

Instruction Manual

HBPH-C1 – pH display



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Safety Instructions

CAUTION! Always read the instruction manual before commencing work! Heed all warnings. Installation and use of the controller may only be carried out by adequately qualified individuals. The operator must be aware of the consequences of setting up the controller incorrectly. Factory settings do not guarantee safe operation since the configuration parameters depend on the type of system.

If changes are made to type-approved equipment, this type approval becomes void. The equipment's inputs and outputs as well as its accessories may only be connected as shown in this guide. HB Products assumes no responsibility for damages that result from failing to abide by the above.

Explanation of symbols: In this instruction manual, the following symbol is used to indicate important safety instructions to the user. The symbol will always appear when the information is necessary. The safety instructions, and particularly the warnings, must always be read and adhered to.

	CAUTION! Refers to threats to system components or a possible limitation of functionality. NOTE! Contains important further information about the product and provides additional tips. It is found in instructional documents describing the correct execution of a certain action. In this context, the head of operations is urged to abide by all the mandatory regulations, to avoid accidents and do everything possible to prevent damage to people and materials in the situation in question.
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Intended use and terms of use: HBPH-C1 level controller is designed to continuously measure and regulate refrigerants in industrial refrigeration systems. If you want to use HBPH-C1 for a different purpose, and if you evaluate that it will not be able to function without problems in this capacity, then prior permission must be obtained from the manufacturer.

Prevention of collateral damage: Make sure that faults are assessed, and relevant precautions are formulated by qualified personnel. In this way, you will prevent collateral damage from the HBLT-C1, which would result in damages to persons and materials.

Environmentally correct behaviour and disposal instructions: HBPH-C1 is also built according to environmentally correct behaviour. The modules can easily be disassembled to allow sorting and are sent for recycling after sorting.

Introduction

HBPH-C1 work together with the pH sensor HBPH mk2 and is designed to monitor the pH level in brine circuits. The display shows the current pH value and has a built-in alarm function.

The display has a 4-20 mA output as well as a digital alarm output. It is delivered in two versions, one for installation in a front panel, and a built-in version delivered with a cabinet and a power supply.

Design

The display can be configured for the variations in application that occur in industrial refrigeration systems. Set-up is carried out using a simple menu system with buttons on the front. The measured value can also be read from a 3-figure display on the front of the component.



Software

The display is supplied with a microprocessor-based design. It is always delivered with the newest software. We continuously develop our products and so there may be changes in the software. The controller cannot be updated after delivery. The controller is designed with a simple menu structure that does not allow for resetting to factory settings. The actual software version can be viewed in the display by pushing on [UP] and [DOWN] at same time.

Technical Data

	HBPH-C1	HBPH-C1-ENC
Supply:		
Voltage	24 V AC/DC $\pm$ 10 %	100..240 V AC or 24 V AC/DC $\pm$ 10 %
Frequency	50/60 Hz	50/60 Hz
Current draw	Max 40 mA	Max 1.5 A
Connection	Screw terminal	Screw terminal
Wire size	< 2,5 mm ²	< 2,5 mm ²
Installation conditions :		
Surrounding temperature	-20...+70°C	-20...+70°C
Protection class	IP45	IP65
Relative humidity	20...80 %	20...80 %
Approvals:		
EMC Emission	EN61000-3-2	EN61000-3-2
EMC Immunity	EN6100-4-2	EN6100-4-2
GOST R	No 0903044	
Mechanical specifications:		
Mounting	In front of panel	On wall
External measurement	96x96x94 mm (BxHxD)	298x198x182 mm (BxHxD)
Cut-out measurement	92,8x92,8 mm	N.A.
Material	Plastic	Plastic
Weight	0.2 kg	1.4 kg
Display:		
Digit's display	3 digits, red	3 digits, red
Alarm indication	LED (green og red)	LED (green og red)
Programming	From front	From front
Updatting	1 time each second	1 time each second
Valve position indication	5 x LED	5 x LED
Input:		
Analogue input - sensor	4-20 mA	4-20 mA
Analogue input – valve feedback	4-20 mA	4-20 mA
Alarm – max level	Relay – 5...25 V DC	Relay – 5...25 V DC
Output:		
Analogue output	4-20 mA	4-20 mA
Load	3A/24 VDC	3A/24 VDC
Relay output	@24VAC/VDC: 3 x 3A	@24VAC/VDC: 3 x 3A
	@110 VAC: 3 x 5A	@110 VAC: 3 x 5A
	@220 VAC: 3 x 5A	@220 VAC: 3 x 5A



NOTE! All terminals are protected against wrong termination up to a supply voltage of 40V. If the supply voltage is greater than 40V, the electronics will be damaged.



