Instruction Manual for
Ultrasonic Measurement Device NivuCompact

(Original Instruction Manual – German)

valid as of Software Revision No. 1.49

NIVUS GmbH
Im Taele 2
75031 Eppingen, Germany
Phone +49 72 62 - 91 91 - 0
Fax +49 72 62 / 91 91 - 999
E-Mail: info@nivus.com
Internet: www.nivus.com

NIVUS AG
Hauptstrasse 49
8750 Glarus, Switzerland
Phone: +41 (0)55 6452066
Fax: +41 (0)55 6452014
E-Mail: swiss@nivus.com
Internet: www.nivus.com

NIVUS Austria
Mühlbergstraße 33B
3382 Loosdorf, Austria
Phone: +43 (0)2754 567 63 21
Fax: +43 (0)2754 567 63 20
E-Mail: austria@nivus.com
Internet: www.nivus.de

NIVUS France
14, rue de la Paix
67770 Sessenheim, France
Phone: +33 (0)3 88071696
Fax: +33 (0)3 88071697
E-Mail: france@nivus.com
Internet: www.nivus.com

NIVUS U.K.
Wedgewood Rugby Road
Weston under Wetherley
Royal Leamington Spa
CV33 9BW, Warwickshire
Phone: +44 (0)1926 632470
E-mail: info@nivus.com
Internet: www.nivus.com

NIVUS U.K.
1 Arisaig Close
Eaglescliffe
Stockton on Tees
Cleveland, TS16 9EY
Phone: +44 (0)1642 659294
E-mail: info@nivus.com
Internet: www.nivus.com

NIVUS Sp. z o.o.
ul. Hutnicza 3 / B-18
81-212 Gdynia, Poland
Phone: +48 (0) 58 7602015
Fax: +48 (0) 58 7602014
E-Mail: poland@nivus.com
Internet: www.nivus.pl

NIVUS Middle East (FZE)
Building Q 1-1 ap. 055
P.O. Box: 9217
Sharjah Airport International
Free Zone
Phone: +971 6 55 78 224
Fax: +971 6 55 78 225
E-Mail: Middle-East@nivus.com
Internet: www.nivus.com

NIVUS Korea Co. Ltd.
#411 EZEN Techno Zone,
1L EB Yangchon Industrial Complex,
Gimpo-Si
Gyeonggi-Do 415-843,
Phone: +82 31 999 5920
Fax: +82 31 999 5923
E-Mail: korea@nivus.com
Internet: www.nivus.com

Translation

If the device is sold to a country in the European currency area, this instruction handbook must be translated into the language of the country in which the device is to be used.
Should the translated text be unclear, the original instruction handbook (German) must be consulted or the manufacturer contacted for clarification.

Copyright

Names

The use of general descriptive names, trade names, trademarks and the like in this handbook does not entitle the reader to assume they may be used freely by everyone. They are often protected registered trademarks even if not marked as such.

1 Contents

1.1 Table of Contents

1.2 Ex-Approval

sira
CERTIFICATION

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 06ATEX2161X

4 Equipment: Nivu Compact 3 i.s., 6 i.s. and 10 i.s. Loop Powered Ultrasonic Level Measurement Devices

5 Applicant: Nivus GmbH

6 Address: Im Tale 2
D-75031 Eppingen
Germany

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R51A14887A

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 plus Amendments 1 and 2
EN 50020:2002
EN 50284:1999

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

Ex II 1 G
EEx ia IIC T4 (Tamb = -40°C to +80°C)

Due to restrictions applied by the applicant some products that are detailed in this certificate may not be commercially available.

For current certificates see end of manual

Project Number 51A14887
Date 26 June 2006
C. Index 13

This certificate and its schedules may only be reproduced in its entirety and without change

ST&C(Chester) Form 9225 Issue 4

Page 1 of 3

D R Stubbings BA MIET
Certification Manager
Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

The approval is only valid in connection with the respective indication on the transmitter nameplate.

The complete EC-type examination certificate can be downloaded from http://www.nivus.com.

2 Overview and use in accordance with the requirements

2.1 Overview

1	Display
2	Keypad
3	Terminal clamp housing
4	Screw thread

Fig. 2-1 Overview

2.2 Use in accordance with the requirements

The NivuCompact is an ultrasonic level sensor for independent non-contact measurement of distance, fill level, empty space or volume. Here the allowed maximum values, as specified in chapter 2.3 must be strictly kept. All cases which vary from these conditions and are not passed by NIVUS GmbH in writing are left at owner's risk.

The device is exclusively intended to be used for purposes as described above.
Modifying or using the devices for other purposes without the written consent of the manufacturer will not be considered as use in accordance with the requirements.
Damages resulting from this are left at user's risk.
The device is designed for a lifetime of approx. 10 years. After that period an inspection in addition with a general overhaul has to be made.

Ex-Protection

The Ex-version of the NivuCompact is designed to be used in areas with explosive atmospheres (zones 0,1 and 2).

Approval

Compact echo sounder: ⟨Ex⟩ II 1 G Ex ia IIC T4 (T_{amb} = -40° C to +80° C)
Ambient temperature = T_{amb}

Electric Values

Analog connection — ignition protection type
intrinsic safety Ex ia IIC
Max. values:
U_i = 28 V
I_i = 162 mA
P_i = 1.03 W
C_i = 0 µF
L_i = 0 mH

The approval is only valid in connection with the respective indication on the transmitter or the sensor nameplate.

For installation and initial start-up the conformity certificates and test certificates of the respective authorities must be followed.

2.3 Specifications

Power Supply	non Ex 2-wire: non Ex 3/4-wire: Ex 2-wire:	11-30 V; 3,8 - 22 mA 11-30 V; max. 65 mA 12 - 28 V; 3,8 - 22 mA	
Output	non Ex / Ex 2-wire: non Ex 3/4-wire:	4-20 mA current loop (passive), resolution: 12 Bit 4-20 mA (active), resolution: 12 Bit 0 to 5/10 V, resolution: 12 Bit 2 relays (SPDT) 30 V/1 A AC/DC j : 0,9)	
Measurement error	±0.25 % or 6 mm (the higher values applies) of measurement span (bottom edge of sensor to zero point)		
Enclosure dimensions	186 mm total height x 133 mm diameter		
Cable inlet	2 cable inlet for cables with diameters 4.5 - 10 mm		
Weight	approx. 1 kg		
Enclosure material	Valox® 357x PVDF	(upper shell of lid to begin of thread) (sensor bottom and thread)	
Temperature range (process)	Transducer: Sensor head:	- 40º C to +60º C (upper shell) - 40º C to +80º C (sensor bottom)	
Temperature range (environment)	- 40º C to +65º C at 80% max. air humidity non-condensing		
Protection	IP67 (if handled correctly)		
Temperature compensation	via internal temperature sensor (±0.5º C measurement error)		
Display	non Ex / Ex 2-wire: non Ex 3/4-wire:	4-digits LCD 4-digits, backlit LCD	
Interface	RS232 connection to PC e.g. echo analysis (not for Ex versions)		
Ex- Approval	⟨Ex⟩ II 1 G Ex ia IIC T4 (T_{amb}* = -40° C to +80° C) * ambient temperature		
NivuCompact Versions	**3 / 3 i.s.**	**6 / 6 i.s.**	**10 / 10 i.s.**
Beam angle	10°	10°	10°
Operation frequency	125 kHz	75 kHz	41 kHz
Measurement range	0.2 m – 3 m	0.3 m – 6 m	0.3 m - 10 m
Screw thread mounting	1.5“ BSP or NPT	1.5“ BSP or NPT	2“ BSP or NPT

3 General Notes on Safety and Danger

3.1 Danger Notes

3.1.1 General Danger Signs

Cautions
are framed and labelled with a warning triangle.

Notes
are framed and labelled with a "hand".

Danger by electric voltage
is framed and labelled with the Symbol on the left.

Warnings
are framed and labelled with a "STOP"-sign.

For connection, initial start-up and operation of the NivuCompact the following information and higher legal regulations (e.g. in Germany VDE), such as applicable Ex-regulations as well as safety requirements and regulations in order to avoid accidents, must be kept.
All operations, which go beyond steps to install, to connect or to program the device, must be carried out by NIVUS staff only due to reasons of safety and guarantee.

3.1.2 Special Danger Notes

Please note that due to the operation in the waste water field transmitter, sensors and cables may be loaded with dangerous disease germs. Respective precautionary measures must be taken to avoid damage to one's health.

3.2 Device Identification

The instructions in this manual are valid only for the type of device indicated on the title page.
The nameplate is fixed on the bottom of the device and contains the following:

- Name and address of manufacturer (e.g. in clamp terminal housing)
- CE label
- Type and serial number
- Year of manufacture
- for Ex protected devices please additionally indicate the Ex protection marking as shown in chapter 2.2.

It is important for queries and replacement part orders to specify type, year of manufacture and order number. This ensures correct and quick processing.

Fig. 3-1 Nameplate of NivuCompact 3 without Ex approval

Fig. 3-2 Nameplate of NivuCompact 3 i.s. with Ex approval

This instruction manual is a part of the device and must be available for the user at any time.

The safety instructions contained within must be followed.

It is strictly prohibited to disable the safety contrivances or to change the way they work.

3.3 Installation of Spare Parts and Parts subject to wear and tear

We herewith particularly emphasize that replacement parts or accessories, which are not supplied by us, are not certified by us, too. Hence, the installation and/or the use of such products may possibly be detrimental to the device's ability to work.
Damages caused by using non-original parts and non-original accessories are left at user's risk.

3.4 Turn-off Procedure

For maintenance, cleaning and repairs (authorized staff personnel only) the device has to be disconnected from mains.

3.5 User's Responsibilities

In the EEA (European Economic Area) national implementation of the framework directive 89/391/EEC and corresponding individual directives, in particular the directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, are to be observed and adhered to.
In Germany the Industrial Safety Ordinance must be observed.

