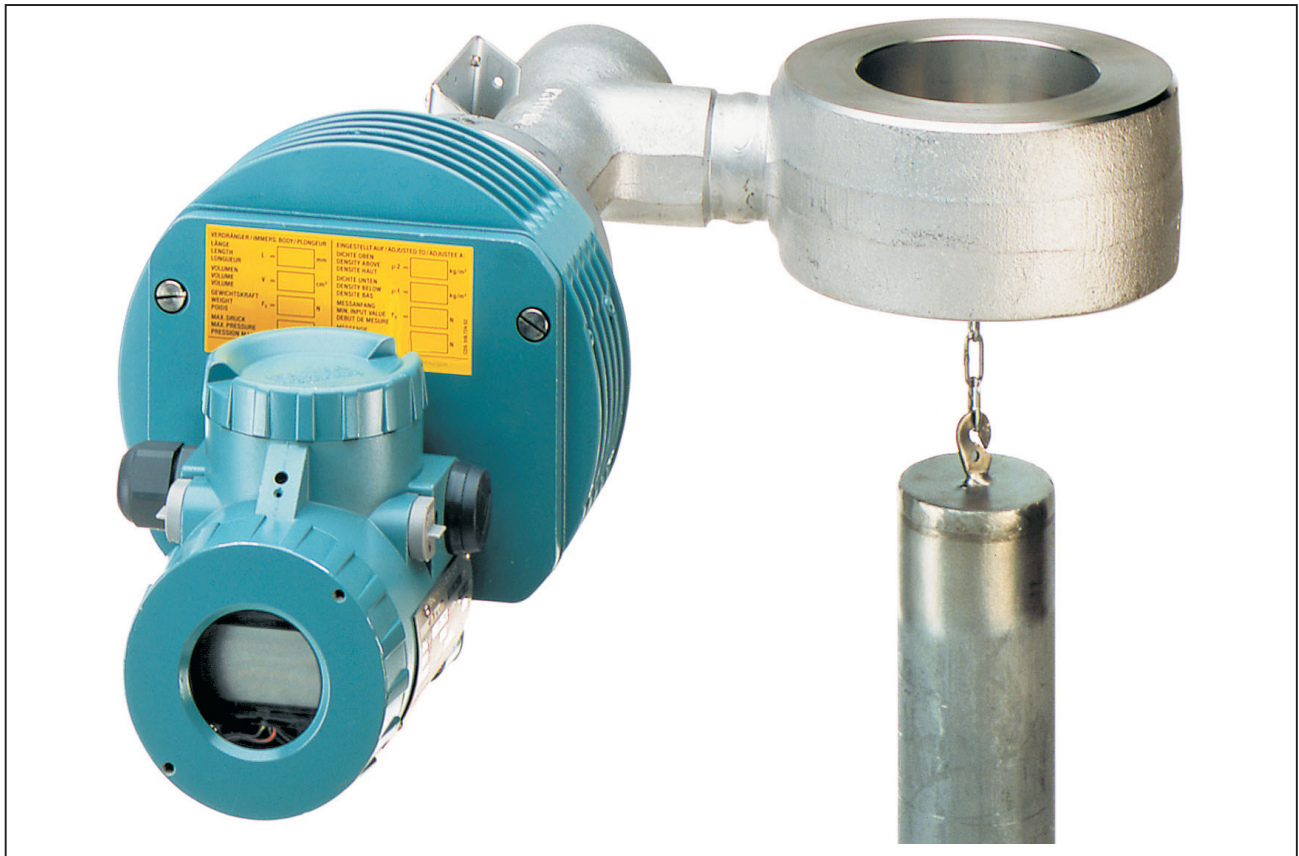


144LD Intelligent Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density



The intelligent transmitter 144LD is designed to perform continuous measurements for liquid level, interface or density of liquids in the process of all industrial applications. The measurement is based on the proven Archimedes buoyancy principle and thus extremely robust and durable. Measuring values can be transferred analog and digital. Digital communication facilitates complete operation and configuration via PC or control system. Despite extreme temperatures, high process pressure and corrosive liquids, the 144LD measures with consistent reliability and high precision. For installations in contact with explosive atmospheres up to Zone 0, certificates are available. The 144LD combines the abundant experience of FOXBORO ECKARDT with most advanced digital technology.

FEATURES

- Communication HART, PROFIBUS PA or FOUNDATION Fieldbus
- Conventional operation with local keys
- Easy adaptation to the measuring point without calibration at the workshop
- Backdocumentation of measuring point
- Continuous self-diagnostics
- Configurable safety value
- Software lock for local keys and reconfiguration
- Simulation of analog output for loop-check
- Local display in %, mA or physical units
- Signal noise suppression by Smart Smoothing
- Linear or customized characteristic
- Process temperature from -196 °C to $+400\text{ °C}$
- Materials for use with aggressive media
- Micro sintermetal sensor technology
- Separate mounting of sensor and amplifier with remote amplifier mounting kit

TECHNICAL DATA

Data refer to the sensor material Type 316L (1.4404)

Explosion protection certificates must be observed!

Input / Output

Measuring ranges 50 mm to 50 m
upper and lower range value
continuously adjustable

Standard lengths of
Displacer (104DE) 350 .. 3000 mm, 14 .. 120 in;
further lengths on request

Weight of displacer ¹⁾ max. 25 N

Measuring span 2... 20 N contin. adjustable
(to 1 N on request)

Span ratio
Turn-down 1:1 .. 1:10 (1:20 on request)

Accuracy ²⁾ $\pm 0.2\%$; increased accuracy
with customized adjustment

Transfer function linear or customized with up
to 32 setpoints

Configuration

- with local push buttons and LCD
- Digital (see communication ...)

