

244LD Intelligent Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density



The intelligent transmitter 244LD 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 244LD measures with consistent reliability and high precision. It is approved for installations in contact with explosive atmospheres. The 244LD 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
- Approved for SIL applications
- 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 $-196\text{ }^{\circ}\text{C}$ to $+400\text{ }^{\circ}\text{C}$
- 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 ³⁾

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

3) Customized not with FoxCom

4) Reset of substitute value after pressure peaks automatically

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	$\leq 0.1 \% / 10 \text{ K}$ ⁶⁾
Span	$\leq 0.07 \% / 10 \text{ K}$
Total	$(0.1 \frac{\text{max. sp.}}{\text{adjusted sp.}} \pm 0.07 \frac{\text{measured value}}{\text{adjusted sp.}}) \% / 10 \text{ K}$ (sp. = measuring span)
< -10 °C / > +70 °C	twice the value
Process temperature	$\leq 0.1 \% / 10 \text{ K}$ 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	$\leq 0.2 \% / 6 \text{ months at } 20^\circ\text{C}$ ⁶⁾
Noise suppression	
Common mode voltage	$\leq \text{AC } 250 \text{ V}_{\text{eff}}$
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 $T < -30^\circ\text{C}$

6) For max. measuring span

Material, Pressure Rating & Contact Face, Mounting Direction

see Model Codes

Material Amplifier housing . . . Aluminum
(Alloy No. GD-AI Si 12),
Polyurethan coated

For Sour Gas applications acc. to NACE Standard MR-0175-95:
Wafer body 316L (1.4404)
Torque tube Hastelloy C or Inconel 600
see Model Codes

Mounting

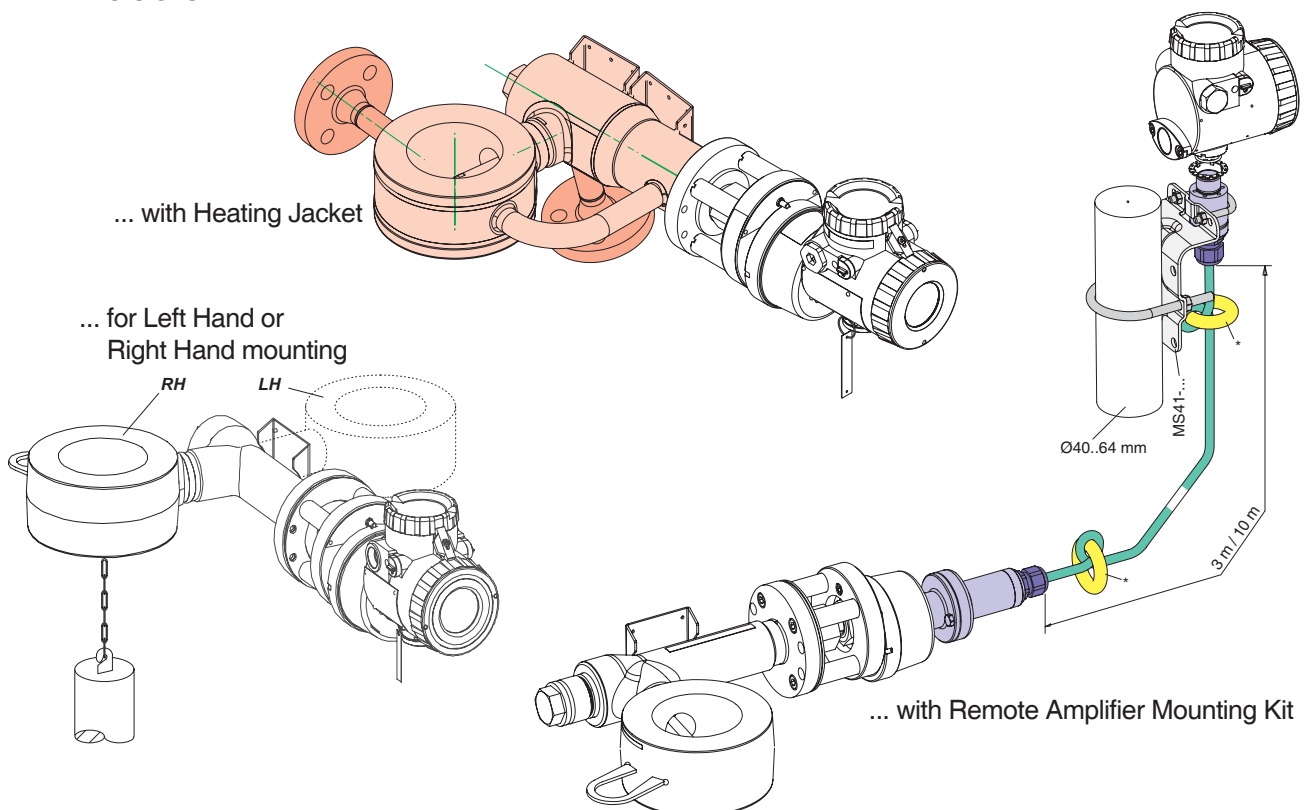
Mounting method sandwich mounted
acc. to DIN DN 80, DN 100
acc. to ANSI 3 inch, 4 inch
see Model Codes

