



TYPE APPROVAL CERTIFICATE
N. ELE177113CS001

This is to certify that the product below is found to be in compliance with the applicable requirements of the RINA type approval system.

Description	Pressure Transmitter / Level Transmitter
Type	Series 2000; Series 2000-SAN; Series CER-2000
Applicant	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
Manufacturer	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
Testing Standards	Rules for the Classification of Ships – Part C – Machinery, Systems and Fire protection – Ch. 3, Sect. 6, Table 1

Issued in Genova on August 07, 2013

This certificate is valid until August 07, 2018

Valerio Bonanni

RINA

Valerio Bonanni



TYPE APPROVAL CERTIFICATE N. ELE177113CS001

Series 2000 diaphragm, piezoresistive pressure/ level transmitter with local display

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,1 % of adjusted span
Measuring ranges	0 - 0,1 bar to 0-100 bar
Output signals	4 - 20 mA / 2 - wire HART protocol Profibus - PA (not available in Ex)
Adjustment	by 3 pushbuttons or Hand Held Terminal
Power supply	12 - 40 Vdc
External load	600 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 66
Process temperature	-20°C to +80 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Wetted parts	AISI 316 (Std.) - flush mounted diaphragms
Electronic housing	AISI 304
EC-Type Examination Certificate Marking	KEMA 03ATEX 1092 X issue 3 II 1 G Ex ia IIC T4 Ga and / or II 1 D Ex ia IIIC T100 °C Da IP6X

Ranges (bar)	Max. overpressure	Adjustable span range
0- 0,1 ... 0,4	6,4	0-0,1 to 0-0,4
0- 0,3 ... 1,2	10,5	0- 0,3 to 0-1,2
0- 1 ... 10	30	0-1 to 0-10
0- 5 ... 30	100	0-5 to 0-30
0- 20 ... 100	200	0-20 to 0-100

Series 2000-SAN diaphragm, piezoresistive relative pressure / level transmitter

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,1 % of adjusted span
Measuring ranges	0 - 0,1 bar to 0-100 bar
Output signal	4 - 20 mA / 2 - wire HART protocol Profibus - PA (not available in Ex)
Adjustment	by 3 pushbuttons or Hand Held Terminal
Power supply	12 - 40 Vdc
External load	600 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 66
Process temperature	-20°C to +100 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Wetted parts	AISI 316 (Std.) Option: Hastelloy C, ... flush mounted diaphragms
Electronic housing	AISI 304
EC-Type Examination Certificate Marking	KEMA 03ATEX 1092 X issue 3 II 1 G Ex ia IIC T4 Ga and / or II 1 D Ex ia IIIC T100 °C Da IP6X

Ranges (bar)	Max. overpressure (bar)	Adjustable span range (bar)
0- 0,04 ... 0,4	6,4	0-0,04 to 0-0,4
0- 0,12 ... 1,2	10,5	0- 0,12 to 0-1,2
0- 1 ... 10	30	0-1 to 0-10
0- 5 ... 30	100	0-5 to 0-30
0- 20 ... 100	200	0-20 to 0-100



TYPE APPROVAL CERTIFICATE N. ELE177113CS001

Series CER 2000 diaphragm, relative or absolute pressure / level transmitter

Measurement principle	resistive on bridge network
Accuracy	0,1 % of adjusted span
Measuring ranges	0 - 0,2 bar to 0-320 bar
Output signal	4 - 20 mA / 2 - wire HART protocol Profibus - PA (not available in Ex)
Adjustment	by 3 pushbuttons or Hand Held Terminal
Power supply	12 - 40 Vdc
External load	600 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 66
Process temperature	-20°C to +90 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Measuring sensor	Ceramic (Al ₂ O ₃)
Sensor sealing	Viton o-ring (standard)
Other wetted parts	AISI 316
Electronic housing	AISI 304
EC-Type Examination Certificate Marking	KEMA 03ATEX 1092 X issue 3 II 1 G Ex ia IIC T4 Ga and / or II 1 D Ex ia IIIC T100 °C Da IP6X

