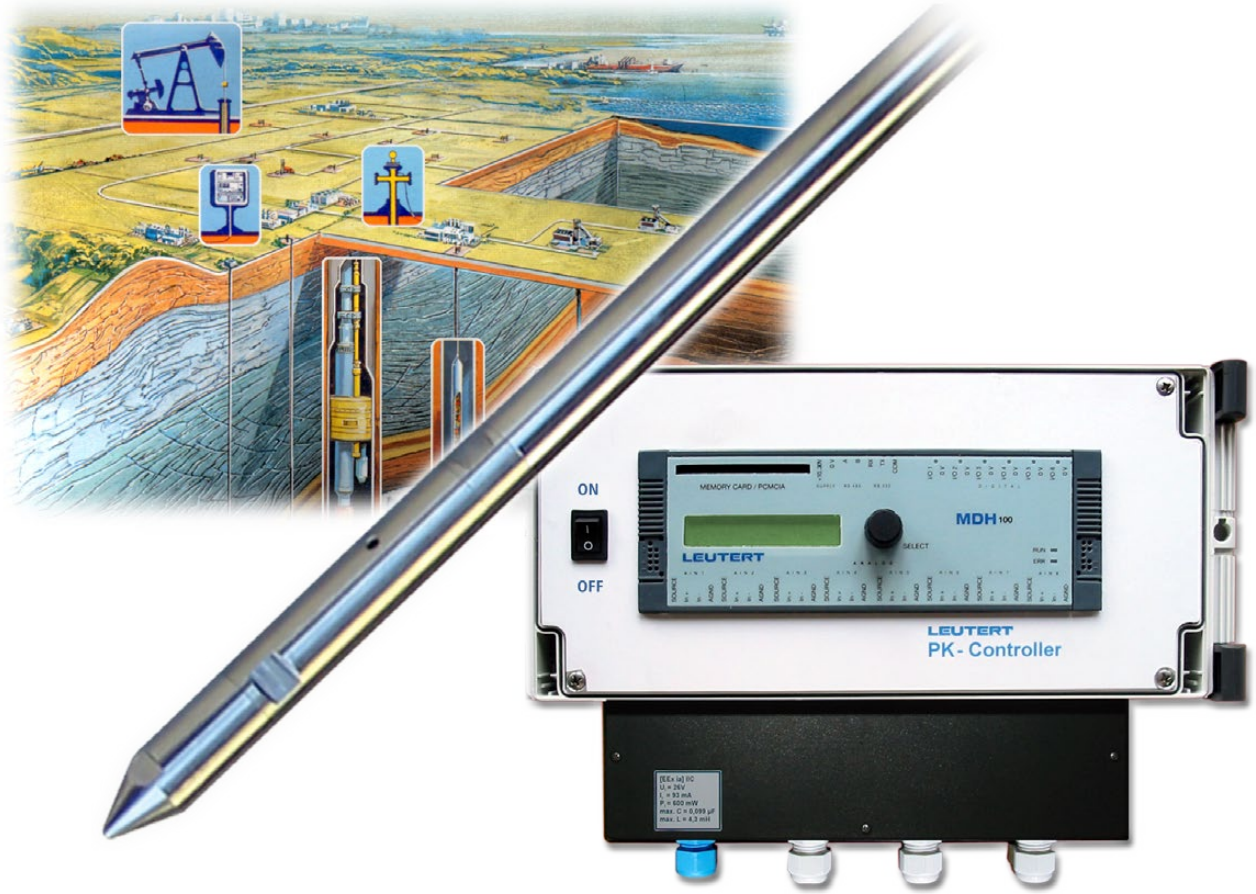
Permanent measurement and control system PK



Pressure and temperature gauges

System for pressure and temperature measurements in deep wells, surface display and data logging or remote transmission to SCADA systems

Content

Description

The PK system implements measurement and control tasks at and in mineral oil and natural gas wells and underground storages as well as water wells including geothermal wells.

Apart from pure measurement tasks, such as measuring pressure in the borehole or pressure and temperature at the wellhead and other parameters such as pipeline pressure, liquid levels and a lot more process parameters can be measured, stored and evaluated.

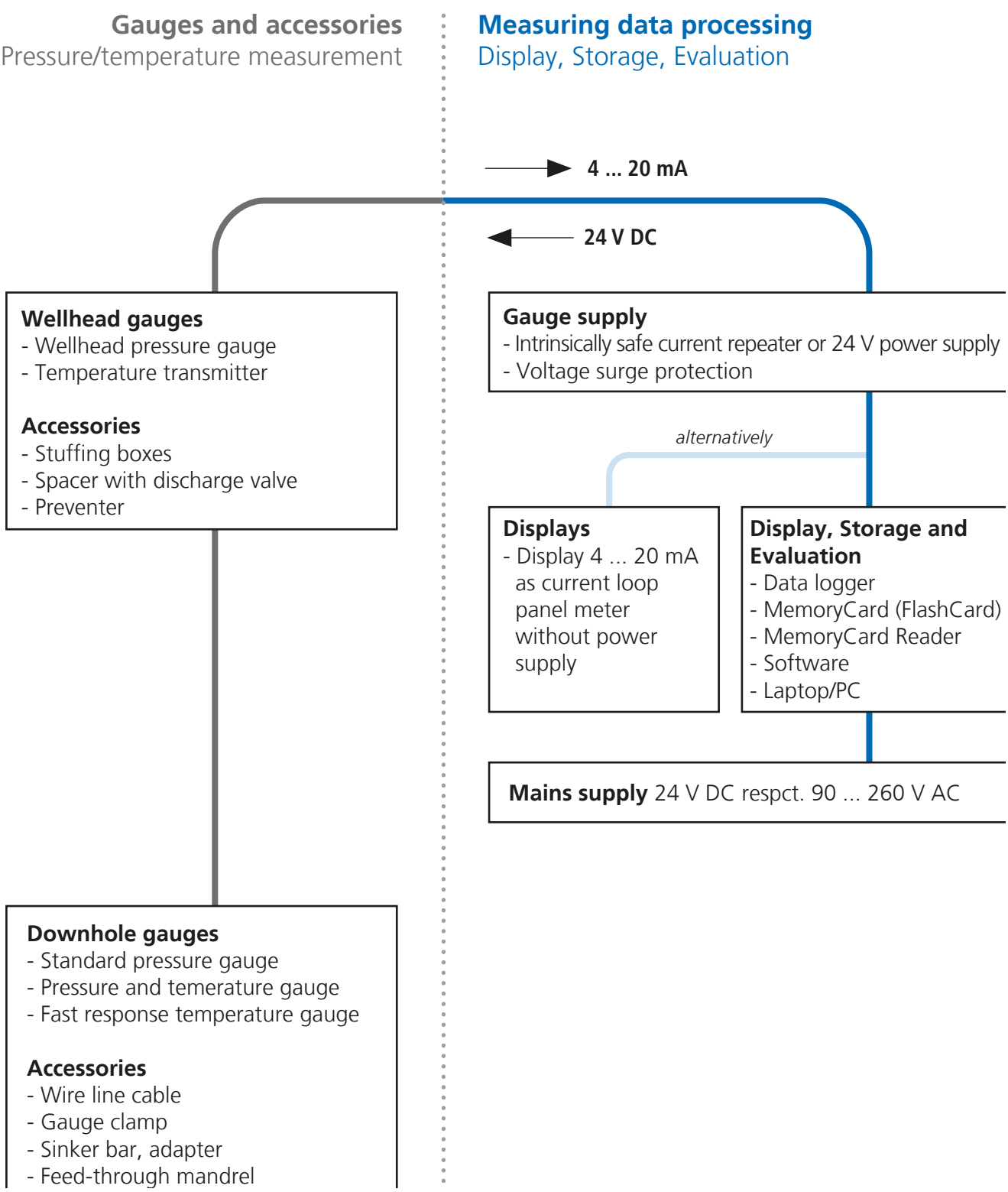
The PK system features enhanced applications, compared to conventional pressure and temperature transmitters.

Examples are:

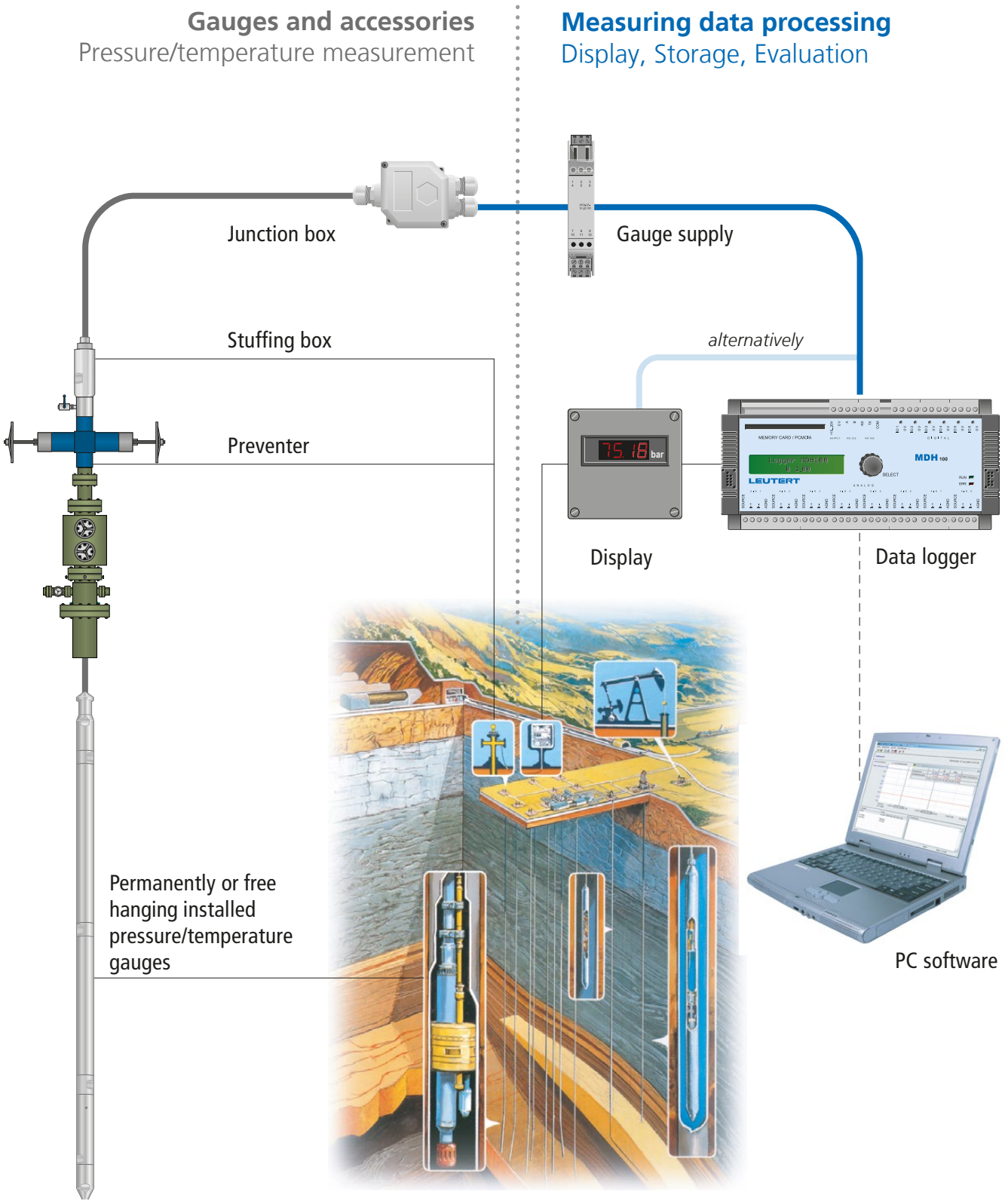
- Storage of measured values at site and remote transmission of data
- Analysis of optimum production and storage capacity
- Monitoring of and automatic response to alarm situations
- Continuous monitoring of fluid level in the well
- Pump operation control according to fluid level for deep well sucker rod pumps, electric submersible pumps and screw pumps
- Measuring data acquisition, communication and evaluation

For the measurement data processing further customer specific solutions are possible. Optionally the PK system can be powered by solar energy or batteries respectively. The PK controller can be delivered completely mounted in weatherproof boxes or cabinets.