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

Weight

Transmitter see table page 7
Displacer see table page 10

244LD versions ...



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

SAFETY REQUIREMENTS

CE Label

Electromagnetic
compatibility 89/336/EWG
Low-voltage regulation DIN EN 61326, 61326-A1

Safety

According to EN 61010-1
(resp. IEC 1010-1) safety class III
Internal fuses none (or not replaceable by
customer)
External fuses Limitation of power supplies
for fire protection have to be observed due to EN 61010-1,
appendix F (resp. IEC 1010-1)

Electrical classification ATEX^{2) 3)}**intrinsic safe:**

AI 408	HART / FoxCom electronics ¹⁾	II 2 G EEx ia/ib IIC T4	PTB 01 ATEX 2168	Zone 1
AI 428	PA/FF electronics	II 2 G EEx ia IIC T4/T6	PTB 01 ATEX 2156	Zone 1
mounted with:				
AI 432	Wafer body 244LD (no gap redu. bush)	II 2 G EEx ia IIC T6/T4	PTB 01 ATEX 2177	Zone 1
AI 432 A	Wafer body 244LD (no CS ₂)	II 1/2 G EEx ia IIC T6/T4	PTB 01 ATEX 2177	Zone 0

explosion-proof:

AD 931	Housing for PA-FF-HART-FoxCom ¹⁾	II 2 G EEx d IIC T6	PTB 02 ATEX 1025 X	Zone 1
mounted with:				
AD 432	Wafer body 244LD (no gap redu. bush)	II 2 G EEx d IIC T6	PTB 02 ATEX 1142	Zone 1
AD 432 A	Wafer body 244LD (no CS ₂)	II 1/2 G EEx d IIC T6	PTB 02 ATEX 1142	Zone 0

intrinsic safe and auxilliary protection:

AID421	Housing for PA-FF-HART-FoxCom ¹⁾	II 2 G EEx ia d IIC T6	PTB 04 ATEX 2011 X	Zone 1
mounted with:				
AD 432	Wafer body 244LD (no gap redu. bush)	II 2 G EEx d IIC T6/T4	PTB 02 ATEX 1142	Zone 1
AD 432 A	Wafer body 244LD (no CS ₂)	II 1/2 G EEx d IIC T6/T4	PTB 02 ATEX 1142	Zone 0

Zone 2:

AN 408	HART/FoxCom electronics ¹⁾	II 3 G EEx ia/ib IIC T4	Manufacturer's Declaration	Zone 2
AN 428	PA/FF electronics	II 3 G EEx ia IIC T4/T6	Manufacturer's Declaration	Zone 2
mounted with:				
AN 432	Wafer body 244LD (no gap redu. bush)	II 3 G EEx ia IIC T6/T4	PTB 01 ATEX 2177	Zone 2