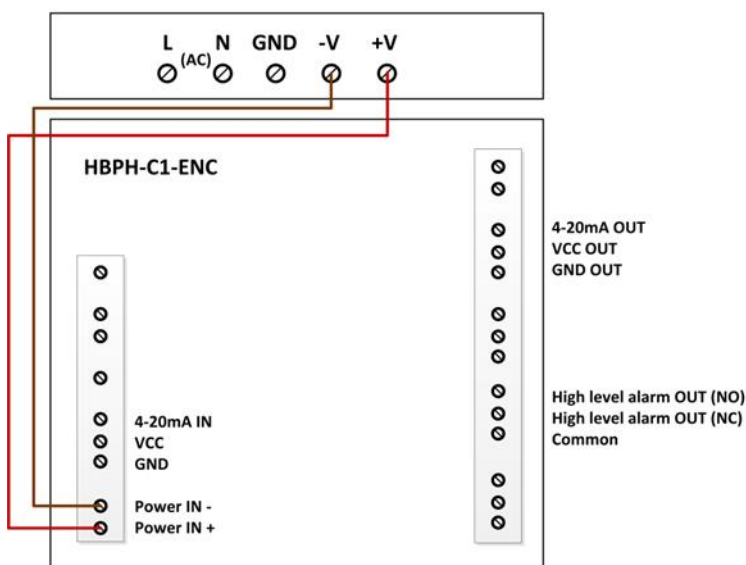
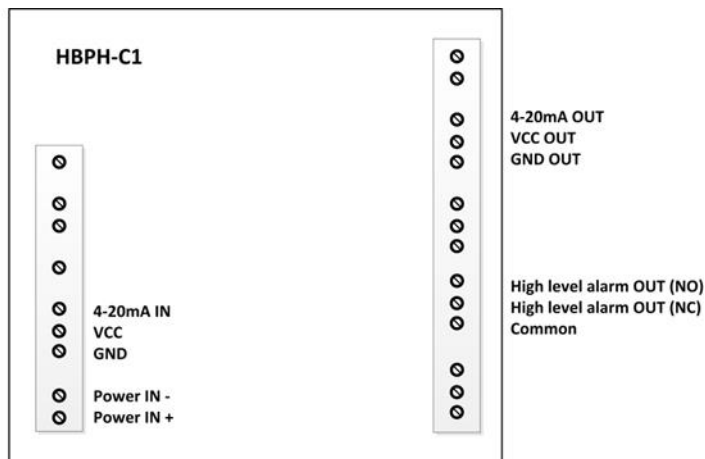
NOTE! Avoid direct sunlight, heavy dust, or heat. Do not expose the instrument to rain or strong humidity from ammonia vapour or other corrosive refrigerants.

Installation Instructions

The following applies to the design of the panel:

- 1) It must be installed on the front of the panel. The front is designed with protection class IP54. Rear facing electronics are designed in protection class IP45.
- 2) The instrument is placed at eye-level to make set-up and reading as easy as possible. Be careful with sunlight from windows as it can affect the reading on the display.
- 3) It is installed with a standard cable without insulation. If EMC from other sources of noise is greater than described in EN 6100-6-2, an insulated cable must be used.

Electrical Connection



The cabinet has a built in power supply which is supplied with 100 to 240V AC alternatively the display can be supplied with 24V AC or DC

Terminal	Description
Power IN – 24 V AC/DC	Supply voltage to the controller
Sensor input	Input from the sensor, e.g. HBLT-A1
High level – alarm out	High level alarm in the vessel
Pump	Signal to start the pump

Fitting Instructions

HBLT-C1 is fitted on the front of the panel. A 92.8 x 92.8 mm hole must be cut.

The module is fitted in a panel cut-out on the front of the panel. Mounting brackets (2 units) are placed on the side of the module, and the module is secured with the 2 screws.



LED Indication

The buttons have the following functions:

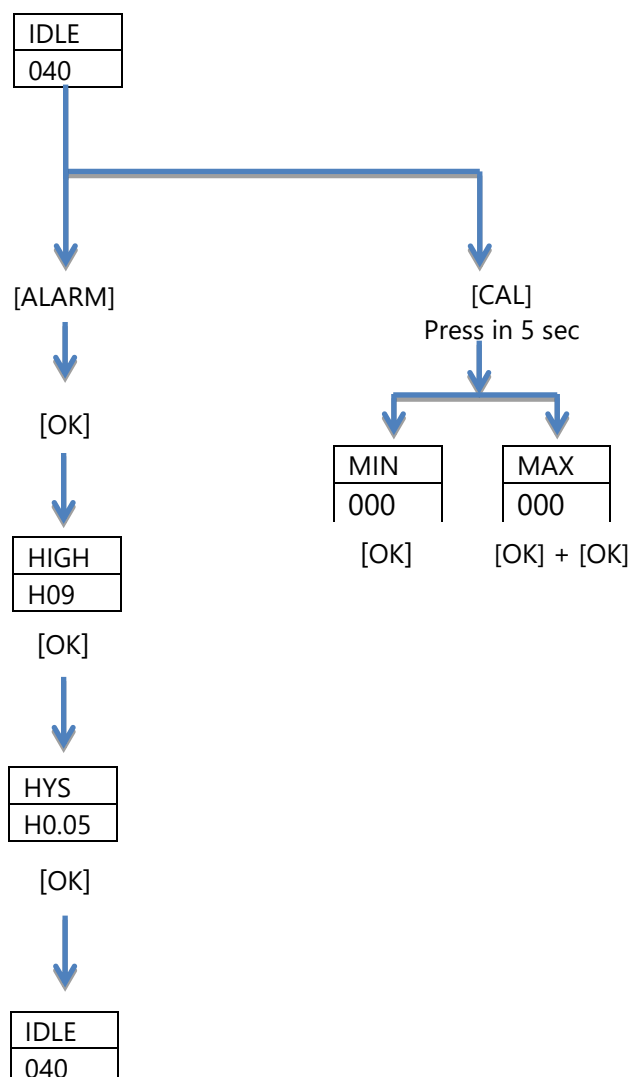
- [ALARM] : Provides access to alarm level: low level, high level, as well as pump level and hysteresis
- [CAL] : Provides access to minimum and maximum calibration
- [OK] : Confirms/saves data and functions as return/forward to the next function.
- [↑] : Changes the parameters in a positive direction with +1 for each click, or through its scroll function by holding the button down.
- [↓] : Changes parameters in a negative direction with -1 with each click, or through its scroll function by holding the button down.



The LED lamps have the following functions:

- RUN [green LED]: Indicates when the controller is in operation
- ALARM LOW [red LED]: Indicates a low level
- ALARM HIGH [red LED]: Indicates a high level
- PUMP [green LED]: Indicates pump function
- VALVE [5 x yellow]: Indicates valve position

Menu flow chart:



3-digit display:

Displays setpoint, programming parameters, as well as information to help navigate the display.

Display	Parameter	Units	Min	Max	Factory settings
Display parameters					
pH level		pH	0	14	xx
Alarm parameters					
High level	Hxx	pH	0	14	10



NOTE! If [↓], [↑] or the [OK] button is not pressed within 10 seconds, automatic calibration mode is exited automatically.

Alarm Mode:

By pushing ALARM mode one gains access to setting up the following alarms, with corresponding hysteresis:

- HIGH = high level (Hxx)
- Hysteresis HIGH

[OK] is used to move forward in the menu.

Calibration:

[CAL] provides access to 2-point calibration. A 2-point calibration can be carried out on two randomly selected points from 0-100%. Based on these two values, the controller itself calculates the sensor's full scale and 0-point.

You can access calibration by pressing [CAL] for 5 seconds. The RUN lamp is shut off and the red LED button in CAL is turned on when you have gained access to the calibration function.

The min/max calibration values are set with the up and down arrow function, and then confirmed with:

- A) Min. calibration is confirmed by pressing the [OK] button once = [OK]
- B) Max. calibration is confirmed by pressing the [OK] button twice = [OK] [OK]

After calibration and activation with [OK], ten seconds will pass before it automatically reverts to normal operation. This is repeated for min. and max. respectively.

Error Detection

Error	Cause	Error diagnostics
No light in the display and no LED lamps activated	No power to the unit or the wrong voltage	Measure the power on 24 V input terminals.
There is no change in display	1) Defective cable from sensor 2) Defective sensor 3) Wrong min./max. calibration.	1-2) Check the sensor. See error detection in the sensor's instruction manual. 3) LED on the front of the instrument.
The display shows too low/high level in relation to the actual level in the vessel.	1) The cable is defective or there is no connection to the sensor 2) Calibration is not correct 3) Calibration is not carried out at the operating temperature 4) Sensor not calibrated to the correct refrigerant	1) Measure the signal from the sensor 2) Calibrate the controller 3) Calibrate at operational temperature 4) Calibrate the sensor. Look at the sensor's instruction manual.
The display flickers or is unstable	1) Loose connection in the power supply or the sensor 2) EMC interference from mobile telephones, frequency converters, or other equipment that does not meet the legal requirements for EMC.	1) Check for loose connections 2) Check the equipment that is causing flickering 3) Install insulated wire from the sensor to the operator.

Repairing the Controller:

If repairs are required, the following procedure must be followed:

Go to www.hbproducts.dk and access the menu called "support – product return". Input all the information into the RMA form and receive an RMA-number. Print out the form and send it in together with the sensor. Following this procedure ensures quick processing.

Please fill out one form per product type. Return the product to the nearest agent. The addresses of our agents can be found on our website.

Further Information

For further information please visit our website www.hbproducts.dk or send an email to support@hbproducts.dk

HB Products A/S – Bøgekildevej 21 – DK8361 Hasselager – support@hbproducts.dk – www.hbproducts.dk