Local display LCD 5 digits, configurable in
%, mA or phys. units

Load $R_{Bmax} = (U_s - 12V) / 23\text{ mA}$

Communication HART

Connection Two-wire system
Supply voltage U_s : 12 .. 42 V DC ⁶⁾, $V_{SS} \leq 1\%$
Current sink max. 23 mA
Signal range 4 .. 20 mA
Operating range 3.8 .. 21 mA
Digital communication HART Protocol, 1200 Baud
Hand held terminal HHT 991
PC Software PC20 / ABO991
Hardware HART Modem MOD991 for PC
Min. load 250 Ω

Failure handling

Substitute value. last value or safety value
Safety value 3.6 ... 23 mA, adjustable
Reset substitute value automatically or manual
Select messages. Internal calibration failed,
Pressure peaks $\geq 150\%$,
Data access failed,
Over range $\geq 110\%$,
Ambient temp. out of limits,
Process temp. out of limits,
Measuring range invalid

Communication PROFIBUS PA

Connection twisted and shielded two wire
cable acc.to recommendation
based on IEC 1158-2

Supply voltage U_s : 9 .. 32 V DC ⁵⁾, $V_{SS} \leq 1\%$

Operating current 10.5 mA ± 0.5 mA
(base current)

Digital communication PROFIBUS PA protocol, acc.
to class B profile, EN 50170
and DIN 19245 part 4

Signal amplitude ± 8 mA

Fault current ≤ 13 mA

Operating values according to IEC 1158-2

Bus connection. Fieldbus interface based on
IEC 1158-2

Power supply Power supply is achieved de-
pendant on the application by
means of segment coupler

GSD file the actual file can be down-
loaded from our homepage

Configuration

Software. PC20 for PC

Hardware PC- or PCMCIA-interfaces
from Softing

Control systems PROFIBUS PA compatible

Failure handling

Substitute value. last value or safety value

Safety value adjustable -110 .. +110 % of out

Reset substitute value automatically or manual

Select messages

Internal calibration failed,
Sensor value out of range
Memory access failed
Measuring range out of sensor range
Ambient temp. out of limits,
Process temp. out of limits,
Measuring range invalid

1) For measurement of interface or density:
weight ≤ 25 N + buoyant force at lowest density

2) Accuracy acc. ANSI / ISA - S51.1 - 1979

5) With explosionproof device 9 .. 24 V

6) With explosionproof device 12 .. 30 V

Communication FOUNDATION Fieldbus

Connection twisted and shielded two wire cable acc.to recommendation based on IEC 1158-2

Supply voltage U_S : 9 .. 32 V DC ¹⁾, $V_{SS} \leq 1\%$

Operating current 10.5 mA \pm 0.5 mA (base current)

Digital communication FF specification Rev. 1.4, Link-Master (LAS)

 Signal amplitude \pm 8 mA

 Fault current \leq 13 mA

 Operating values according to IEC 1158-2

 Bus connection Fieldbus interface based on IEC 1158-2

 Power supply Power supply is achieved dependant on the application by means of segment coupler

 File the actual file can be downloaded from our homepage

Configuration

 Software National Instruments NI-FBUS Configurator

 Hardware FBUS interfaces from National Instruments (AT-FBUS and PCMCIA- FBUS)

 Control systems FOUNDATION Fieldbus H1 compatible

Failure handling

 Substitute value last value or safety value

 Safety value adjustable -110 .. +110 % of out

 Reset substitute value automatically or manual

 Select messages

- Internal calibration failed,
- Sensor value out of range
- Memory access failed
- Measuring range out of sensor range
- Ambient temp. out of limits,
- Process temp. out of limits,
- Measuring range invalid

Operating conditions ²⁾

Process temperature -196 °C ... +400 °C

Pressure rating

 acc. to DIN PN 16, 40, 63, 100, 160, 250

 acc. to ANSI Class 150, 300, 600, 900, 1500

Ambient temperature ^{3) 4)}

 without indicator -40 °C ... +85 °C

 with LCD indicator -40 °C ... +70 °C ⁵⁾

Relative humidity \leq 100%

Condensation permitted

Transportation-storage temperature -50 °C ... +85 °C

Protection IP 66 (acc. DIN 40 050)

The device can be operated at a class D2 location in accordance with DIN IEC 654, part 1.

Operation condition effects

Ambient temperature -10 °C ... +70 °C

 Zero \leq 0.1 % / 10 K ⁶⁾

 Span \leq 0.07 % / 10 K

 Total

$(0.1 \frac{\text{max. sp.}}{\text{adjusted sp.}} \pm 0.07 \frac{\text{measured value}}{\text{adjusted sp.}}) \% / 10K$

 (sp. = measuring span)

 < -10 °C / > +70 °C twice the value

Process temperature \leq 0.1 % / 10 K ⁶⁾

Operating pressure no influence (vakuum resistant)

Transitional behavior

Dynamic behavior

 Damping (90%-time) 0 ... 32 s

 Switch-on time 7 s

 Step response (63%-time)

 with damping 0 s 250 ms

Update rate 10/s

Long term stability \leq 0.2 % / 6 months at 20°C ⁶⁾

Noise suppression

 Common mode voltage \leq AC 250 V_{eff}

 Common mode rejection 120 dB

 Series mode rejection 50 dB

 Mains synchronization 50 Hz / 60 Hz

 Filter Smart Smoothing

1) With explosionproof device 9 .. 24 V

2) Not with all materials - see Table of Comparison of Materials page 7

3) Ambient temperature must not exceed 50°C at measuring module housing, when process medium or heating of medium exceed 300°C

4) -50 °C on request

5) Display invisible at T < -30 °C

6) For max. measuring span

Materials (Table of Comparison of Materials see page 7)

Wafer body	Carbon Steel 1.0460 (~ A105), 316L (1.4404) or Hastelloy C
Torque tube	316L (1.4404 / 1.4435), Hastelloy C or Inconel 600
Displacer 204DE	316L (1.4404 / 1.4435), PTFE, PTFE with 25% carbon or Hastelloy C
Suspension	316L (1.4404 / 1.4435 / 1.4436) or Hastelloy C
Amplifier housing	Aluminium (Alloy NoGD-Al Si 12), Polyurethan coated

For Sour Gas applications,

according to NACE Standard MR-0175-92:

Wafer body	316L (1.4404)
Torque tube	Hastelloy C or Inconel 600

Electrical connection

Cable entry thread M20x1.5 or 1/2 - 14 NPT
Cable gland and screwed sealing plug have to be ordered
separately under model code BUSG ...