Further National certificates

- Overfill protection according to WHG
- Bauteilprüfung von Wasserstand-Stetigreglern (VdTÜV 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 /1,2 /T4 Ta=85°C
 Type 4X

Entity Parameters:

V_{max}=30 V, I_{max}=150 mA, C_i=2,45 nF, L_i=0,14 mH

CSA Certification *

RUSSIAN "Intrinsic safety"

RUSSIAN "Explosionproof"

Belarus - Certificate Number 2176

- Further protection types of on request -

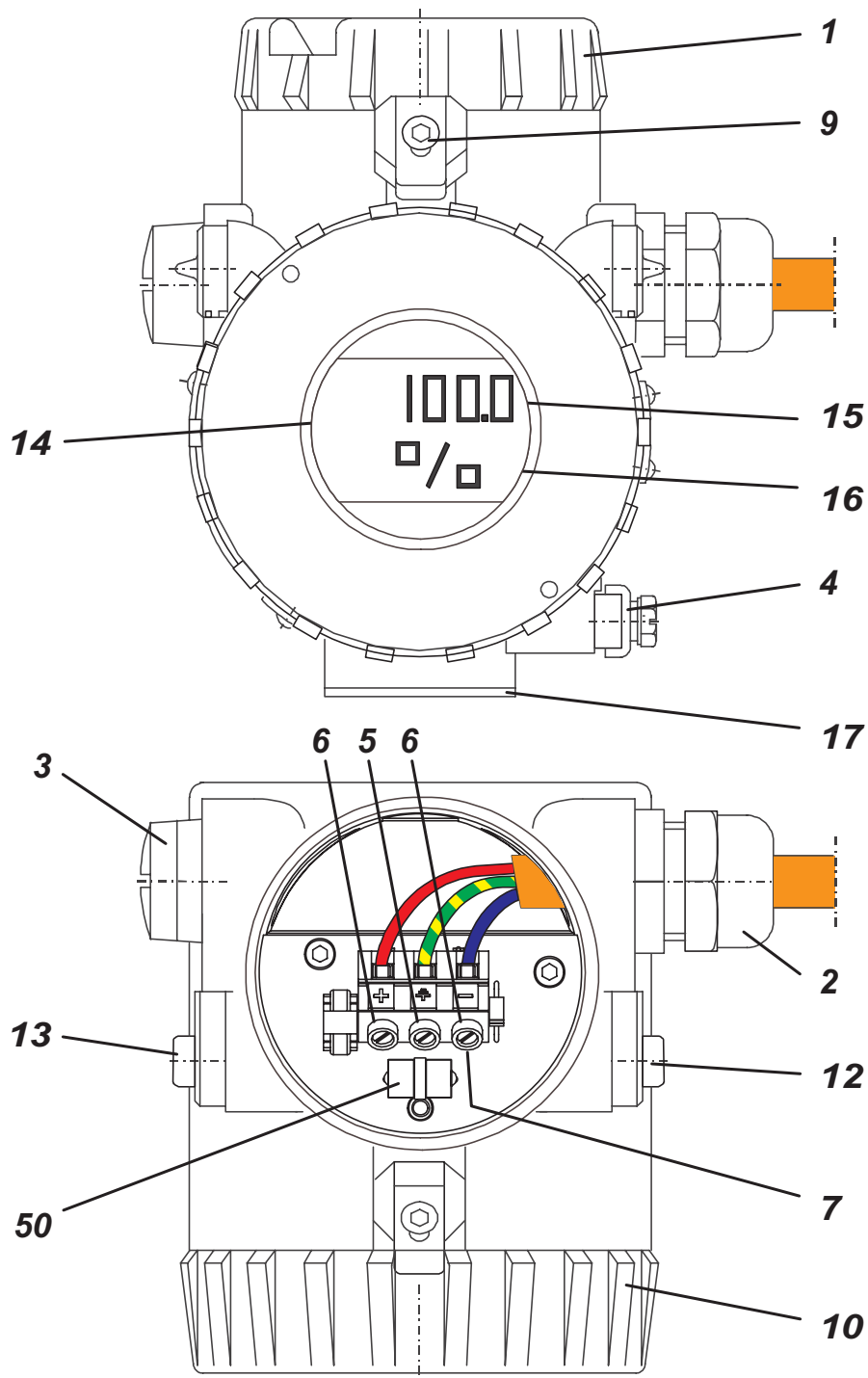
* In preparation

1) Electrical data see EC 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	W Nr	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	28	25
PN 63 DIN 2636	48	64	50	45	39	30	64			57	51	45	33
PN 100 DIN 2637	73	98	80	70	60	48	100			95	80	70	64
PN 160 DIN 2638	120	160	130	112	96	90	160			142	128	113	97
PN 250 DIN 2628	187	250	200	175	150	140	250			230	200	177	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	12.5	12.5	12.5			16
DN 100 / 4 inch	13.5	13.5	13.5			18.5

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

Version		Form of Sealings			DN 80 / 3 inch			DN 100 / 4 inch		
DIN	PN	Type E, DIN 2526	Type N, DIN 2512	Type L, DIN 2696	c	d	g	c	d	g
	DIN	16	:	:		140	82	138	160	102
40		:	:							
63		:	:							
100		:	:	:						
160		:	x	:						
250		x		x						
ANSI	150	Raised Face (RF), ANSI B16.5, Ring Joint Face (RJF), ANSI B16.5			140	82	RF	160	102	162
	300						RJF			
	600						140			
	900						147			
	1500						162			

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

2) On request

MODEL CODES 244LD

Intelligent Buoyancy Transmitter with 244LD Torque Tube for Liquid Level, Interface and Density		011008
Wafer Body Material (Process Wetted)		
Carbon Steel 1.0460 (~A 105), application from -10°C to +350°C	-K	
Carbon Steel 1.0460 (~A 105), application from -60°C to +350°C.	-L	
16Mo3, 1.5415, DIN EN 10028-2, application from -10°C to +500°C	-O	
16Mo3, 1.5415, DIN EN 10028-2, application from -40°C to +500°C	-P	