The customer must (where necessary) obtain any local **operating permits** required and observe the provisions contained therein.
In addition to this, he must observe local laws and regulations on

- personnel safety (accident prevention regulations)
- safety of work materials and tools (safety equipment and maintenance)
- disposal of products (laws on wastes)
- disposal of materials (laws on wastes)
- cleaning (cleansing agents and disposal)
- environmental protection.

Connections:

Before operating the device the user has to ensure, that the local regulations (e.g. for electric supply) on installation and initial start-up are taken into account, if this is both carried out by the user.

4 Functional Principle

4.1 General

The NivuCompact is an ultrasonic compact echo sounder for non-contact distance, level, space or volume measurement. It works to echo transit time principle. While high sensor capacity, small beam angle and digital echo processing this sensor is ideal for „difficult “conditions of use. In case of doubt or questions regarding your application please consult the NIVUS service hotline
Phone +49(0)72629191-955 or
the NIVUS head office
Phone +49(0)72629191-0.
The unique design allows 2- or 3-wire connections all-in-one (Ex available as 2-wire version only!).

Initial start-up using the integrated keypad with hotkey function and the 4-character LC display.
Easy calibration through storage of measurement place environments and independent avoidance of interfering edges.
The 3/4-wire version has a mA-output signal, a 0 to 5/10 V DC voltage output and 2 relays with changeover contacts as alarm or control relays with free programmable switching points available.
Relays and mA output can be set to fall to defined conditions in case of errors (hold latest value, 3.5 mA or 22mA).

If set to >volume measurement< the NivuCompact is capable of being used accordingly (Q/h using 16 break points). This mode will utilise the analog output as volume signal.

For the most applications the compact enclosure is equipped with an IP 67 lid covering.
Installation is carried out using 1.5“ or 2“ BSP- or NPT screw-in threads.
For electric connection there are 2 cable glands for cables with cross-sectional areas between 4 mm and 10 mm available.

The NivuCompact echo sounder utilises is integrated interface and the accompanying PC software for communication. This is where parameter data can be received, saved, modified and transmitted back to the NivuCompact again (available only for non-Ex versions). Furthermore echo profiles can be represented, evaluated and saved on PC. All parameters and echo profiles can be printed using the PC software.

If your application should cause any problems please send the saved data under the heading of >Level- fault analysis < to Hotline-worldwide@nivus.com for error analysis purposes.
In this case we require the parameter data, a minimum of 2 minutes of recorded echoes and, if possible, please provide a brief functional description including application photos.

4.2 Device Variations

The NivuCompact is available in different variations.
They are different in measurement range
From the article key the type of device can be specified.

NMC0	Type	Measurement range		
	P03	0,2 bis 3 m for fluids		
	P06	0,3 bis 6 m for fluids		
	P10	0,3 bis 10 m for fluids		
		Enclosure		
		0	Valox (standard)	
		P	PVDF	
			ATEX Approvals	
			0	none
			E	Ex- Zone 0
NMC0				

Fig. 4-1 Type keys for NivuCompact

5 Storing, Delivery and Transport

5.1 Receipt

Please check your delivery according to the delivery note for completeness and intactness immediately after receipt. Any damage in transit must be instantly reported to the carrier. An immediate, written report must be sent to NIVUS GmbH Eppingen as well.
Please report any delivery incompleteness in writing to your representative or directly to NIVUS Eppingen within two weeks.

Mistakes cannot be rectified later!

5.1.1 Delivery

The standard delivery of the NivuCompact contains:

- the instruction manual with the certificate of conformity. Here, all necessary steps to correctly install and to operate the measurement system are listed.
- an ultrasonic compact echo sounder Type NivuCompact
- 1 lock nut PVC-H

More accessories depending on order. Please check with delivery note.

5.2 Storing

The following storing conditions must be strictly kept:

sensor:	max. temperature:	+65° C
	min. temperature:	-40° C
	max. humidity:	80 %, non-condensing

The devices must be protected from corrosive or organic solvent vapours, radioactive radiation as well as strong electromagnetic radiation.

5.3 Transport

Sensor and Transmitter are conceived for harsh industrial conditions. Despite this do not expose them to heavy shocks or vibrations.
Transportation must be carried out in the original packaging.

5.4 Return

The NivuCompact must be returned at customer cost to NIVUS Eppingen in the original packaging.
Otherwise the return cannot be accepted!

6 Installation

6.1 General

For electric installation the local regulations in the respective countries (e.g. VDE 0100 in Germany) must be referred to.

Before feeding the rated voltage the unit installation must be correctly completed. The installation is allowed to be carried out by qualified personnel only. Further statutory standards, regulations and technical rulings have to be taken into account.
All outer circuits, wires and lines connected to the device must have a minimum isolation resistance of 250 V. If the voltage exceeds 42 V DC an isolation resistance with 500 kOhm min. is necessary.
The section dimension of the power supply wires or the current loop wires shall meet the technical requirements of the NivuCompact. For information on device protection see chapter 2.3.
Particularly regarding Ex protection measures it must be checked if the unit power supplies must be integrated into the facility's emergency shutdown conception.

6.2 Transmitter Installation

6.2.1 General

The transmitters mounting place has to be selected according to certain criteria. Please strictly avoid:

- direct sunlight (use weatherproof cover if necessary)
- heat emitting objects (max. ambient temperature: +65° C)
- objects with strong electromagnetic fields (e.g. frequency converters)
- corrosive chemicals or gas
- mechanical shocks
- vibrations
- radioactive radiation
- installation close to footpaths or travel ways
- to cross the sonic cone
- distances below the minimum distance to max. level (see specifications Chap. 2.3, Measurement Range)

Please note during installation that electronic components may be destructed caused by electrostatic strokes. Due to this make sure to have sufficient earthing devices in order to avoid too high electrostatic charge.

6.2.2 Enclosure dimensions

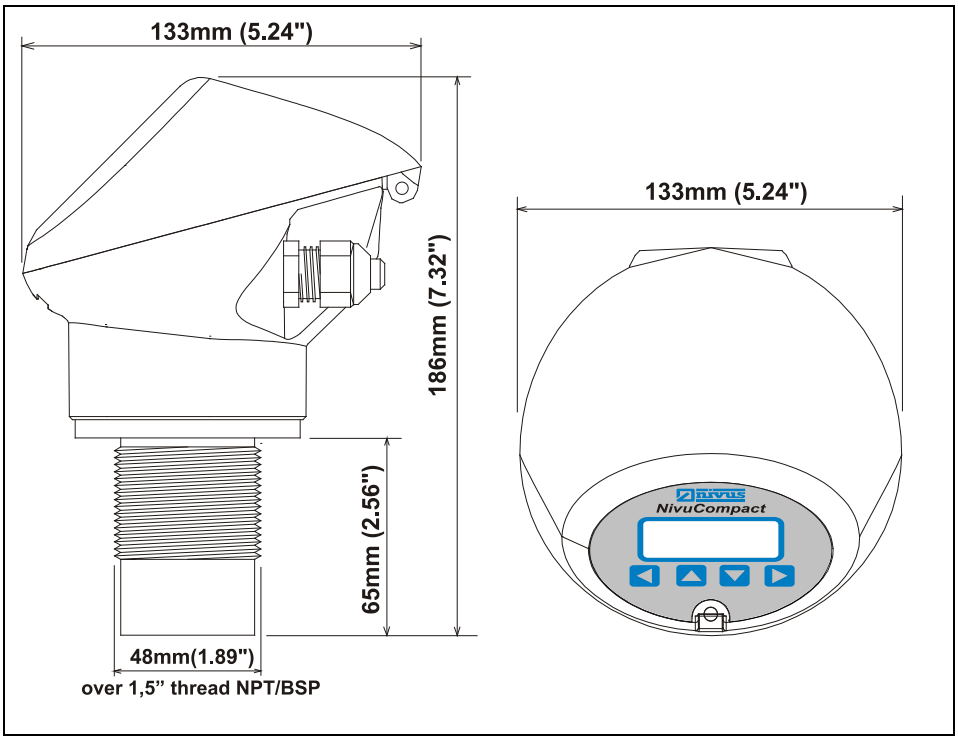


Fig. 6-1 NivuCompact 3 and 6 m

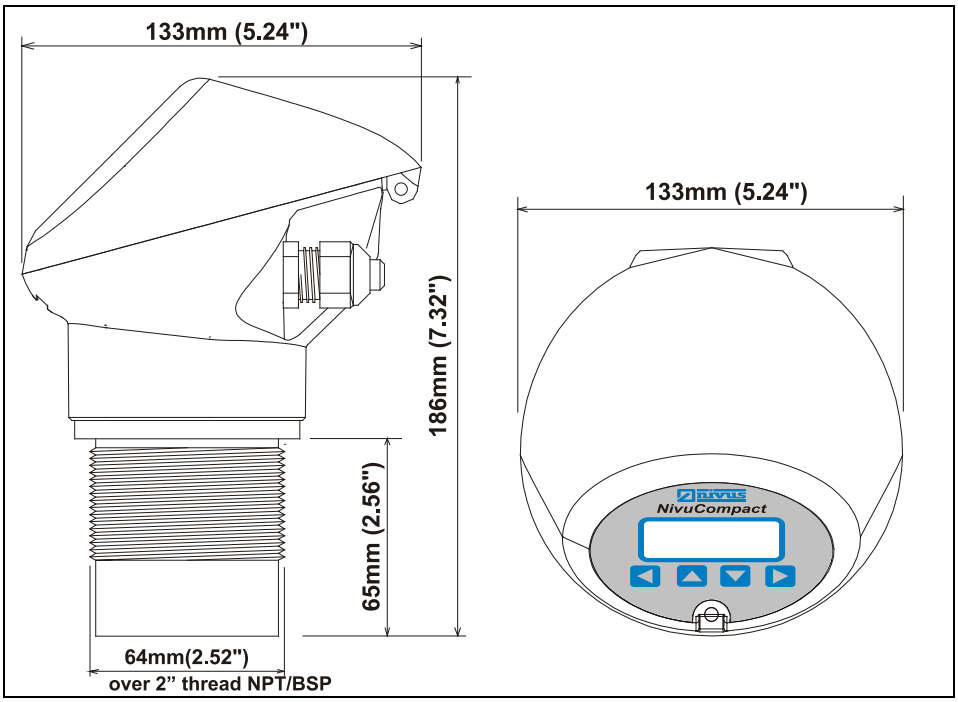


Fig. 6-2 NivuCompact 10 m

6.3 Transmitter Connection

When opening the NivuCompact enclosure, please strictly avoid moisture (dew, drops etc.) or dirt to get into the NivuCompact electronics compartment.

