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**Universal Flow Computer**

**URS-09**

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**Operating Manual**



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## Foreword

### I. Transport, delivery, storage

Equipment shall be protected from moisture, humidity, contamination, shock and damage.

#### Check of delivery:

The shipment is to be checked for completeness upon receipt. The data of the device are to be compared with the data of the delivery note and the order documents.

Any transport damage must be reported immediately after delivery. Damage reported later cannot be accepted.

### II. Warranty

The scope and period of a warranty can be found in the contractual delivery conditions.


A warranty claim presupposes professional assembly and commissioning in accordance with the operating instructions valid for the device. The necessary assembly, commissioning and maintenance work may only be carried out by competent and authorized persons.

### III. General safety instructions

1. The URS09 universal calculator is a highly accurate and reliable quantity measuring device. It may only be used in accordance with its intended purpose. The temperature application limits listed in the operating instructions as well as the other technical data of the devices and safety instructions must be observed during installation, commissioning and operation of the devices.
2. National and international regulations for the operation of electrical equipment and systems must be observed.
3. Before installation, the operator must ensure that the URS universal computer system has not been damaged during transport.
4. The equipment must be installed, operated and maintained by qualified personnel. The operator is responsible for ensuring that the personnel are sufficiently and appropriately qualified. In cases of doubt, the manufacturer must be consulted.
5. The URS universal flow computer system may only be installed and operated in a safe area.

### IV. Basic safety information

Description of symbols:

	<p><b>IMPORTANT NOTES!</b></p> <p>Please consider these notes carefully to achieve a reliable functional system. The accompanying text contains important information about the product, handling the product or about a section of the document that is of particular importance.</p>
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**WARNING!**

Failure to take the prescribed precautions could result in death, severe bodily injury, or substantial material / product damage.

**V. Intended User**

The intended user is not a general purpose user.



The intended user is not allowed to open, manipulate or dismantle the device.  
The device may be maintained, serviced or opened only by dedicated and qualified service personnel.

## 1. Identification

Manufacturer: Bopp & Reuther Messtechnik GmbH  
 Am Neuen Rheinhafen 4  
 67346 Speyer, Germany  
 Phone: +49 6232 657-0  
 Fax : +49 6232 657-505

Type of product: Universal flow computer

Product name: URS-09

## 2. Area of Application

### Intended use

The URS-09 is used to control valves, pumps, motors or other actuator or recording equipment in a system that are not subject to custody transfer metering. The URS-09 contains a UR06 which assumes the custody transfer relevant role. Various types of volume, mass, flow, pressure, temperature and density transmitters can be connected to the UR06. The measured values and the set parameters are used according to generally acknowledged rules of technology (OIML approval) to form the volume sizes. In order to further process the measured and calculated values, it is possible to transfer the data via variably configurable standard interfaces (RS232, RS485 or Ethernet).

### Warning signs

At the time of delivery, the universal flow computer URS-09 meets the highest technical specifications and is generally safe to operate. It has been tested and left the factory in perfect working order. However, careless or incorrect usage of the universal flow computer can result in hazardous situations.

Therefore, always observe the warning signs.



### Operational safety



The URS-09 must not be used in explosive areas.

The universal flow computer URS-09 meets the following safety criteria which are guaranteed by the UR06 that is contained in the URS-09:

- Safety requirements in accordance with EN 61010-1:2001
- Interference stability in accordance with EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8
- Interference emit in accordance with EN 61326 Class A
- Enclosure protection IP 65

Parameters and counter data are saved in the EEPROM during a power failure.

**Personnel for installation, start-up and operation**

- Only trained personnel who have received authorization from the system owner are allowed to carry out assembly, electrical installation, start-up, maintenance, and operation. They should have read and understood the operation manual and always follow the information contained therein. Incorrect installation and start-up can result in significant measuring errors or damage to the device.
- Always adhere to national regulations.
- Danger of death if the power supply is connected incorrectly.

**Factory setting**

The universal flow computer URS-09 is usually adapted to the customer's requirements. The default configuration of the URS-09 has 8 inputs and/or 8 outputs. More inputs or outputs can be incorporated for larger systems.

See the enclosed configuration data sheet for the set values.

Incorrect alterations to the parameters can result in measuring errors.

**Technical modifications**

In view of technical developments, Bopp & Reuther Messtechnik GmbH reserves the right to make appropriate technical modifications without prior notice.

**3. System Design**

The universal flow computer URS-09 is a state-of-the-art system or loading computer. The URS-09 has a touch panel display, which allows users to view all the relevant measuring and calculation values. It stands out due to its easy handling and menu-guided operation. The operator and the user can enter or change the settings and parameters in the individual screens according to their level of access.

