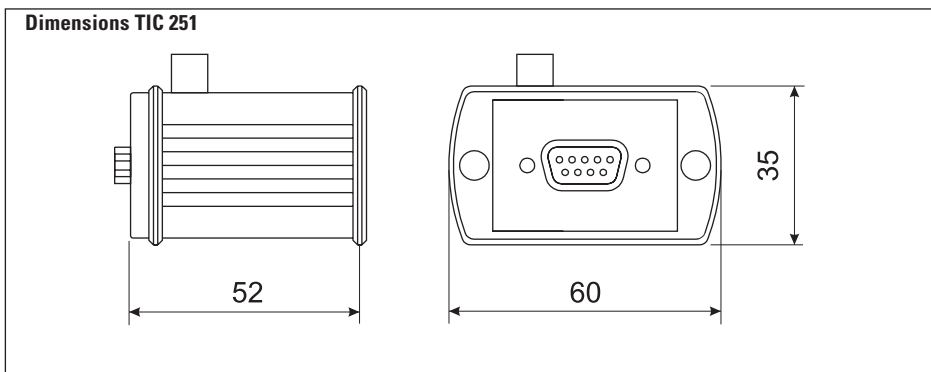
## 7. Technical Data

### 7.1. Data list

Description	Value	TIC 251/252
Connection voltage	V DC	21-30
Default Profibus Address		1
Power (without Transmitter)	W	3,5
Perm. ambient temp.	°C	5 - 40
Max. relative humidity <sup>1)</sup>	%	5 - 85
Atmospheric pressure	kPa	86 - 106
Protection type		IP 20
Weight	kg	0,10 / 0,12

<sup>1)</sup> non condensing at 5-40°C

### 7.2. Dimensions



## 8. Supplementary Informationen

The TIC 251 / TIC 252 gateway allows the connection of vacuum transmitters to the Profibus-DP.

Depending on the configuration of your components further operating instructions are included in the delivery consignment (please see the table). If, despite every effort by us, information on your products is missing please get in touch with your local Pfeiffer representatives or call us on the hotline shown on the back cover page. All operating instructions are also available as PDF files.

The following operating instructions are available for the "Digiline" program:

<b>Product</b>	<b>Definition</b>	<b>No. operating instructions</b>
CPT 100	Rough vacuum transmitter	PG 0001 BN
PPT 100	Medium vacuum transmitter	PG 0002 BN
RPT 100	Combination vacuum transmitter	PG 0003 BN
HPT 100	High vacuum transmitter	PG 0004 BN
MPT 100	Combi vacuum transmitter	PG 0017 BN

<sup>1)</sup> Number is requestable via the Pfeiffer Vacuum service.

**CE** **Konformitätserklärung** **CE**  
**Declaration of Conformity**

im Sinne folgender EU-Richtlinien:  
*pursuant to the following EU directives:*

- **Elektromagnetische Verträglichkeit / *Electromagnetic Compatibility* 89/336/EWG**
- **Niederspannung / *Low Voltage* 2006/95/EWG**

Wir bestätigen Konformität mit der EU-Richtlinie über elektromagnetische Verträglichkeit 89/336/EWG und der EU-Niederspannungsrichtlinie 73/23/EWG.

*We hereby certify that the product specified below is in accordance with the provision of EU Electromagnetic Compatibility Directive 89/336/EEC and EU Low Voltage Directive 2006/95/EEC.*

Produkt/Product:  
**TIC 251, TIC 252 Profibus Gateway**

Angewendete Richtlinien, harmonisierte Normen und angewendete, nationale Normen:  
*Guidelines, harmonised standards, national standards in which have been applied:*

**EN 61010, EN 55011, EN 50081-1, EN 50082-2, IEC 801 1-4, VDE 0843-6, EN 50170**

Unterschrift/Signature:



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