For equipment in Ex d version, 1 screwed sealing plug
made of stainless steel is included in delivery.

Screw terminals wire cross-section up to 2.5 mm²
Test sockets Ø 2 mm

Electromagnetic compatibility EMC

Operating conditions industrial environment
Immunity according to
EN 61326 (3/2002). fulfilled
Emission according to
EN 61326 (3/2002). fulfilled
EN 55011, May 2000,
Group 1, Class A. fulfilled
EN 50081-2 fulfilled
NAMUR recommendation Ne21 Status Aug.1998 fulfilled

Mounting

Mounting method sandwich mounted
acc. DIN DN 80, DN 100
acc. ANSI 3 inch, 4 inch

Accessories for separate
mounting of amplifier remote amplifier mounting kit
Length of cable 3 m / 10 m

Weight

Transmitter see Tabel page 7
Displacer see Tabel page 10

SAFETY REQUIREMENTS

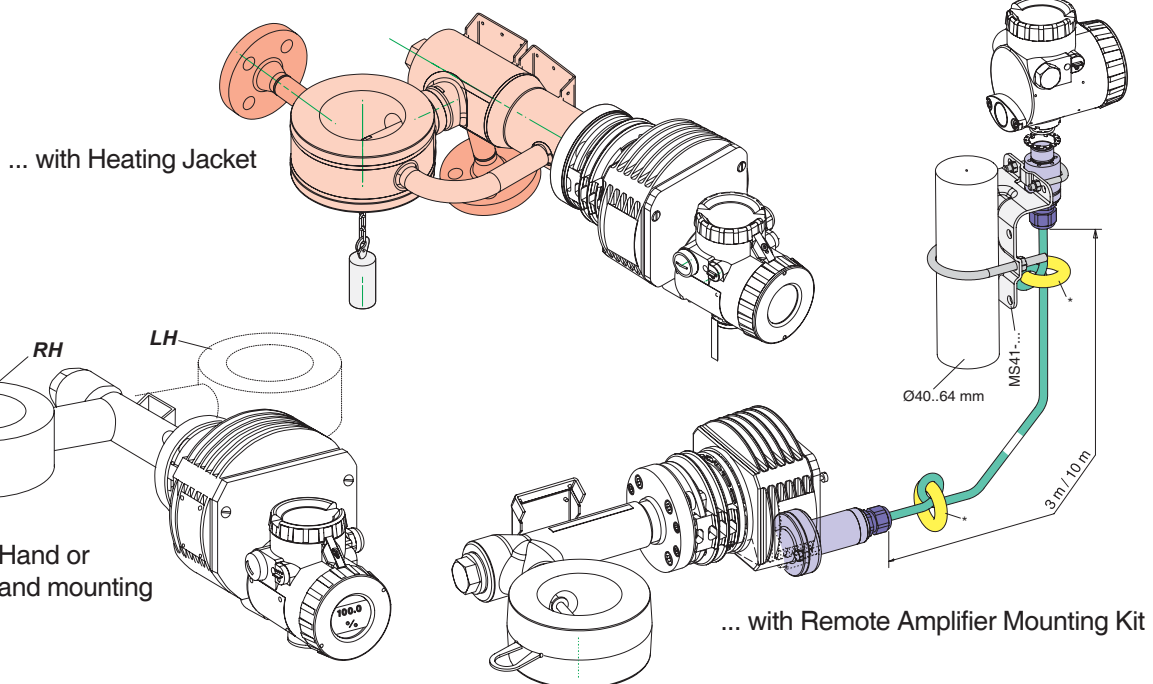
CE Label

Electromagnetic
compatibility 89/336/EWG
Low-voltage regulation 73/23/EWG not applicable

Safety

According to EN 61010-1
(resp. IEC 1010-1) safety class III
Internal fuses none
External fuses Limitation of power supplies
for fire protection have to be observed due to EN 61010-1,
appendix F (resp. IEC 1010-1).

144LD versions ...



Electrical classification ATEX^{2) 3)}**Intrinsic Safe:**

AI 408	HART - electronics ¹⁾	II 2 G EEx ia/ib IIC T4	PTB 01 ATEX 2168	Zone 1
mounted with:				
AI 591 A	Wafer body 144LD (no CS ₂)	II 1/2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 0
AI 591 B	Wafer body 144LD (for CS ₂)	II 1/2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 0
AI 591	Wafer body 144LD (no gap redu. bush)	II 2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 1
AI 428	PA/FF - electronics ¹⁾	II 2 G EEx ia IIC T4/T6	PTB 01 ATEX 2156	Zone 1
mounted with:				
AI 591 A	Wafer body 144LD (no CS ₂)	II 1/2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 0
AI 591 B	Wafer body 144LD (for CS ₂)	II 1/2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 0
AI 591	Wafer body 144LD (no gap redu. bush)	II 2 G EEx ia IIC T6/T4	PTB 01 ATEX 2176	Zone 1

Zone 2:

AN 408	HART - electronics	II 3 G EEx ia/ib IIC T4	Declaration of Manufacturer	Zone 2
AN 428	PA/FF - electronics	II 3 G EEx ia IIC T4/T6	Declaration of Manufacturer	Zone 2

Explosionproof:

AD 931	Housing for PA-FF-HART ¹⁾	II 2 G EEx d IIC T6	PTB 02 ATEX 1025 X	Zone 1
mounted with:				
AD 405	Wafer body 144LD	II 2 G EEx d IIC T6	PTB 02 ATEX 1025 X	Zone 1

