Operating instructions
Betriebsanleitung

F-20 / F-21

Pressure Transmitter with Field Case — GB

Druckmessumformer in Feldgehäuseausführung — D

CE

F-20

F-21

WIKA Alexander Wiegand GmbH & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/ Germany
Tel. (+49) 93 72/132-295
Fax (+49) 93 72/132-706
E-Mail support-tronic@wika.de
www.wika.de

2103870.03 GB/D 01/2006

WIKA

Part of your business

Operating instructions
Betriebsanleitung

F-20, F-21

Pressure transmitter /
Druckmessumformer

CE

F-20

F-21

WIKA Alexander Wiegand GmbH & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Phone (+49) 93 72/132-295
Fax (+49) 93 72/132-706
E-Mail support-tronic@wika.de
www.wika.de

2103870.03 GB/D 01/2006

WIKA

Part of your business

Current terms and conditions apply.
Details are available on www.wika.de

Es gelten unsere aktuellen Verkaufs- und Lieferbedingungen siehe unter www.wika.de

2103870.03 GB/D 01/2006

1. Important details for your information

Read these operating instructions before installing and starting the pressure transmitter. Keep the operating instructions in a place that is accessible to all users at any time.
The following installation and operating instructions have been compiled by us with great care but it is not feasible to take all possible applications into consideration. These installation and operation instructions should meet the needs of most pressure measurement applications. If questions remain regarding a specific application, you can obtain further information (data sheets, instructions, etc.) via our Internet address (www.wika.de / www.wika.com) or contact WIKA for additional technical support (see section7 „Starting, Operation“/Further information). With special model number, e.g. F-20000 or F-21000, please note specifications in the delivery note.
The product data sheet is designated as PE 81.19
WIKA pressure transmitters are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection before assembly and each instrument is fully tested prior to shipment.

Use of the product in accordance with the intended use F-2✳
Use the pressure transmitter for pressure measurement.

Knowledge required
Install and start the pressure transmitter only if you are familiar with the relevant regulations and directives of your country and if you have the qualification required. You have to be acquainted with the rules and regulations on measurement and control technology and electric circuits, since this pressure transmitter is „electrical equipment“ as defined by EN 50178. Depending on the operating conditions of your application you have to have the corresponding knowledge, e.g. of aggressive media.

2. A quick overview for you

If you want to get a quick overview, read **Chapters 5, 7 and 10**. There you will get some short safety instructions and important information on your product and its starting.
Read these chapters in any case. Get some more detailed information on this product in Chapters 4 „Function and accessories” and 6 „Packaging”. Read Chapter 8 for „Maintenance”. In the case of failures please refer to Chapter 9.

2103870.03 GB/D 01/2006

3. Abbreviations, signs and symbols

Warning	Potential danger of life or of severe injuries.
Warning	Potential danger of life or of severe injuries due to catapulting parts.
Caution	Potential danger of burns due to hot surfaces.
	Notice, important information, malfunction.
CE	The product complies with the applicable European directives.

	Power supply
	Load (e.g. display)
FDA	Food and Drug Administration
2-wire	Two connection lines are intended for the voltage supply. The supply current is the measurement signal.
3-wire	Two connection lines are intended for the voltage supply. One connection line is intended for the measurement signal.
UB+/Sig+	Positive supply / measurement connection
OV/Sig-	Negative supply / measurement connection

4. Function and accessories

F-20: Standard pressure connection
F-21: Pressure connection with flush diaphragm for highly viscous or solids entrained media which might clog the pressure port.

Function: With the pressure transmitter you measure the pressure of your application, which is trans-formed into an electric signal. This electric signal changes in proportion to the pressure and can be evaluated correspondingly.

Accessories: For details about the accessories, please refer to WIKA‘s price list, WIKA‘s product catalog on CD or WIKA’s web site www.wika.de. Please refer to our data sheet “Pressure gauge sealing washers AC 09.08” in WIKA’s product catalog Pressure and Temperature Measurement or our web site www.wika.de for details about sealing washers.