Water or dirt must not leak into the terminal housing. Please seal the clamp housing in a way that neither water nor dirt might leak in.

An incorrect or faulty sealing does not ensure the indicated protection.

Connecting and/or utilising the NivuCompact in another way than described in this instruction manual may interfere with standard protection and lead to defects in the equipment.

6.3.1 Maximum load for 2-wire and 3/4-wire operation

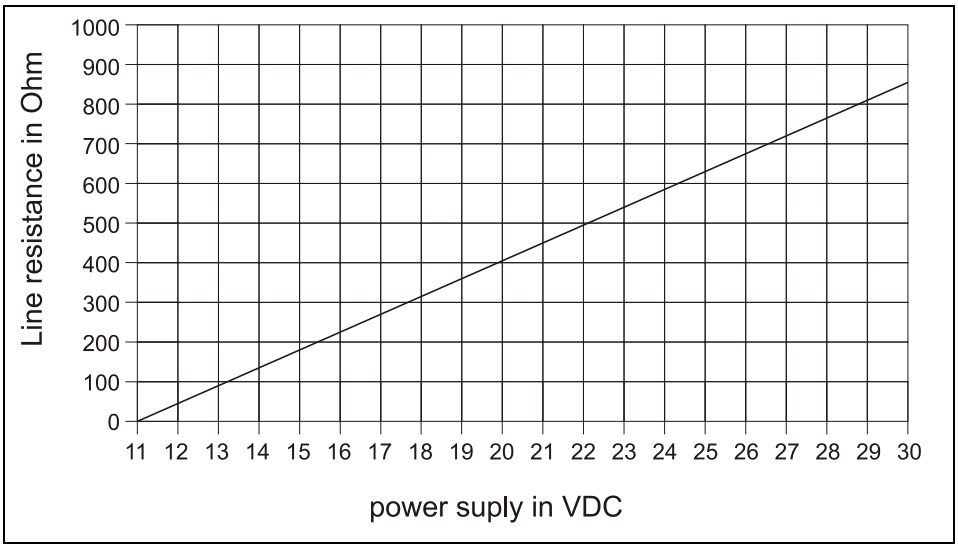


Fig. 6-3 Maximum permissible line resistance at 2- wire connection

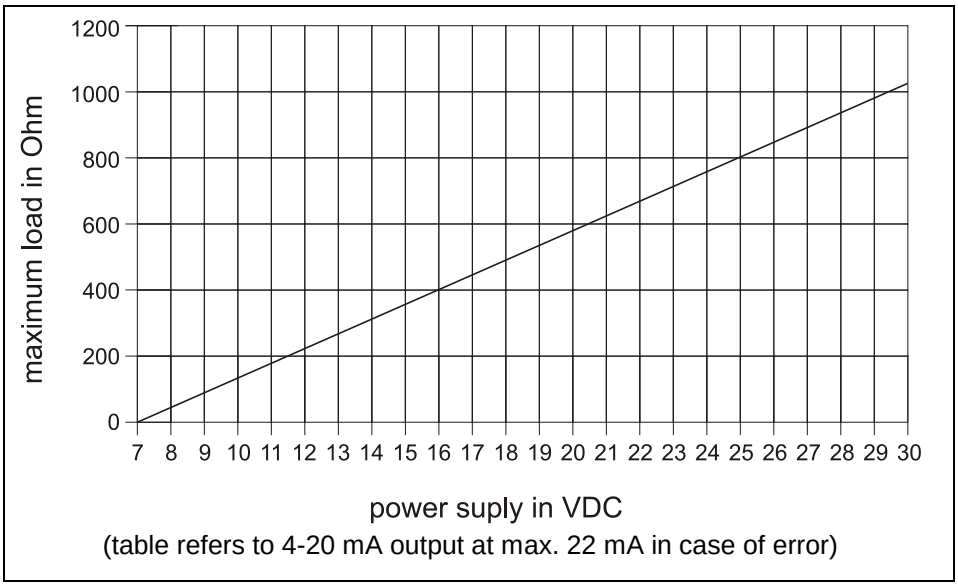


Fig. 6-4 Maximum load at 3- wire connection

We recommend to use a shielded cable such as LIYCY or A-2Y(L)2Y to connect the NivuCompact.

6.3.2 2-wire connection

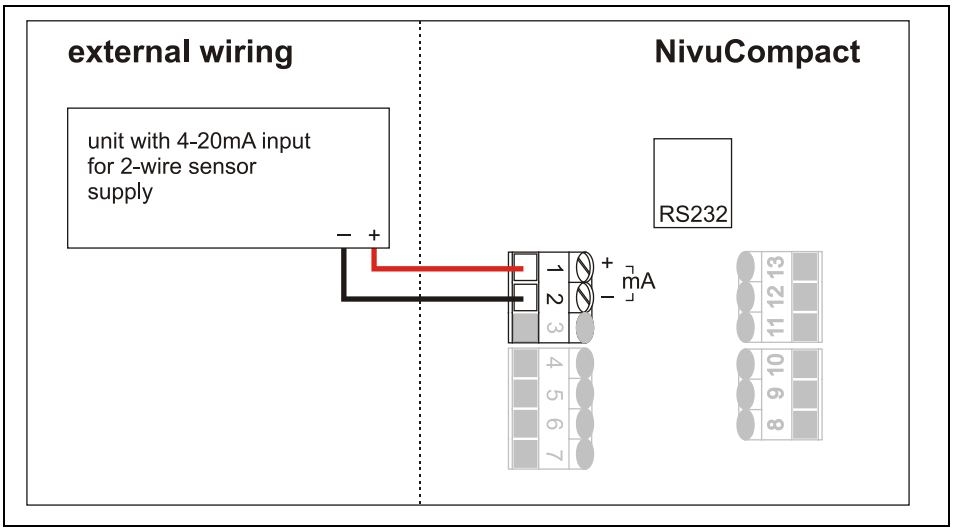


Fig. 6-5 2-wire connection

Terminal clamp 1: + 11-30 V DC current loop input
Terminal clamp 2: current loop output (4-20 mA)

At 2-wire connection relays, voltage output and display back-lighting are not available.

Clamps 3 - 13 cannot be used during 2-wire operation!

6.3.3 3/4- wire connection

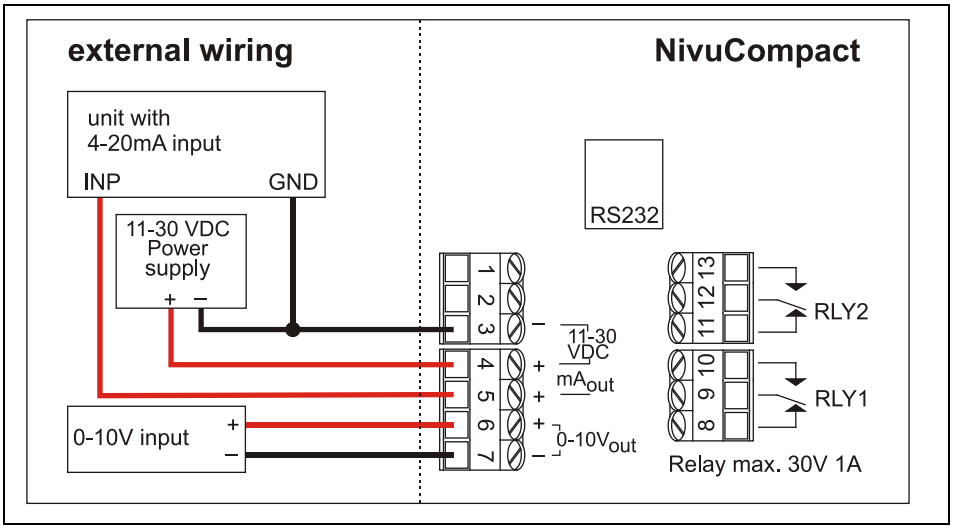


Fig. 6-6 3/4- wire connection

Terminal clamp 3: GND (DC power supply / current loop output)
Terminal clamp 4: +11 to 30 V DC power supply
Terminal clamp 5: current loop output 4 - 20 mA (SOURCE Mode)
Terminal clamp 6: +voltage output 0 to 5/10 V
Terminal clamp 7: GND voltage output 0 to 5/10 V

The relays 1 and 2 are implemented as SPDT.