Component overview and signal flow chart PK system

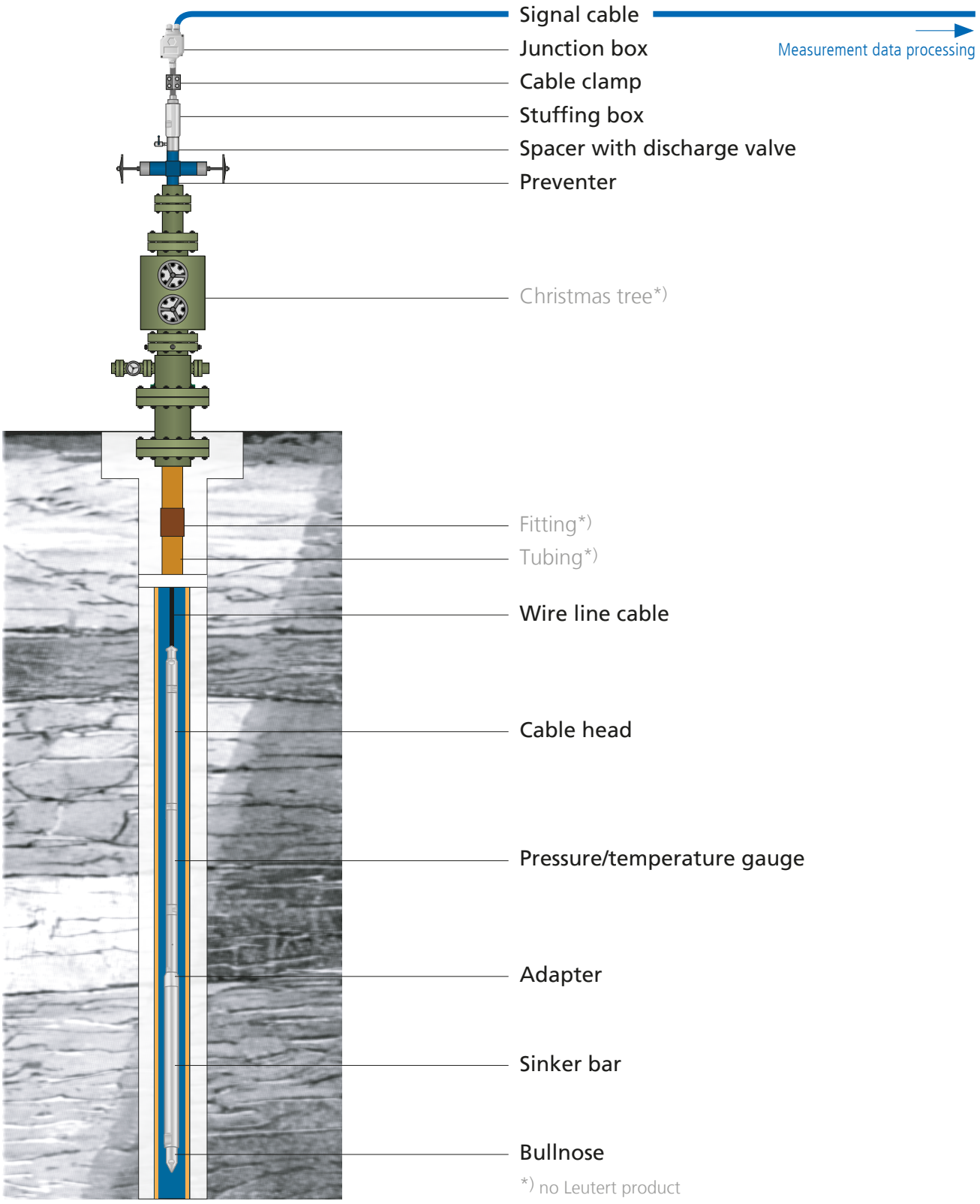


Schematic function diagram PK system



Types of gauge installation

Installation freely suspended



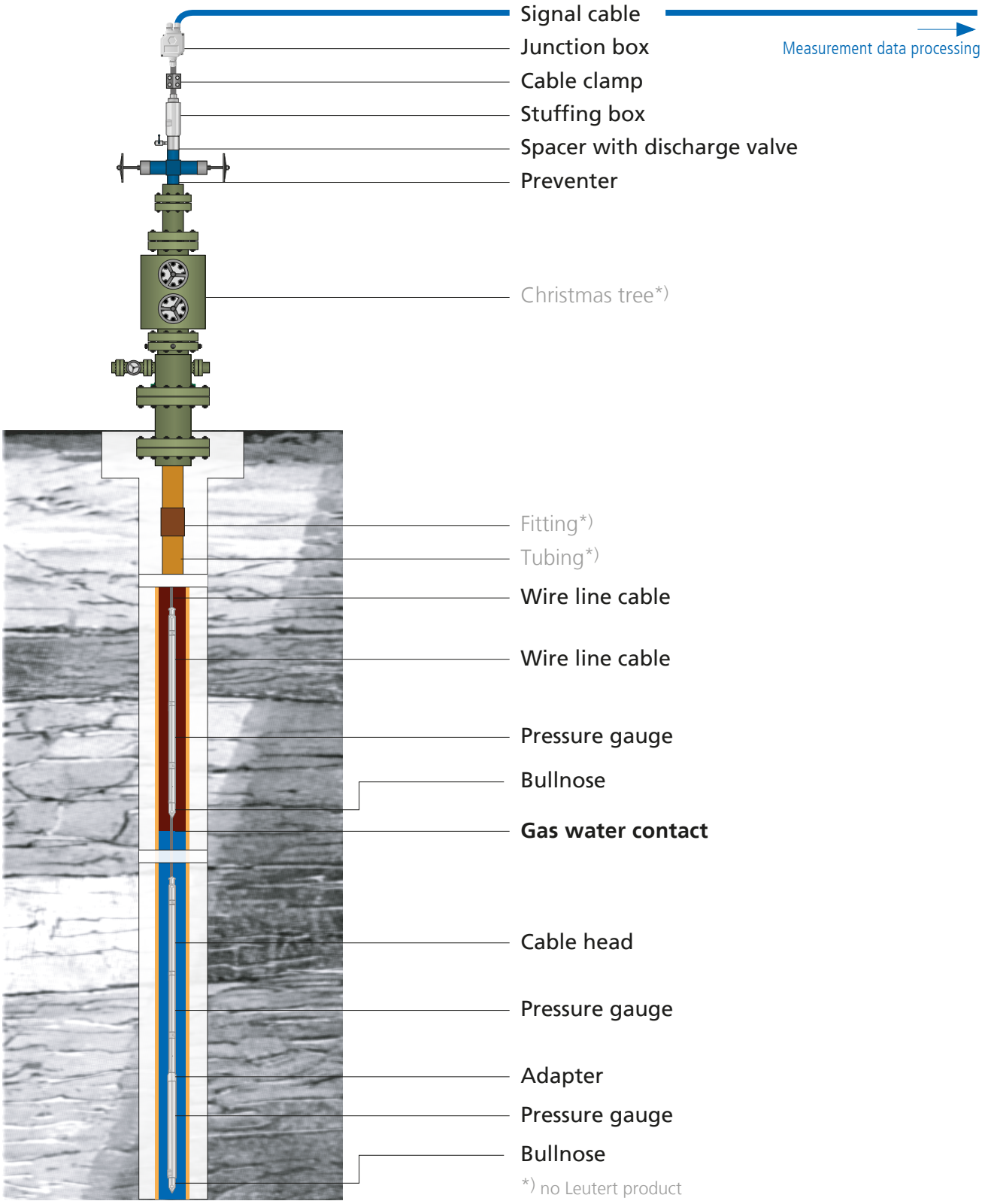
*) no Leutert product

Installation freely suspended

Type of installation	free hanging (inside tubing)
Function	Pressure and temperature measurement in gases and liquids
Components	• Pressure/temperature gauge • Cable head • Sinker bar, adapter • Wire line cable • Preventer • Spacer with discharge valve • Stuffing box • Cable clamp • Junction box • Signal cable