The URS-09 consists of the following components:

- Computer unit UR06 with integrated inputs and outputs (pulse, temperature, pulse outputs, current outputs)
- Touch panel PLC/PC as well as the respective inputs and outputs
- Further input cards for the UR06 and for the PLC (optional)
- Further output cards for the UR06 and for the PLC (optional)

## 4. Input

### 4.1. Measured variables

The measured variables listed below are also available in the UR06 description.

Electrical measured variables:

Current, pulse, frequency, resistance, contact (status)

Physical measured variables:

Temperature, pressure, differential pressure, volume (flow), mass (flow), density

Special feature:

2 independent 24 Bit AD converters for resistance (temperature) and current.

Measured variable	Input parameter
Resistance	Model: PT 100, PT500, PT1000 4-wire measurement Measuring ranges: -100 °C ... 600 °C PT100: -100 °C ... 600 °C PT500: -100 °C ... 500 °C PT1000: -100°C ... 300°C Overload protection: ± 24 V Measuring uncertainty T: 0.1% of MV ± 0.1 K Measuring uncertainty ΔT: 0.1% of MV ± 0.02 K Temperature influence T: 0.0025% / K Temperature influence ΔT: 0.0010% / K Resolution: 24 Bit Measuring rate: approx. 16 / s Sensor break monitoring Sensor current PT 100: approx. 1.8 mA Sensor current PT 500 / 1000: approx. 0.7 mA
Current	Measuring range: 0..0.22 mA Overload protection: ± 24 V Error detection 3.6 mA according to Namur NE43 Measuring uncertainty: 0.01% of MV ± 0.001 mA Temperature influence: 0.0025% / K Resolution: 24 Bit Measuring rate: approx. 16 / s
Frequency Pulse Status	Frequency measurement: 0.1 Hz ...15 kHz Metering: 0 ... 15 kHz Min. measuring time can be set: (0.1...10s) Measuring uncertainty: 0.01% of MV Temperature influence: 0.0025% / K Resolution: 0.001% of MV Switchable hardware filter: Without, 50 Hz (for suppressing contact bounces) Active signals: Voltage Lo (U <sub>S</sub> approx. 1.9/2.2 V) Voltage Hi (U <sub>S</sub> approx. 6.6/7.0 V) Passive signals: O.C, relay, Namur (U <sub>0</sub> approx. 8.5 V; I <sub>S</sub> approx. 1.4/1.8 mA)

## 5. URS-09

The universal flow computer URS-09 from Bopp & Reuther Messtechnik is suitable for custody transfer applications. The preselection counter consists of a custody flow computer type UR06 and a non-custody part that consists of a small PLC with touch screen for operation and control of the necessary components, e.g. valves, pumps, etc. Both components are housed in a compact enclosure. The cable is connected via cable glands. The technical data of the PLC inputs and outputs are listed below.

Working temperature	-10°C ... 50°C
Storage temperature	- 10°C ... 60°C
Climate class	In accordance with IEC 60 654-1 Class B2 / EN 1434 Class C
Air humidity	5 % ... 95%, non-condensing
Degree of protection	Min. IP 54
Voltage supply	115 VAC ...230 VAC; 24 AC or 24 VDC
Electromagnetic compatibility	<p>Interference emit:</p> <ul style="list-style-type: none"> <li>• EN 61326 Class A</li> </ul> <p>Interference stability:</p> <ul style="list-style-type: none"> <li>• Power failure: 20 ms, no influence</li> <li>• Inrush current protection: I max / I n =50% (T50% =50 ms)</li> <li>• Electromagnetic fields: 10 V/m in accordance with IEC 61000-4-3</li> <li>• Conducted HF: 0.15 to 80 MHz, 10 V in accordance with EN 61000-4-3</li> <li>• Electrostatic discharge: <ul style="list-style-type: none"> <li>6 kV contact, indirect in accordance with EN 61000-4-2</li> </ul> </li> <li>• Burst (supply): 2 kV in accordance with IEC 61000-4-4</li> <li>• Burst (signal): 1 kV / 2 kV in accordance with IEC 61000-4-4</li> <li>• Surge (AC supply): 1 kV / 2 kV in accordance with IEC 61000-4-5</li> <li>• Surge (DC supply): 1 kV / 2 kV in accordance with IEC 61000-4-5</li> <li>• Surge (signal): 500 V/1 kV in accordance with IEC 61000-4-5</li> <li>• EN1434-4 Class C</li> </ul> <p>Note: The specified error limits must be observed for continuous interference signals (HF, etc.). Temporary interference signals (burst, discharge, surge, etc.) may result in temporary non-adherence to the error limits and possible malfunctioning; the computer must return to normal operation after eliminating the interference. Keypad must be resistant to oil.</p>
Electrical safety	EN 61010-1:2001
Material	Plastic
Dimensions	380x300x180
Weight	3 – 5 kg depending on the actual design
Measured variable	Input parameter