Other Certificates

- Overfill protection according to WHG
- Wasserstand 100

International Certificates**FM Certification**

Intrinsically Safe / I, II, III /1 / ABCDEFG / T4 Ta=85°C

Nonincendive / I /2 / ABCD /T4 Ta=85°C

Special Protection / II /2 /FG /T4 Ta=85°C

Special Protection / III /2 /T4 Ta=85°C

Explosionproof / I /1 / BCD /T6

Dust-Ignitionproof / II, III /1 / EFG /T6

Type 4X

Entity Parameters:

V_{max}=30 V, I_{max}=150 mA, C_i=2.45 nF, L_i=0.14 mH

CSA Certification

Class I, Groups A,B,C,D;

Class II, Groups E,F,G;

Class III; Encl Type 4X

Input rated 12 to 30 V dc, 4-20 mA; intrinsically safe with Entity parameters

V_{max}=30 V, I_{max}=150 mA, C_i=2.45 nF, L_i=0.14 mH

Temp Code T3C at Max Amb 85°C; T4 at Max Amb 60°C; T4A at Max Amb 40°C

RUSSIAN “Intrinsic safety”**RUSSIAN “Explosionproof”****Belarus - Certificate Number 2176**

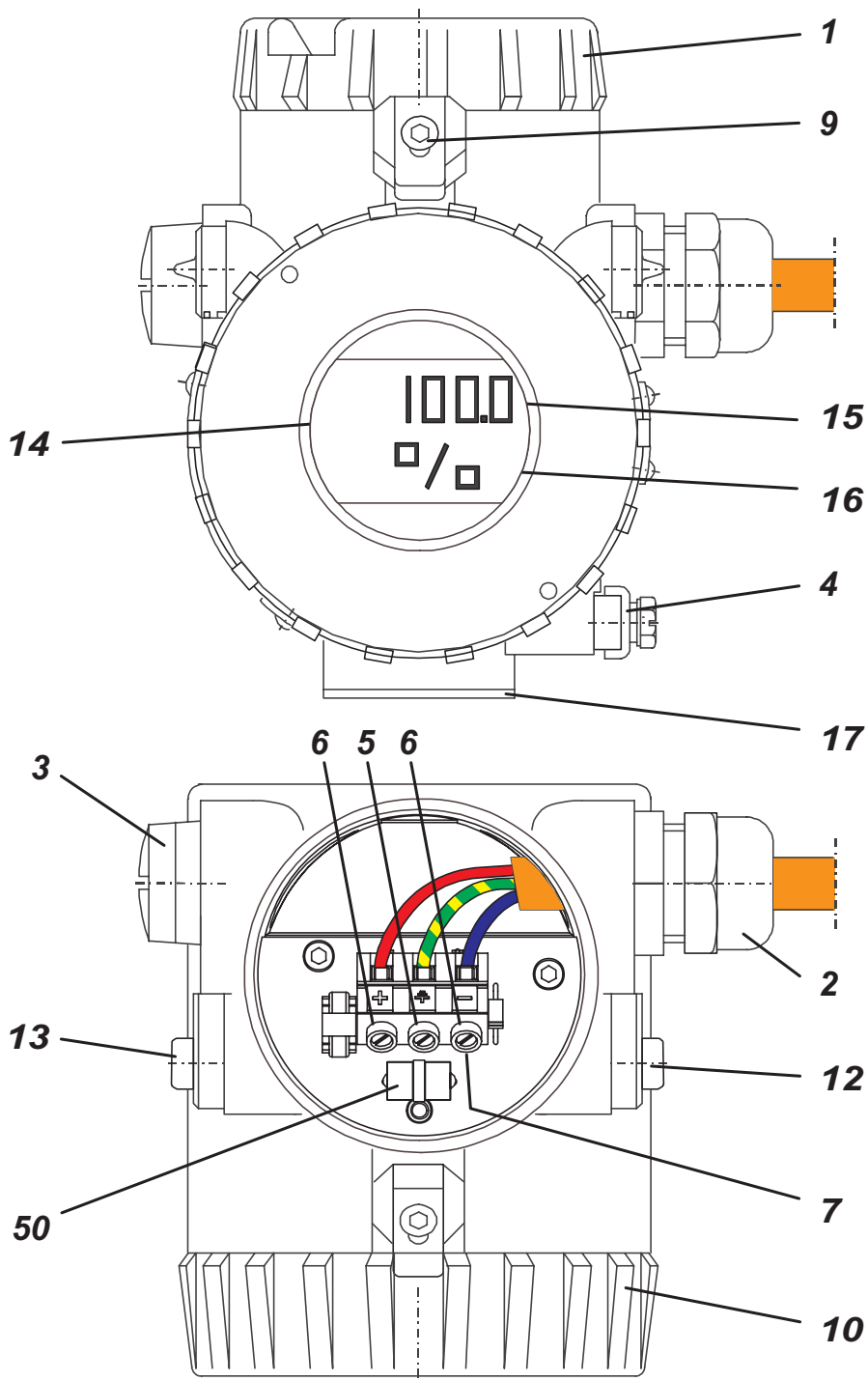
- Further Certifications on request -

1) Electrical dates see Certificates of Conformity

2) With appropriate order only

3) National requirements have to be observed

CONNECTIONS, OPERATIONAL ELEMENTS



1 Cover for terminal compartment

2 Cable gland

3 Plug, interchangeable by Pos. 2

4 External ground connection

5 Internal ground connection

6 Terminals (+ / -)

7 Test sockets \varnothing 2 mm integrated in terminals

9 Security lock for EEx d version

10 Cover for amplifier housing (with local display)

12 Local key for lower range value / zero

13 Local key for upper range value / damping

14 LCD indicator

15 Measuring variable

16 Engineering unit

17 Bottom housing cover

50 Overvoltage protection (if present)

Comparison of Material

Code	WNR	DIN	Remarks	equivalent to
St 35	1.0308	2391		
St 35.8 III	1.0305	17 175		ASTM A 519 - 1020
C 21	1.0432	–	VdTÜV - Wbl. 399 (for ANSI flanges only)	ASTM A 105
C 22.8	1.0460	EN 10 273	VdTÜV - Wbl. 350/3	ASTM A 576 - 1020
X6 CrNiMoTi 17 12 2	1.4571	17 440		~ ASTM Typ 316Ti
X2 CrNiMo 17 13 2	1.4404			ASTM Typ 316L
X2 CrNiMo 18 14 3	1.4435			
X5 CrNiMo 17 13 3	1.4436			
NiMo 16 Cr 15 W	2.4883	17 744	equivalent to Hastelloy C-276 VdTÜV - Wbl. 400	UNS N 12 276
NiCr 15 Fe	2.4816	17 742	Inconel 600 VdTÜV - Wbl. 305	UNS N 06600
GD - AISi 12	3.2582.05	17 007	Al - Diecasting	

Service Limits

Nominal pressure	C22.8 (~ A105)							316 / 316L (1.4404 / 1.4571) /Hastelloy C ¹⁾						
	Max. operating pressure in bar at temperature in °C													
	–60 ... –10 ²⁾	–10 ... 120	200	250	300	350	–196 ... –60 ²⁾	–60 ... –10	–10 ... 50	100	200	300	400	
PN 16 DIN 2633	12	16	13	11	9	8	16			12	9	7		
PN 40 DIN 2635	30	40	35	32	27	21	40			35	32	25		
PN 63 DIN 2636	48	64	50	45	39	30	64			57	51	33		
PN 100 DIN 2637	73	98	80	70	60	48	100			95	80	64		
PN 160 DIN 2638	120	160	130	112	96	90	160			142	128	97		
PN 250 DIN 2628	187	250	200	175	150	140	250			230	200	162		
Class 150	14	16	14	12	10	8	19	18	16	13	10	6		
Class 300	38	46	43	41	38	37	49		42	35	31	27		
Class 600	76	92	87	83	77	73	99		84	71	63	58		
Class 900	114	139	131	123	116	110	148		126	107	94	87		
Class 1500	191	231	219	206	180	145	248		211	178	158	145		

Table of Weights

Transmitter with wafer body and measuring module housing	Weight [kg]					
	DIN PN		ANSI Class			
	16 ... 160	250	150	300 / 600	900	1500
DN 80 / 3 inch	13	13	13			16,5
DN 100 / 4 inch	14	14	14			19

Table of versions (for dimensions c, d, g see drawing on page 12)

Version	PN	Sealings	DN 80 / 3 inch			DN 100 / 4 inch				
			c	d	g	c	d	g		
DIN	16	Type E, DIN 2526 Type N, DIN 2512	140	82	138	160	102	162		
	40									
	63									