Ranges (bar)	Max. overpressure (bar)	Adjustable span range (bar)
0- 0,2 ... 0,8	5	0-0,2 to 0-0,8
0- 0,8 ...2	10	0- 0,8 to 0-2
0- 2 ...10	50	0-2 to 0-10
0- 10 ...40	120	0-10 to 0-40
0- 40 ...200	350	0-40 to 0-200
0- 150 ...320	600	0-150 to 0-320

Reference documentation:

KLAY-INSTRUMENTS Instruction Manual : " Intelligent Pressure and Level transmitters"
Series 2000-SAN, SERIES 2000, SERIES CER-2000, Doc. n° H/EN/2000-HART/06-2012/18

Test Reports:

KLAY-INSTRUMENTS Performance test (August 5 th. 1999)
KLAY-INSTRUMENTS Power variation test (July 28th1999),
KLAY-INSTRUMENTS Power supply failure test (July 28th1999)
KLAY-INSTRUMENTS Dry Heat test (July 28th 1999)
KLAY-INSTRUMENTS Low temp. test (July 28th 1999)
KLAY-INSTRUMENTS Humidity test (August 3nd/5th. 1999)
ELS - EMC report (02/05/1997)
NMI- EMC test report , project 10112176
TNO- Salt mist test report , BU 4.00/036506-1/AA (25/04/2000)
PNO- PROFIBUS test report, itm/DP-Slave 514/02/14 (21/06/2000)



**TYPE APPROVAL CERTIFICATE
N. ELE177113CS002**

**This is to certify that the product below is found to be in compliance with the applicable requirements
of the RINA type approval system.**

<i>Description</i>	Pressure Transmitter / Level Transmitter
<i>Type</i>	Series 8000; Series 8000-SAN; Series CER-8000
<i>Applicant</i>	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
<i>Manufacturer</i>	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
<i>Testing Standards</i>	Rules for the Classification of Ships – Part C – Machinery, Systems and Fire protection – Ch. 3, Sect. 6, Table 1

Issued in **Genova** on **August 07, 2013**

This certificate is valid until **August 07, 2018**

Valerio Bonanni

RINA

Valerio Bonanni



TYPE APPROVAL CERTIFICATE N. ELE177113CS002

Series 8000 diaphragm, piezoresistive pressure/ level transmitter

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,2 % of adjusted span
Measuring ranges	0,1 bar to 50 bar
Output signal	4 - 20 mA / 2 - wire
Adjustment	zero and span internally
Power supply	13 - 40 Vdc
External load	550 Ohm / 24V to 1250 Ohm / 40V
Mechanical protection	IP 66
Process temperature	-20°C to +80 °C
Temperature effect	± 0,015 % / K (temperature compensated)
O-ring	Viton
Wetted parts	AISI 316 (Std.) flush mounted diaphragm
Electronic housing	AISI 304
EC-Type Examination Certificate	KEMA 03ATEX 1219 X issue 4
Marking	II 1 G Ex ia IIC T4 Ga

Ranges (bar)	Max. overpressure	Adjustable span range
0-0,1 ... 0,4	6,4	0-0,1 to 0-0,4
0-0,4 ... 0,7	6,4	0-0,4 to 0-0,7
0-0,7 ... 1,5	10,5	0-0,7 to 0-1,5
0-1 ... 4	16	0-1 to 0-4
0-2,5 ... 10	30	0-2,5 to 0-10
0-7,5 ... 16	80	0-7,5 to 0-16
0-16 ... 50	120	0-16 to 0-50

Series 8000-SAN diaphragm, piezoresistive relative pressure / level transmitter with integral 3 ½ digit LCD indicator (option)