1.4404 equivalent to 316L / 1.4435, application from -60°C to +400°C (material is 1.4435 when Wafer Body Pressure Rating codes H1 and H2 selected)	-S	
1.4404 equivalent to 316L / 1.4435, application from -196°C to +400°C (material is 1.4435 when Wafer Body Pressure Rating codes H1 and H2 selected)	-U	
1.4404 equivalent to 316L / 1.4435, application from -60°C to +500°C (material is 1.4435 when Wafer Body Pressure Rating codes H1 and H2 selected)	-T	
Duplex - 1.4462, application from -10°C to +280°C (no PED Certification)	-N	
Inconel 825 - 2.4858, application from -10°C to +450°C (no PED Certification).	-I	
Hastelloy C - 2.4811, application from -196°C to +400°C	-C	
Torque Tube Material (Process Wetted):		
1.4404 equivalent to 316L	S	
Hastelloy C	C	
Inconel 600 - 2.4816	I	
Monel K500- 2.4375	M	
Wafer Body Flange Size		
DN 70 (available with Wafer Body Material S, U, T and Torque Tube Material S and C)	0	
DN 80	1	
DN 100.	2	
3-Inch	3	
4-Inch	4	
Wafer Body Pressure Rating & Contact Face		
PN 40 (PN 16 to PN 40) B1/B1 (Contact Face DIN EN 1092-1) (a)	B1	
PN 250 (PN 16 to PN 250) B2/B2 (Contact Face DIN EN 1092-1) (Draft DIN EN 1092-1:2005-04) (a)	B2	
PN 250 (PN 16 to PN 250) D/C (Contact Face DIN EN 1092-1) (Draft DIN EN 1092-1:2005-04) (a)(r)	DC	
PN 250 (PN 16 to PN 250) D/D (Contact Face DIN EN 1092-1) (Draft DIN EN 1092-1:2005-04) (a)	DD	
PN 250 (PN 16 to PN 250) F/F (Contact Face DIN EN 1092-1) (Draft DIN EN 1092-1:2005-04) (a)	FF	
PN 250 (PN 16 to PN 250) F/E (Contact Face DIN EN 1092-1) (Draft DIN EN 1092-1:2005-04) (a)(s)	FE	
PN 250 (PN 16 to PN 250) L/L (Contact Face DIN 2696) (a)	L1	
PN 400 L/L Lense (Contact Face DIN 2696). (k) (n)	H1	
PN 500 L/L Lense (IG-Norm High Pressure Version) (i) (n)	H2	
ANSI Class 150 RF/RF (b)	R1	
ANSI Class 900 (300/600/900) RF/RF (b)	R2	
ANSI Class 1500 RF/RF (b)	R3	
ANSI Class 150 SF/SF. (b)	S1	
ANSI Class 900 (300/600/900) SF/SF (b)	S2	
ANSI Class 1500 SF/SF (b)	S3	