	100									
	160	Type L, DIN 2696								
250										
ANSI	150	Raised Face (RF), ANSI B16.5	140	82	138	160	102	162		
	300									
	600									
	900	Ring Joint Face (RJF), ANSI B16.5						102	174	174
	1500									

1) With material wafer body Hastelloy C: max. PN 100 / Class 600

2) On request

MODEL CODES 144LD

Intelligent Buoyancy Transmitter with Torque Tube	144LD												10408
Wafer Body Flange Size & Pressure Rating													
DN 80, PN 40 (PN 16 To PN 40)	-11												
DN 80, PN 250 (PN 16 To PN 250)	-12												
DN 100, PN 40 (PN 16 To PN 40)	-13												
DN 100, PN 250 (PN 16 To PN 250)	-14												
3-Inch, ANSI Class 150	-31												
3-Inch, ANSI Class 300	-32												
3-Inch, ANSI Class 600	-33												
3-Inch, ANSI Class 900	-34												
3-Inch, ANSI Class 1500	-35												
4-Inch, ANSI Class 150	-41												
4-Inch, ANSI Class 300	-42												
4-Inch, ANSI Class 600	-43												
4-Inch, ANSI Class 900	-44												
4-Inch, ANSI Class 1500	-45												
Wafer Body Contact Face													
Type B1/B1, Raised Face DIN EN 1092-1 (with -11 & -13)	. . . . .	A											
Type B2/B2, Raised Face DIN EN 1092-1 (with -12 & -14)	. . . . .	B											
Type D/D, Groove DIN EN 1092-1 (with -12 & -14)	. . . . .	D											
Type D/C, Tongue DIN EN 1092-1 (with -12 & -14)	. . . . .	C											
Form L, Lense, DIN 2696 (available with -12 & -14)	. . . . .	L											
Form RF Raised Face ANSI B16.5 (w. -31 to -33, -41 to -43)	. . . . .	R											
Form RJF Ring Joint Face ANSI B16.5 (w. -32 to -35, -42 to -45)	. . . . .	J											
Type SF(RF), Smooth Finish (RA 125 microinch.) (available with -31 to -33 & -41 to -43)	. . . . .	S											
Wafer Body Material (Process wetted)													
Carbon Steel 1.0460 (~A 105)	. . . . .	K											
316L / 1.4404	. . . . .	S											
Hastelloy C	. . . . .	C											
Wafer Body Mounting Direction: (Amplifier to body)													
Right Hand Mounted	. . . . .	R											
Left Hand Mounted	. . . . .	L											
Torque Tube Material (Process Wetted)													
316L / 1.4435 / 1.4404	. . . . .	S											
Hastelloy C	. . . . .	C											
Inconel 600	. . . . .	I											
Electrical Classification													
ATEX intrinsic safe - Zone 0 - IIC T4 (with HART) (not Flange Contact Faces L and J)	. . . . .	0C4											
ATEX intrinsic safe - Zone 0 - IIC T6 (with PB or FF) (not Flange Contact Faces L and J)	. . . . .	0C6											
ATEX intrinsic safe - Zone 1 - IIC T4 (with HART)	. . . . .	1C4											
ATEX intrinsic safe - Zone 1 - IIC T6 (with HART or PROFIBUS or FOUNDATION Fieldb.)	. . . . .	1C6											
ATEX intrinsic safe - Zone 2 - IIC T4 (with HART)	. . . . .	2C4											
ATEX intrinsic safe - Zone 2 - IIC T6 (with PROFIBUS or FOUNDATION Fieldbus)	. . . . .	2C6											
FM Nonincendive (f)	. . . . .	NFM											
FM Explosionproof	. . . . .	FDZ											
CSA Explosionproof	. . . . .	CDZ											
FM Intrinsically Safe (f)	. . . . .	FAA											
CSA Intrinsically Safe (f)	. . . . .	CAA											
GOST-R HART - Intrinsically Safe T4	. . . . .	GA4											
GOST-R HART, Profibus oder Fieldbus - Intrinsically Safe T6	. . . . .	GA6											
GOST-R - Explosionproof T6	. . . . .	GDZ											
NEPSI HART - Intrinsically Safe T4	. . . . .	NA4											
NEPSI HART, Profibus or Fieldbus - Intrinsically Safe T6	. . . . .	NA6											
NEPSI - Explosionproof T6	. . . . .	NDZ											
For General Purpose Areas, Not Explosionproof	. . . . .	ZZZ											