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,2 % of adjusted span
Measuring ranges	0 - 0,08 bar to 0-50 bar
Output signal	4 - 20 mA / 2 - wire
Adjustment	zero and span internally
Power supply	13 - 40 Vdc
External load	550 Ohm / 24V to 1250 Ohm / 40V
Mechanical protection	IP 66
Process temperature	-20°C to +100 °C or: -20 °C to + 140°C for 8000-SAN -cable
Temperature effect	± 0,015 % / K (temperature compensated)
Packing ring	PTFE
Wetted parts	AISI 316 (Std.) Option: HastelloyC, ... flush mounted diaphragms 8000 - SAN - cable is provided with standard 3m cable length
Electronic housing	AISI 304
EC-Type Examination Certificate	KEMA 03ATEX 1219 X issue 4
Marking	II 1 G Ex ia IIC T4 Ga

Ranges (bar)	Max. overpressure (bar)	Adjustable span range (bar)
0-0,08 ... 0,4	6,4	0-0,08 to 0-0,4
0-0,4 ... 0,7	6,4	0-0,4 to 0-0,7
0-0,7 ... 1,5	10,5	0-0,7 to 0-1,5
0-1 ... 4,0	16	0-1 to 0-4
0-2,5 ... 10	30	0-2,5 to 0-10
0-7,5 ... 16	60	0-7,5 to 0-16
0-16 ... 50	120	0-16 to 0-50



TYPE APPROVAL CERTIFICATE N. ELE177113CS002

Series PERAMIC CER -8000 diaphragm, gauge pressure / level transmitter (Local indicator optional)

Measurement principle	resistive on bridge network
Accuracy	0,2 % of adjusted span
Measuring ranges	0 - 0,2 bar to 0-350 bar
Output signal	4 - 20 mA / 2 - wire
Adjustment	zero and span internally
Power supply	12 - 40 Vdc
External load	600 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 66
Process temperature	-20°C to +100 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Measuring sensor	Ceramic (Al ₂ O ₃)
Sensor sealing	Viton o-ring seal (standard)
Wetted parts	Ceramic (Aluminiumoxide 96%) other parts AISI 316
Electronic housing	AISI 304
EC-Type Examination Certificate	KEMA 03ATEX 1219 X issue 4
Marking	II 1 G Ex ia IIC T4 Ga

Ranges (bar)	Max. overpressure (bar)	Adjustable span range (bar)
0- 0,2 ... 0,8	6	0-0,2 to 0-0,8
0- 0,8 ... 1,6	12	0- 0,8 to 0-1,6
0- 1,6 ... 4	20	0-1,6 to 0-4
0- 2,5 ... 10	50	0-2,5 to 0-10
0- 10 ... 40	120	0-10 to 0-40
0- 40 ... 150	350	0-40 to 0-150
0- 100 ... 350	600	0-100 to 0-350

Reference documentation:

KLAY-INSTRUMENTS Instruction Manual : " Pressure and Level Transmitters"

Series 8000-SAN, SERIES 8000, doc. n° H/E/8000/-HART/06-2012/10

KLAY-INSTRUMENT, data sheet:Pressure and level transmitters Series 8000

KLAY-INSTRUMENT, data sheet:Pressure and level transmitters All Stainless Series 8000 - SAN

KLAY-INSTRUMENT, data sheet:Peramic Pressure transmitter

Test Reports:

KLAY-INSTRUMENTS Performance test (August 5 th. 1999)

KLAY-INSTRUMENTS Power variation test (July 28th1999),

KLAY-INSTRUMENTS Power supply failure test (July 28th1999)

KLAY-INSTRUMENTS Dry Heat test (July 28th 1999)

KLAY-INSTRUMENTS Low temp. test (July 28th 1999)

KLAY-INSTRUMENTS Humidity test (August 3nd/5th. 1999)

ELS - EMC test report (02/05/1997)

NMI- EMC test report , project 10112176

TNO- Salt mist test report , BU 4.00/036506-1/AA (25/04/2000)

PNO- PROFIBUS test report, itm/DP-Slave 514/02/14 (21/06/2000)