2103870.03 GB/D 01/2006

5. For your safety

Warning

- Select the appropriate pressure transmitter with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.
- Observe the relevant national safety regulations (e.g.: EN 50178) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as oxygen, acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors). **If you do not observe the appropriate regulations, serious injuries and/or damage can occur!**
- **Open pressure connections only after the system is without pressure!**
- Please make sure that the pressure transmitter is only used within the overload threshold limit all the time!
- Observe the ambient and working conditions outlined in section 7 „Technical data”.
- Ensure that the pressure transmitter is only operated in accordance with the provisions i.e. as described in the following instructions.
- Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions.
- Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- **Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!**
- Have repairs performed by the manufacturer only.

Information about material consistency against corrosion and diffusion can be found in our WIKA-Handbook, 'Pressure and Temperature Measurement'.

2103870.03 GB/D 01/2006

6. Packaging

- Inspect the pressure transmitter for possible damage during transportation. Should there be any obvious damage, inform the transport company and WIKA without delay.
- Keep the packaging, as it offers optimal protection during transportation (e.g. changing installation location, shipment for repair).
- Keep the protection cap of the pressure connection thread and the diaphragm for later storage or transport.

In order to protect the diaphragm, the pressure connection of the instrument F-21 is provided with a special protection cap.

- Remove this protection cap only just before installing the pressure transmitter in order to prevent any damage to the diaphragm.
- Ensure that the pressure connection thread and the connection contacts will not be damaged.
- Mount the protection cap when removing and transporting the instrument.

7. Starting, operation

Has everything been supplied?

Check the scope of supply:

- Completely assembled pressure transmitters; with flush version F-21 including pre-assembled sealings and protection cap.

Required tools: wrench (flats 27), screw driver

Diaphragm test for your safety

It is necessary that before starting the pressure transmitter you test the diaphragm, as this is a **safety-relevant component**.

Warning

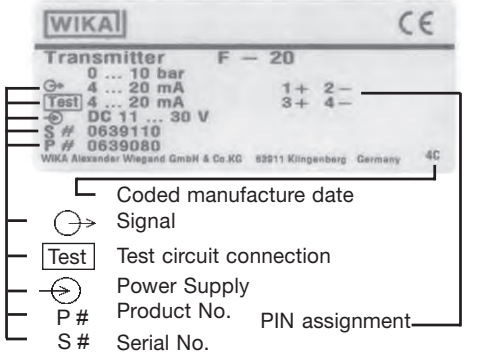
- Pay attention to any liquid leaking out, for this points to a diaphragm damage.
- Check the diaphragm visually for any damage.
- Use the pressure transmitter only if the diaphragm is undamaged.
- Use the pressure transmitter only if it is in a faultless condition as far as the safety-relevant features are concerned.

2103870.03 GB/D 01/2006

Installation

- Remove the protection cap only just before installation and absolutely avoid any damage to the diaphragm during installation as well.
- Ensure that the cable diameter you select fits to the cable gland of the connector. Ensure that the cable gland of the mounted connector is positioned correctly and that the sealings are available and undamaged. Tighten the threaded connection and check the correct position of the sealings in order to ensure the ingress protection.
- Connect the instrument to earth via the pressure connection and/or connection terminal 5.
- Hold the instrument on the flat of the nut with an appropriate tool and tighten the screws to the required torque or unscrew it as the case may be. Do not hold onto the housing with pliers to screw or unscrew.

Product label



For Model F-20 the sealing ring is available as an optional extra.