The following measured variables are measured by the UR06 component contained in the URS-09:

Resistance	<p>Model: PT 100,          4-wire measurement or head transducer ( 4...20 mA)          Measuring ranges: -20°C ... 60°C up to 100°C possible          PT100: -20°C ... 60°C (custody transfer -10...+50°C)          Overload protection: &gt; ± (24 V + 15%)          Accuracy: (relating to the temperature)          Tabs 0.1% of MV ± 0.1 K          ΔT 0.1% of MV ± 0.02 K          Temperature drift: 0.0025% / K          Resolution:          0.01 K (-100°C ... 250°C)          0.03 K ( &gt; 250°C)          Measuring rate: &gt; 2 / s          Sensor break monitoring (also short-circuit monitoring)</p>
Current	<p>Measuring range: 0..0.22 mA          Overload limit: &gt;= 30 mA, no influence on other measured values          Overload protection: &gt; ± (24 V + 15%)          Error detection 3.6 mA and 21 mA in accordance with Namur NE43 (software)          Accuracy: 0.01% of MV. ± 0.001 mA          Temperature drift: 0.0025% / K          Resolution: 0.001 mA          Measuring rate: &gt; 10 / s (0.1 s per channel)</p>
Frequency Pulse Status	<p>Status: &lt;= 50 ms (reaction to status changes)          Min. measuring time can be set: (0.1 s, 1 s, 2 s)          Accuracy: 0.01% of MV          Temperature drift: 0.0025% / K          Resolution: 0.001% of MV          Switchable hardware filter: Without, 50 Hz (for suppressing contact bounces)          Active signals: Voltage Lo (Us approx. 2 V), Hi (Us approx. 9 V)          Passive signals: O.C, relay, Namur (without short-circuit and LB monitoring) approx.: U0 = 8V, Ri,= 1k, Is = 1.5 mA dI = 0.25 mA</p>
Inputs	<p>1x volume measurement 1 or 2 channels. (depending on custody transfer or non-custody transfer requirement)          2 x 2 channel measurement with additional module possible          2x temperature measurement as 4-wire technology (medium temperature, density transmitter temperature) optionally for PT100, PT500 or PT1000</p>

Inputs (digital)	<p>DI1: Sensor 3 of the measuring system  DI2: Sensor 4 of the measuring system  DI3: Sensor 5 of the measuring system  DI4 : ANA (similar to emergency switching off)  DI5 : Ext. release  DI6 : Ext. reset  DI7 : Ext. stop/pause  DI8: Freely programmable (grounding release)</p>
Output variable	Output parameter
Current	<p>Range: 0..0.22 mA, active  Max. load: <math>\geq 500 \Omega</math> (<math>U_0</math> approx. 12V -15 V)  Galvanic isolation among each other and to the basic device  Error signals: 3.6 mA and 21 mA according to Namur NE43  Accuracy: 0.02% of MV <math>\pm</math> 0.002 mA  Temperature drift: 0.005% / K  Resolution: 0.001 mA</p>
Pulse / Status	<p>Type: Open collector, passive, galvanically isolated  Frequency range: 0 ... 100 Hz  Min. pulse width: 5 ms 500 ms settable  <math>I_{max} &gt; 20</math> mA  <math>U_{max}</math>: 24 V + 15%  <math>U_{lmax} &lt; 1.2</math> V + 70 <math>\Omega</math> * I</p>
Outputs	<p>3x freely configurable pulse output (used to activate error messages) 2x  current output (must be allocated to the respective actuating variables)  2x interface: RS232/ Modbus RTU or ASCII, and M-Bus</p>
Outputs (digital)	<p>DO1: V1 valve output 1 = valve between tank and  measuring system  DO2: V2 valve LOW flow  DO3: V3 valve HIGH flow  DO4: P1 (product pump)  DO5: freely programmable      only by B&amp;R  DO6: freely programmable      only by B&amp;R  DO7: freely programmable      only by B&amp;R  DO8: freely programmable      only by B&amp;R</p>

## 6. Operation:

In the individual menus, the touch panel functions (button) can be used to set the parameters, quantities or chambers required for filling and to operate the system, i.e. to put it into operation.