MODEL CODES 244LD (continued)

ANSI Class 150 RJF/RJF	(b)	J1				
ANSI Class 900 (300/600/900) RJF/RJF	(b)	J2				
ANSI Class 1500 RJF/RJF	(b)	J3				
ANSI Class 300 to 1500, Form LF/LM	(b)	LM				
ANSI Class 300 to 1500, Form LF/LF	(b)	LF				
ANSI Class 300 to 1500, Form LG/LT	(b)	LT				
ANSI Class 300 to 1500, Form LG/LG	(b)	LG				
ANSI Class 150, Form SG/ST	(b)	GT				
ANSI Class 300 to 1500, Form SG/ST	(b)	ST				
ANSI Class 150, Form SG/SG	(b)	GG				
ANSI Class 300 to 1500, Form SG/SG	(b)	SG				
Wafer Body Mounting Direction: (Amplifier to body)						
Right Hand mounted		R				
Right Hand mounted w/heating jacket						
- connecting flanges B1 / DN15, PN40 (DIN EN 1092-1)(m). (o)		A				
Right Hand mounted w/heating jacket						
- connecting flanges B1 / DN25, PN40 (DIN EN 1092-1) . (m) (o)		B				
Right Hand mounted w/heating jacket						
- connecting flanges B2 / DN15, PN40 (DIN EN 1092-1) . (m) (o)		C				
Right Hand mounted w/heating jacket						
- connecting flanges B2 / DN25, PN40 (DIN EN 1092-1) . (m) (o)		D				
Right Hand mounted w/heating jacket						
- connecting flanges RF/SF, 1/2 in, Class 300 (m) (o)		E				
Right Hand mounted w/heating jacket						
- connecting flanges RF/SF, 1 in, Class 300 (m) (o)		F				
Right Hand mounted w/heating jacket						
- connecting flanges RJF, 1/2 in, Class 300 (m) (o)		G				
Right Hand mounted w/heating jacket						
- connecting flanges RJF, 1 in, Class 300 (m) (o)		H				
Left Hand mounted		L				
Left Hand mounted w/heating jacket						
- connecting flanges B1 / DN15, PN40 (DIN EN 1092-1) . (m) (o)		M				
Left Hand mounted w/heating jacket						
- connecting flanges B1 / DN25, PN40 (DIN EN 1092-1) . (m) (o)		N				
Left Hand mounted w/heating jacket						
- connecting flanges B2 / DN15, PN40 (DIN EN 1092-1) . (m) (o)		O				
Left Hand mounted w/heating jacket						
- connecting flanges B2 / DN25, PN40 (DIN EN 1092-1) . (m) (o)		P				
Left Hand mounted w/heating jacket						
- connecting flanges RF/SF, 1/2 in, Class 300 (m) (o)		S				
Left Hand mounted w/heating jacket						
- connecting flanges RF/SF, 1 in, Class 300 (m) (o)		T				
Left Hand mounted w/heating jacket						
- connecting flanges RJF, 1/2 in, Class 300 (m) (o)		U				
Left Hand mounted w/heating jacket						
- connecting flanges RJF, 1 in, Class 300 (m) (o)		V				
Version						
Base (244LD).		B				
Base + Displacer (244LD + 204DE)		S				
Base + Displacer + Displacer Camber + Flange combination + Flange (244LD + 204DE + 204DC + 204FK + 204BCF)" (h)		C				
Cable Entry:						
M20x1.5 without cable gland				M		
1/2-14 NPT without cable gland				N		
Communication:						
HART					H	
PROFIBUS-PA					P	
FOUNDATION Fieldbus H1					B	
(continued on next page)						