Terminal clamp 8:	Relay 1 Normally Open (N/C)
Terminal clamp 9:	Relay 1 Common
Terminal clamp 10:	Relay 1 Normally Closed (N/O)
Terminal clamp 11:	Relay 2 Normally Open (N/C)
Terminal clamp 12:	Relay 2 Common
Terminal clamp 13:	Relay 2 Normally Closed (N/O)

SPDT can be loaded up to max. 30 V (AC/DC) / 1 A (cos ϕ 0,9)

6.3.4 Connection as Ex version

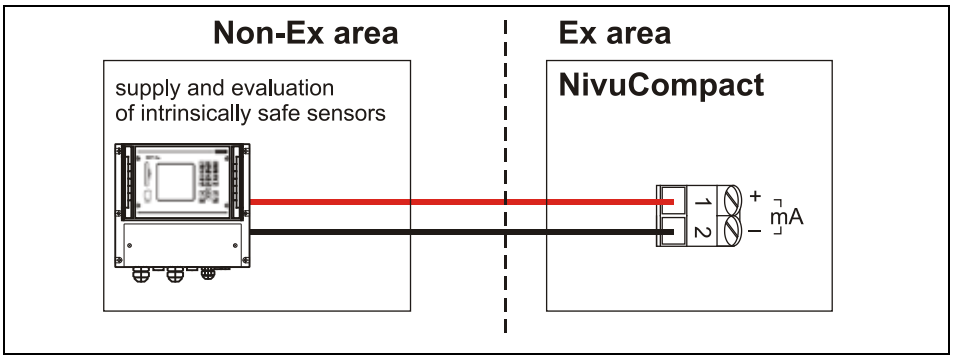


Fig. 6-7 Connection as Ex version

Terminal clamp 1:	+12 to 28 V DC current loop input
Terminal clamp 2:	current loop output (4-20 mA)

Please observe the maximum permissible connected loads when connecting the NivuCompact i.s (Ex) (see chapter 2.3 Specifications).

6.3.5 Connecting options to NIVUS units

Flow	Level
OCM Series	NivuCont / NivuCont Plus
PCM Series	NivuCont S
HydraulicCalculator Plus	DataCont FWU
NivuChannel	RuebController
NivuSonic	NivuLine

Please observe the specifications under chapter 2.3 Specifications when connecting the NivuCompact to external devices.

6.4 Overvoltage Protection

For effective protection of the NivuCompact it is necessary to protect power supply and mA outputs by using overvoltage protection devices.
NIVUS recommends:

- **DataPro 2x1-24V/24V TR** for mA and voltage output of NivuCompact. Overvoltage protection is implemented by using leakage current of 20.000 A as well as automatic self-control using failsafe diodes.
- **EnerPro 1-24V TR** for 24 V- power supply of the NivuCompact. Leakage current 20.000 A and high capacity (up to 6A) for safe and durable protection of several devices simultaneously.

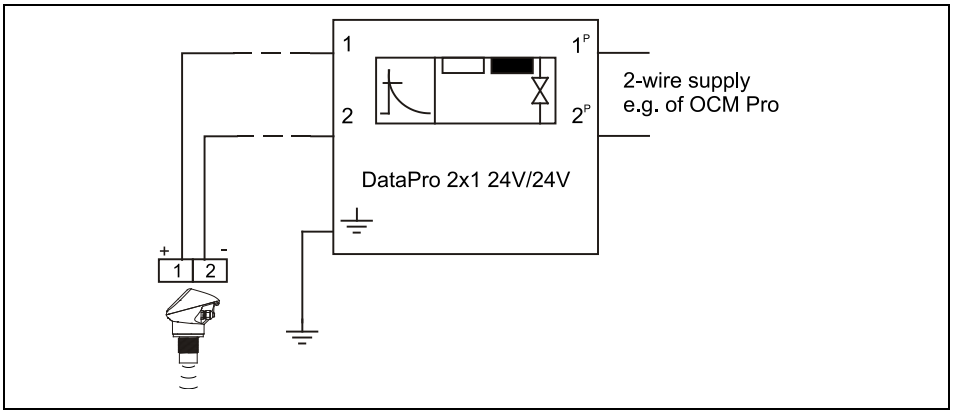


Fig. 6-8 Overvoltage Protection of 2-wire supply

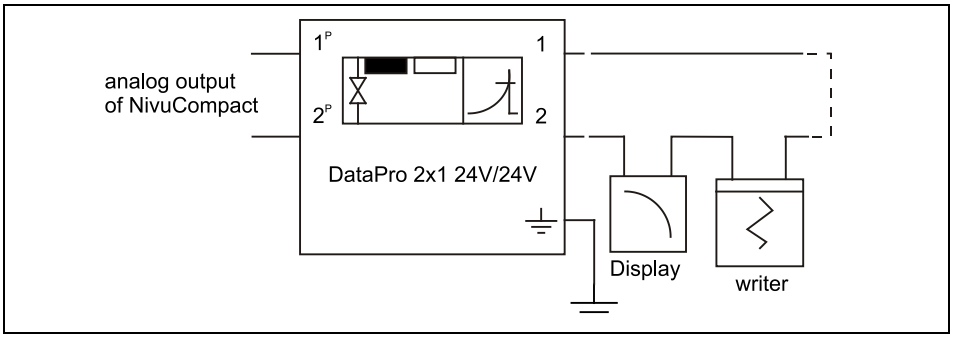


Fig. 6-9 Overvoltage Protection of analog Outputs

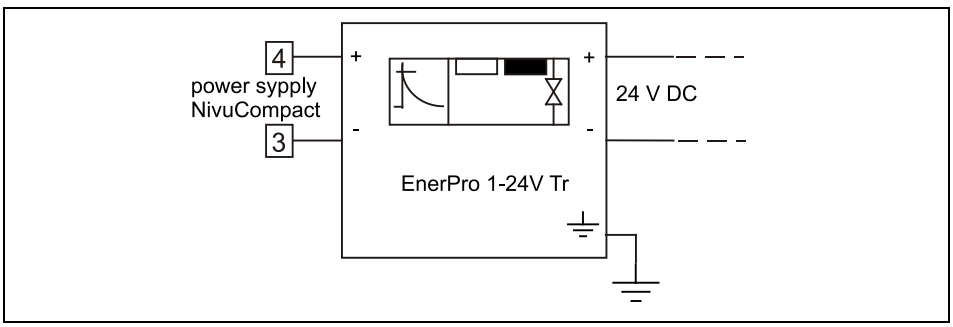


Fig. 6-10 Overvoltage Protection of operation voltage supply (only 3/4-wire operation)

6.5 NivuCompact Installation

6.5.1 General

The NivuCompact echo sounder shall durably and reliably be installed in a way that the sensor face is adjusted in a right angle to the measurement medium.

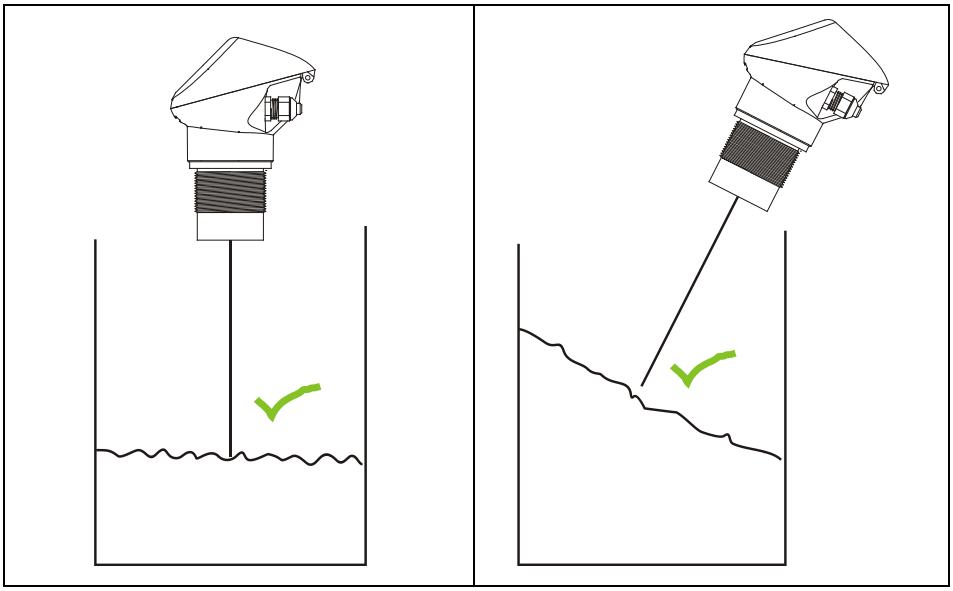


Fig. 6-11 Correct installation of the compact echo sounder

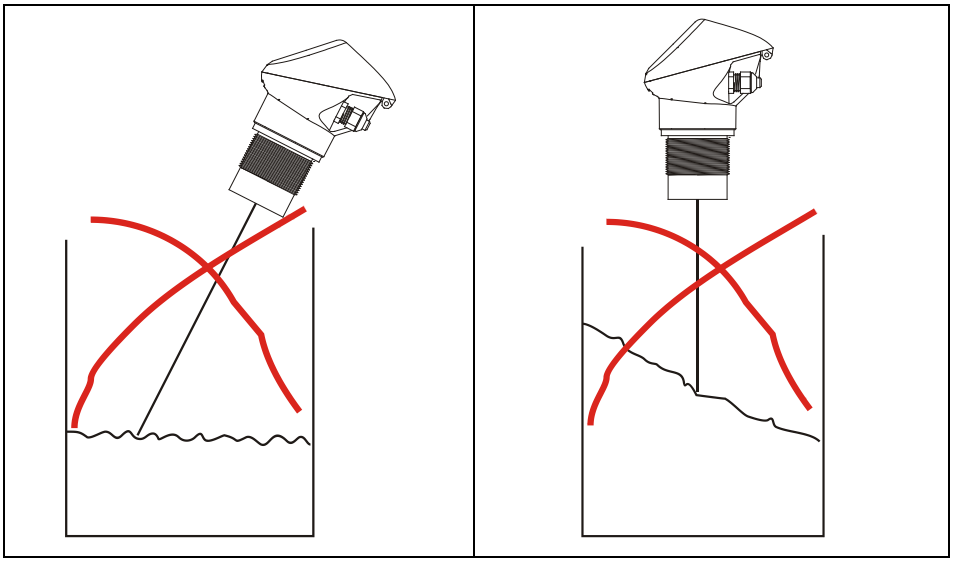


Fig. 6-12 Incorrect installation of the compact echo sounder

Please install the NivuCompact in a position which avoids obstructions within the sonic lobe. Obstructive constructions may interfere with the measurement or may even lead to measurement failure.
See Fig. 6-13 for dimensions of sonic lobe.