Types of gauge installation

Tandem installation freely suspended



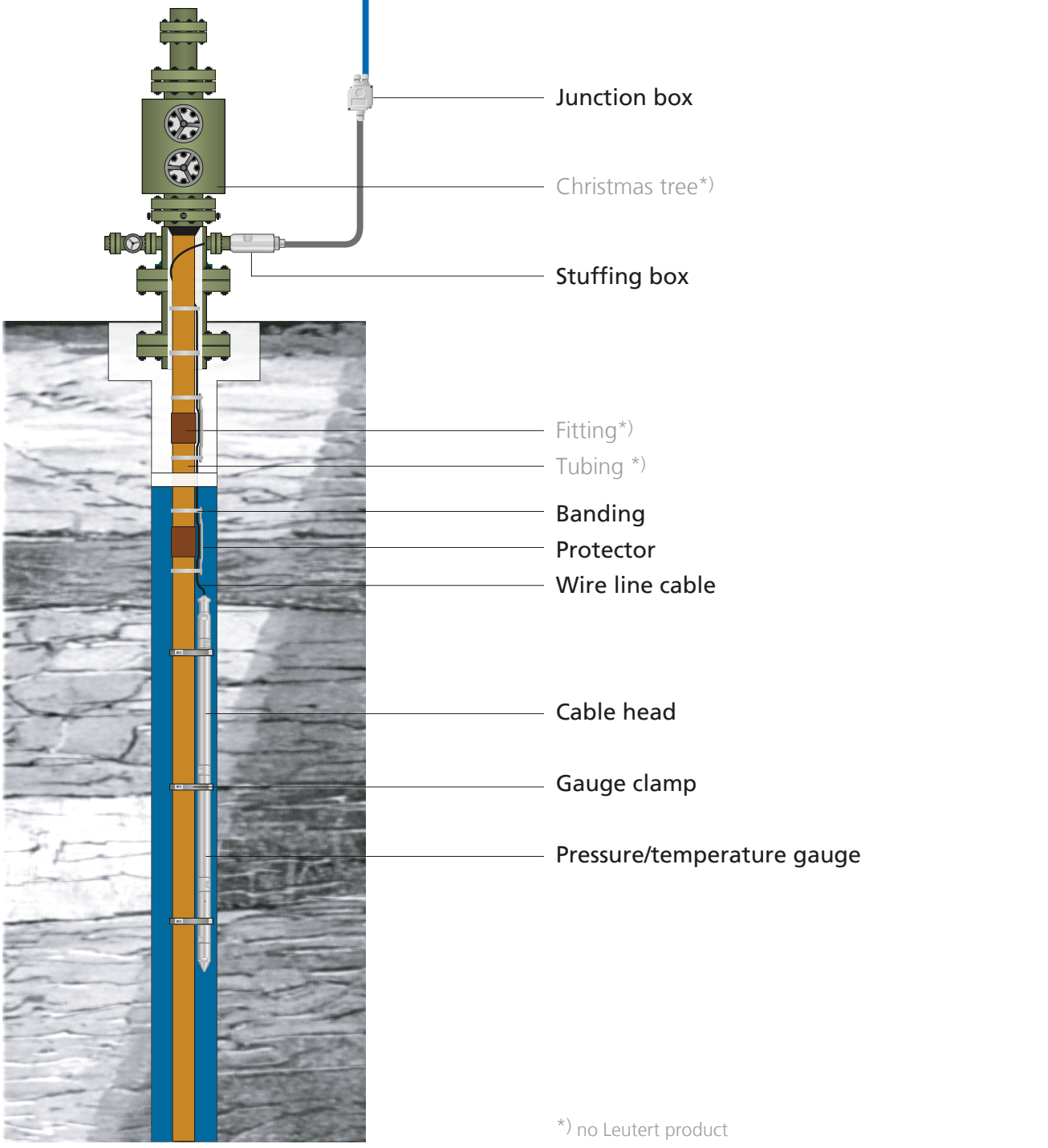
*) no Leutert product

Tandem installation freely suspended

Type of installation	freely suspended (inside tubing)
Function	Determination of the gas water contact in aquifer storages
Components	• 2 x Pressure gauge • 2 x Cable head • Sinker bar, adapter • Wire line cable • Preventer • Spacer with discharge valve • Stuffing box • Cable clamp • Junction box • Signal cable

Types of gauge installation

Installation in annular space



*) no Leutert product

Installation in annular space

Type of installation permanent (in annular space)

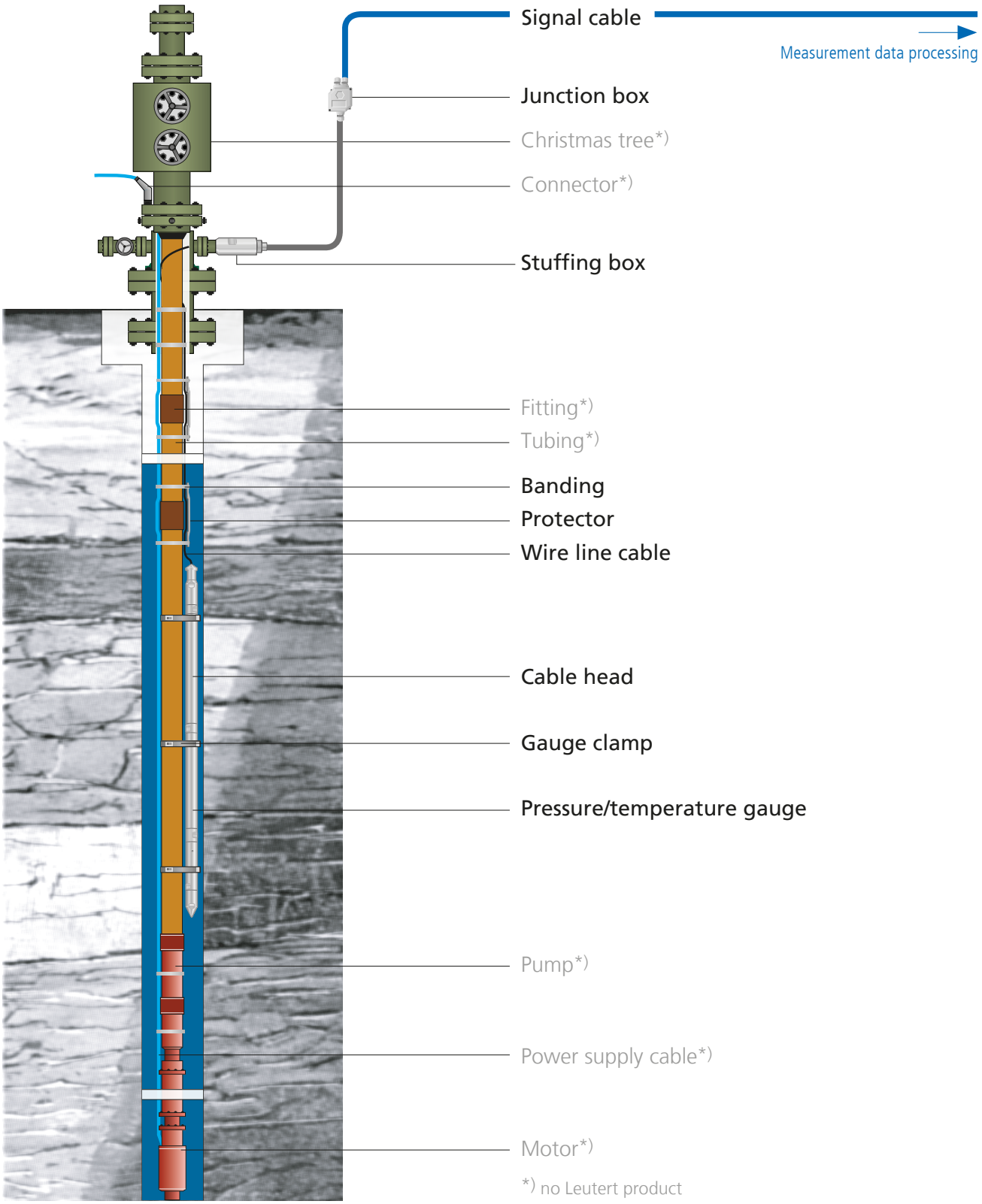
Function Pressure and temperature measurement in gases and liquids

Components

- Pressure/temperature gauge
- Cable head
- Wire line cable
- Gauge clamp
- Protectors
- Banding
- Stuffing box
- Junction box
- Signal cable

Types of gauge installation

Installation in annular space - for pump monitoring



*) no Leutert product

Installation in annular space - for pump monitoring

Type of installation permanent (in annular space)

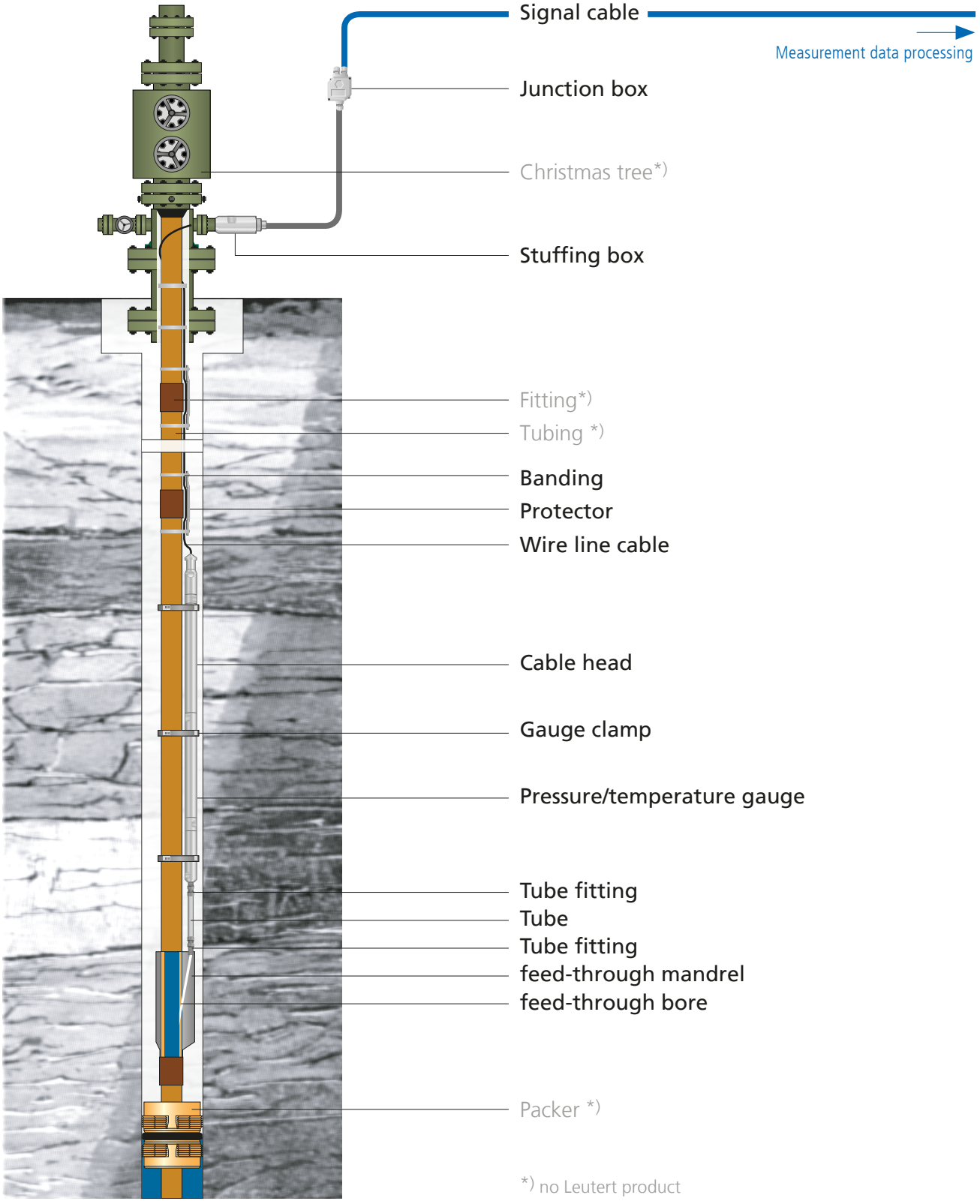
Function Pump monitoring

Components

- Pressure/temperature gauge
- Cable head
- Wire line cable
- Gauge clamp
- Protectors
- Banding
- Stuffing box
- Junction box
- Signal cable