Genova, August 07, 2013

3/3



**TYPE APPROVAL CERTIFICATE
N. ELE177113CS003**

**This is to certify that the product below is found to be in compliance with the applicable requirements
of the RINA type approval system.**

<i>Description</i>	Level Transmitters
<i>Type</i>	Series HYDROBAR CABLE – FR Series HYDROBAR – I - CABLE
<i>Applicant</i>	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
<i>Manufacturer</i>	KLAY INSTRUMENTS B.V. Nijverheidsweg 5 7991 CZ Dwingeloo The Netherlands
<i>Testing Standards</i>	Rules for the Classification of Ships – Part C – Machinery, Systems and Fire protection – Ch. 3, Sect. 6, Table 1

Issued in **Genova** on **August 07, 2013**

This certificate is valid until **August 07, 2018**

RINA

Valerio Bonanni



TYPE APPROVAL CERTIFICATE N. ELE177113CS003

Hydrobar Cable FR Series submersible level transmitter

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,2 % of adjusted span
Measuring ranges	0,1 bar to 4 bar (fixed range)
Output signal	4 - 20 mA / 2 - wire
Adjustment	no
Power supply	13 - 40 Vdc (Exi: 17-28Vdc).
External load	550 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 68 (cable / SS tube extension) IP 66 (electronic housing)
Process temperature	-10°C to + 70 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Cable	Polyethylene (Std.) option : Hytrel or PTFE
Wetted parts	AISI 316 L (Std.) flush mounted diaphragm
EC-Type Examination Certificate	KEMA 03ATEX 1219 X Issue 4
Marking	II 1 G Ex ia IIC T4 Ga

Hydrobar- I - Cable Series submersible level transmitter (with digital local indicator 3½ digit)

Measurement principle	piezoresistive monocrystalline silicon sensor
Accuracy	0,2 % of adjusted span
Measuring ranges	0,1 bar to 4 bar
Output signal	4 - 20 mA / 2 - wire Hart Protocol
Adjustment	zero and span internally via Hart protocol
Power supply	13 - 40 Vdc (Exi: 17-28Vdc).
External load	550 Ohm / 24V to 1400 Ohm / 40V
Mechanical Protection	IP 68 (cable / SS tube extension) IP 66 (electronic housing)
Process temperature	-10°C to + 70 °C
Temperature effect	± 0,015 % / K (temperature compensated)
Cable	Polyethylene (Std.) option : Hytrel or PTFE
Wetted parts	AISI 316 L (Std.) flush mounted diaphragm
EC-Type Examination Certificate	KEMA 03ATEX 1092 X Issue 3
Marking	II 1 G Ex ia IIC T4 Ga and / or II 1 D Ex ia IIIC T100°C Da IP6X

Ranges (bar)	Max. overpressure (bar)	Adjustable span range (bar)
0- 0,1 ... 0,4	6,4	0-0,1 to 0-0,4
0- 0,4 ... 0,7	6,4	0- 0,4 to 0-0,7
0- 0,7 ... 1,5	10,5	0-0,7 to 0-1,5
0- 1 ... 4,0	16	0-1 to 0-4

Reference documentation:

KLAY-INSTRUMENTS data sheet: Submersible level transmitters HYDROBAR

Test Reports:

KLAY-INSTRUMENTS Performance test (August 5 th. 1999)
KLAY-INSTRUMENTS Power variation test (July 28th1999),
KLAY-INSTRUMENTS Power supply failure test (July 28th1999)
KLAY-INSTRUMENTS Dry Heat test (July 28th 1999)
KLAY-INSTRUMENTS Low temp. test (July 28th 1999)
KLAY-INSTRUMENTS Humidity test (August 3nd/5th. 1999)
 ELS - EMC report (02/05/1997)
 NMI- EMC test report , project 10112176
 TNO- Salt mist test report , BU 4.00/036506-1/AA (25/04/2000)
 PNO- PROFIBUS test report, itm/DP-Slave 514/02/14 (21/06/2000)

Genova, August 07, 2013

2/2