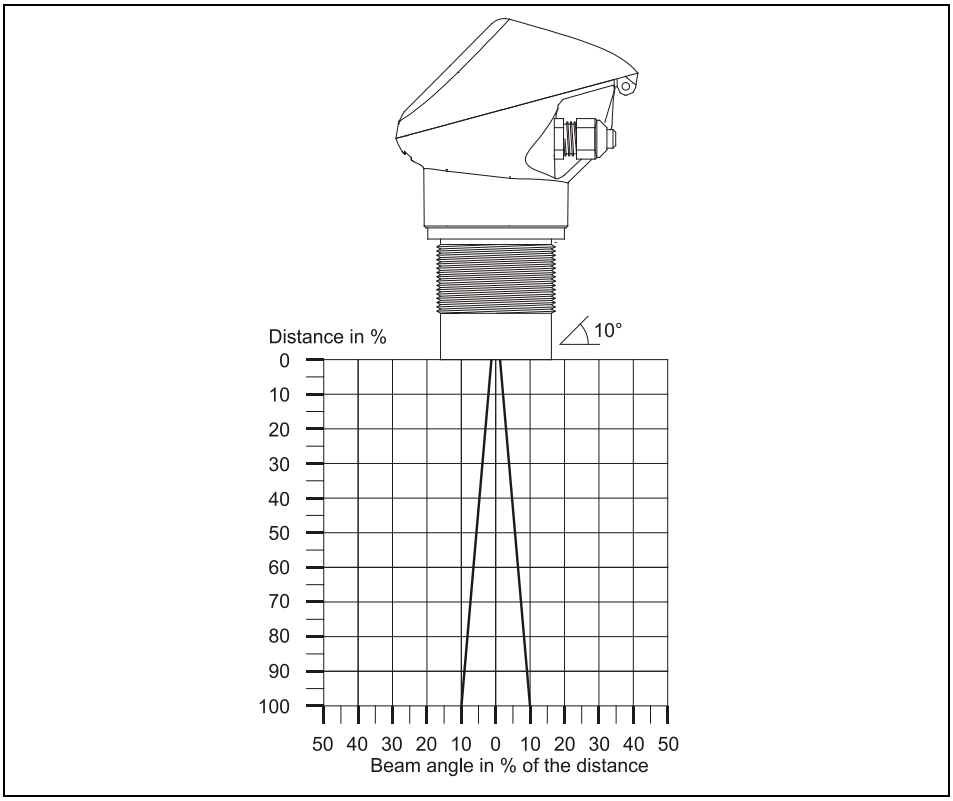


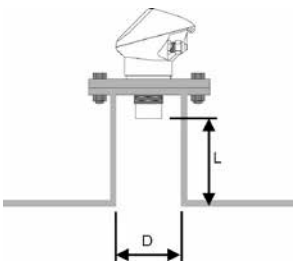
Fig. 6-13 Beam angle

6.5.2 Installation on open channels

If used in open channels please ensure to install the NivuCompact in the channel centre if possible and keep the distance to the measurement medium as short as possible (observe min. measurement range). If the measurement place is exposed to direct sunlight use a weatherproof cover to protect the sensor (higher sensor temperatures compared to ambient temperatures will cause faulty transit time and hence faulty distance evaluation and indication).

6.5.3 Installation on closed channels

In case of installation on closed channels please note that it is not allowed to immerse the sensor face.
The application depicted below shows a dome top on a pipe measuring section (Fig. 6-14) and the maximum installation dimensions to be observed.



diameter (D) in mm	Min. length (L) in mm
80	220
100	280
150	420
200	560

Fig. 6-14 Dome top on pipe measuring section: installation dimensions

6.5.4 Installation on containers, silos and tanks

The compact echo sounder installation on containers, silos and tanks depends on the medium which is to be measured.
The most important thing is to adjust the NivuCompact sensor face as perpendicular as possible (±2°) to the medium to be measured (see Fig. 6-11).

If using a pipe nozzle projecting into a closed container ensure to cut the nozzle end in an angle of 45°.

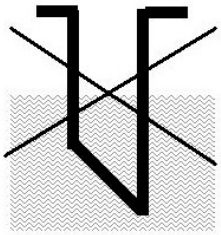
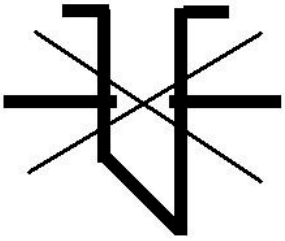
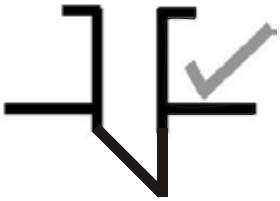
	
Protect the pipe nozzle from being immersed. Otherwise sedimentation may settle on the pipe walls, causing false echoes which might influence the measurement.	Weld seams, flanges, sealings etc. shall not project into the pipe nozzle. Such obstructions might cause false echoes affecting the measurement.
	
Correct nozzle installation for open and closed applications.	

Fig. 6-15 Installation using a pipe nozzle

7 Initial Start-up

7.1 General

Notes to the user

Before you connect and operate the NivuCompact you should strictly follow the notes below!
This instruction manual contains all necessary information to program and to operate the device.
It is addressed to qualified technical personnel who have appropriate knowledge about measurement, automation and regulation technology.
If any problems regarding installation, connecting or programming should occur please contact our technical division or our service center.

NIVUS GmbH
Intern. Service-Hotline: Tel. +49 (0)7262 9191-888
Product Management Level: Tel. 07262 9191-0
or via e-mail to: Hotline-worldwide@nivus.com

For help during initial start-up procedure in most cases the following specifications are sufficient:

- brief description of the measuring place.
- used sensors and their positions
- what is to be indicated?
- span and function of analog and relay outputs

General Principles

The initial start-up is not allowed until the installation is finished and checked. To exclude faulty programming this instruction manual must be read before the initial start-up. Please get used to operate the NivuCompact via keypad and display by reading the instruction manual before you begin to program the device.
After connecting the sensor the parameters are going to be set.

For extensive programming, difficult conditions, special channel and tank shapes, lack of qualified personnel or if target specifications require setup and error protocols please allow programming to be implemented either by the manufacturer or by a manufacturer-authorised expert company.

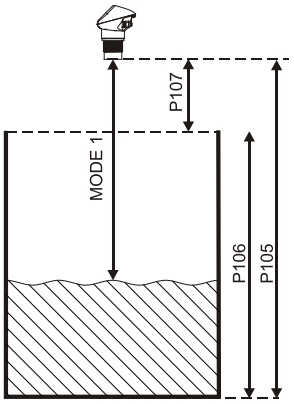
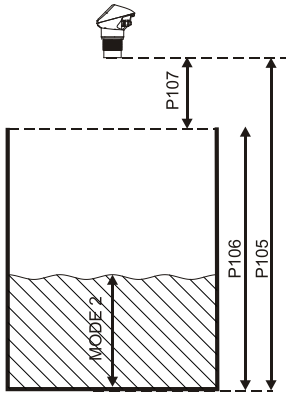
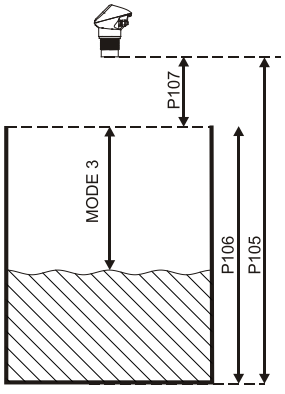
The NivuCompact user interface has been designed as user-friendly as possible. Even inexperienced users are capable of easily adjusting all basic settings ensuring reliable unit operation.

7.2 Operation mode

The NivuCompact has four different operation modes (select in P100):

- distance
- fill level
- empty space
- volume

The operation mode defines the NivuCompact measurement mode.

	**MODE 1 (distance)** The distance measurement P100 = 1 measures the distance between measurement medium and sensor bottom edge and indicates the value on the display. P105 = zero point P106 = measurement span P107 = near blanking distance (see chapter 14)
	**MODE2 (fill level)** The fill level measurement P100 = 2 measures the distance between zero point and maximum fill level of measurement medium and indicates the value on the display. P105 = zero point P106 = measurement span P107 = near blanking distance (see chapter 14)
	**MODE 3 (empty space)** The empty space measurement P100 = 3 measures the distance between maximum fill level and entered measurement span and indicates the value on the display. P105 = zero point P106 = measurement span P107 = near blanking distance (see chapter 14)
(see chapter 9) P600 vol – menu P600 = 0 to 12	**MODE 4 (volume)** The volume measurement calculates the volume by using the measured fill level regarding the tank dimensions (P600). P605 = volume unit P606 = correction factor P607 = max. volume (indication only) P610 – P641 = 16 volume break points

7.3 Navigation buttons

There are 4 push buttons located on the top of the NivuCompact. They allow initial start-up as well as to set up/program the unit. Pressing enables to access individual “hotkey functions” as well.

In the programming mode

1 ◄ ESC (change an upper menu level or cancel a value)
2 ▲ UP (change to next higher parameter or increase value)
3 ▼ DOWN (change to next lower parameter or decrease value)
4 ► Enter (change to a lower menu level or confirm values)

Fig. 7-1 Keypad

Hotkey function (only in operation mode; this value is displayed for 2 sec.).

◄	details of unit, serial no. and software version
▲	displays current temperature in centigrade
▼	displays current echo strength (dB’s)
►	displays loop current in mA

8 Program mode

8.1 General

Programming the NivuCompact is carried out in various menus where the individual parameters are stored related to their functions (see chapter 9).