### 6.1. Start screen



Language selection:

The following languages are planned for the time being:  
German, English, French and Spanish

The customer can log in with a transponder or chip card. The customer is then automatically saved as customer XXXXX. This ensures precise identification.

If desired, identification via chip card or transponder can be replaced with identification via a customer number (PIN) specified by the operator.

The operator can use an Excel spreadsheet at his/her PC to allocate the individual chip cards, transponders or customer numbers (PIN) and thus save and update customer data (individual drivers, vehicles, etc.) in this Excel file.

### 6.2. Log in

Please keep your chip on the receptor:

---



Name:

Street:

City:

Telephone:

Vehicle:

Customer no. & pin    read again        

OK

The user has been identified via chip card, transponder or PIN.

### 6.3. Customer-specific selection



Various settings, which the user can alter, have been set in this display based on the actual identification. The total quantity must be entered every time due to reasons of safety. Before exiting this menu, make sure all the status displays on the right-hand side of the screen are green. An error appears if not all the parameters have been met.

License plate :    ABC 1234

Loading Type :    Top    **Bottom**

Number of chambers :    2    +    -

Total :    1500    |

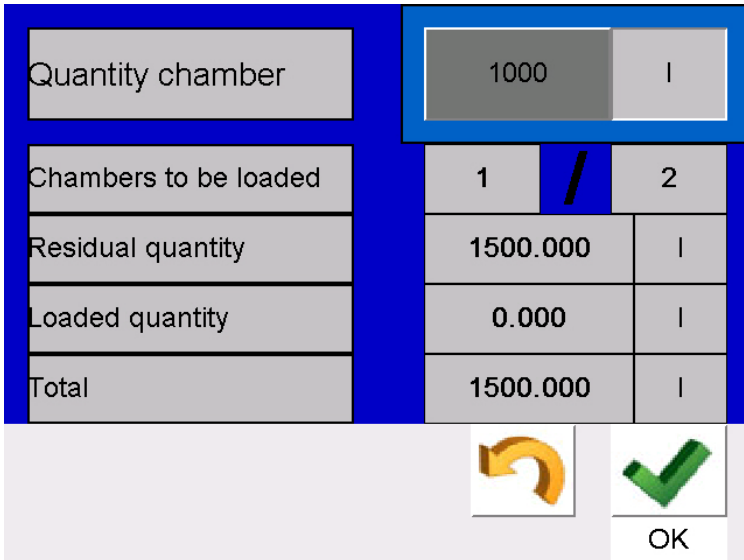
    

OK

All the necessary settings have been set in this display.

Customer-specific level 2

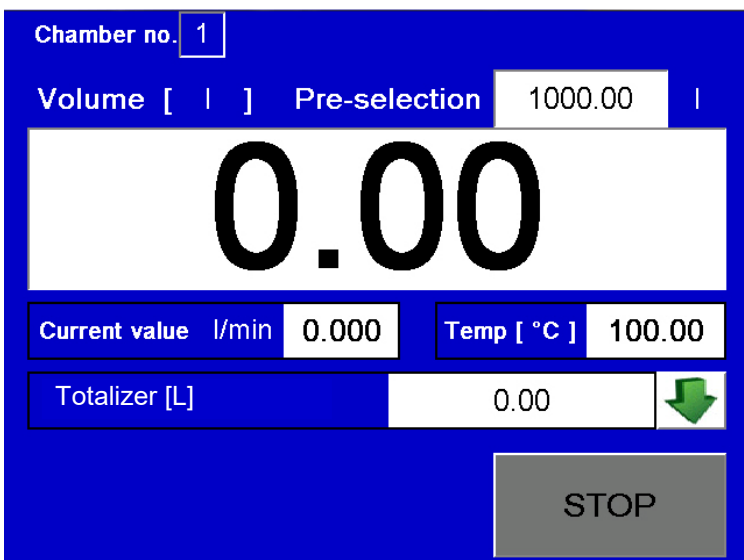
This display shows all the parameters set by the user, allowing him/her to **once again** make sure that all the settings are correct.



The settings in this display are necessary and must be set.

The menu shown below appears in the display once all the filling **requests** have been executed and the filling process has been started. The user can set various quantities in the small display. (Volume V15, mass, etc.)


6.4. Loading procedure



The large display (volume at operating temperature) has been selected in advance and the small window can display the quantity at 15° C or the volume at the operating temperature or the calculated mass.