Types of gauge installation

Installation in annular space - to measure the tubing pressure



*) no Leutert product

Installation in annular space - to measure the tubing pressure

Type of installation permanent (in annular space)

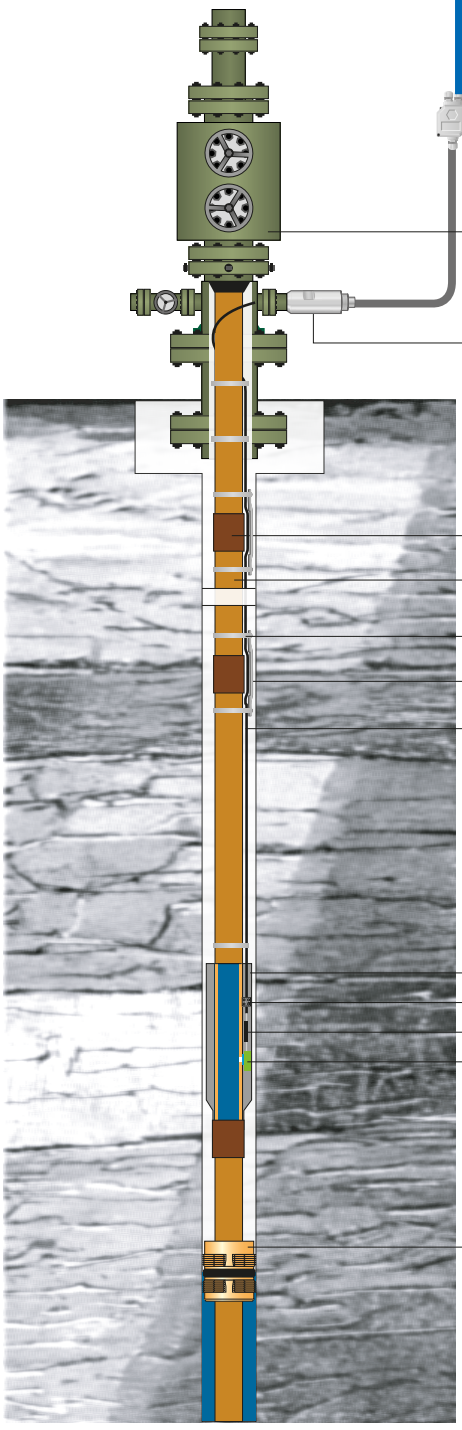
Function Measurement of tubing pressure

Components

- Pressure/temperature gauge
- Cable head
- Wire line cable
- Gauge clamp
- Protectors
- Banding
- Stuffing box
- Junction box
- Signal cable
- Tube fittings
- Tube
- Feed-through mandrel
- Packer

Types of gauge installation

Gauge inside tubing - measuring tubing pressure



Signal cable

Measurement data processing

Junction box

Christmas tree*)

Stuffing box

Fitting*)

Tubing *)

Banding

Protector

Wire line cable

Tubing sub with pressure connection:
Cable clamp
High pressure connector system
Pressure sensor with transmitter electronics

Packer*)

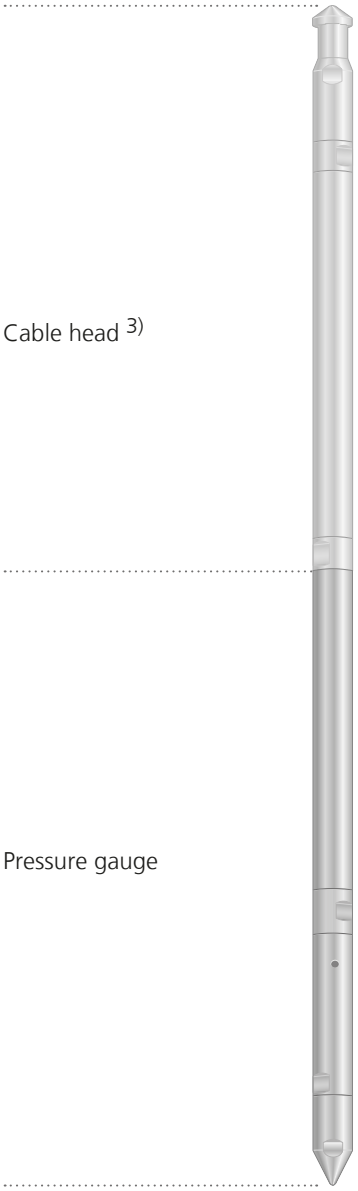
*) no Leutert product

Gauge inside tubing - measuring tubing pressure

Type of installation	permanent (in annular space)
Function	Measuring of tubing pressure up to 200 bar (3000 psi) for holes with small casing diameter
Components	• Pressure/temperature gauge • Cable head • Wire line cable • Gauge clamp • Protectors • Banding • Stuffing box • Junction box • Signal cable • Tubing sub with pressure connection: - Pressure sensor with transmitter electronics - high pressure connector system - cable clamp • Packer

Gauges / accessories (downhole)

Downhole pressure gauge



Description

The downhole pressure gauge is a part of the PK system and is used for pressure monitoring in deep wells of oil, natural gas and water production and also in observation wells. The gauge contains a 2-wire transmitter with a 4 – 20 mA signal and it is offered in two different operating temperature ranges.

Technical Data

Pressure steps	:	0 – 50 bar	| 0 – 750 psi
		0 – 100 bar	| 0 – 1500 psi
		0 – 200 bar	| 0 – 3000 psi
		0 – 400 bar	| 0 – 6000 psi
		0 – 1000 bar	| 0 – 15000 psi 1)
Diameter	:	26 mm	| 1,02“ 2)
		32 mm	| 1,26“
Length	:	approx. 950 mm	| 37,8“
Weight	:	approx. 2000 g	
Material	:	Stainless steel 1.4462 H_2S-resistant optional Titanium	
Output signal	:	4 – 20 mA	
Gauge supply	:	13 – 28 V DC	

1) on request
2) up to max. 200 bar
3) The cable head does not belong to the scope of delivery of the gauge.

Downhole pressure gauge

Operating temperature range -20 °C – 120 °C

Accuracy characteristic values

Accuracy pressure signal : ± 1.0 % FSO (at 10 °C – 110 °C)
± 1.5 % FSO (at -20 °C – 120 °C)
± 0.1 % if calibrated at a specific temp.

Linearity/Hysteresis : ± 0.3 % FSO
Repeatability : 0.1 % FSO
Long-term offset drift : 0.1 % per year

Order-Numbers

Pressure gauge	ø 26 mm	ø 32 mm
0 – 50 bar	2701.0.25.00000	2700.1.25.00000
0 – 100 bar	2701.0.26.00000	2700.1.26.00000
0 – 200 bar	2701.0.27.00000	2700.1.27.00000
0 – 400 bar		2700.1.28.00000

Operating temperature range -20 °C – 170 °C

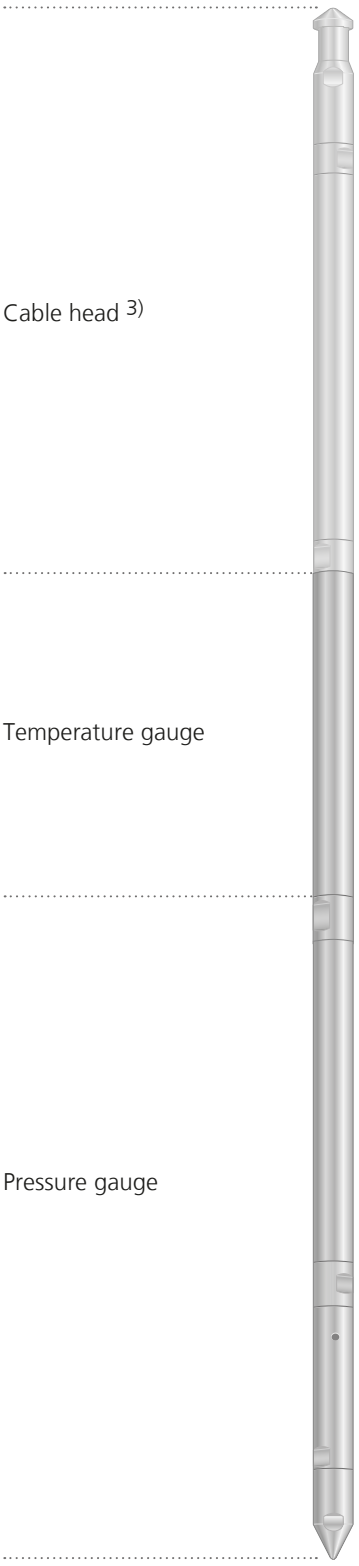
Accuracy characteristic values

Accuracy pressure signal : ± 1.0 % FSO (at 10 °C – 110 °C)
± 2.0 % FSO (at -20 °C – 170 °C)
± 0.1 % if calibrated at a specific temp.

Linearity/Hysteresis : ± 0.3 % FSO
Repeatability : 0.1 % FSO
Long-term offset drift : 0.1 % per year

Gauges / accessories (downhole)

Downhole pressure/temperature gauge



Description

The downhole pressure/temperature gauge is a part of the PK system and is used for pressure and temperature monitoring in deep wells of oil, natural gas and water production and also in observation wells. The gauge contains two 2-wire transmitters with output signals 4 – 20 mA and it is offered in two different operating temperature ranges.

Technical Data

Pressure steps	:	0 – 50 bar	| 0 – 750 psi
		0 – 100 bar	| 0 – 1500 psi
		0 – 200 bar	| 0 – 3000 psi
		0 – 400 bar	| 0 – 6000 psi
		0 – 1000 bar	| 0 – 15000 psi 1)
Diameter	:	26 mm	| 1,02" 2)
		32 mm	| 1,26"
Length	:	approx. 1200 mm	| 47,2"
Weight	:	approx. 3500 g	
Material	:	Stainless steel 1.4462 H_2S-resistant optional Titanium	
Output signal	:	2 x 4 – 20 mA	
Gauge supply	:	13 – 28 V DC	

1) on request
2) up to max. 200 bar
3) The cable head does not belong to the scope of delivery of the gauge.