MODEL CODES 244LD (continued)**Electrical Classification:**

ATEX intrinsic safe, Zone 0, IIC T4 (HART) (d)	0C4
ATEX Intrinsic safe, (d)	0C6
Zone 0, IIC T6 (HART)	
Zone 0, IIC T6 (PROFIBUS or FOUNDATION Fieldbus). . . (d)	
ATEX intrinsic safe, Zone 1, IIC T4 (HART).	1C4
ATEX intrinsic safe, Zone 1, IIC T6 (HART, PROFIBUS or FOUNDATION Fieldbus)	1C6
ATEX intrinsic safe, Zone 2, IIC T4 (HART).	2C4
ATEX intrinsic safe, Zone 2, IIC T6 (PROFIBUS or FOUNDATION Fieldbus)	2C6
ATEX explosionproof, Zone 0, IIC T6 (d)	DOC
ATEX explosionproof, Zone 1, IIC T6	D1C
FM Nonincendive	NFM
HART	
PROFIBUS or FOUNDATION Fieldbus (c)	
FM Explosionproof	FDZ
CSA Explosionproof	CDZ
FM Intrinsically Safe	FAA
HART	
PROFIBUS or FOUNDATION Fieldbus (c)	
CSA Intrinsically Safe (c)	CAA
GOST-R Intrinsically Safe, T4 (HART)	GA4
GOST-R Intrinsically Safe, T6 (HART, PROFIBUS or FOUNDATION Fieldbus)	GA6
GOST-R Explosionproof, T6	GDZ
NEPSI Intrinsically Safe, T4 (HART)	NA4
NEPSI Intrinsically Safe, T6 (HART, PROFIBUS or FOUNDATION Fieldbus)	NA6
NEPSI Explosionproof, Ex d IIC T4-T6.	NDZ
For General Purpose Areas, Not Explosionproof	ZZZ

Options:

Housing Complete Stainless Steel without external Pushbuttons (not available with Electrical Classification code GDZ or Wafer Body Material codes K, L, I, P)	-H
Remote Amplifier Mounting Kit (3m), Mounted (e)	-R
Remote Amplifier Mounting Kit (10m), Mounted (e)	-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 (c)	-V
Wasserstand 100	-9
TA-Luft	-K
ABSA (Canada)	-A
Germanischer Lloyd (q)	-G
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 Material.	-3
PED 97/23/EC additional unit verification, according to module F/G (Not available with Wafer Body Material codes N and I)	-4
Comply With NACE Standard MR-0175 (available with Torque Tube Material I, M or C) (g)	-6
SIL 2 Certificate. (q)	-Q

(continued on next page)

MODEL CODES 244LD (continued)