### 6.5. Loading verification

Upon loading completion, the user is presented with all the parameters, volumes, masses and densities which were either set before loading or which were measured/calculated during loading and then evaluated by the URS-09.

Customer 1	Date	2013-08-21
Driver 1	Time	08:21:48
ABC 1234		
Volume 1	0.000	
V15	0.000	
Temp 1 <input type="checkbox"/>	100.00	°C
Density 1 <input type="checkbox"/>	958.55	kg/m <sup>3</sup>
Error		
Filling no.	50	

Press the “Printer” button to generate a print-out at the delivery note printer and to terminate measuring. The “Without printer” button also terminates measuring. Each filling procedure is stored in the custody transfer computer with: the time, date, relevant quantities and temperature averaged via filling. Up to 7000 filling procedures can be stored on the URS-09 memory. Using the touch panel, these procedures can be readout, displayed and printed out at the delivery note printer at a later date.

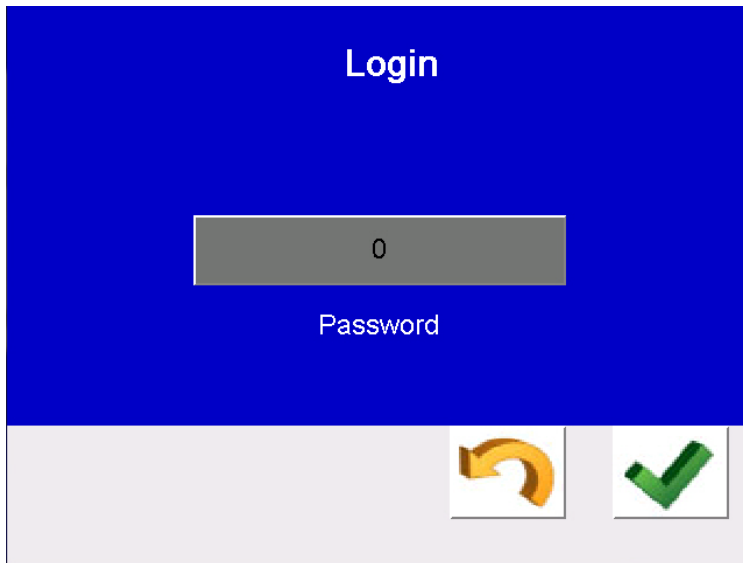
## 7. Programming

### 7.1. Start screen

The following menus have been created for the **operator** and for the **service staff** of Bopp & Reuther Messtechnik GmbH **only**.

On the top left corner of the Start screen is a hidden menu key. The menu key has to be pressed until the login appears.

The operator or service staff must enter a PIN to access this menu. This PIN can be changed by the operator or member of the service staff prior to exiting the assigned menu in the respective level.

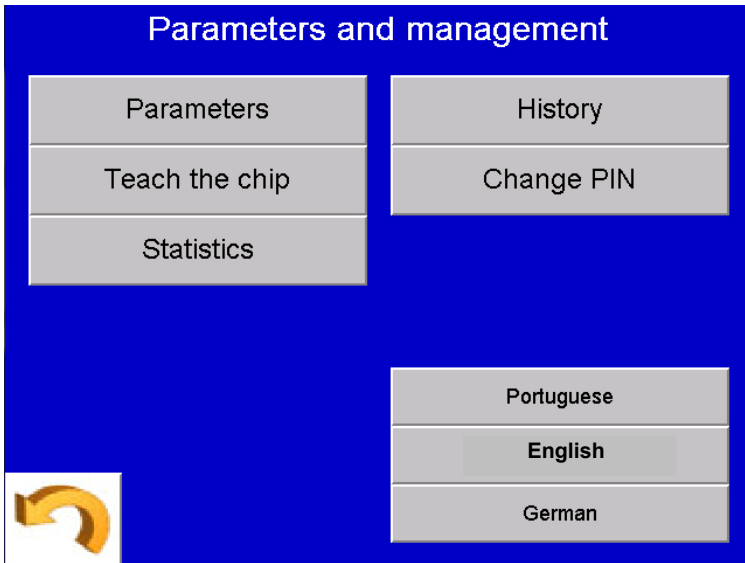


### 7.2 Parameters and administration

In this menu, the operator can change the parameters set by the service staff of Bopp & Reuther Messtechnik GmbH in cooperation with the operator during commissioning.