To access the **Program mode** press the ◄ and ► button (ESC and ENTER) simultaneously, where upon the display will show **PASS** on the LC display briefly, to prompt you to enter the password P922 (default = 1997).
The display will now show **0000**, and the left hand digit will flash. By using the >▲ UP< und >▼ DOWN< keys to increment or decrement the digit, and the ENTER key ► to shift the flashing digit to the next position. Please proceed as described in order to complete the 4-digit access code. Press ENTER ► again to confirm the access code. If your entry was successful the display will indicate >APP< for application. If however you input the wrong pass code the NivuCompact LC display will show “Fail” for 2 seconds and will revert back to operation mode.
To get from parameter setting menu to operation mode press >ESC< several times until the display indicates >run< and confirm with >ENTER< subsequently. The NivuCompact will jump to operation mode automatically if no entry (key action) has been registered in parameter setting mode for 10 minutes.

8.2 Navigating in set-up menu (parameter menu)

If you are in the set-up menu the NivuCompact will show APP (Application). Pressing the >▲ UP< and >▼ DOWN< buttons will scroll the display between the menu items. Pressing the >► ENTER< key takes you to the selected menu. To exit simply press >◄ ESC<.

Example 1:

Press the „UP“-button 1x to get into the Relay menu (abbreviation rL)
To stay in the Relay menu press >ENTER<. With the >UP< and >DOWN< buttons you can get to the parameters in the sub-menu.

Example 2:

You have chosen the menu diSP (Display menu) and you want to change the unit in P800:

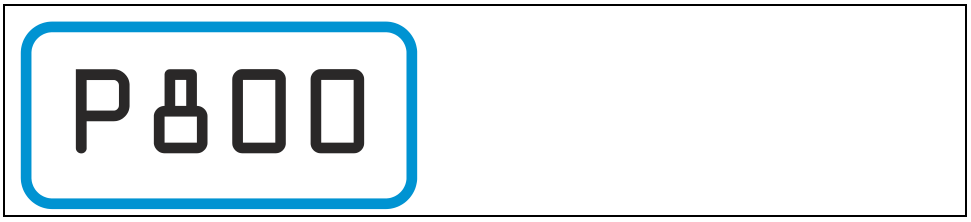


Fig. 8-1 P800 in display menu

Go to parameter setting mode as described in chapter 8.1. The >UP< or >DOWN< keys take you through the parameter menu to the point called >diSP< where you can get into the menu by pressing >ENTER<. The according parameter numbers are going to be indicated now. You can step through the individual parameters using the >UP< or >DOWN< keys. Go to P800 now and press >ENTER< in order to modify this parameter. The LCD will indicate 0000 with the rightmost digit flashing. This means that the current value is >0<.
The display is set to measured distance. To change the display parameter to 1 press the „UP“ key – this will increase the digit by one.

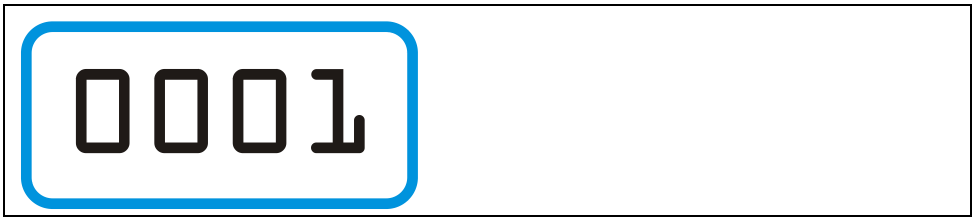


Fig. 8-2 Selection of indication based on percentage or readings in P800

The modification will be accepted by pressing ENTER. Pressing the ESC key however will take you back to P800 screen without having changed the value.

8.3 Analog output calibration

Calibration of analog output (4-20 mA) as well as voltage output (0-10 V) has been carried out per default. If the current output value should be incorrect anyway, it may be adjusted anew using parameters P834 and P835 (only possible by using PC software).

8.4 Calibration Ultrasonic Measurement

Calibrating the ultrasonic measurement is required only if the echo sounder sensor is surrounded by another medium than air.
For calibration enter the parameter menu under >COP / P860< and modify the value Air = 344,1 m/sec. Enter the velocity of sound for the new medium accordingly. The following list may be helpful, containing the sound velocities in various gases. If the gas used in your application is not listed in the table below please contact NIVUS GmbH >level@nivus.de<

GAS (0 °C)	m/sec	ft/sec
Ammoniac	415	1362
Argon	308	1010
Hydrogen bromide	200	656
Chloric gas	206	676
Deuterium	890	2920
Nitrous oxide	263	863
Ethane (10 °C)	308	1010
Ethylene	317	1040
Helium	965	3166
Hydro chloric gas	206	676
Hydrogen iode	157	515
Carbon dioxide	259	850
Carbon monoxide	338	1109
Illuminating/coal gas	453	1486
air, dry	331	1086
Methane	430	1411
Neon	435	1427
Oxygen	316	1037
Sulfur dioxide	213	699
Hydrogen sulfide	289	948
Nitrate	334	1096
Nitrate monoxide (10 °C)	324	1063
Hydrogen	1284	4213
STEAM (97 °C)		
Acetone	230	755
Benzol	202	663
Chloroform	171	561
Ethyl alcohol	269	883
Ethyl airwaves	206	676
carbon tetrachloride	145	476
Methanol	335	1099
Steam (134 °C)	494	1621

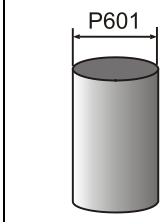
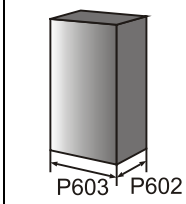
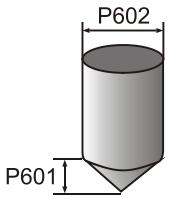
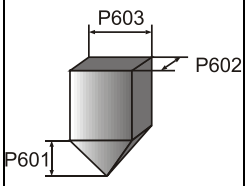
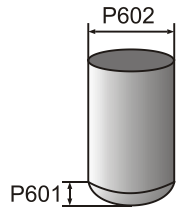
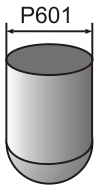
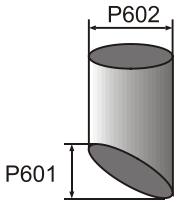
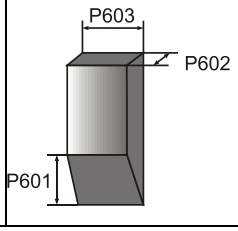
Fig. 8-3 Velocity of sound in gases (P860)

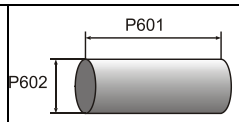
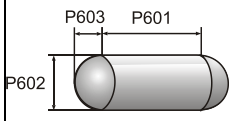
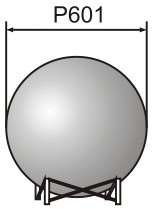
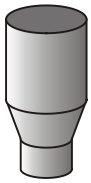
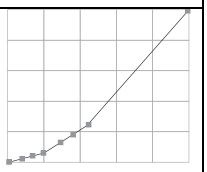
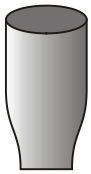
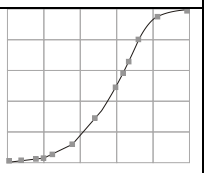
9 Parameter list

The access code in P922 is: >1997< (Factory Defaults)
The following table shows the meaning of the individual parameter numbers:

Menu	Entry	Description	default setting
APP	**Application menu**		
P100 Operation-Mode	1 = Distance	distance between sensor bottom and surface	1
	2 = Level	distance between empty level (P105) and fill level	
	3 = Space	empty distance between max. level (P106) and fill level	
	4 = Volume	volume calculated from filling level and container geometry (P600)	
P104 Unit	1 = m 2 = cm 3 = mm 4 = ft 5 = inches.	unit for entry purposes and value indication on the display	1
P105 Zero point	0 - 9999 (in selected P104 unit)	Distance from the face of the sensor to the zero point, selected in P104 unit.	3.00 m (3 m) 6.00 m (6 m) 10.00 m (10 m)
P106 Measurement span	0 - 9999 (in selected P104 unit)	Measurement span between zero point and max. level (consider P107!)	2.80 m (3 m) 5.70 m (6 m) 9.70 m (10m)
P107 Near blanking	0 – 9999 (in selected P104 unit)	distance from the face that is not measurable depending on version (see chapter 2.3) (can be set up to selected measurement span (P106) max.)	0.20 m (3 m) 0.30 m (6 m) 0.30 m (10 m)
P108 Far blanking	0 – 100 %	The far blanking is added to the value by percentage in P105 (max. total range may vary depending on type 3 m = 3,3 m, 6 m = 6,6 m or 10 m = 11 m) Hence the sensor is able to measure beyond its zero point without any loss of echo e.g.: P105 = 2 m ; P108 = 10% ; using far blanking = 2.20m total.	10 %

Rl	**Relay menu**		
P210 Relay 1 Type	0 = Not in use	Relay will remain in de-energised condition. This condition refers to the relay condition shown in the wiring diagram.	0
	1 = Alarm	Relay operates based on the closed circuit current principle, i.e. relay will de-energise to set the alarm "ON".	
	2 = Control	Relay will operate based on the working current principle, i.e. relay will energise to set the control "ON".	
P211 Relay 1 Function	0 = Not in use	No function	0
	1 = Level	On and off thresholds are based on the measured level.	
	4 = Loss of Echo	No on and off thresholds have to be set since echo loss does not depend on fill level. Alarm is raised if the Failsafe Timer (P809)	
P213 Relay 1	"**ON**" Setpoint	Level entry	0.00
P214 Relay 1	**"OFF"** Setpoint	Level entry	0.00
P220 Relay 2 Type	0 = Not in use	Relay will remain in de-energised condition. This condition refers to the relay condition shown in the wiring diagram.	0
	1 = Alarm	Relay operates based on closed circuit current principle, i.e. relay will de-energise in alarm condition.	
	2 = Control	Relay operates based on working current principle, i.e. relay will energise to set the control "ON".	
P221 Relay 2 Function	0 = Not in use	No function	0
	1 = Level	On and off thresholds are based on the measured level.	
	4 = Loss of Echo	No on and off thresholds have to be set since echo loss does not depend on fill level. Alarm is raised if the Failsafe Timer (P809)	
P223 Relay 2	"**ON**" Setpoint	Level entry	0.00
P224 Relay 2	**"OFF"** Setpoint	Level entry	0.00