Material Test	
X-Ray And Isotope Test For Weldings	-7
Dye Penetration Test	-8
PMI - Test	-5
Subassemblies	
Torque Tube for selected code (244LD-*****-W) . . . (p)	-W
Amplifier for selected code (244LD-*****-X) . . . (p)	-X
Complete Sensor for selected code (244LD-*****-Y) . . . (p)	-Y
Wafer body for selected code (244LD-*****-Z) . . . (p)	-Z
<p>(a) Available with Wafer Body Flange Size 1 or 2</p> <p>(b) Available with Wafer Body Flange Size 3 or 4</p> <p>(c) Pending</p> <p>(d) Not available with Wafer Body Pressure Rating & Contact Face codes L1, J1, J2, J3, H1, H2, DD</p> <p>(e) Not available with Electrical Classification FDZ, CDZ, 0C6, D0C, D1C, GDZ, NDZ</p> <p>(g) Restrictions concerning the limit of application for the used materials are to considering (NACE Standard MR-0175/2003, bzw. ISO 15156-3)</p> <p>(h) Pending, order separately at this time</p> <p>(i) Available with Wafer Body Flange Size 0</p> <p>(k) Available with Wafer Body Flange Size 1</p> <p>(m) Not available with Wafer Body Flange Size code 4 with Wafer Body Pressure Rating code J3</p> <p>(n) Not available with Wafer Body Material codes K, L, O, P, N, I, C or Torque Tube Material codes I and M</p> <p>(o) Not available with Wafer Body Material codes K, L, O, P, U, N, I, C</p> <p>(p) on request</p> <p>(q) Available with HART</p> <p>(r) D at top</p> <p>(s) F at top</p>	

Displacer 204DE

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			

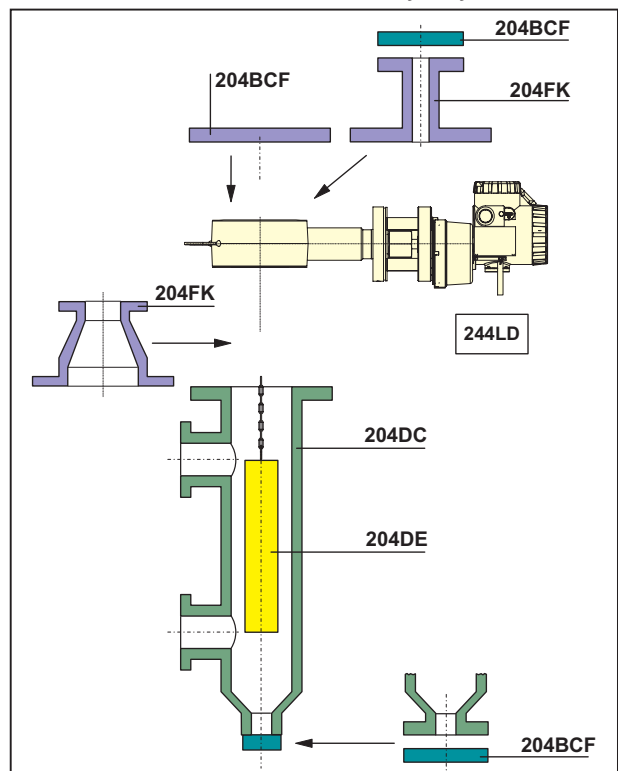
- $\Delta\rho = \rho_1 - \rho_2$
 ρ_1 = density of lower medium
 ρ_2 = density of upper medium
- Using displacer material 1.4571 can cause small deviations in diameter, volume and weight.
- For measurement of interface or density, the max. density of the lower medium is 1350 kg/m³.
- Min. density of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