Downhole pressure/temperature gauge

Operating temperature range -20 °C – 120 °C

Accuracy characteristic values

Accuracy temperature signal : ± 1.0 % FSO (at -20 °C – 120 °C)

Accuracy pressure signal : ± 1.0 % FSO (at 10 °C – 110 °C)
± 1.5 % FSO (at -20 °C – 120 °C)
± 0.1 % if calibrated at a specific temp.

Linearity/Hysteresis : ± 0.3 % FSO
Repeatability : 0.1 % FSO
Long-term offset drift : 0.1 % per year

Order-Numbers

Pressure gauge	ø 26 mm	ø 32 mm
0 – 50 bar	2701.0.25.00000	2700.1.25.00000
0 – 100 bar	2701.0.26.00000	2700.1.26.00000
0 – 200 bar	2701.0.27.00000	2700.1.27.00000
0 – 400 bar		2700.1.28.00000
Temperature gauge	**ø 26 mm**	**ø 32 mm**
	2701.0.72.01000	2700.0.72.01000

Operating temperature range -20 °C – 170 °C

Accuracy characteristic values

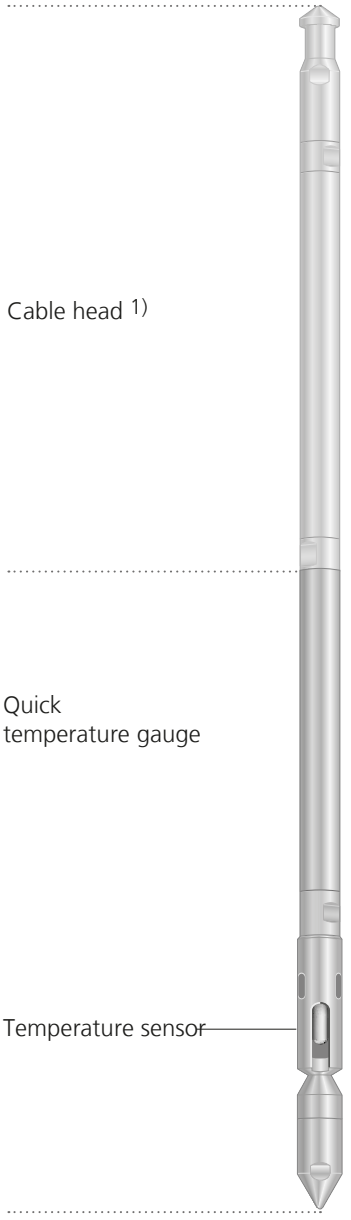
Accuracy temperature signal : ± 1.0 % FSO (at -20 °C – 170 °C)

Accuracy pressure signal : ± 1.0 % FSO (at 10 °C – 110 °C)
± 2.0 % FSO (at -20 °C – 170 °C)
± 0.1 % if calibrated at a specific temp.

Linearity/Hysteresis : ± 0.3 % FSO
Repeatability : 0.1 % FSO
Long-term offset drift : 0.1 % per year

Gauges / accessories (downhole)

Downhole quick temperature gauge



Description

The downhole quick temperature gauge is a part of the PK system and is used for pressure and temperature monitoring in deep wells of oil, natural gas and water production and also in observation wells. Due to the fast response of the sensor the gauge can determine a temperature profile during run in or find leaks. The gauge contains a 2-wire transmitter with a 4 – 20 mA output signal.

Technical data

Temperature range	:	-40 °C – 150 °C | -40 °F – 300 °F
Accuracy	:	± 0,1 °C FSO
Diameter	:	32 mm | 1,26" (Cable head and gauge) 36 mm | 1,42" (Gauge housing)
Length	:	approx. 950 mm | 37,8"
Weight	:	approx. 2000 g
Material	:	Stainless steel 1.4462 H_2S-resistant optional Titanium
Output signal	:	4 – 20 mA
Gauge supply	:	13 – 28 V DC

1) The cable head does not belong to the scope of delivery of the gauge.

Cable head

Description

The cable head provides a pressure tight connection between the cable and the down hole gauge. The cable head connection can either be done by the LEUTERT service or by sufficiently qualified customer's personnel according to the instruction manual.

Technical data

Diameter	:	26 mm | 1,02" (up to max. 200 bar) [1)] 32 mm | 1,26"
Length	:	400 mm | 15,75"
Weight	:	approx. 2000 g
Material	:	Stainless steel 1.4462 H_2S-resistant optional Titanium
Operating conditions	:	-40 °C – 170 °C | -40 °F – 338 °F 0 - 1000 bar | 0 – 15000 PSI

Artikel-Nummern

Cable head, 2-pole, triaxial, **ø 26 mm**	2851.0.02.00000
Cable head, 1-pole, triaxial, **ø 32 mm**	2850.1.01.00000
Cable head, 4-pole, triaxial, **ø 32 mm**	2850.1.05.00000

1) on request

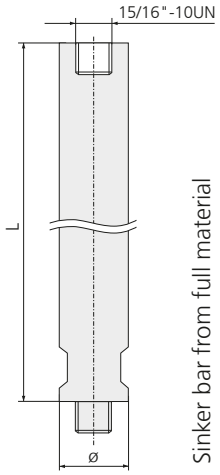
Gauges / accessories (downhole) — Freely suspended installation, combination gauge - sinker bar

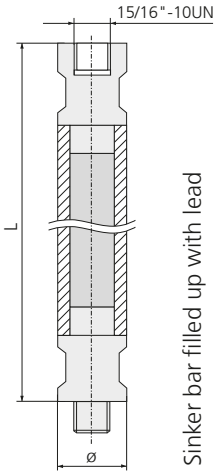
Cable head	 **Ø 26 mm | 1,02"**	 **Ø 32 mm | 1,26"**
Pressure/ temperature gauge	 **Ø 26 mm | 1,02"** M 22 x 1,5 (PIN)	 **Ø 32 mm | 1,26"** 15/16" - 10UN (PIN)
Adapter	 M 22 x 1,5 (BOX) 15/16" - 10UN (PIN)	
Sinker bar	 15/16" - 10UN (BOX) **Ø 32 – 50 mm | 1,26 – 1,97"** according to application 15/16" - 10UN (PIN)	 15/16" - 10UN (BOX) **Ø 32 – 50 mm | 1,26 – 1,97"** according to application 15/16" - 10UN (PIN)
Bullnose	 15/16" - 10UN (BOX) **Ø 26 mm | 1,02"**	 15/16" - 10UN (BOX) **Ø 32 mm | 1,26"**

Sinker bars, Adapter

Description

The sinker bar is part of the PK system. It provides the necessary increase of weight in connection with a freely suspended gauge. Several sinker bars can be coupled. Depending on the required load sinker bars made of solid steel or filled with lead can be supplied.





Schwerstange aus Vollmaterial

Diameter	Length	Weight	Connection	Order number
50 mm	1800 mm	approx. 25 kg	15/16"-10UN	2700.0.99.03001
38 mm (1½")	1500 mm	approx. 13 kg	15/16"-10UN	2700.0.99.03001

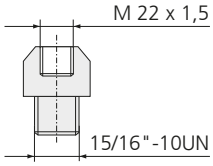
Schwerstange mit Bleifüllung

Diameter	Length	Weight	Connection	Order number
32 mm (1¼")	1000 mm	approx. 8 kg	15/16"-10UN	2700.0.99.03100
32 mm (1¼")	500 mm	approx. 4 kg	15/16"-10UN	2700.0.99.03200
38 mm (1½")	1000 mm	approx. 10 kg	15/16"-10UN	2700.0.99.03300
38 mm (1½")	500 mm	approx. 5 kg	15/16"-10UN	2700.0.99.03400
45 mm (1¾")	1000 mm	approx. 12 kg	15/16"-10UN	2700.0.99.03500
45 mm (1¾")	500 mm	approx. 6 kg	15/16"-10UN	2700.0.99.03600

Other dimensions on request

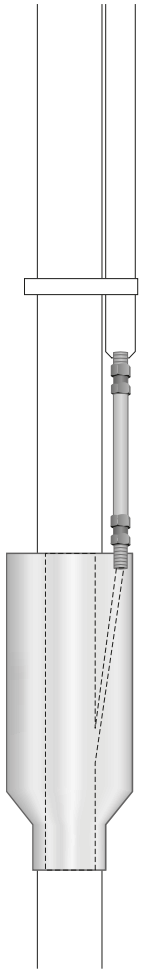
Description

The adapter (cross over) is required to connect a sinker bar (thread 15/16'' – 10UN) to a gauge with 20 mm diameter (thread: M 22 x 1.5).



Gauges / accessories (downhole)

Feed-through mandrel



Description

The feed-through mandrel is part of the PK system. It serves for measuring the inner tubing pressure. Via the drilled feed-through and a special connection tube the pressure is lead to the pressure gauge.

Technical data

Material	:	42CrMo4
Inner diameter [1]	:	**2 7/8" (**Tubing diameter)
Outer diameter[1]	:	140 mm
Length [1]	:	240 mm

Order number

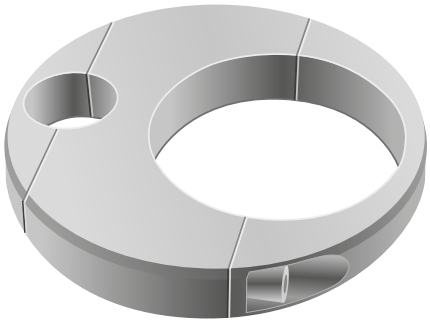
Feed-through mandrel [2]	9000.0.00.87427

1) other dimensions on request
2) incl. tube fitting 1/4 NPT and connection tube, length adapted

Gauge clamp

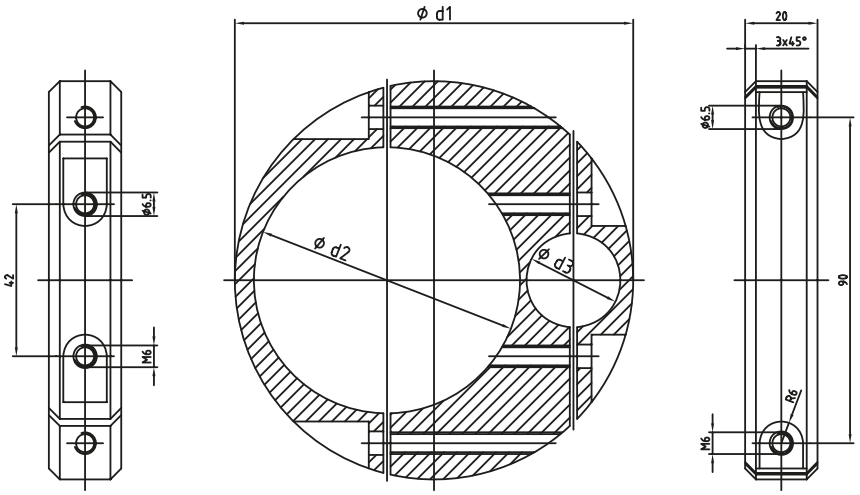
Description

The gauge clamp is part of the PK system. It serves the attachment of the pressure/temperature gauge at the tubing.