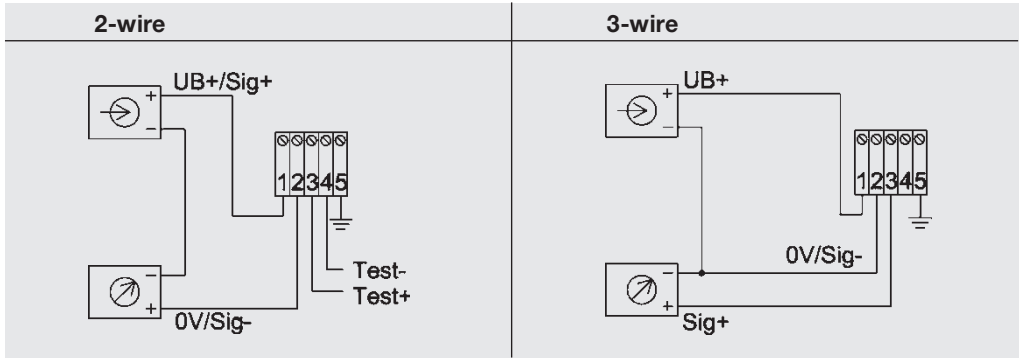
For Model F-21 the sealing ring is included in delivery.

For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de -Service

Wiring

Ingress protection IP 68 per IEC 60529
(Please make sure that the ends of cables do not allow any ingress of moisture.)

conductor outer diameter 7 - 13 mm



Cable connection in the spring clip terminal

- Cover the stripped wire ends with end splices.
- Unscrew the case cover.
- Loosen the cable gland using an open-end wrench, wrench size 24.
- Lead the cable through the cable gland into the opened case head.
- Press the corresponding plastic lever at the spring clip terminal down using a screw driver, so that the clamped contact will be released.
- Lead the prepared flying lead into the opening and let go of the plastic lever, so that the flying lead will be squeezed inside the spring clip terminal.
- After connecting the individual wires, tighten the cable gland and screw down the case over.

2103870.03 GB/D 01/2006

Specifications		Model F-20, F-21						
Pressure ranges *)	bar	0.1	0.16	0.25	0.4	0.6	1	1.6
Over pressure safety	bar	1	1.5	2	2	4	5	10
Burst pressure	bar	2	2	2.4	2.4	4.8	6	12
Pressure ranges *)	bar	2.5	4	6	10	16	25	40
Over pressure safety	bar	10	17	35	35	80	50	80
Burst pressure	bar	12	20.5	42	42	96	96	400
Pressure ranges *)	bar	60	100	160	250	400	600	1000 [1]
Over pressure safety	bar	120	200	320	500	800	1200	1500
Burst pressure	bar	550	800	1000	1200	1700 [2]	2400 [2]	3000
	{Vacuum, gauge pressure, compound range, absolute pressure are available}							
	[1] Only Model F-20							
	[2] For Model F-21: the value specified in the table applies only when sealing is realised with the sealing ring underneath the hex. Otherwise max. 1500 bar applies.							
Materials								
■ Wetted parts		(Other materials see WIKA diaphragm seal program)						
➢ Model F-20 *)		Stainless steel						
➢ Model F-21		Stainless steel {Hastelloy C4}; O-ring: NBR {FPM/FKM}						
■ Case		Stainless steel						
■ Electrical connection	with internal spring clip terminal; cross section max. 2.5 mm²,							
	Ground terminals internal for brass nickel-plated and							
	{stainless steel} and {stainless steel conduit} threaded connection							
Internal transmission fluid [3]		Synthetic oil {Halocarbon oil for oxygen applications}						
		{Listed by FDA for Food & Beverage}						
	[3] Not for F-20 with pressure ranges > 25 bar							