Continued on next page

MODEL CODES 144LD (continued)

Amplifier Housing					
Housing AI, with operating buttons and external push buttons	P				
Cable Entry					
M20x1.5 Without Cable Gland		M1			
1/2-14 NPT Without Cable Gland		N1			
Communication					
HART				H	
PROFIBUS-PA				P	
FOUNDATION Fieldbus H1				B	
Optional Features					
LCD Indicator (required for Amplifier Housing P)					-A
Remote Amplifier Mounting Kit (3 m), mounted. (c)					-R
Remote Amplifier Mounting Kit (10m), mounted (c)					-B
Tag No. Labeling					
Stainless Steel Label Fixed With Wire					-L
Stainless Steel Label Fixed On Amplifier					-F
National Certificates					
Overfill Protection per WHG Environmental Pollution					-V
Germanischer Lloyd (i)(a)					-C
ABSA					-D
DNV (a)					-E
BV					-N
Certificates					
EN 10204-2.1, Certificate Of Compliance					-1
EN 10204-2.2, Specific Test Report (Calibration)					-2
EN 10204-3.1, Inspection Certificate Of Process Wetted Metallic Material.					-3
Certificate for SIL2 -applications (i)					-Q
Comply With NACE Standard MR-01-75 (available with Wafer Body Material S and Torque Tube Material I or C) (h)					-6
PED 97/23/EC additional unit verification, according to module F/G					-4
Wasserstand 100					-9
Material Test					
X-Ray And Isotope Test For Weldings					-7
Dye Penetration Test					-8
<p>(a) Displacer must have Damping Spring Option -D (c) Not available with Electrical Classification FDZ, CDZ, D1C, 1C6 (f) Not with Communication B, P (h) Restrictions concerning the limit of application for the used materials are considerable (NACE Standard MR-0175/2003, resp. ISO 15156-3) (i) Only with HART</p>					

Product Specifications for Intelligent Transmitters

PSS EMP0610 A-(en) 141GP	Intelligent Gauge Pressure Transmitter
PSS EMP0620 A-(en) 142AP	Intelligent Absolute Pressure Transmitter
PSS EMP0630 A-(en) 143DP	Intelligent d/p Transmitter
PSS EML0610 A-(en) 144LD	Intelligent Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density
PSS EML0710 A-(en) 244LD	Intelligent Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density
PSS EML1610 A-(en) 144LVD	Intelligent Buoyancy Transmitter for Liquid Level, Interface and Density
PSS EML1710 A-(en) 244LVP	Intelligent Buoyancy Transmitter for Liquid Level, Interface and Density
PSS EML2610 A-(en) 144FP	Intelligent d/p Transmitter for Liquid Level, Interface and Density - Flange mounted
PSS EML0900 A-(en) 204..	Accessories for Buoyancy Transmitters
PSS EMO0100 A-(en)	Accessories for Devices with HART-Protocol