Technical data

Material	:	Stainless steel 1.4462 H_2S-resistant
Height *)	:	20 mm
Gauge diameter *)	:	32 mm (d3)
Tubing | outer diameter *)	:	d2 | d1 2 7/8" | 130 mm 3 1/2" | 150 mm



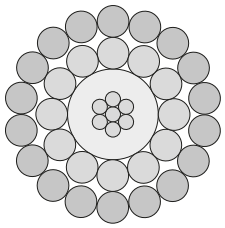
Order numbers

Tubing diameter (d2) 2 7/8"	2840.0.26.00000
Tubing diameter (d2) 3 1/2"	2840.0.25.01000

*) other dimensions on request

Gauges / accessories

1 conductor wire line cable, 3/16“



Description

In onshore and offshore oil exploration wells single or multiconductor cables with double armour are being used to collect subsurface data. Due to this protection neither the alternating bending load during winch operation nor the tensile or torsional stress during the rough everyday operation can harm the cable.

Technical data

20 AWG copper EPC insulation	:	7/0,32 mm	| 7/0.013“
Nominal	:	4,70 mm	| 0.185“
compressed diameter	:	2,11 mm	| 0.083“
Inner armor	:	12/0,65 mm	| 12/0.026“
Outer armor	:	18/0,65 mm	| 18/0.026“

Electrical properties

DC resistant (at 20 °C | 68 °F)			
- Conductor	:	34 Ω/km	| 10.4 Ω/kFt
- Armor	:	19 Ω/km	| 6.0 Ω/kFt
Insulation resistance (at 500 V DC)	:	15000 MΩ/km	| 50000 MΩ/kFt
Capacitance (at 1 kHz)	:	148 pf/km	| 45 pf/Ft
Voltage rating	:	600 Vrms	| 600 Vrms

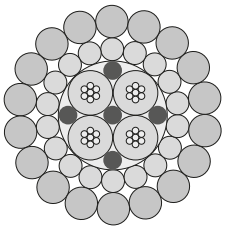
Mechanical properties

Calculated weight			
- In air	:	94 kg/km	| 63 Lbs/kFt
- In fresh water	:	77 kg/km	| 52 Lbs/kFt
Temperature range			
- Minimum	:	-40 °C	| -40°F
- Maximum	:	150 °C	| 300 °F
Breaking strength			
- Ends fixed	:	15 KN	| 3440 Lbs
- Ends free	:	11 KN	| 2560 Lbs
Maximum end to end variation	:	0,13 mm	| 0.005 Inch

4 conductor wire line cable, 3/16“

Description

In onshore and offshore oil exploration wells single or multiconductor cables with double armour are being used to collect subsurface data. Due to this protection neither the alternating bending load during winch operation nor the tensile or torsional stress during the rough everyday operation can harm the cable.



Technical data

24 AWG copper	:	7/0,20 mm	| 7/0.008“
EPC insulation	:	1,00 mm	| 0.039“
Fillers rod, filler coumpound and tape binder			
compressed diameter	:	2,49 mm	| 0.098“
Inner armor	:	18/0,48 mm	| 18/0.019“
Outer armor	:	18/0,65 mm	| 18/0.025“
Nominal	:	4,72 mm	| 0.186“

Electrical properties

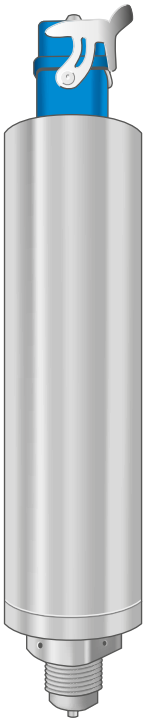
DC resistant (at 20 °C | 68 °F)			
- Conductor	:	26 Ω/km	| 85 Ω/kFt
- Armor	:	6,7 Ωkm	| 22 Ω/kFt
Insulation resistance (at 500 V DC)	:	5000 MΩ/km	| 15000 MΩ/kFt
Capacitance (at 1 kHz)	:	148 pf/km	| 45 pf/Ft
Voltage rating	:	600 Vrms	| 600 Vrms

Mechanical properties

Calculated weight			
- In air	:	91 kg/km	| 61 Lbs/kFt
- In fresh water	:	74 kg/km	| 50 Lbs/kFt
Temperature range			
- Minimum	:	-40 °C	| -40°F
- Maximum	:	150 °C	| 300 °F
Breaking strength			
- Ends fixed	:	11 KN	| 2580 Lbs
- Ends free	:	8 KN	| 1580 Lbs
Maximum end to end variation	:	0,13 mm	| 0.005 Inch
Minimum static dia of curvature	:	188 mm	| 7.44 Inch
Minimum dynamic dia of curvature	:	236 mm	| 9.300 Inch
Torque	:		| 0.322 m.daN

Gauges / accessories (surface)

Wellhead pressure gauge



Description

The wellhead pressure gauge is a part of the PK system and is used for the surface pressure monitoring of deep wells of oil, natural gas and water production and also in observation wells. The gauge contains a 2-wire transmitter with a 4 – 20 mA signal. Optionally a temperature transmitter can be added to the gauge.

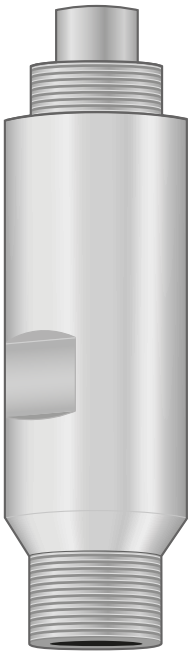
Technical Data

Pressure ranges	:	0 – 25 bar	0 – 360 psi
		0 – 60 bar	0 – 870 psi
		0 – 160 bar	0 – 2300 psi
		0 – 250 bar	0 – 3600 psi
		0 – 400 bar	0 – 5800 psi
		0 – 600 bar	0 – 8700 psi
		0 – 700 bar	0 – 10150 psi
Operating temperature	:	-30 °C – 120 °C	-22 °F – 250 °F
Diameter	:	55 mm	2.16“
Length	:	approx. 240 mm	9.5“
Weight	:	approx. 2000 g	
Material	:	Stainless steel 1.4462 H_2S-resistant	
Degree of protection	:	IP 68	
Connections	:	R 1/2“, 1/2“ NPT, Leutert-Quick-Coupling	
Accuracy	:	± 0,05 % – 0,5 % FSO depending on temperature and operating conditions	
Long-term offset drift	:	0,1 % per year at constant operating conditions	
Output signal	:	4 – 20 mA	
Gauge supply	:	9 – 30 V DC	
Intrinsically safety	:	EEx i a II T4	

Order numbers

0 – 25 bar	0 – 360 psi	2700.0.31.0 x 000
0 – 60 bar	0 – 870 psi	2700.0.32.0 x 000
0 – 160 bar	0 – 2300 psi	2700.0.33.0 x 000
0 – 250 bar	0 – 3600 psi	2700.0.34.0 x 000
0 – 400 bar	0 – 5800 psi	2700.0.35.0 x 000
0 – 600 bar	0 – 8700 psi	2700.0.36.0 x 000
0 – 700 bar	0 – 10150 psi	2700.0.37.0 x 000
		|
Connection R 1/2“		1
Connection 1/2“ NPT		2
Connection Leutert-Quick-Coupling		3

Stuffing box



Description

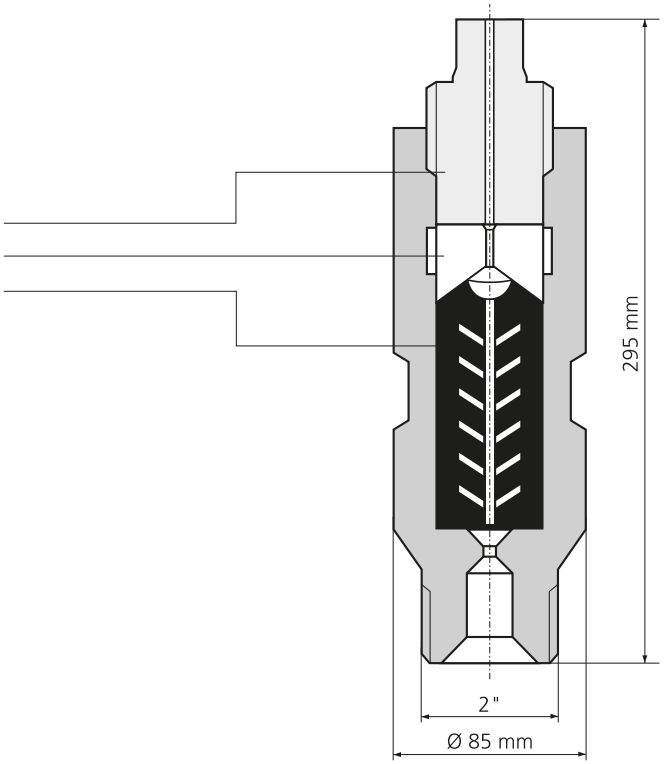
The stuffing box is a part of the PK system. It serves for the sealing of the wire line cable. This model is suitable for 3/16“ wire line cable and designed for a maximum pressure of 100 bar.