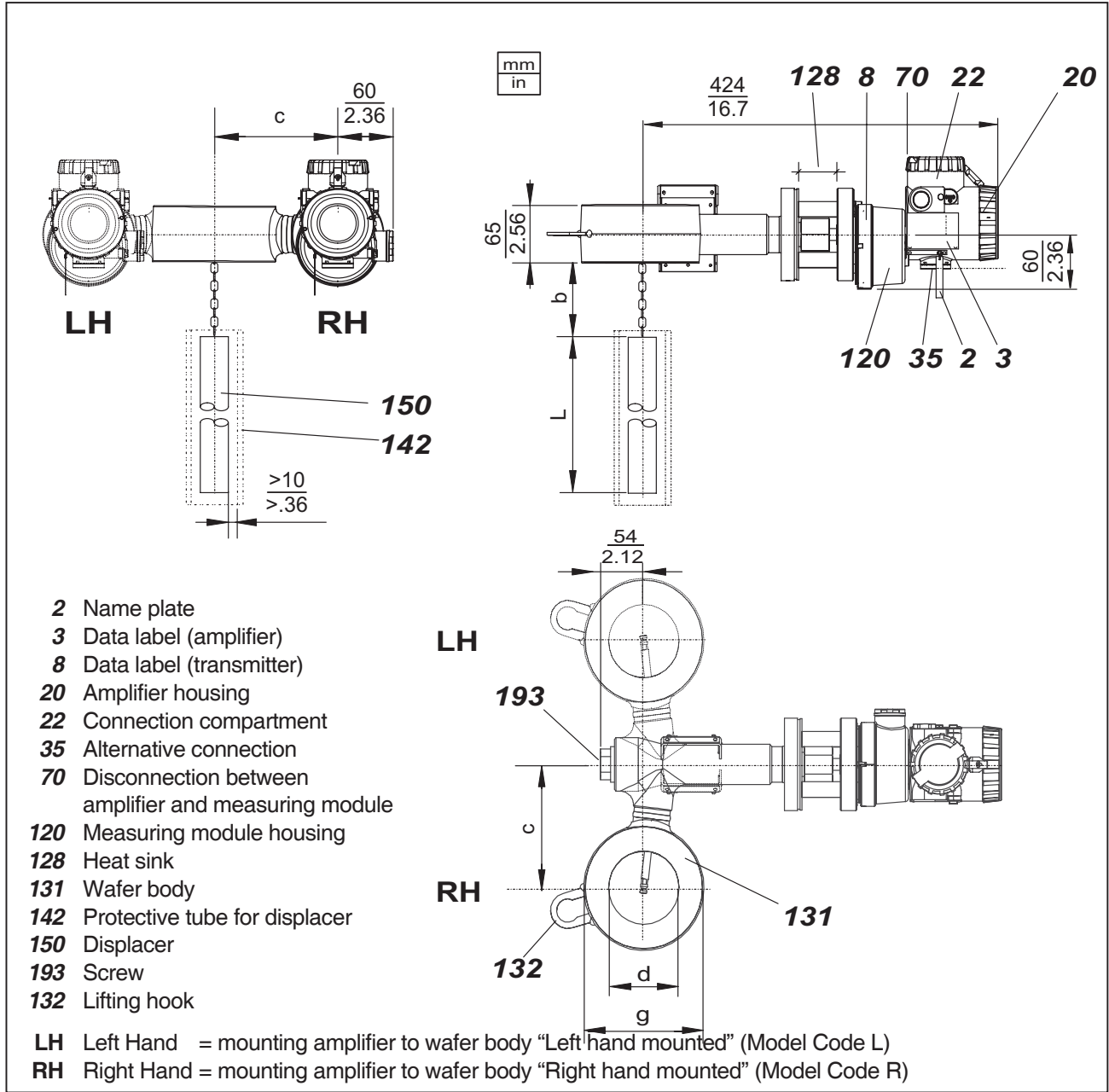
(continued on next page)

MODEL CODES 204DE (continued)

Displacer Element	204DE
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
<p>(a) Upper and Lower Medium Density required (at operating temp.) (b) Only in connection with Model Code 204DC (c) Exact length required (Contact face of flange to upper end of displacer) (d) All +/- 8mm (0.3inch) (e) Pending (f) Required for 244LD Version B and Option -G</p>	
<p>Suspension Length (Required)☐ Displacer Length (Required)☐WITH (Displacer Length "L":30) Lower Density (Required)☐ Upper Density (Required)☐ Tag No. Labeling -L (Required)☐WITH (Optional Features:L) Tag No. Labeling -S (Required)☐WITH (Optional Features:S) Used w. Transmitter (Required)☐ Choose One from list 144LD; 144LVD; 244LD; 244LVP; 167LP; 134LD; 134LVD; 114LI Electrical Classification (Required)☐ Choose One from list no Zone 0, Zone 0</p>	

Dimensions

244LD up to PN 250 / Class 1500



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)	144LVP	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 EML0901 A-(en)	204..	Accessories for Buoyancy Transmitters
PSS EMO0100 A-(en)		Accessories for Devices with HART-Protocol

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