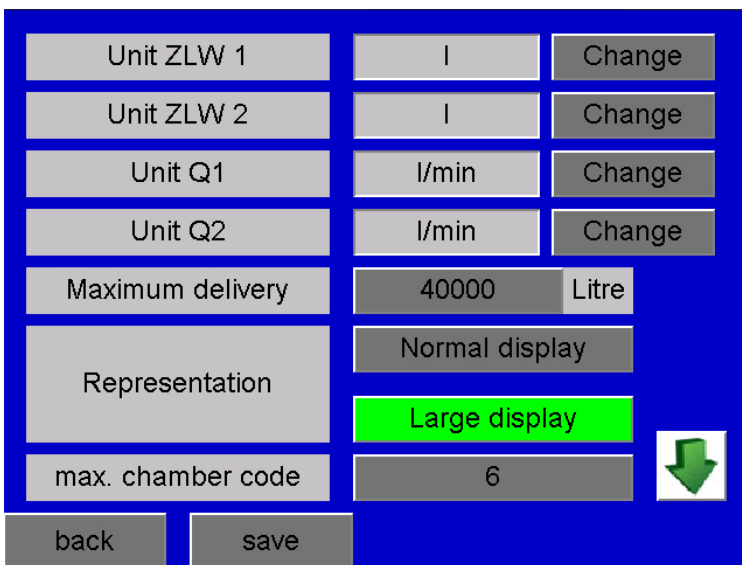
The operator can add new customers or change drivers, vehicles, customers, etc. in the "Parameters and administration" level and the "Teach the chip" button.

The operator can access the loading procedure incidents in the "Statistics" section. For example, it is possible to discover how often which valve has switched.



### 7.3. System-specific data

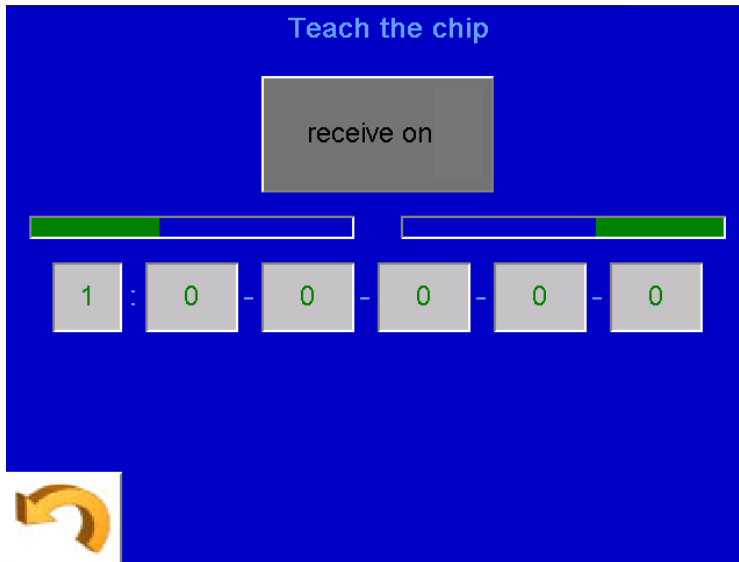
The operator can set system-specific parameters in this level, e.g. approach and off ramp, the units, pre-switch quantity, max. chamber pre-selection for the vehicles with bottom loading, smallest or largest delivery, etc.





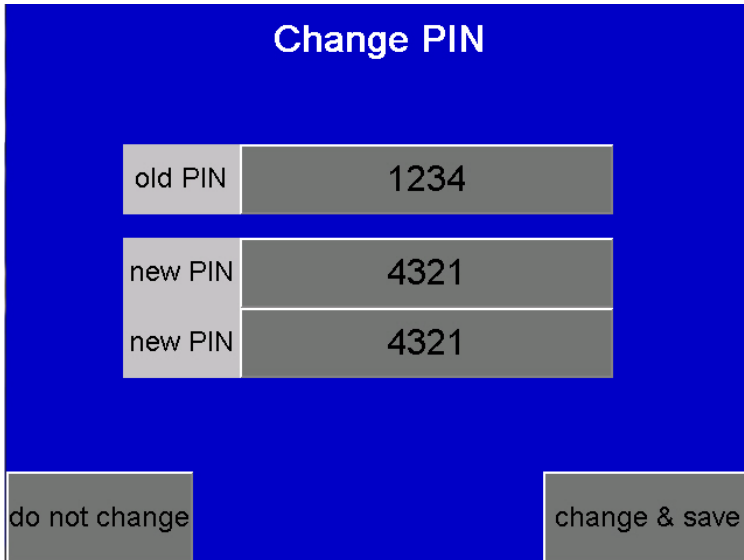
## 7.4. Teach the chip

In the “Teach the chip” level, the operator can program new or added chips or transponders when allocating further transponders, chips or customer numbers (PIN). These chips and transponders then mask the various types of customer-specific data (Excel file)