Technical data

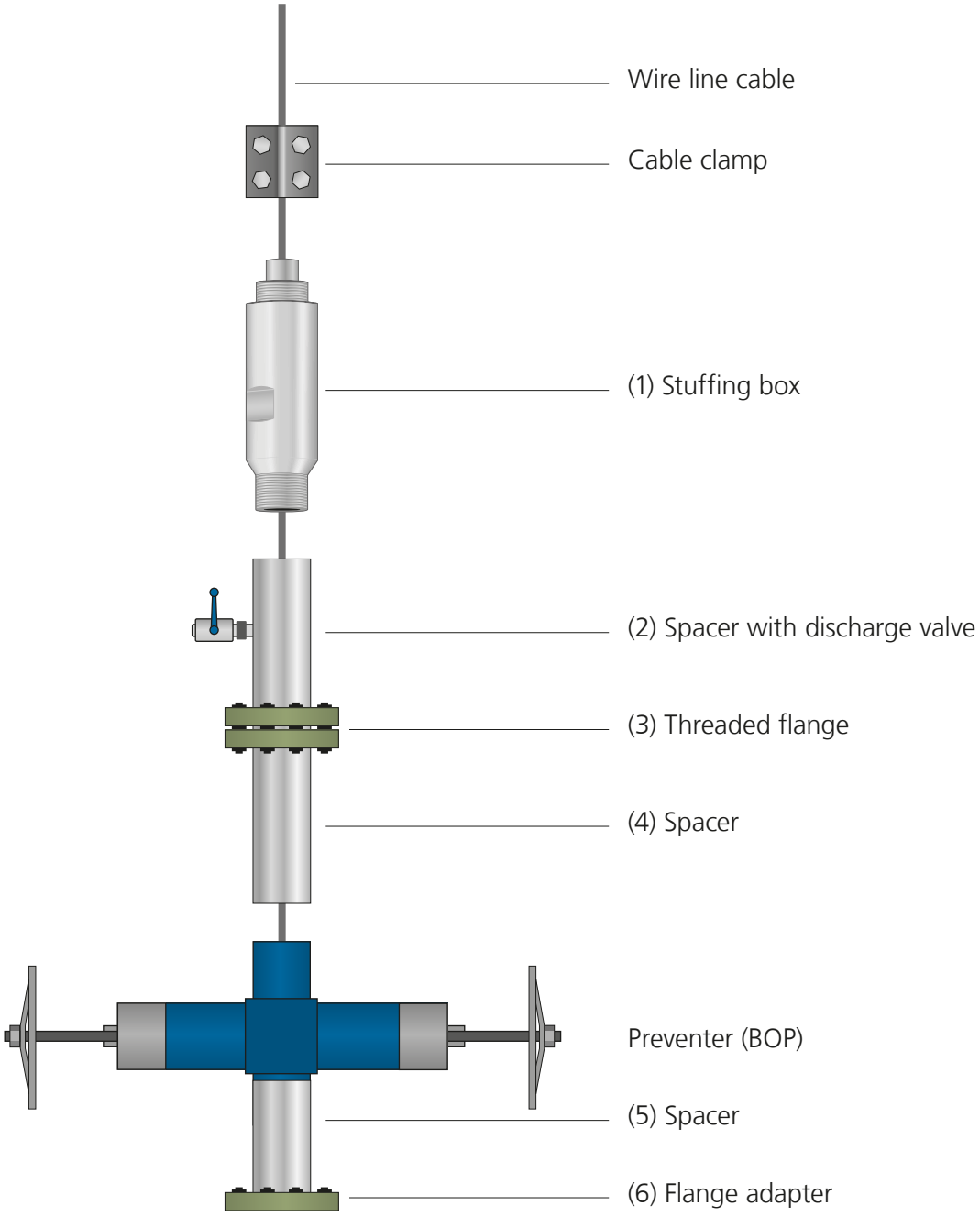
Operating conditions	:	max. 100 bar	| 1500 PSI
Diameter	:	85 mm	| 3.35“
Length	:	295 mm	| 11.6“
Connecting thread	:	2“ line pipe	
Material	:	Stainless steel 1.4305	

Order numbers

Stuffing box, complete	2840.0.99.00600
Clamp screw	2840.0.99.00103
Clamp	2840.0.99.00102
Line wiper	9000.0.00.59337



Gauges / accessories (surface) — Wellhead seal



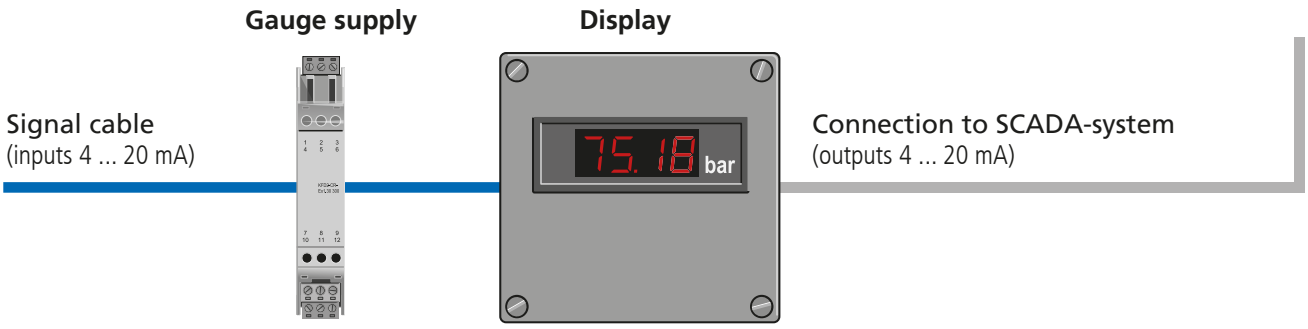
Wellhead seal

Description
The illustrated wellhead seal is an example for a freely suspended installation. Depending of the stuffing box, it is suitable for a head pressure of up to 100 bar. For higher pressure, please contact us. The hight of this complete unit is approximately 1500 mm.

No.	Item	Description
(1)	Stuffing box	2“ line pipe male Part-No. 2840.0.99.00600
(2)	Spacer	Adapter 2“ line pipe female to 3“ line pipe male API 3000 Part-No. 280333.155
	Discharge valve	1/2“ NPT female
(3)	Threaded flange	3 1/8“ API 3000-R31 with 3“ line pipe female Part-No. 280333.150_01
(4)	Spacer	Adapter 3“ line pipe male to 3“ line pipe male API 3000 Part-No. 280333.145
	Preventer	3“ line pipe, 3000 psi
(5)	Spacer	Adapter 3“ line pipe female to 3“ line pipe male API 3000 Part-No. 280333.135
(6)	Flange adapter	at the wellhead with 3“ line pipe female, provides by customer or Leutert manufacturing according to customer specifications

Measurement data processing

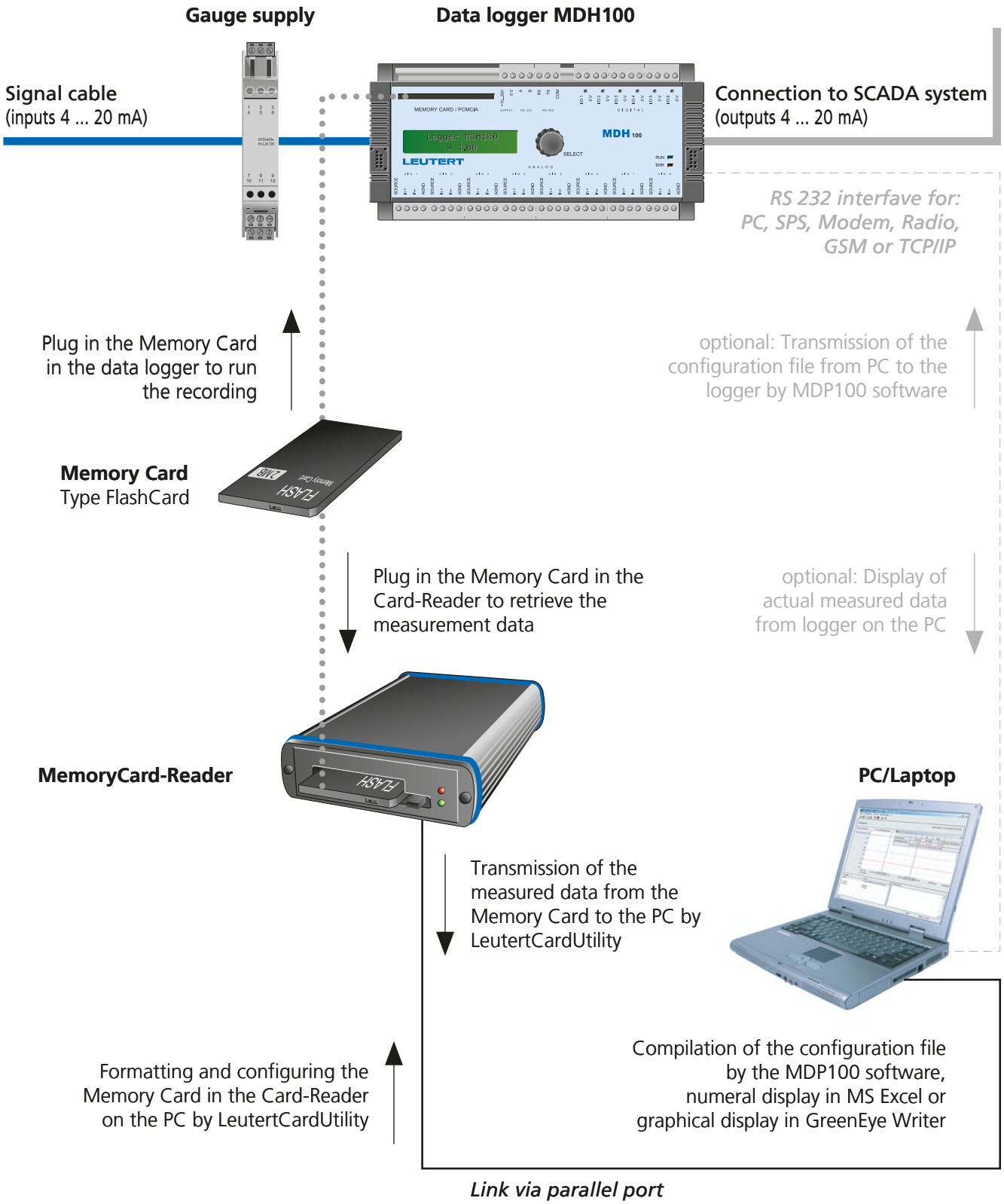
Display of measured data (without storage)



Current loop panel meter
4 ... 20 mA LED display
without power supply
intrinsically safe
EEx ia/ib IIC T6 (T5)

Display, storage and evaluation of measured data

Measurement data processing



Measurement data processing | Data logger MDH100

Function
The data recorder serves the tasks of acquiring, storing and evaluating the following parameters:
- 8 multifunctional, analog inputs for current, voltage, resistance (thermocouples, RTDs)
- 6 digital I/O-ports
- 16 bit resolution
- Sampling rate selectable 1 sec to 1 h
- sophisticated signal conditioning by means of individual linearisation, scaling and formatting
- autonome limit control
- mathematical functions and links between the channels

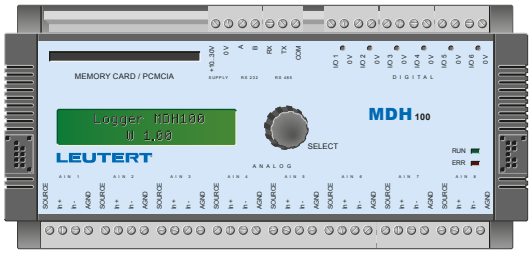
The loggers function depends on the application specific configuration.