VoL	Volume Menu		
P600	Vessel Shape	Choice of Vessel Shape	0
		600 = 0 Cylindrical Flat base (Default)	
		P600 = 1 Rectangular Flat base	
		P600 = 2 Cylindrical Cone base	
		P600 = 3 Rectangular Pyramid base	
		P600 = 4 Cylindrical Parabola base	
		P600 = 5 Cylindrical Half-sphere base	
		P600 = 6 Cylindrical Flat sloped base	
		P600 = 7 Rectangular Flat sloped base	

		P600 = 8 Horizontal cylinder with flat ends	
		P600 = 9 Horizontal cylinder with parabolic ends	
		P600 = 10 Sphere	
		P600 = 11 Universal Linear A linear point-to-point calculation is going to be carried out. The following parameters have to be set: 2 - 16 break points from P610 to P641	
		P600 = 12 Universal Curved An interpolated point-to-point calculation is going to be carried out. The following parameters have to be set: 2 - 16 break points from P610 to P641	
P604 Content	Calculated Volume (Read Only)	This parameter displays the calculated volume that has been calculated using the pre-set dimensions	0.0
P605 Volume units	0 = No Units 1 = Tons 2 = Tonnes 3 = Cubic metres 4 = Litres 5 = UK Gallons 6 = US Gallons 7 = Cubic feet 8 = Barrels	Volume units of the unit indicated on the display	3
P606 Correction Factor	0 – 100 %	This parameter is used to enter a correction factor, when required, such as the specific gravity of the material so that the volume calculated is relative to the actual amount of material that can be contained between **empty level** (**P105)** and 100% of **span** (**P106)**.	1.00
P607 Max. Volume	Max Volume (Read Only)	This parameter displays the actual maximum volume that has been calculated by the NivuCompact. P607 = P604 x P606	0.0
P610 -P641 Linearisation	0 – 9999	16 break points (adjustable only via PC)	0

DiSP	**Display Menu**		
P800 Units	1 = Units (P104) 2 = Percentage	This parameter determines whether the reading displayed is in **Measurement Units** (**P104**), or as a **percentage of span.**	1
P801 Decimal Places	0 – 2	This parameter determines the number of decimal places on the reading during run mode.	2
P808 Fail-safe Mode	1 = Known 2 = High 3 = Low	Remain at the last **known** value Will fail to the **high** value (100% of Span). Will fail to the **low** value (empty)	1
P809 Fail-safe Time	1-9999 (mins)	In the event of a fail-safe condition occurring the fail safe timer determines the time before fail-safe mode is activated.	2
LOOP	**mA Output Menu**		
P834	0 – 9999	This parameter sets the distance, level or space at 4 mA.	0.00
P835	0 – 9999	This parameter sets the distance, level or space at 20 mA	3.00 (3m) 6.00 (6m) 10.00 (10m)
P838	0 – 9999	fine adjustment 4 mA	0
P839	0 – 9999	fine adjustment 20 mA	0
P840 Output behaviour of mA output in case of error	0 = P808 1 = Hold 2 = 3,5 mA 3 = 22 mA	mA output will fail as per **P808**. mA output will retain its last known value. mA output will fail to its **low** condition. **3.5mA** mA output will fail to its **high** condition. **22mA**	0
P842 Voltage Output	0 = 0 – 5 V 1 = 0 – 10 V	The voltage output will be **scaled automatically** to represent the **Span** (P106) where 0 V represents 0% (**empty**) and maximum voltage 5 V /10 V = 100% depending on selected range (in case of error the voltage output will behave as per P808)	0
P35	0 – 9999	Trim low mA value in case of error (can be set via PC only)	0
P36	0 – 9999	Trim high mA value in case of error (can be set via PC only)	0

COP	**Compensation Menu**		
P851 Offset	0-9999	The value of this parameter is added to the measured distance, in **Measurement Units** (**P104**) and affects display, analog output as well as relay setpoints.	0
P852 Temp. source	1 = Internal 3 = Fixed P854	Temperature source for ultrasonic evaluation.	1
P854 fixed Temp.	0 – 9999	Fixed Temperature in °C (if P852 = 3)	20.0
P860 Velocity of sound	0 – 9999	To enter velocity of sound in m/sec. at 20 °C, according to the atmosphere the sensor is operating in. (air = 344,1 m/sec)	344.1
P645	0 – 9999	Sound velocity compensation in cm/°C	60
P857	0 – 9999	Temperature offset in °C (possible only via PC)	0.0
StA	**Stability Menu (Damping)**		
P870 Damping	0-9999	Enter damping at increasing level. Unit (P104) / minute	10.0
P871 Damping	0 – 9999	Enter damping at decreasing level. Unit (P104) / minute	10.0
P881 Measurement window	0,1 – 1 m	Width of Measurement window. Unit (P104)	0.2 m
SyS1	**System Menu**		
P921 Passcode	0 = OFF 1 = ON	Turn password request on or off	1
P922 Passcode	0000 – 9999	Change passcode, Attention: access to NivuCompact by using this password only!	1997
P926	Read Only	Displays the current software revision	
P928	Read Only	Displays the serial number of the unit	
P930 Reset	0 = Not in use 1 = Parameter reset	Resets all parameter values to the original Factory Set values (excluding P838+P839)	0
P020	0 = Not in use 2 = Reset threshold characteristic	Reset the threshold characteristic to default value	0
P021	0 – 9999	Put the threshold characteristic from sensor face to distance entry (in P104 units)	0.00

tESt	**Test Menu**		
P991 Relay test and Display test	▲ = Relay 1 ▼ = Relay 2 ► = Display ◄= finish Test	Press the >UP< button for Relay 1 (ON or OFF) Press the >DOWN< button for Relay 2 (ON or OFF) Press the ENTER button to start the Display test. All the segments on the LCD and the backlight are lit up(8.8.8.8), so you can see if they all work. Press the **ENTER** button again, to test keypad. You should press each button from the right to the left. If the test was successful „PASS“ will be indicated. If the test was not, then >Err< is displayed. Exit the hardware test with the >ESC< key.	0
P992 mA-Test	0 – 9999	mA Out Test Value entry between 4.00 mA and 20.00 mA. Confirm with ENTER. The figure you enter will be generated by the mA output.	0.00

To exit the parameter setting mode press >ESC< several times until the display indicates „run“. Pressing the >ENTER<-key subsequently will take you to operation/measurement mode again.

10 Troubleshooting

Symptom	Possible Reason	Correction
	2-wire operation	- Check power supply - Check if a minimum loop current of 3.8 mA at 11 V DC clamp voltage is available. - Decrease load resistance
	3/4- wire operation	- Check connection wiring - Check power supply
Empty display	Echo loss	- Sensor perpendicular to material surface? - Measurement range exceeded - Measurement range undershot - Check parameter (P105,P106,P107 and P108) - Clean sensor surface - Remove obstructive constructions underneath NivuCompact Execute reset (P930 = 1)
Password not accepted	Wrong pass code	- Enter the correct password - Password unknown? →Send unit to NIVUS.
Password not accepted Faulty values on analog output	Key pad not working	- Check if hotkey functions are available - Send NivuCompact to NIVUS for inspection
	Parameter setting	- Check if parameter settings are correct - Perform analog output test - Execute reset (P930 = 1)
Faulty values on analog output Relays do not energise/de-energise	Interface	- remove connected interface cable
	load	- Perform analog output test - Observe max. permissible load - Max. permissible load has been observed, however output current is still incorrect? → send unit to NIVUS for inspection
	2-wire operation	- Rewire for 3/4-wire operation
Relays do not energise/de-energise Unit cannot detect the correct measurement spot	3-wire operation	- Activate relays via parameter - Check connection wiring - Change from parameter mode to operation mode - Check power supply
	False echo	- Check parameter settings - Remove obstructive constructions underneath NivuCompact - Enter correct distance between sensor bottom edge and measurement spot in P21
Parameter entry not accepted	Wrong parameter entry	- Consult parameter list for correct parameter settings - Enter parameters in correct range of values - Enter required parameter values before
>Pd< on display (Power down)	Supply voltage too low	- Check power supply - Check connection wiring - Remove communication cable

11 Table of Resistiveness

Some combinations of chemical ambient conditions as well as temperature situations and tension may have negative effects on thermoplastic Polymers. This is why any lubricants, cleansing solutions or other substances which might be contacting the equipment initially need to be checked regarding compatibility. The short-term chemical resistance of semi-crystalline materials normally is well. Semi-crystalline Valox types stand out for their remarkable resistance against a wide variety of chemical substances including aliphatic hydrocarbon, petrol / gasoline, oil and grease, diluted acids and bases, clean-sing agents and most watery saline solutions at room temperature. The table >Chemical resistance of Valox®< shows a comparison between the chemical resistance of the different Valox types. The classification is based on immer-sion tests executed with sample rods which have been manufactured under controlled conditions. The specifications mentioned below are conceived as an indication of the resistive-ness of the complete moulded part. In all cases we recommend to test the application under actual operational conditions.