Displacer 104DE

Typical Dimensions and Weights for Density Ranges $\Delta\rho$ ¹⁾

Material	316L (1.4404 / 1.4435) ²⁾										PTFE / PTFE with 25 % C				Hastelloy C									
Code	-S (PN 100)				-T ³⁾ (PN 40 / 63)				-S (PN 250)				-S (PN 500)				-S (PN 100 / 160)							
Len. L	Density Range $\Delta\rho$																							
	250 ... 1500 kg/m ³					100 ... 600 kg/m ³					400 ... 2000 kg/m ³					200 ... 1500 kg/m ³					300 ... 1500 kg/m ³			
mm	\varnothing mm	Vol. cm ³	Wei. N	PN bar	\varnothing mm	Vol. cm ³	Wei. N	PN bar	ρ_{min} ⁴⁾ kg/m ³	\varnothing mm	Vol. cm ³	Wei. N	PN bar	\varnothing mm	Vol. cm ³	Wei. N	PN bar	\varnothing mm	Vol. cm ³	Wei. N	PN bar			
350	60,3	1000	19	100	101,6	2840	38	40	460	42,4	500	18	250	62	1056	23	500	60,3	1000	18	100			
500	48,3	920	17	100	88,9	3100	43	63	580	42,4	710	24	250	51	1021	23	500	48,3	920	19	100			
750	42,4	1060	21	100	76,1	3410	44	63	545	33,7	670	21	250	42	1039	24	500	48,3	1370	27	100			
1000	33,7	890	17	100	60,3	2855	41	63	545	26,9	570	18	250	35	961	21	500	33,7	890	19	100			
1200	33,7	1070	20	100	60,3	3425	48	63	675	26,9	680	22	250	35	1153	25	500	33,7	1070	22	100			
1500	26,9	850	16	100	51	3065	39	63	460	21,3	540	17	250	30	1060	24	500	26,9	850	18	160			
1800	26,9	1020	19	100	42,4	2540	38	63	495	21,3	640	20	250	28	1107	25	500	26,9	1020	21	160			
2000	26,9	1140	21	100	42,4	2825	41	63	565	21,3	710	22	250	25	981	22	500	26,9	1140	23	160			
2500	21,3	890	20	100	38	2840	37	63	425	17,2	580	16	250	22,5	993	23	500	21,3	890	23	160			
3000	21,3	1070	24	100	38	3400	45	63	575	17,2	700	23	250	20	942	22	500	21,3	1070	27	160			
inch																								
14	60,3	1020	20	100	101,6	2885	38	40	455	42,4	510	18	250	62	1074	23	500	60,3	1020	18	100			
32	42,4	1150	23	100	76,1	3700	47	63	595	33,7	730	23	250	42	1126	26	500	33,7	720	16	100			
48	33,7	1090	20	100	60,3	3480	49	63	680	26,9	690	22	250	35	1171	26	500	33,7	1090	23	100			
60	26,9	870	16	100	51	3115	40	63	465	21,3	540	18	250	30	1076	24	500	26,9	870	18	100			
72	26,9	1040	19	100	42,4	2580	38	63	505	21,3	650	21	250	28	1124	26	500	26,9	1040	21	160			
84	26,9	1210	22	100	42,4	3000	44	63	635	21,3	760	23	250	25	1046	24	500	26,9	1210	25	160			
96	21,3	870	20	100	38	2765	37	63	420	17,2	570	16	250	22,5	968	22	500	21,3	870	23	160			
120	21,3	1090	25	100	38	3455	46	63	595	17,2	710	24	250	20	957	22	500	21,3	1090	25	160			

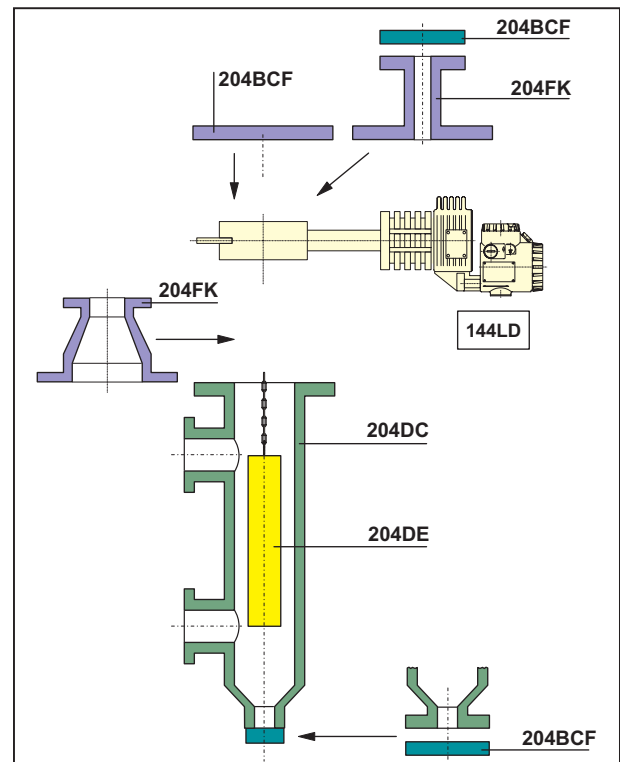
- 1) $\Delta\rho = \rho_1 - \rho_2$
 ρ_1 = density of lower medium
 ρ_2 = density of upper medium
- 2) Using displacer material 1.4571 can cause small deviations in diameter, volume and weight.
- 3) For measurement of interface or density, the max. density of the lower medium is 1350 kg/m³.
- 4) Min. density of the lower medium

If a Displacer Chamber is used, the difference between the diameter of the Displacer and the inside diameter of the Displacer Chamber must be at least 10 mm.

Lengths < 350 mm and > 3000 mm, and density ranges < 100 kg/m³ and > 2000 kg/m³ on request.

Accessories

For Displacer Chamber 204DC, Flange combination 204FK and Cover Flange Kit 204BCF see PSS EML0901, 204.. Accessories for Buoyancy Transmitter.