Operating element
- 1 push and dial button

Equipment
- LC display 2 x 16 characters
- 256 kB RAM for internal storage of data, extendable to 2 MB by PCMCIA-SRAM-Card or 8 MB by PCMCIA-Flash-Card
- serial interface RS 232 for PC or modem connection
- field bus interface RS 485 for module expansion

Memory Card
Storage media for
- function controlling configuration file *.pro
- measurement data file *.log

Software for data logger MDH100
- MDP100 software is used to compile the configuration file.
- LeutertCardUtility
- Evaluation software Greeneye-Writer



Power supply
- Supply voltage 10 to 30 VDC
- Power consumption
  approx. 200 mW (sampling rate 1 h)
  approx. 840 mW (sampling rate 1 s)

Mechanical
- Dimensions (189 x 90 x 83) mm
- Weight 742 g
- Protective system IP 20
- DIN EN-Rail mounting
- Connection plug-in screw terminals

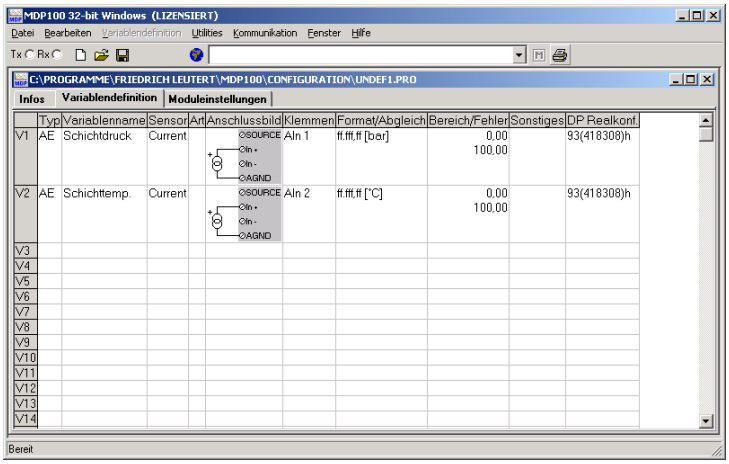
Environmental
- Operating temperature -30°C to 60°C
- Storing temperature -30°C to 80°C
- Humidity 0 % to 95 % at 50°C

Electromagnetic Compatibility (EMC)
- Electro static discharge:
  level 2 acc. IEC 801-2: 4 kV
- Radiated electromagnetic fields:
  level 3 acc. IEC 801-3: 10 V/m
- Electrical fast transients:
  level 3 acc. IEC 801-3: 2 kV / 1 kV
- Radiated RFI/EMI:
  level B acc. VDE 0871-1/CISPR11

Software

Measurement data processing

MDP100 configuration software



The MDP100 is a 32-bit software for Windows® 95, 98, 2000, NT and XP. It is used to configure the data logger and adapt it to the requirements.

Main features:

- clear tabular structure of variables
- display of measured data and variables
- data base for commonly used sensors
- import and export functions for sensor parameters
- online measuring of characteristic curves and calibration data
- online functions such as taring, storing, deleting or status

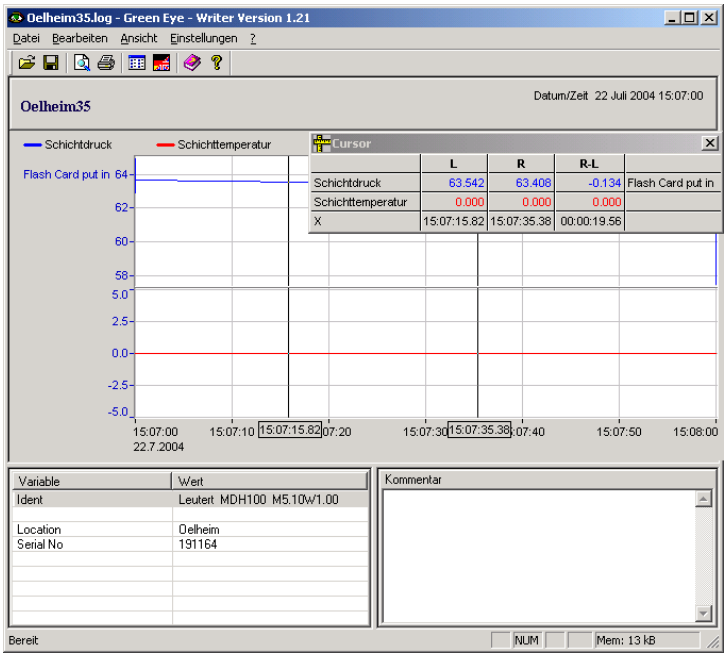
Evaluation software

Greeneye-Writer

This software is used for the graphical display of the stored measurement data. The recorded channels are displayed in differently coloured lines.

Microsoft Excel

Tabular evaluation can be performed in MS Excel. Pay attention to the limitation of data sets by MS Excel!



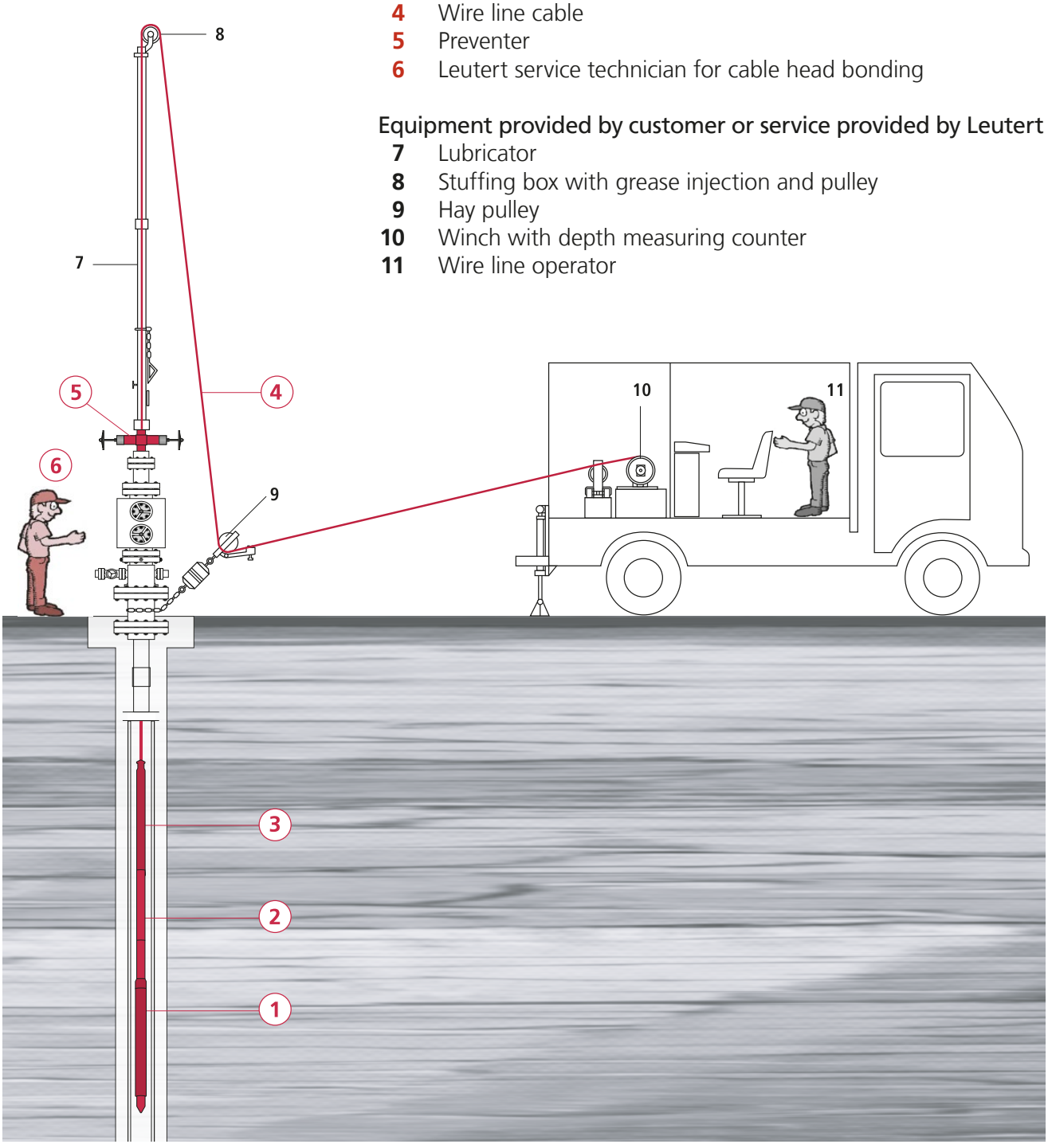
optional: **Software e-console**

e.console is able to visualize the measured data offline or online. It convinces by it´s versatile analysis capabilities and simple link to external data bases.

But the main target is the periodical archiving of measurement data and reacting to alarm messages sent by the data logger.

Gauges and accessories

Equipment for freely suspended gauge installation



Equipment of the Leutert Company

1 Sinker bar
2 Pressure/temperature gauge
3 Cable head
4 Wire line cable
5 Preventer
6 Leutert service technician for cable head bonding

Equipment provided by customer or service provided by Leutert

7 Lubricator
8 Stuffing box with grease injection and pulley
9 Hay pulley
10 Winch with depth measuring counter
11 Wire line operator

Questionnaire - Permanently installed gauges PK

Gauges and accessories

Customer information

Company: _____ Person in charge: _____
Department: _____ Project: _____
Phone: _____ Fax: _____ E-Mail: _____
Street: _____ City/Country: _____

General questions regarding the well(s)	Answers: Yes, No or value
1. Max. downhole pressure	
2. Max. wellhead pressure	
3. Max. downhole temperature/surface temperature	
4. Depth of pressure /temperature gauge (sensor)	
5. Aggressive media (H_2S,CO_2), (attach chemical analysis if available)	
6. Production or observation well	
7. Completion drawing for wellhead (attach as separate sheet)	
8. Completion drawing downhole (attach as separate sheet)	
9. Installation of gauge (sensor) in annular space	
10. Cable- or pressure feedthrough required for packer or hanger. (If yes, attach drawings or dimensions)	
11. Installation of gauge (sensor), suspended in tubing	
12. Casing diameter	
13. Tubing diameter	
14. Deviated well	
15. Special remarks	

General questions measuring technology	Answers: Yes, No or value
1. Online- or memory measurement	
2. Power supply of 230V AC, 24/12V DC available at wellsite	
3. Cable for remote control or data transmission available	
4. Surface installation with digital display or digital display and datalogger	
5. Power supply by solar panel	
6. Required height of mast for solar panel 1,7 m or 6 m	
7. Pressure only or pressure and temperature required	
8. Surface unit in: - weather proof housing (IP65) - rack mounted 19“ panel (IP54) - desktop housing with 19“ panel - mobile datalogger (IP65)	
9. Suitable working range: e.g. 4 ... 20 mA represent 0...300 bar	
10. Other required parameters (e.g. flow)	

This questionnaire was prepared by: _____