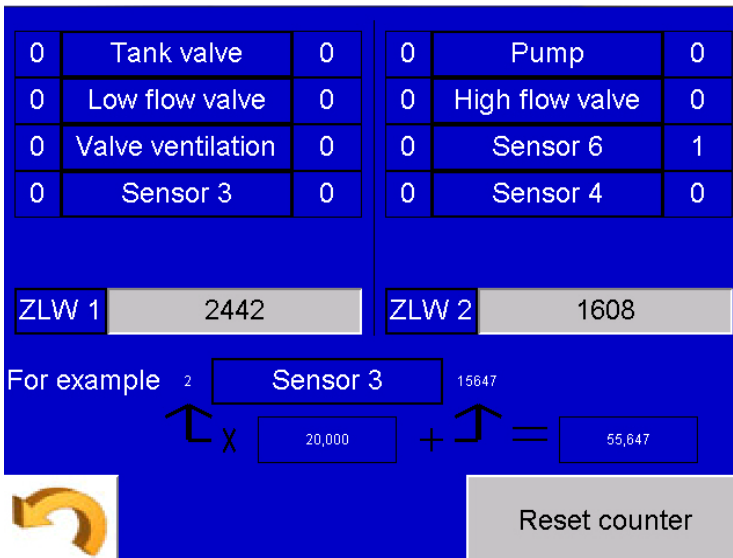
### 7.5. Change PIN

The operator can change PINs within his/her area of responsibility under "Change PIN".



### 7.6. History

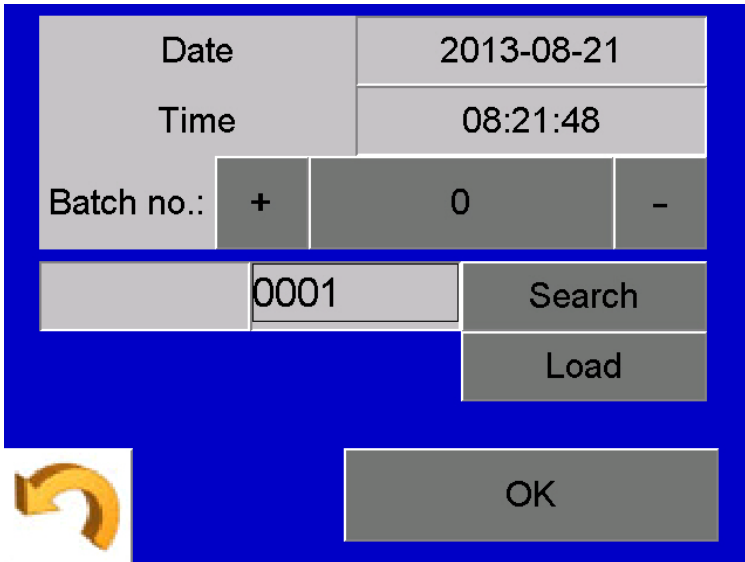
The operator can use this menu to see how often the individual valves installed in the system have switched. Furthermore, the operator can view the total quantity and reset it. The total custody transfer quantity is not affected by the reset, as it has been saved in the UR06 (approx. 7000 batches).



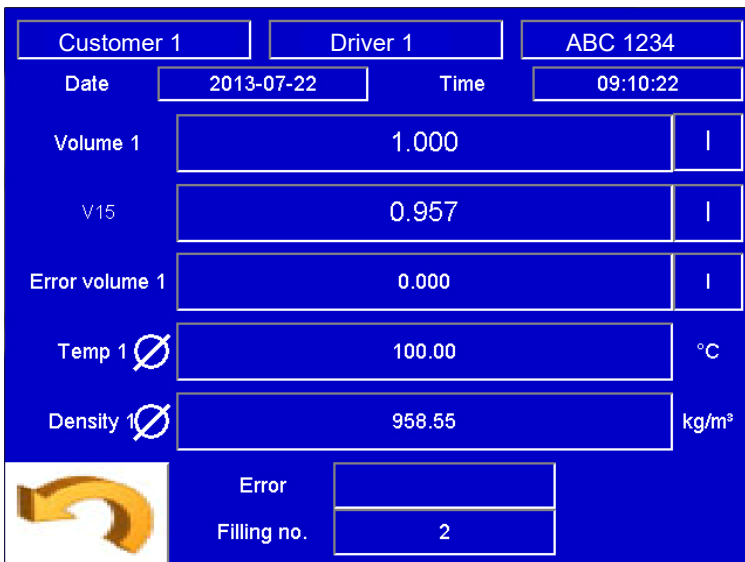
The system-specific parameters can be checked and set again here.