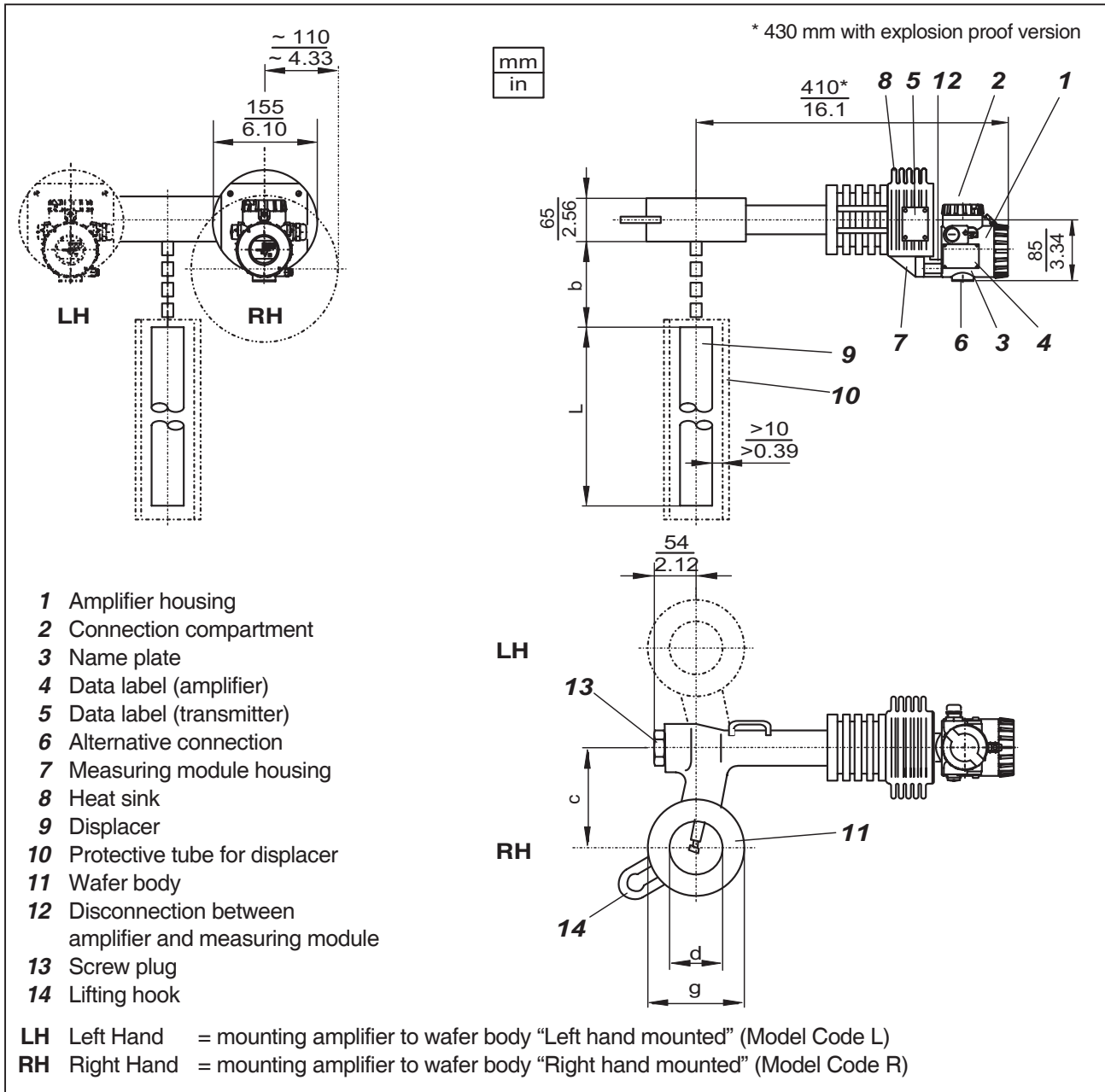


MODEL CODES 204DE

Displacer for Buoyancy Transmitters, from 2N up to 20N		204DE							010608
RANGE OF APPLICATION:									
Liquid Level - Media: Liquid / Gas or Air									
(Density difference = 250 kg/m ³ to 2000 kg/m ³) -S									
Interface Level / Density - Media: Liquid 1 / Liquid 2									
(Density difference = 100 kg/m ³ to 600 kg/m ³) -T									
DISPLACER MATERIAL:									
316L (1.4404 / 1.4435 / 1.4571) S									
PTFE P									
PTFE With 25% Carbon O									
Hastelloy C C									
Inconel 600 (2.4816) I									
Monel 400 (2.4360) M									
Titan (3.7035) T									
PRESSURE RATING:									
Up to PN 100 / Class 600 D									
Up to PN160 / Class 900 E									
Up to PN 250 / Class 1500 F									
Up to PN 500 / Class 2500 G									
SUITABLE FOR FLANGE SIZE: (at top of vessel/chamber)									
DN 50 0									
DN 70 1									
DN 80 2									
DN 100 3									
DN 150 4									
2 inch 5									
3 inch 6									
4 inch 7									
6 inch 8									
DISPLACER LENGTH "L": (inches are approx.)									
For Displacer Material codes P and O:									
300 mm (12 in) to 2000 mm (79 in) without partitioning A									
2001 mm (79 in) to 4000 mm (157 in) One partition point B									
4001 mm (157 in) to 6000 mm (236 in) Two partition points C									
6001 mm (236 in) to 8000 mm (315 in) Three partition points D									
8001 mm (315 in) to 10000 mm (394 in) Four partition points E									
10001 mm (394 in) to 12000 mm (472 in) Five partition points F									
For Displacer Material codes S, C, I, M and T:									
300 mm (12 in) to 3000 mm (118 in) without partitioning K									
3001 mm (118 in) to 6000 mm (236 in) One partition point L									
6001 mm (236 in) to 9000 mm (354 in) Two partition points M									
9001 mm (354 in) to 12000 mm (472 in) Three partition points N									
12001 mm (472 in) to 15000 mm (591 in) Four partition points O									
MATERIAL AND LENGTH OF THE SUSPENSION: (Length "b") (d)									
316L / 1.4404 / Standard length of Suspension (b) S1									
316L / 1.4404 / Customized Suspension-Length (c) S2									
Hastelloy C Standard length of Suspension (b) C1									
Hastelloy C Customized Suspension-Length (c) C2									
Inconel Standard length of Suspension (b) I1									
Inconel Customized Suspension-Length (c) I2									
Monel Standard length of Suspension (b) M1									
Monel Customized Suspension-Length (c) M2									
Titan Standard length of Suspension (b) T1									
Titan Customized Suspension-Length (c) T2									
OPTIONS:									
for application in Zone 0 (Additional grounding rope) (not available with Displacer Material: P) -E									
Damping Spring (Mat. 1.4301, max. 250°C (482°F)) (f) -D									
Damping Spring (Mat. HC, max. 350°C (662°F)) (f) -C									
Degreased -O									
Tag No. Labeling with Stainless Steel Label Fixed With Wire (Text required) -L									
Certificates									
EN 10204-2.1 Certificate Of Compliance -1									
EN 10204-3.1 Inspection Certificate Of Process Wetted Material -3									
PMI - Test -5									
(a) Upper and Lower Medium Density required (at operating temp.) (d) All +/- 8mm (0.3inch)									
(b) Only in connection with Model Code 204DC (e) Pending									
(c) Exact length required (Contact face of flange to upper end of displacer) (f) Required for 244LD Version B and Option -G									

Dimensions

144LD up to PN 250 / Class 1500



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