2103870.03 GB/D 01/2006

Specifications		Model F-20, F-21	
Power supply U_B	U_B in DC V	$10 < U_B \leq 30$ (11 ... 30 with signal output 4 ... 20 mA,	
		14 ... 30 with signal output 0 ... 10 V)	
Signal output and	R_A in Ohm	4 ... 20 mA, 2-wire $R_A \leq (U_B - 11\ V) / 0{,}02\ A$	
maximum load R_A		0 ... 20 mA, 3-wire $R_A \leq (U_B - 3\ V) / 0{,}02\ A$	
		{0 ... 5 V, 3-wire} $R_A > 5\,000$ {0 ... 10 V, 3-wire} $R_A > 10\,000$	
Test circuit signal / max. load R_A		Only for instruments with 4 ... 20 mA signal output;	
		$R_A < 15$ Ohm with 20mA	
Adjustability zero/span	%	± 10 using potentiometers inside the instrument	
Response time (10 ... 90 %)	ms	≤ 1	
Dielectric strength	DC V	500	
Accuracy	% of span	≤ 0.25 {0.125} [4] (BFSL)	
	% of span	≤ 0.5 {0.25} [4] [5]	
	[4] Accuracy { } for pressure ranges ≥ 0.25 bar		
	[5] Including non-linearity, hysteresis, non-repeatability, zero point and full scale error		
	(corresponds to error of measurement per IEC 61298-2).		
	Adjusted in vertical mounting position with lower pressure connection.		
Non-linearity	% of span	≤ 0.2 (BFSL) according to IEC 1298-2	
1-year stability	% of span	≤ 0.2 (at reference conditions)	
Permissible temperature of			
■ Medium [6] *)		-30 ... +100 °C {-40 ... +125 °C [7]}	-22 ... +212°F {-40 ...+ 257°F [7]}
■ Ambience [6]		-20 ... + 80 °C {-30 ... +105 °C}	-4 ... +176 °F {-22 ... +221°F}
■ Storage [6]		-40 ... +100 °C	-40 ... +212 °F
	[6] Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3		
	[7] Response time F-20: ≤ 10 ms at medium temperatures below -30 °C for pressure		
	ranges up to 25 bar		
	Response time F-21: ≤ 10 ms at medium temperatures below -30 °C (-22 °F)		

2103870.03 GB/D 01/2006

Specifications		Model F-20, F-21	
Compensated temperature range		0 ... + 80 °C	+32 ... +176 °F
Temperature coefficients within			
compensated temp range			
■ Mean TC of zero	% of span / 10 K	≤ 0.2 (< 0.4 for pressure range 0 ... 0.1 and 0 ... 0.16 bar)	
■ Mean TC of range	% of span / 10 K	≤ 0.2	
CE- conformity		89/336/EEC interference emission and immunity see	
		EN 61 326, interference emission limit class A and B	
		97/23/EG Pressure equipment directive (Module H)	
Shock resistance	g	600 according to IEC 60068-2-27 (mechanical shock)	
Vibration resistance	g	10 according to IEC 60068-2-6 (vibration under resonance)	
Wiring protection		Protected against reverse polarity and and short circuiting on the	
		instrument side	
Mass	kg	Approx. 0.35	

*) In an oxygen version model F-21 is not available. In an oxygen version model F-20 is only available in gauge pressure ranges ≥ 0.25 bar with media temperatures between -20 … +60 °C / -4 … +140 °F and using stainless steel or Elgiloy® wetted parts.
{ } Items in curved brackets are optional extras for additional price.

When designing your plant, take into account that the stated values (e.g. burst pressure, over pressure safety) apply depending on the material, thread and sealing element used.

Functional test

- Open pressure connections only after the system is without pressure!
- Observe the ambient and working conditions outlined in section 7 „Technical data.
- Please make sure that the pressure transmitter is only used within the overload threshold limit at all times!

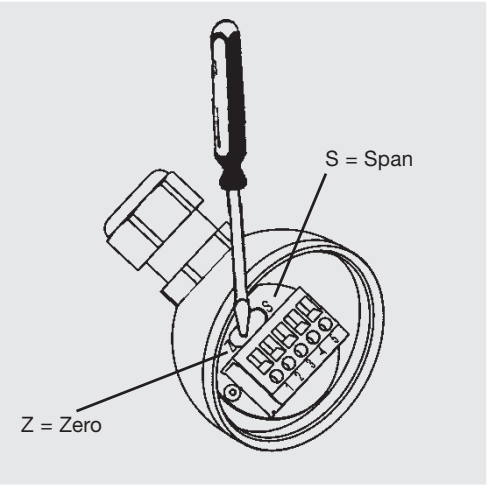
When touching the pressure transmitter, keep in mind that the surfaces of the instrument components might get hot during operation.

The output signal must be proportional to the pressure. If not, this might point to a damage of the diaphragm. In that case refer to chapter 9 „Trouble shooting“.