### 7.7. Batch memory

The most recently loaded individual batches can be opened in the batch memory, displayed on the screen and, if necessary, printed out.



If a loading is retrieved from the batch memory, all the relevant data is displayed on the screen, e.g. date, time, quantity at loading temperature, standardized volume, mass, determined temperature via loading, etc.



## A. Certificates

### A.1 EU-Declaration of conformity

BOPP & REUTHER  
MESSTECHNIK 

## EU - Konformitätserklärung EU - Declaration of conformity UE - Déclaration de conformité

Hiermit erklärt der Hersteller in alleiniger Verantwortung, dass die nachfolgend bezeichnete Baueinheit den Anforderungen der zutreffenden EU-Richtlinien entspricht. Bei nicht mit uns abgestimmten Änderungen verliert diese Erklärung ihre Gültigkeit.

*The manufacturer herewith declares under sole responsibility that the unit mentioned below complies with the requirements of the relevant EU directives. This declaration is no longer valid if the unit is modified without our agreement.*

Par la présente, le fabricant déclare sous sa seule responsabilité que les appareils décrits ci-dessous, correspondent aux exigences de la réglementation UE qui les concerne. Toute modification des appareils sans notre accord entraîne la perte de validité de cette déclaration de conformité.

<b>Hersteller</b> <i>Manufacturer</i> Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 67346 Speyer / Germany
<b>Bezeichnung</b> <i>Description</i> Description	Wärmezähler Rechenwerk / Durchfluss Rechner <i>Thermal energy computer / flow computer</i> <i>Calculateur de débit / calculateur d'énergie thermique</i>
<b>Typ, Modell</b> <i>Type, model</i> Type, modèle	ERW 700, 700A, 700C, UR06, URS06, URS09
<b>Richtlinie</b> <i>Directive</i> Directive	2014/30/EU /UE L 96/79 Elektromagnetische Verträglichkeit <i>Electromagnetic interference</i> Compatibilité électromagnétique
<b>Normen und normative Dokumente</b> <i>Standards and normative documents</i> Normes et documents normatifs	EN IEC 61000-6-2:2019 EN IEC 61000-6-3:2021
<b>Richtlinie</b> <i>Directive</i> Directive	2014/35/EU /UE L 96/357 Niederspannung <i>Low voltage</i> Basse tension
<b>Normen und normative Dokumente</b> <i>Standards and normative documents</i> Normes et documents normatifs	EN 61010-1:2010+A1:2019+A1:2019/AC:2019
<b>Richtlinie</b> <i>Directive</i> Directive	2011/65/EU /UE L 174/88 Beschränkung gefährlicher Stoffe <i>Restriction of hazardous substances</i> Limitation de substances dangereuses
<b>Delegierte Richtlinie</b> <i>Delegated Directive</i> Directive Déléguée	(EU /UE) 2015/863 L 137/10 Änderung Anhang II der Richtlinie 2011/65/EU <i>Amending Annex II to Directive 2011/65/EU</i> Modifiant l'annexe II de la directive 2011/65/UE
<b>Normen und normative Dokumente</b> <i>Standards and normative documents</i> Normes et documents normatifs	EN IEC 63000:2018

Ort, Datum / Place, Date / Lieu, Date:

Speyer, 2023-01-30

  
**Dr. J. Ph. Herzog**  
Geschäftsführer  
Managing director / Gérant

  
**i. V. J. Riedl**  
stv. QM Beauftragter  
Deputy QM Officer / Adjoint chargé de la qualité

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Z-ML-KE ERW700-UR06-V3 2023-01-30

**Notes:**

**Notes:**

**Notes:**

## **Our product portfolio:**

### **Volume flowmeter:**

- Oval wheel meter
- Turbine meter
- Electromagnetic flowmeter

### **Mass flowmeter:**

- Vortex meter
- Compact orifice
- Coriolis mass flowmeter

### **Density and concentration meter (Measuring and testing equipment)**

### **Dosing measurement technology**

- Electromagnetic flowmeter
- Coriolis mass flowmeter
- Oval wheel meter
- Dosing control system

### **Measurement Accessories**

- Processing electronics
- Mechanical indicator
- Pulse pick-ups
- Components

### **Measuring and testing equipment**

### **Conformity assessment according to MID Directive 2014/32/EU**

### **After Sales Service**

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