Bad ⊖ **(not resistant)**	**Fairly good** ⊙ **(resistant to a limited extent)**	**Very good** ⊕ **(resistant)**
- leads to failure or heavy corrosion	- only for short-term exposure at low temperatures or if loss of mechanic properties is not too critical. Very good under normal conditions.	- long-term exposure may result in slight loss of properties - higher temperatures may lead to loss of essential properties

Chemical resistance of VALOX®

Hydrocarbon	aliphatic	⊕ acceptable
	aromatic	⊕ acceptable
	completely halogenated	⊖ not recommended
	partly halogenated	⊖ not recommended
Alcohols		⊕ acceptable
Phenol		⊖ not recommended
Ketones		⊙ conditionally resistant
Ester		⊙ conditionally resistant
Ether		⊕ acceptable
Acids	inorganic	⊕ acceptable
	organic	⊙ conditionally resistant
	oxygenate	⊖ not recommended
Alkali		⊖ not recommended
Car liquids		⊖ not recommended
lubricants (non-reactive, organic Ester)		⊕ acceptable
Oils (unsaturated aliphatic alloys)		⊕ acceptable
Waxes (heavy oil)		⊕ acceptable
Petrol / gasoline		⊕ acceptable
Coolant solution (Glycol)		⊕ acceptable
Break fluid (heavy alcohols)		⊕ acceptable
Cleaning agent		⊕ acceptable
Water, hot (> 80°C)		⊖ not recommended

Chemical resistance of Polyvinylidenfluoride (PVDF)

mineral lubricants	⊕ acceptable
aliphatic Hydrocarbon	⊕ acceptable
aromatic Hydrocarbon	⊕ acceptable
Petrol / gasoline	⊕ acceptable
weak mineral acids	⊕ acceptable
Sharp mineral acids	⊕ acceptable
weak organic acids	⊕ acceptable
Sharp organic acids	⊕ acceptable
oxygenate acids	⊙ conditionally resistant
weak leaches	⊕ acceptable
Sharp lye	⊖ not recommended
Trichloroethylene	⊕ acceptable
Perchlorethylene	⊕ acceptable
Acetone	⊖ not recommended
Alcohols	⊕ acceptable

12 Maintenance and Cleaning

Due to using the measurement system mostly in the waste water field which may be contaminated with hazardous germs, please ensure to take respective precautions getting in contact with system, transmitter, cables and sensors.

The device Type NivuCompact is designed to be virtually maintenance-free and free of material wear.
If required clean the transmitter enclosure if with a dry, lint-free cloth. For heavy pollution NIVUS recommends the use of surface-active agents.
The use of abrasive cleansing agents is not allowed.

If you wish to clean the unit with a dry cloth there is a risk of electrostatic charging of the enclosure with the risk of spark formation in case of being touched.
This will result in increased danger of explosion!

13 Emergency

In case of emergency

- press the emergency-off button of the superordinate system

14 Dismantling/Disposal

The device has to be disposed according to the local regulations for electronic products.

15 Table of Pictures

16 Index

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	**Kompaktecholot NivuCompact 3, 6, 10**
Description:	*Compact echo sounder*
Désignation:	*Capteur compact á traitement d´écho*
Typ / Type:	**NMC0P03…/…06…/…10…**

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:

nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

- 2014/30/EU
- 2011/65/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug auf die nachfolgend genannten anderen technischen Spezifikationen:

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013
- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

abgegeben durch / *represented by / faite par:*

Ingrid Steppe (Geschäftsführerin / *Managing Director / Directeur général)*

Eppingen, den 21.10.2022

Gez. *Ingrid Steppe*

UK Declaration of Conformity

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

For the following product:

Description:	**Compact echo sounder NivuCompact 3, 6, 10**
Type:	**NMC0P03…/…06…/…10…**

we declare under our sole responsibility that the equipment made available on the UK market as of the date of signature of this document meets the standards of the following applicable UK harmonisation legislation:

- SI 2016 / 1091 The Electromagnetic Compatibility Regulations 2016
- SI 2012 / 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

- BS EN 61326-1:2013
- BS EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

This declaration is submitted on behalf of the manufacturer:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

represented by:
Ingrid Steppe (Managing Director)

Eppingen, 21/10/2022

Signed by *Ingrid Steppe*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	**"Ex" Kompaktecholot NivuCompact 3 i.s., 6i.s., 10 i.s.**
Description:	*"Ex" Compact echo sounder*
Désignation:	*"Ex" Capteur compact á traitement d´écho*
Typ / Type:	**NMC0P03xE / NMC0P06xE / NMC0P10xE**

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:

nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

- 2014/34/EU
- 2014/30/EU
- 2014/35/EU
- 2011/65/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug auf die nachfolgend genannten anderen technischen Spezifikationen:

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN IEC 60079-0:2018
- EN 60079-11:2012
- EN 61326-1:2013
- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

Ex-Kennzeichnung */ Ex-designation / Marquage Ex* : Ⓔx II 1G Ex ia IIC T4 (T_{amb} =-40°C to +80°C)

EU-Baumusterprüfbescheinigung / *EU-Type Examination Certificate / Attestation d'examen «UE» de type:*

Sira 06ATEX2161X Issue: 1

Benannte Stelle (Kennnummer) / *Notified Body (Identif. No.) / Organisme notifié (№ d'identification)*

CSA Group Netherlands B.V., Utrechtseweg 310, Building B42, 6812AR, Netherlands (2813)

Qualitätssicherung ATEX / *Quality assurance ATEX / Assurance qualité ATEX:*

TÜV Nord CERT GmbH, Am TÜV 1, 45307 Essen, Germany (0044)

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

abgegeben durch / *represented by / faite par:*

Ingrid Steppe (Geschäftsführerin / *Managing Director / Directeur général)*

Eppingen, den 21.10.2022

Gez. *Ingrid Steppe*

UK Declaration of Conformity

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

For the following product:

Description:	**"Ex" Compact echo sounder NivuCompact 3 i.s., 6i.s., 10 i.s.**
Type:	**NMC0P03xE / NMC0P06xE / NMC0P10xE**

we declare under our sole responsibility that the equipment made available on the UK market as of the date of signature of this document meets the standards of the following applicable UK harmonisation legislation:

- SI 2016 / 1107 The Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016
- SI 2016 / 1091 The Electromagnetic Compatibility Regulations 2016
- SI 2016 / 1101 The Electrical Equipment (Safety) Regulations 2016
- SI 2012 / 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

- BS EN IEC 60079-0:2018
- BS EN 60079-11:2012
- BS EN 61326-1:2013
- BS EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

Ex-designation: ⟨Ex⟩ II 1G Ex ia IIC T4 (T_{amb} =-40°C to +80°C)

EU-Type Examination Certificate: Sira 06ATEX2161X Issue: 1

Notified Body (Identif. No.):

CSA Group Netherlands B.V., Utrechtseweg 310, Building B42, 6812AR, Netherlands (2813)

Quality Assurance Ex:

TÜV Nord CERT GmbH, Am TÜV 1, 45307 Essen, Germany (0044)

This declaration is submitted on behalf of the manufacturer:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

represented by:
Ingrid Steppe (Managing Director)

Eppingen, 21/10/2022

Signed by *Ingrid Steppe*

1 **EU TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 06ATEX2161X** Issue: **1**

4 Equipment: **Nivu Compact 3 i.s., 6 i.s. and 10 i.s. Loop Powered Ultrasonic Level Measurement Devices**

5 Applicant: **Nivus GmbH**

6 Address: Im Tale 2
D-75031 Eppingen
Germany

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 CSA Group Netherlands B.V., notified body number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 plus Amendments 1 and 2 EN 50020:2002 EN 50284:1999

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 1 G
EEx ia IIC T4 (Tamb = -40°C to +80°C)

* Due to restrictions applied by the applicant some products that are detailed in this certificate may not be commercially available.

Project Number 80066900

Signed: J A May

Title: Director of Operations

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR, Netherlands

SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 06ATEX2161X**
Issue 1

13 **DESCRIPTION OF EQUIPMENT**

These ultrasonic level measuring devices are designed as 4-20 mA, loop powered, level measurement sensors that are used in level measurement systems. The sensors in the series differ only in the size of transducer crystal, the Ping board population and the housing. They comprise two printed circuit boards and a piezo electric crystal transducer; these are all housed inside a plastic enclosure and then totally encapsulated. The devices also have an unencapsulated display board and keypad. A terminal block provides the connection facilities to the external circuits. The models included in the range are described as follows:

Nivu Compact 3 i.s. (the numbers 3, 6 and 10 relate
Nivu Compact 6 i.s. to the maximum measurable
Nivu Compact 10 i.s. distance in metres)

The ultrasonic level measuring devices have been assessed with the following input parameters:

Ui = 28 V
Ii = 162 mA
Pi = 1.03 W
Ci = 0
Li = 0

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	26 June 2006	R51A14887A	The release of the prime certificate.
1	21 December 2020	R80066900A	This Issue covers the following changes: • EC-Type Examination Certificate in accordance with 94/9/EC updated to EU-Type Examination Certificate in accordance with Directive 2014/34/EU. *(In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC-Type Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)]* • Transfer of certificate Sira 06ATEX2161X from Sira Certification Service to CSA Group Netherlands B.V..

14.3 Certificate number Sira 06ATEX2014X dated last amended 03/03/06.

15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)

15.1 Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, when it is used for applications that specifically require group II, Category 1, zone 0, equipment, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment shall only be cleaned with a damp cloth.

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR, Netherlands

SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 06ATEX2161X**
Issue 1

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF MANUFACTURE**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of CSA Certificates.

17.2 Holders of EU-Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.

17.3 This product shall be uniquely marked with the label identified in section 14.1 of this certificate.

17.4 The applicant shall only market those products that may be marked with this certificate number, as identified by the drawings listed in section 14.1 of this certificate.

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR, Netherlands

Certificate Annexe

Certificate Number: **Sira 06ATEX2161X**

Equipment: **Nivu Compact 3 i.s., 6 i.s. and 10 i.s. Loop Powered Ultrasonic Level Measurement Devices**

Applicant: **Nivus GmbH**

Issue 0

Drawing No.	Rev.	Sheet	Date	Title
D-804-0697-A	1 of 1	-	26 Jun 06	Nivu Compact i.s. wraparound label detail
D-804-0698-A	1 of 1	-	26 Jun 06	Nivu Compact i.s. Internal Wiring Label

Issue 1 – No new drawings were introduced.

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR, Netherlands