2103870.03 GB/D 01/2006

Adjustment of zero point / span

- Make sure using a pressure standard with adequate accuracy.
  Pressure standard with adequate accuracy means with an accuracy that is at least 3x more accurate than the accuracy indicated for the instrument.
- Open the pressure transmitter by twisting off the field case over.
- Adjust the zero point (**Z**) by generating the lower limit of the pressure range.
- Adjust the span (**S**) by generating the higher limit of the pressure range.
- Check the zero point.
- If the zero point is incorrect, repeat procedure as required.
- Close the pressure transmitter carefully. Make sure that the sealings are not damaged and check their correct position in order to ensure the ingress protection.
  And make sure that no braids get pinched.



For further information
(+49) 9372/132-295

Recommended recalibration cycle: 1 year

Function of the test circuit for 2-wire

By means of the test circuit the current can be metered during normal operation without having to disconnect the instrument. For that purpose you have to connect an ammeter (internal resistance < 15 Ohm) to the test +/- terminals.

2103870.03 GB/D 01/2006

2103870.03 GB/D 01/2006

8. Maintenance, spare parts

WIKA pressure transmitters require no maintenance!

Warning

- Open pressure connections only after the system is without pressure!

Warning

- Take precautions with regard to remaining media in removed pressure transmitters. Remaining media in the pressure port may be hazardous or toxic!
- Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- Have repairs performed by the manufacturer only.

Do not insert any pointed or hard objects into the pressure port for cleaning to prevent damage to the diaphragm of the pressure connection.

Spare parts

For spare part details refer to our current stock price list, the CD catalog or contact our sales department.

9. Trouble shooting

Problem	Possible cause	Remedy
No output	Power supply failure	Check power supply
	Open wiring	Check continuity
	Wiring reversed	Correct polarity
	No pressure or port blocked	Check pressure port
	Transmitter failure due to wrong	
	Supply voltage or power surge	Replace transmitter
Output steady as pressure	Pressure port blocked	Check pressure port
changes	Transmitter over-pressurized	Replace transmitter
	Transmitter failure due to wrong	
	Supply voltage or power surge	Replace Transmitter
Full span output low	Supply voltage too low	Check supply voltage
	Load impedance too high or too low	Adjust load or supply voltage
	Transmitter over-pressurized	Recalibrate Transmitter
		Replace Transmitter *)
Zero signal too low	Transmitter over-pressurized	Recalibrate Transmitter
		Replace Transmitter *)
Zero signal too high	Transmitter over-pressurized	Recalibrate Transmitter
		Replace Transmitter *)
Non-linear output	Transmitter over-pressurized	Replace Transmitter

*) Test the system for proper operation after adjustments are made. An excessive change in the output signal that cannot be corrected by calibration indicates possible transmitter damage. This may cause the output to be non-linear, requiring transmitter replacement.

If the problem persists, contact our sales department.

2103870.03 GB/D 01/2006

USA, Canada
If the problem continues, contact WIKA or an authorized agent for assistance. If the pressure transmitter must be returned obtain an RMA (return material authorization) number and shipping instructions from the place of purchase. Be sure to include detailed information about the problem. Pressure transmitters received by WIKA without a valid RMA number will not be accepted.

Process material certificate (Contamination declaration for returned goods)
Purge / clean dismounted instruments before returning them.
Service of instruments can only take place safely when a contamination declaration has been submitted and fully filled-in. This declaration contains information on **all** materials with which the instrument has come into contact, either through installation, test purposes, or cleaning.
You can find a contamination declaration on our internet site (www.wika.de / www.wika.com).

10. Storage, disposal

Warning
When storing or disposing of the pressure transmitter, take precautions with regard to remaining media in removed pressure transmitters. Remaining media in the pressure port may be hazardous or toxic!

Storage
Mount the protection cap when storing the pressure transmitter in order to prevent any damage to the diaphragm.

Disposal
Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument is supplied.

WIKA reserves the right to alter these technical specifications.

2103870.03 GB/D 01/2006